Charge Questions for the Approach for Developing Lead Dust Hazard Standards for Residences

Background

TSCA section 403 directs EPA to promulgate regulations that identify, for the purposes of Title X and Title IV of TSCA, dangerous levels of lead in paint, dust, and soil. EPA promulgated regulations pursuant to TSCA section 403 on January 5, 2001, and codified them at 40 CFR part 745, subpart D (USEPA, 2001a). These hazard standards identify dangerous levels of lead in paint, dust, and soil and provide benchmarks on which to base remedial actions taken to safeguard children and the public from the dangers of lead. Lead-based paint hazards in target housing and child-occupied facilities are defined in these standards as paint-lead, dust-lead, and soil-lead hazards. A paint-lead hazard is defined as any damaged or deteriorated lead-based paint, any chewable lead-based painted surface with evidence of teeth marks, or any lead-based paint on a friction surface if lead dust levels underneath the friction surface exceed the dust-lead hazard standards. A dust-lead hazard is surface dust that contains a mass-per-area concentration of lead equal to or exceeding 40 micrograms per square foot ($\mu g/ft^2$) on floors or 250 $\mu g/ft^2$ on interior windowsills based on wipe samples. A soil-lead hazard is bare soil that contains total lead equal to or exceeding 400 parts per million (ppm) in a play area or average of 1,200 ppm of bare soil in the rest of the yard based on soil samples.

On August 10, 2009, EPA received a petition from several environmental and public health advocacy groups requesting that the EPA amend regulations issued under Title IV of TSCA (Sierra Club et al., 2009). Specifically, the petitioners requested that EPA lower the Agency's dust-lead hazard standards issued pursuant to section 403 of TSCA from 40 $\mu g/ft^2$ to 10 $\mu g/ft^2$ or less for floors and from 250 $\mu g/ft^2$ to 100 $\mu g/ft^2$ or less for window sills. On October 22, 2009, EPA granted this petition under section 553(e) of the Administrative Procedures Act, 5 U.S.C. 553(e) (USEPA, 2009a). In granting this petition, EPA agreed to commence the appropriate proceeding, but did not commit to a particular schedule or to a particular outcome.

In June 2010, EPA issued a Proposed Approach for Developing Lead Dust Hazard Standards for Residences and submitted the document to the Science Advisory Board (SAB) Lead Review Panel for a consultation. The SAB Panel met July 6–7, 2010 and provided comments on the Proposed Approach to EPA on August 20, 2010.

The current document entitled "Approach for Developing Lead Dust Hazard Standards for Residences" describes the methods that EPA proposes to examine candidate hazard standards for floors and windowsills in residences. This document takes the SAB comments from the July, 2010 consultation into consideration in developing several candidate standards for residences.

Charge Question 1 - Approach Document

OPPT has developed an Approach document for developing the hazard standards for floors and windowsills in residences. This includes a description of the empirical and biokinetic approaches, as well as the resultant analyses used to estimate candidate lead dust hazard standards for residences.

1. Please comment on the clarity and transparency of the document.

Charge Question 2 - Empirical Models

The empirical approach involves the estimation of blood-lead impacts based on analyses of empirical data from the 1999–2004 National Health and Nutrition Examination Survey (NHANES). Two analyses were used. First, the regression relationships among floor and windowsill dust, other covariates, and blood-lead concentrations that Dixon et al. (2009) derived were applied to predict blood-lead levels for the various hazard standards (combinations of floor and windowsill dust loadings). The second was an independent reanalysis of the NHANES data to derive alternate models for predicting blood-lead impacts; the variations from the Dixon et al. (2009) approach included changes to the form of the dust-loading variables and application of models that are inherently linear at low lead exposures, a relationship that is supported by a wide range of biokinetic data, and regression of blood-lead values against estimated dust concentrations, rather than dust loading.

2. Please comment on the EPA reanalysis.

Charge Question 3 - Biokinetic Models

Two biokinetic models were used to estimate children's blood lead concentrations including EPA's Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK), and the Leggett model. Information from the exposure scenarios is used to estimate relative contributions of exposures from different sources (soil, dust, air, diet, and water) and in different microenvironments.

3. Please comment on the use of the biokinetic models and the inputs to the models.

Charge Question 4 - Analyses of Variability and Uncertainty

Monte Carlo methodology was not used to evaluate the impacts of variability and uncertainty in model parameters on blood-lead estimates as insufficient data exist concerning the potential variability in many key model variables to support informative Monte Carlo modeling. Instead, point estimates of central tendency (geometric mean) blood-lead concentrations in children are derived utilizing statistical models based on empirical data and on biokinetic models of blood lead, coupled with assumptions regarding distributions of highly uncertain variables. The sensitivity of the deterministic relationships between dust lead and blood lead to changes in key variables and covariates

is explored through sensitivity analyses. As presented in Section 6, the modeling inputs and assumptions that most strongly affect the predicted blood-lead distributions associated with candidate lead-dust hazard standards have been identified, based on the measures of statistical uncertainty from the empirical analyses and sensitivity analyses of the biokinetic models.

4. Please comment on the characterization of variability and uncertainty.

Charge Question 5 - Choice of Model for Residential Hazard Standards

The document presents two empirical models and two biokinetics models. OPPT proposes to use the NHANES Quasi-Likelihood, Empirical Model for the estimation of the residential hazard standards.

5. Please comment on this proposed choice.