



FCID 2003-08

EPA Dietary Exposure Assessment of Pesticides

Overview and Evaluation of Updated Consumption Data on Commodity Intake and Exposure

Risk Analysis: Advancing Analysis Workshop

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What's New

- **Food Commodity Intake Database (FCID), 2003-2008**
 - Recipe and consumption database used by EPA/OPP in exposure models
 - Originally developed using CSFII, 1994-96, 1998
 - Updated for NHANES-WWEIA, 2003-08
- **Foodrisk.org Web Application**
 - FCID recipe search tool
 - Links to NHANES-WWEIA
 - Population-based consumption estimates
- **Dietary Exposure Evaluation Model (DEEM)**
 - Dietary exposure assessment model
 - Now free and publically available for download (<http://www.epa.gov/pesticides/science/deem/>)
 - Utilizes NHANES WWEIA 2003-08 survey data

Overview

1. OPP's Dietary Exposure Assessment Methods

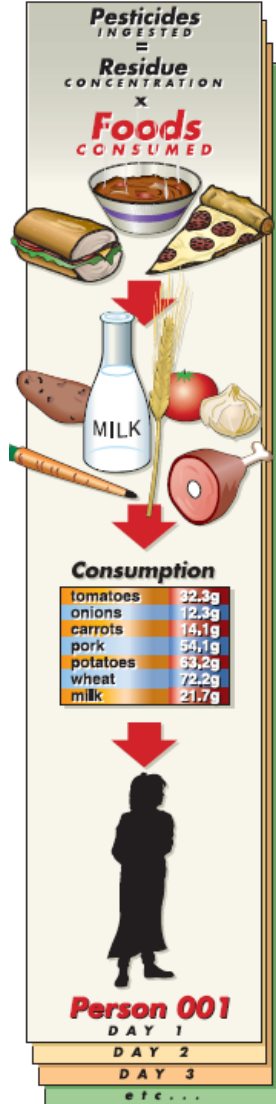
2. What's New

- Food Commodity Intake Database (FCID)
- JIFSAN Foodrisk.org Web Application
- Dietary Exposure Evaluation Model (DEEM)

Dietary Exposure Assessment

Overview

- Evaluate food consumption patterns and residue concentrations that lead to highest potential for exposure
- Assessments range from simple to complex, but based on same general framework



Consumption

X

Residue

=

Dietary
Exposure

- Tiering process used to refine exposure assessment to reflect more realistic assumptions

Dietary Exposure Modeling

- Exposure assessment models based on nationally-representative monitoring surveys

Key data surveys and databases:

- **USDA's Pesticide Data Program (PDP)**

Nationally representative commodity residue sampling program

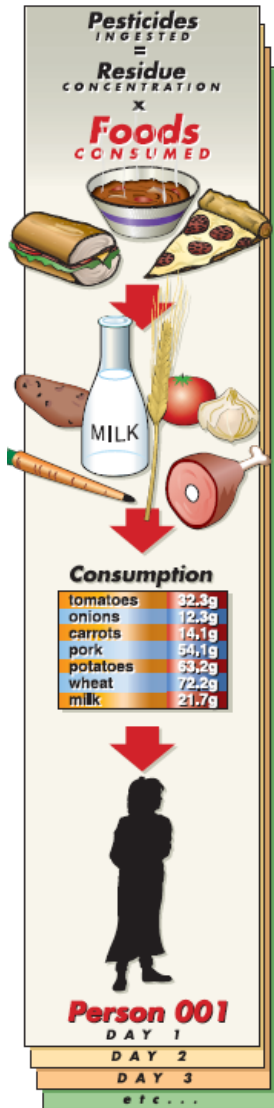
- **Continuing Survey of Food Intake by Individuals (CSFII) (1994-96/1998)**

