


# Pincer attack on risk

Epidemiological studies can provide useful information for health-related risk assessment, for example concerning contaminants in fish.





How healthy is fish nowadays? Many people are concerned as contaminants such as dioxins and per- and polyfluoroalkyl substances (PFAS) have been found in fish. The European Food Safety Authority (EFSA) has recently lowered the threshold for both substances. What does that mean for fish as food? An expert team from the Norwegian Scientific Committee for Food and Environment (VKM) took this question as the starting point for a risk-benefit assessment.

The assessment was based primarily on epidemiological research, as presented by the VKM at an international conference on epidemiological studies. The conference, held in Berlin, was organised by the German Federal Institute for Risk Assessment (BfR) and the European Food Safety Authority (EFSA). Such observational studies on humans involve the gene-

ral population or certain population groups, rather than focusing purely on individual cases. These studies help identify possible connections between “end points”, such as disease (for example, heart problems or cancer) or death, and a specific cause (for example, contact with a chemical substance). In this way, it is possible to recognise health effects on the population under actual, real-life conditions.

### THE DOSE MAKES THE POISON

In general, in order to establish how high a risk a potentially harmful substance poses to health, scientists in the field of toxicology – the science of poisons – conduct experiments on animals. These experiments allow scientists to clearly attribute a cause – for example, a chemical – to an effect, such as weakened organ function. Associations between various doses of a substance and certain effects can also be analysed. However, findings based on animals cannot be automatically transferred to humans.

Epidemiological studies, on the other hand, focus directly on humans. Their strength lies in the way they can support hints derived from animal experiments by showing health risks actually observed in the human population. These studies can also identify health risks that are not identified in animal experiments.

### OBSTACLES AND OPPORTUNITIES

The conference in Berlin aimed to deepen the mutual understanding between epidemiology and risk assessment. The use of epidemiological data to assess health risks rarely occurs systematically. The supposed weakness of such studies, namely that they are only seldom able to prove a causal link between substance intake (exposure) and a disease, can even lead to such research being excluded from an assessment despite delivering valuable insights. However, despite the continued existence of barriers, mutual understanding and cooperation between the two fields is growing. “We need valuable epidemiological studies and a deeper understanding of epidemiology in the field of toxicology in order to develop common approaches,” is how BfR scientist Professor Matthias Greiner summarises the situation. Pooling insights from various scientific disciplines remains a challenge. However, there are useful ideas to help achieve this, such as the weight-of-evidence approach, which incorporates, alongside both animal and animal-free experiments, valuable findings from epidemiological studies in assessments. In a sense, this represents a pincer attack from more than one side on risk. To return to fish and its benefits and risks. The comprehensive, approximately one-thousand-page assessment by the Norwegian research team reached the following clear conclusion: “The benefits clearly outweigh the negligible risk posed by the current concentration of contaminants and other undesirable substances in fish”. So, eat and enjoy! —

#### More information



Video recordings of talks at the International Conference on Using Epidemiological Studies in Health Risk Assessment