Influences of air substances and meteorological conditions on human health

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For a long time it has been known that exceptionally strong and long-lasting heat waves have negative health effects on the population, which is expressed in an intensification of existing diseases and over-mortality of certain risk groups (Kampa, Castanas 2008). Often associated with heat are stagnant airflow conditions that cause a large increase in the concentration of certain air substances (Ebi, McGregor 2008). Many of these air substances have a strong adverse effect on the human organism (Kampa, Castanas 2008).

The aim of the project is to investigate the actual hazard potential air pollution- and climatological variables by quantifying the effects on human health of increased exposure to air constituents and temperature extremes. Different multivariate statistical methods such as correlation analysis, regression models and random forests, extreme value analysis and individual case studies are used.

As a medical data basis for this purpose, the emergency department data of the University Hospital Augsburg are regarded. In addition to the diagnosis, supplementary information such as age, gender, place of residence and pre-existing conditions of the patients are used. Among the air constituents, the focus is on ozone, nitrogen dioxide and particulate matter. In the meteorological part, the focus is primarily on temperature, which is not only a direct burden but, as in the case of ozone, also has a decisive influence on the formation of ground-level ozone. However, a large number of other meteorological parameters such as precipitation, relative humidity and wind speed as well as the synoptic situation also play a major role in the formation, decomposition process and the distribution of pollutants (Ebi, McGregor 2008).

The first major question to answer is whether air pollution and meteorological stress situations are visible in the emergency department data. Further in-depth questions are which factors have the greatest negative impact, what is the most common environment-related disease, which weather conditions carry a higher than average risk and what are the health risks of climate change.
Ideally, the analysis may also provide a short-term forecast from which to derive whether or not there will be an above or below average number of visits to the emergency department.

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Literature:

