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Ethylene-oxide: A challenge for hospitals

A cluster of breast cancer cases emerged in 1991 at a pediatric ward of a Hungarian county hospital. Initially, the possible role of several harmful exposures was raised: radon from building materials and drinking water, X-ray machines and ethylene-oxide sterilisers. The public authorities were able to exclude radon and could not justify the exclusive role of X-ray machines either. The IARC linked ethylene-oxide (EtO) only with hematologic-lymphoid malignancies. There were 17 malignancies diagnosed between 1986 and 1998 among the ~200 workers of the ward: 8 cases were fatal. By the turn of the millennium, the case expanded into court cases with broad media coverage.

In the 1970s there was a huge demand for the sterilisation of sensitive medical devices in Hungarian hospitals, which could be readily answered by EtO, on the spot. The then standards were strictly setting how to operate the machines (good technology, exclusion of women, maximum concentration 1 mg/m³), however, these were not adhered to in practice. The desktop machines (using cartridge refills) were mostly operated at the nurse's station or rest area, the aeration was not proper and high workplace air concentrations were measured. Still, measures were taken slowly after inspections. The investigation of the case verified the chromosome damaging property of EtO by before-after cytogenetic tests. A national survey showed a significantly higher odds ratio for any malignancy or for breast cancer among healthcare workers who were exposed to EtO one to two decades earlier. Concerning the case, X-rays were also raised as carcinogen co-exposure.

Due to the availability of single use sterile devices and the emergence of novel methods of sterilising, the use of EtO drastically decreased in the 1990s. To our knowledge, there is only one hospital in 2021 that runs EtO sterilisation in a central unit. The story above highlights the common problem of the sector when the provision of healthcare is in conflict with the health and safety of healthcare workers. Centralising the preparation of cytotoxic infusions was a huge step forward in the fight against carcinogens; however, workers are still subjected to several other harmful exposures. Lasting effects can be achieved by mainstreaming occupational safety and health into the management and into education, providing

sufficient resources, enabling workers participation and using a systemic approach. Enhancing the active participation and the appreciation of occupational health services and hospital hygiene units is essential.