

Exponent[®]

FARE[™]

A Research Tool for Assessing Dietary
Exposure to Nutrients, Food Ingredients, and
Contaminants

Exponent[®]

What is FARE™?



- Food Analysis and Residue Evaluation program
- A multi-objective computational program
- Provides intake data for the US population and subpopulations

FARE™ Features



- Consumption data on fresh & processed foods, as actually eaten in the US
- Primary resource for analyses involving nutrients, functional components of foods, and additives/GRAS substances
- Optimal use requires detailed knowledge of food industry and processing
- The recipes in FARE™ are based on USDA's, but have been refined for ease of use and for use in additional kinds of analyses

FARE™ Features



- Provide intake estimates for:
 - Nutrients
 - Protein, CHO, vitamins, minerals, fats, fiber
 - Intentionally added ingredients
 - GRAS substances, food additives
 - Functional components
 - “Nutraceuticals,” naturally-occurring substances
 - Contaminants, processing impurities, breakdown products

Consumption Data Used in FARE™



- **USDA CSFII** - adjusted by “translation factors”
 - 1989-91 -- 35,736 person-days
 - 1994-96 -- 30,606 person-days
 - 1998 -- 10,608 person days (Children 0 -- 9 years)
- **CDC NHANES** - adjusted by “translation factors”
 - 1999-2002 – 18,725 person-days
 - 2003-2004 – ~ 20,000 person-days

Data Resources for Ingredients or Residues



- Publicly available databases
 - USDA Pesticide Data Program
 - FDA Total Diet Study
 - USDA's Nutrient Database
- Confidential data
 - Client studies
 - Market-basket or other Exponent designed studies

FARE™ Capabilities



- “Standard” as well as user-defined US population sub-groups, e.g.,
 - Demographic characteristics
 - Income
 - Geographic location
- Broad food category analyses, e.g.,
 - Cookies
 - Cakes
- Specific foods, e.g.,
 - Orange juice from frozen concentrate
 - All sources of oranges in the diet
- Food intake based on location/source of food, e.g.,
 - Fast food restaurant
 - School cafeteria
 - Home grown
 - Vending machines

FARE™ Capabilities



- Food consumption estimates
- Nutrient Intake
 - From defined foods only
 - Total for users of specified foods
 - Total for non-users of specified foods
- Trans-fatty acids intake
- Intake of food additives
- Exposure to food contaminants

FARE™ Capabilities



- Consumption Per:
 - Eating occasion
 - Meal
 - Elapsed time since last eating occasion
 - Per day
 - Over the entire survey time period
- Seasonal/Geographic differences
- Customized, e.g.,
 - Nutritional Status of people who eat X,Y,Z
 - Chronic average daily intake of an ingredient or contaminant

FARE™ Capabilities



“Scenario testing”, e.g.,

- Food fortification
- Diet-drug interactions
- Dietary interventions

Food Coding in FARE™



- Foods-as-eaten:
 - As reported in survey, e.g., cheese sandwich, apple pie, etc...
 - 8-digit codes, strict hierarchy
- Ingredients:
 - USDA defined (NDB codes)
 - e.g. American cheese, bread, margarine
 - 5-digit codes (no hierarchy)

Food Coding in FARE™ (Cont'd)



- Raw agricultural commodities (RAC):
 - e.g., wheat flour, milk fat solids, milk non fat solids, sugar, salt, vegetable oil, etc.
 - RACS derived using Exponent translation factors or US EPA translation factors

Other Types of Analysis in FARE™



- Can view all recipes that include a given ingredient
- Can view recipes for specific foods
- Can modify recipes
- Monte Carlo assessments

FARE™ Exposure Module with Monte Carlo



- Incorporates Monte Carlo simulations utilizing entire consumption distribution and entire ingredient/nutrient distribution
- Identifies “high-end” individuals: demographically, consumption, ingredient/nutrient exposure (by food), exposure as percent of individual total exposure