Analysis to Determine if Acute Oral Systemic Toxicity Data Can Be Used to Estimate and Avoid Acute Dermal Systemic Toxicity Testing

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Acute poisonings from chemicals and products continue to be a significant public health problem. Development of the Up-and-Down Procedure for acute oral systemic toxicity testing has reduced the number of animals used by 70% while continuing to provide accurate classification and labeling for human health hazards. U.S. regulatory agencies also require acute dermal systemic toxicity testing for chemicals and products to estimate their potential to cause life-threatening or fatal toxicity from skin exposures. The resulting estimated lethal dose (LD_{50}) values are used for acute dermal exposure hazard classification and labeling in order to protect human health and the environment during the handling, transport, and use of chemicals. With the objective of reducing the number of animals used for acute dermal systemic toxicity testing while maintaining the protection of human health for acute dermal exposures, NICEATM analyzed acute oral systemic toxicity data to determine its usefulness for assigning acute dermal systemic toxicity hazard categories for a wide range of chemicals. LD_{50} values were collected for 427 substances that had both acute oral and dermal data. Using oral data to classify dermal toxicity hazard categories underclassified 30% (126/427) and overclassified 34% (146/427) of the substances using the hazard classification categories in the Globally Harmonized System of Classification and Labelling of Chemicals. Underclassification of substances is less protective of public health and would fail to appropriately notify material handlers of chemical hazards while overclassification could desensitize them to such hazards. Therefore, acute oral toxicity data should not be used for classifying dermal toxicity hazards because it would underclassify or overclassify a substantial proportion of substances.