- **What We Eat In America (WWEIA) (2003-08)**

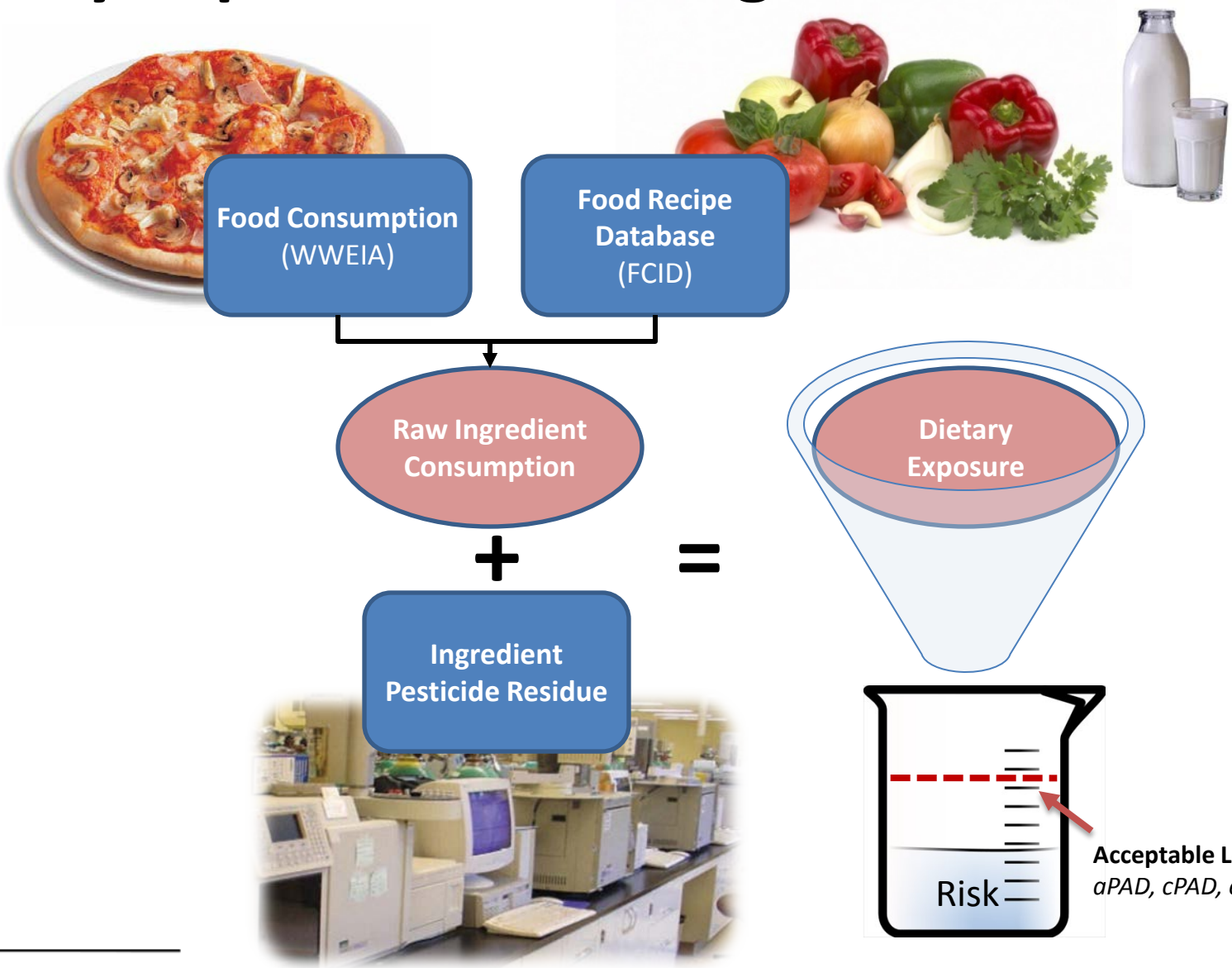
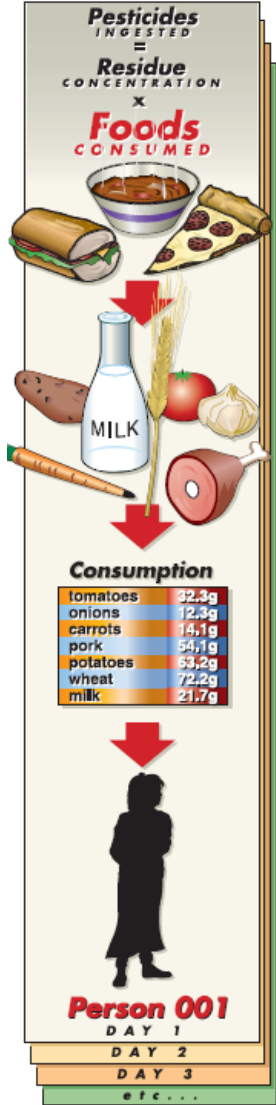
Nationally representative food consumption surveys

