Air pollution policy must be based on indoor and outdoor sources

New research reveals that indoor air pollution is an important indicator of the impact of emissions from an oil refinery on nearby communities. It suggests policies based on outdoor monitoring alone are not sufficient to safeguard health, especially with regards to breast cancer.

The EU Environment and Health Action Plan has identified indoor air pollution as one of its 13 actions. It aims to understand better the link between indoor air quality and health and establish how exposure to pollutants influences various health conditions.

The research was designed on the basis of community health concerns and aimed to inform policy. It studied levels of exposure to a wide range of pollutants, particularly those that are thought to contribute to breast cancer. Dust and air samples were taken from inside and outside 40 homes in an American community that was neighbouring an oil-refinery (fence-line community or FLC). The samples were compared with those taken from 10 homes in a non-industrial community (NIC).

80 compounds were detected outdoors in the FLC and 60 in the NIC. Concentrations in the FLC were generally higher and, compared with previous figures, the levels of nickel and vanadium were among the highest in the state (California). These are known to come from heavy oil combustion and are some of most harmful components of PM$_{2.5}$ (particulate matter less than 2.5 micrometres in diameter).

The study analysed the relationship between indoor and outdoor air pollution. The level of pollutants indoors was much higher than outdoors, indicating that environmental assessments based on outdoor air pollution may be inadequate. Although the air quality standard is not intended to be applied indoors, nearly half of the FLC homes exceeded California’s regulations for PM$_{2.5}$.

Further analysis on the relationship between outdoor and indoor levels indicates that pollutants are penetrating indoors. Examples are sulphates, vanadium and selenium. However, the source of indoor endocrine disrupting compounds (EDCs), particularly di-n-butyl phthalate, is more likely to be from consumer products. Previous research has associated EDCs with breast cancer.

The study is limited by its small sample size and that it sampled each home only once. However, the results suggest that monitoring of both indoor and outdoor air is important and that greater consideration should be given to the impact of local pollution sources on communities. The research was community-based and involved participants in the design. Its results have supported community efforts to block permits for a nearby oil refinery.


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