LIFELINE™ VERSION 4.3 SOFTWARE FOR MODELING AGGREGATE AND CUMULATIVE EXPOSURES TO PESTICIDES AND CHEMICALS

Last Revision Date: 08/25/2009

General Information

Model Abbreviated Name: LIFELINE™ 4.3

Model Extended Name: LIFELINE™ VERSION 4.3 SOFTWARE FOR MODELING AGGREGATE AND CUMULATIVE EXPOSURES TO PESTICIDES AND CHEMICALS

Model Overview/Abstract:
LifeLine Version 4.3 uses probabilistic techniques to model exposure, risks and benefits for the general population or for selected subpopulations such as children, women of childbearing age or the elderly. Sources of exposure included in the software:

- Diet
- Home Environments and Products
- Drinking and Tap Water
- Consumer Products
- Pesticide Users
- Routes of exposure considered in the software:
- Inhalation
- Dermal
- Oral from Diet and Child's Mouthing Behaviors

LifeLine™ Version 4.3 is designed to be user friendly for dietary assessments for pesticide and chemical exposure and risk assessments. Residue files created with other software can be imported and dietary exposure estimates produced. This eliminates the need to re-enter data. EPA is currently using Version 4.3 to assess dietary, aggregate and cumulative risks of pesticides.

Keywords:

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Model Homepage:	http://www.thelifelinegroup.org
Substantive Changes from Prior Version:	Version 4.3 is 50% faster than the prior version of LifeLine™ and includes new features in virtually every portion of the model. • The ability to create a summary report of key regulatory findings from a LifeLine™ model run. The report uses a format developed jointly with EPA Office of Pesticides Programs and contains the exposure and risk information currently used by the Agency in regulatory decisions. • Incorporation of the new definitions of raw agricultural commodities (RACs) and the EPA/USDA Food Commodity Ingredient Database (FCID) along with the USDA 1994-96,98 Continuing Survey of Food Intake by Individual; • The ability to input water residues (for all but tap water) in the Food Residue Translator; • The ability to enter residue data on a food basis as well as a RAC basis; • Improved ability to directly import data files formatted for use in DEEM™ v.2005,thus minimizing the effort needed to move existing information into the LifeLine™ dietary assessments; and • The ability to enter data on residential exposure using either English or metric units.

User Information

Technical Requirements

Computer Hardware
Ideally the PC should meet the following standards; however, LifeLine will run (more slowly) on older computers. • Pentium III, 700MHz or higher; • A minimum of 256 megabytes of RAM (512 megabytes or 1.0 gigabytes recommended); • 200 megabytes of disk space for the system; and • Up to one gigabyte of free space on the swap file's hard drive may be required depending on the amount of RAM your system has, how much of it is free, and the size of the analysis.

Compatible Operating Systems
Windows 2000 or later

Other Software Required to Run the Model
None

Download Information

http://www.thelifelinegroup.org

Using the Model

Basic Model Inputs
Information on 1) residues in agricultural commodities, foods, drinking water supplies, other water sources, and on residential surfaces following pesticide use, 2) use of pesticides on crops, 3) effect of cooking and food processing on residues, 4) use of pesticides in the home, 5) exposure related activity factors, 6) toxicity information, and 7) chemical properties of the pesticides and chemicals modeled.

Basic Model Outputs
Estimates of dose and risk for periods of time from one day to a lifetime.

User Support

User's Guide Available?
Available at http://www.thelifelinegroup.org

Model Science

Problem Identification
LifeLine Version 4.3 is a Monte Carlo (probabilistic) model of the longitudinal aggregate exposure to pesticides that occurs to each member of a simulated population of individuals. The key focus of the software is modeling each potentially exposed individual within that population as an individual. Specifically, the model seeks to define each simulation of an individual in such a way as to provide an accurate characterization of inter-individual differences in exposure-related behaviors for populations of interest. This simulation must assign all of the individual's characteristics in an internally consistent way and in a manner that reflects the population under investigation. LifeLine also simulates each individual's behavior over time. For additional information see the LifeLine Version 4.3 Technical Manual April, 2006 and "Construction of a Comprehensive Chemical Exposure Framework Using Person Oriented Modeling, June 20, 2003" available at www.thelifelinegroup.org.

Summary of Model Structure and Methods
See technical manual.

Model Evaluation
LifeLine Version 4.3 has undergone extensive testing by LifeLine and EPA staff. This testing has included independent calculation of specific dietary doses and other doses. These tests have demonstrated that the code is operating as designed. Comparison of dietary dose predictions across models demonstrates that differences in acute random day doses are explainable based on differences in model design. LifeLine's predictions of aggregate exposures are currently being evaluated by academia using the results of biomonitoring data.