- **U.S. EPA's Food Commodity Intake Database (FCID)**

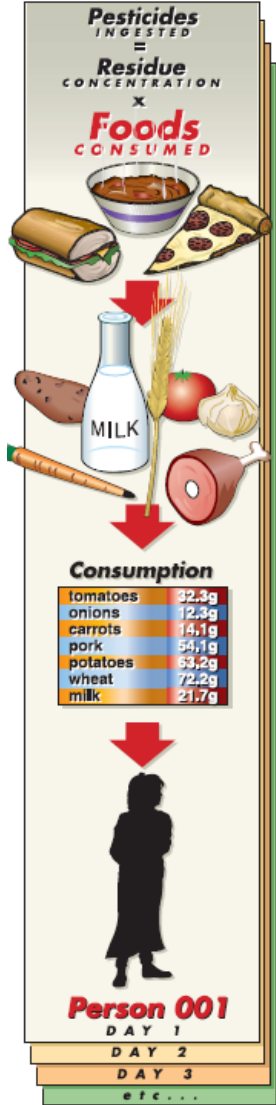
Recipe database that links WWEIA foods to PDP residue data



Dietary Exposure Modeling Framework



Dietary Exposure Modeling Framework



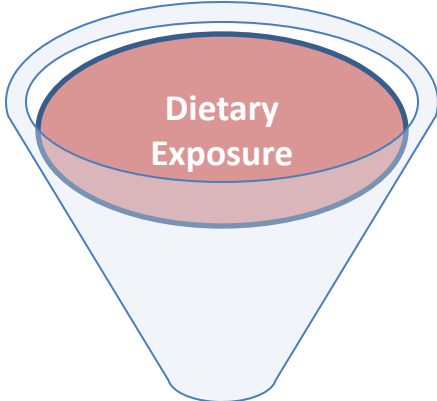
Food Consumption (WWEIA)

Food Recipe Database (FCID)

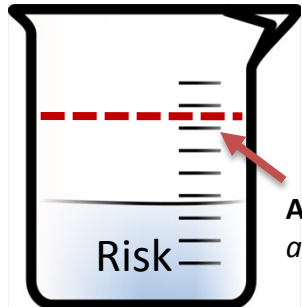


Raw Ingredient Consumption

+ =



Ingredient Pesticide Residue

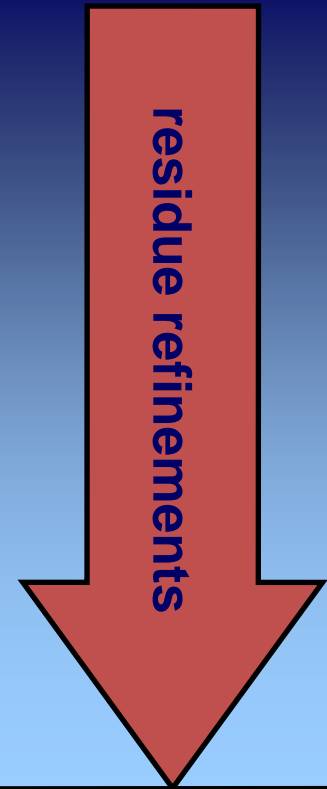


Acceptable Level
aPAD, cPAD, etc.

