

Ethanol, the alcohol that is commonly consumed in a variety of drinks, is chemically an organic solvent, and affects the CNS in ways that are very similar to the effects of other inhaled solvents. Because effects of ethanol and some solvents have been measured using the same test methods, it is possible to relate the potency of these solvents and ethanol quantitatively. We applied this relationship, called a dose-equivalence equation (Benignus *et al.*, 2007), to the extensive database relating ingested ethanol to fatal automobile crashes. Surprisingly, this analysis revealed that acute exposure to solvent vapors at concentrations below those associated with long-term effects appears to increase the risk of a fatal automobile accident. Furthermore, this increase in risk is comparable to the risk of death from leukemia after long-term exposure to benzene, another solvent that has the well-known property of causing this type of cancer.

However, other experiments have revealed also that rats can become tolerant to these “acute” effects of solvents – in some situations completely overcoming impairment that is initially caused by inhaling high concentrations of the chemical. After exploring several aspects of this tolerance, it became apparent that assessment of the risk of acute exposure to solvents is not simply a balance between toxicity and tolerance. As will be discussed below, it depends upon value judgments and the perception of the risks and benefits associated with normal behavior. The best we can do under these circumstances is to pose difficult questions about the degree to which the risk of acute exposure can be ameliorated by tolerance.