



Toxicology



ICF's perchlorate work was recognized by NASA at the Annual Headquarters Honor Awards Ceremony and the Annual Agency Honor Awards Ceremony.

Through the collaboration of highly experienced professionals across a variety of technical disciplines, ICF International was able to formulate a unique approach and complete its analysis of perchlorate health risks under an extremely tight schedule.

ICF International provides toxicology, safety assessment, risk assessment, and related support that address the full spectrum of potentially hazardous agents, including chemicals, microbes, and radionuclides. We specialize in identifying and quantifying the effects of environmental pollutants, such as metals, pesticides, and volatile organic compounds, on human health and the environment. Our experience also extends to food additives, food contact substances, microbial contaminants in food, and pharmaceutical residues in food. Our in-depth analyses provide our clients with the information they need to determine health-protective and cost-effective solutions.

Our Approach

ICF brings end-to-end services and value to our clients by designing case-specific approaches and incorporating the most current modeling and uncertainty analyses. As experienced consultants, we are sensitive to budgets, schedules, and resources, and tailor each approach to fit our clients' needs. Our multidisciplinary team includes hundreds of specialists with expertise in areas required for scientifically defensible evaluations, with unique capabilities in hazard assessment, dose-response assessment, risk model development, fault tree and other probabilistic analyses, and uncertainty analysis. These specialists are supported by experts, including academics and retired professionals, who either already provide consulting services to us under standing agreements or who can be retained quickly and efficiently on an as-needed basis.

Featured Solutions

[Derivation of a "Safe Level" for Perchlorate Ingestion, National Aeronautics Space Administration](#)

ICF reviewed existing risk assessments on perchlorate and their supporting studies and made an independent determination of a "safe level" for ingestion of perchlorate for the National Aeronautics Space Administration (NASA). Under an extremely tight time schedule, ICF put together a team of scientific experts, established a review strategy, and examined dozens of complex studies on perchlorate effects in humans and animals. The ICF team conducted an exhaustive review of the toxicological and epidemiological data available for perchlorate and evaluated several approaches to estimating "safe" levels. The analysis identified and reviewed key dose-response, pharmacokinetic, and epidemiological studies, reviewed thyroid physiology and potential perchlorate toxic mechanisms, identified sensitive populations, selected studies for derivation of a reference dose, and included benchmark dose modeling from the critical study. The results of the analysis were summarized in written report and presented to the National Research Council's Committee to Assess the Health Implications of Perchlorate Ingestion.

Featured Solutions (continued)

[Technical Support for Registration and Registration Review of Antimicrobials, U.S. Environmental Protection Agency](#)
ICF supports the U.S. Environmental Protection Agency (EPA) in assessing the potential human health and environmental impact of antimicrobial pesticides (e.g., disinfectants, antibacterial hand cleaners, wood treatment chemicals, cooling water additives). ICF critically reviews industry-submitted study data in the areas of toxicology, ecotoxicology, environmental fate, human exposure, and residue chemistry, which inform regulatory decisions on registration or registration review, as well as reviews all types of toxicology studies, including genetic, acute, subchronic, and chronic toxicity studies that address systemic, oncogenic, developmental, reproductive, pharmacokinetics, neurological, and other endpoints. ICF also assists EPA in evaluating human and environmental exposures to antimicrobial pesticides in residential and occupational use and post-application settings. ICF determines use patterns and application scenarios based on draft antimicrobial labels submitted by the registrant, quantifies levels of pesticide active ingredients in products and treated materials, estimates exposures via non-dietary routes, and synthesizes the available data to make a determination of the potential for human health risk via a margin of exposure approach. ICF also uses EPA environmental fate and transport models to estimate human and ecological exposure levels. ICF's support for risk assessments of antimicrobial pesticides has enabled EPA to respond to a wide range of technical challenges and meet the tight deadlines associated with the registration process.

[Lead Pharmacokinetics and Biokinetic Modeling of Drinking Water Exposures, U.S. Environmental Protection Agency](#)
ICF developed a white paper summarizing recent research related to lead occurrence, exposures, toxicokinetics, and adverse effects in infants, children, and adults. This effort included an extensive review of the recent scientific literature related to lead biokinetics, as well as detailed evaluation of several biokinetic and physiologically based

pharmacokinetic models developed to simulate the absorption, deposition, and excretion of lead in the human body. Variability in responses to lead exposures related to age, gender, race/ethnicity, socioeconomic status, and genetic polymorphisms also were reviewed as a prelude to conducting population blood lead modeling in support of revising the action level (the concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow). ICF applied two of the most well-documented biokinetic models (the IEUBK and Leggett model) to evaluate potential blood lead impacts of short-term changes in drinking water exposures. Model results were compared and calibrated versus data from national blood lead surveys and smaller studies of blood lead-level exposure relationships. The models were used to explore the implications of alternative exposure scenarios when evaluated using different time-weighted blood lead metrics. Age variations in blood lead response were used to identify children most at risk from lead exposures in drinking water.

[Evaluation of Scientific Data Related to Food Safety, U.S. Food and Drug Administration](#)

ICF reviewed and evaluated premarket notification data submitted to the U.S. Food and Drug Administration (FDA) for food contact substances (e.g., food packaging materials), flavors, colors, and generally recognized as safe materials. The toxicology studies included genetic, acute, subchronic, and chronic toxicity studies that address systemic, oncogenic, developmental, reproductive, neurological, and other endpoints. ICF also reviewed and evaluated chemistry information related to food contact substances to estimate the migration of chemicals from food packaging into foods, the resulting concentrations of those chemicals in foods, and the levels of probable consumer exposure to those chemicals. In addition, ICF reviewed and evaluated scientific information related to food safety, including literature reviews on special topics (e.g., liver toxicity, herbal/botanical food ingredients) or special compounds (e.g., carmine and sulfites).

About ICF International

ICF International (NASDAQ: ICFI) partners with government and commercial clients to deliver consulting services and technology solutions in the energy, climate change, environment, transportation, social programs, health, defense, and emergency management markets. The firm combines passion for its work with industry expertise and innovative analytics to produce compelling results throughout the entire program life cycle, from analysis and design through implementation and improvement. Since 1969, ICF has been serving government at all levels, major corporations, and multilateral institutions. More than 3,000 employees serve these clients worldwide. ICF's Web site is www.icfi.com.

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