Sources of Residue Data

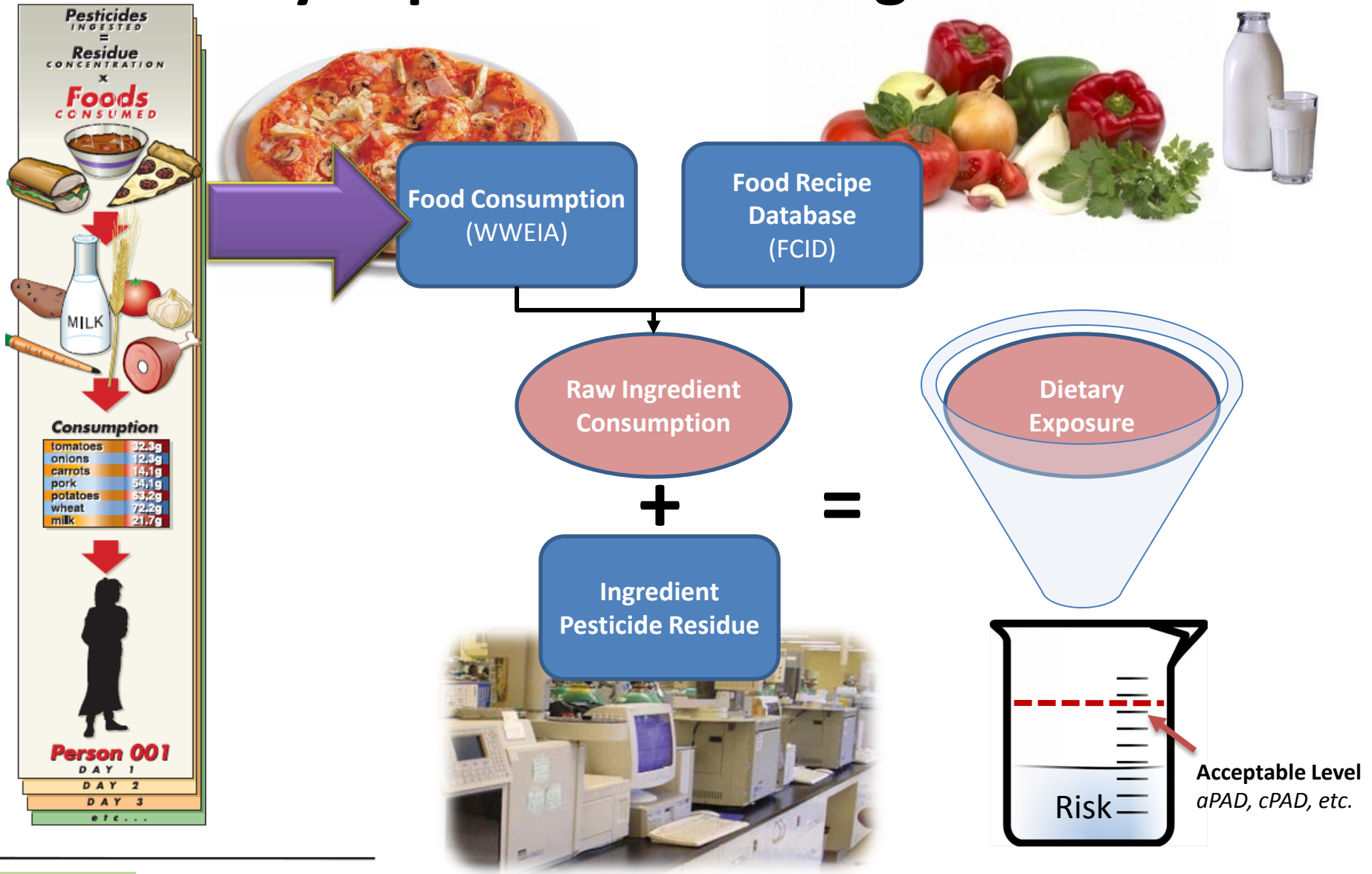
Tier 1 -- *Tolerance-level residues and 100%CT*

- **% Crop Treated**
- **Field trial data**
- **PDP/FDA data**
- **Processing studies**
- **Cooking Factors**
- **Bridging studies**
- **Residue degradation/decline studies**
- **Market basket data**



Tier 4 -- *highly refined residues*

Dietary Exposure Modeling Framework





USDA's What We Eat In America



- National food survey conducted as part of the *National Health Assessment and Nutrition Examination Survey (NHANES)*
 - Nationally representative design
 - Contains food consumption data for ~ 7000 foods
 - Also captures water consumption data
 - Data collected on two non-consecutive days of 24-hour dietary recall using validated USDA method
- **Limitations:** Seasonal, Regional, Longitudinal Considerations

