

state of Maryland during 1966-1971 showed COHb levels in the 40-79% range for 98% of lethal cases (Nelson 2006a). The Institute of Forensic Medicine in Oslo reported a study of COHb levels in 54 automobile exhaust victims. The mean fatal COHb level was 70%, and 40% was the minimum COHb level exhibited by less than 2% of the cases (Nelson 2006a). Another forensic study (Nelson et al. 2006) examining 2,241 fatalities between the years of 1976-1985 found that the mean COHb level of all the cases was 64.20% with an SD of 17.47. The data showed that 34% of victims had COHb levels of less than 60%. Of those who died in fires, 41% had COHb levels of less than 60% compared with 22% of the nonfire deaths.

Kizakevich et al. (2000) reported that healthy young men can perform sub-maximal exercise without overt impairment of cardiovascular function after CO exposures attaining 20% COHb. Stewart et al. (1970) found that a CO exposure of healthy subjects resulting in 12.5% to 25.5% COHb did not affect the results of several neurophysiologic tests. Nielsen (1971) did not report on severe effects in three subjects who were repeatedly exposed to CO resulting in concentrations of 25-33% COHb.

In susceptible groups of the population, deaths may be caused by considerable lower exposure to CO: Caravati et al. (1988) and Koren et al. (1991) described cases of stillbirth after CO exposure of pregnant women. In these cases, the COHb measured in the maternal blood were higher than 22-25%.

Persons with coronary artery disease constitute another susceptible sub-population (Balraj 1984). Several case reports indicate that death through myocardial infarction can occur after repeated or prolonged exposure. The corresponding COHb levels measured after transport to the hospital (and thus not representing the end-of-exposure concentrations) were about 20-30% and as low as about 15% (Grace and Platt 1981; Atkins and Baker 1985; Ebisuno et al. 1986).

7.2. Animal Data Relevant to AEGL-3

Several studies reported LC₅₀ values for rats, mice, and guinea pigs for exposure durations of 5 min to 4 h. The values are given in Table 2-12 and are shown in Figure 2-1. Similar to humans, the minimum lethal COHb concentrations in rats and mice were about 50-70% (Rose et al. 1970; E.I. du Pont de Nemours and Co. 1981).

An increase in the rate of stillbirths was reported in pigs after a 2-3 day-exposure to CO resulting in maternal COHb above 23% (Dominick and Carson 1983). Increased rates in fetal mortality were also observed in rabbits after continuous exposure maternal COHb of 16-18% throughout gestation (Astrup et al. 1972) as well as after daily exposure to high CO concentrations in cigarette smoke (exposure for 12 min/day on gestational days 6-18, resulting in COHb of 16%) (Rosenkrantz et al. 1986).