The Centre for Fire Research is developing a computer model to predict the toxic hazard that people will experience under various fire scenarios. Toward this end, the toxicity of single and multiple fire gazes is being studied to determine whether the toxic effects of a material's combustion products can be explained by the biological interactions of the primary fire gases or if minor, more obscure gases need to be considered.

LC50 values 4 for Fischer 344 rats have been calculated for carbonmonoxide (CO) in air for 2, 5, 10, 20, 30, and 60 minute exposures using the NBS Toxicity Test Method. LC50 values have also been calculated for hydrogen cyanide (HCN) in air for similar time periods, plus 1minute exposures.

Combination experiments with CO and HCN indicate that they act in an additive manner. Synergistic effects have been found when the animals are exposed to certain combinations of CO and carbon dioxide (CO2). Decreasing the oxygen (o2) concentrations in the presence of various combinations of the concentrations of the major combustion products generated from some materials tested at their LC50 values. With the combined gas results indicates that the observed toxicity for these materials appears to be explained by the biological interactions of the primary toxic fire gases.