

ESTIMATION OF ACUTE INHALATION THRESHOLD CONCENTRATIONS FOR HUMAN EXPOSURE FROM LIMITED ANIMAL DATA.

T L Long, H T Borges, C B Bast, K A Davidson, C S Forsyth, S Milanez, C M Troxel, R A Young, and S S Talmage. Toxicology and Risk Analysis Section, Life Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, USA.

Data on safe concentrations for human exposure are lacking for many potentially hazardous chemicals that may be accidentally released to the atmosphere. We reviewed available sublethal and lethal animal and human toxicity data on 50 chemicals that are produced and transported within the United States. Inhalation exposure limits were derived for 30 min to 8 hr timepoints representing airborne concentrations 1) at or above which most individuals would experience irreversible or disabling effects and 2) which represent a threshold for lethality among humans. These concentration limits were based on the toxicity data and use of appropriate uncertainty factors. Ratios between these levels were generally # 10 (92%), and most were # 5 (80%). Only four chemicals had ratios that were >10 (8%). The mean ratio for the fifty chemicals analyzed was  $5.04 \pm 6.22$ , the median was 3, and the range was 1.7 - 40. The 95% confidence limits were 3.27 - 6.80. An analysis of toxicity data utilized for development of these levels revealed a significant difference between ratios for chemical-specific values that were based on human and animal data, values based on animal data from different species ( $p < 0.05$ ), or values derived from data using the same animal species (n.s., but an obvious difference). Independent t-tests were used to determine statistical significance between groups of ratios. In summary, when data are lacking for determination of exposure concentrations associated with disabling or irreversible effects of a chemical in humans, a five-fold reduction of the lethality threshold from animal data would encompass ~ 80% of these situations, and a ten-fold reduction would encompass ~ 92 % of these cases. Oak Ridge National Laboratory is managed by Lockheed Martin Energy Research Corporation for the U.S. Department of Energy under Contract No. DEAC0596OR22464

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