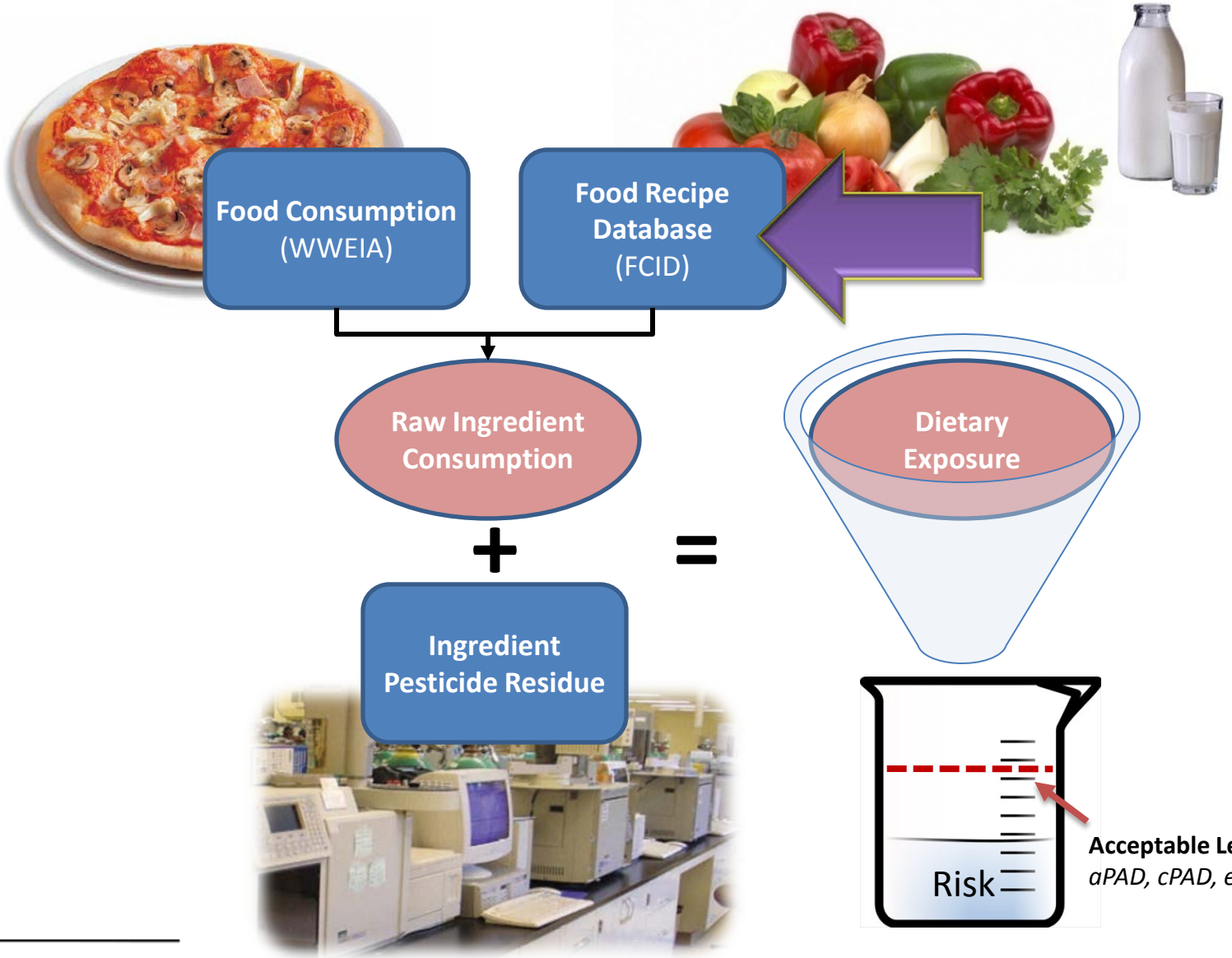
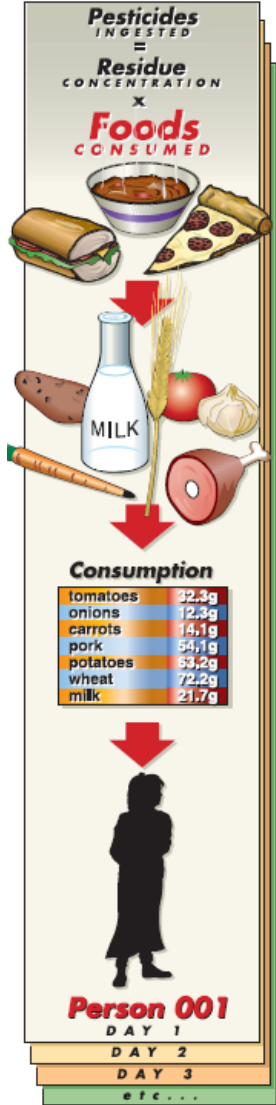


Additional Information: <http://www.ars.usda.gov/Services/docs.htm?docid=13793>



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Dietary Exposure Modeling Framework



Food Commodity Intake Database (FCID), 2003-08

- Pesticide residue information and regulatory focus is on a food commodity basis
- Both CSFII and WWEIA capture dietary recall data on foods as reported eaten

Examples:

- 1 slice apple pie,
 - 1 Big Mac™ ,
 - 1 slice Cheese Pizza (1/8 of 12" pie)
- Therefore, estimating dietary exposure requires converting data on foods “as eaten” to food commodities

Swiss chard and ricotta Ravioli with meat sauce

**EPA Food Commodity Intake
Database**

**NHANES, What We Eat In
America**



Food Commodity Intake Database (FCID), 2003-08

- Translates foods as reported eaten to raw agricultural commodities using U.S. EPA food vocabulary
- Converts more than 5,000 food codes into recipes containing roughly 540 different food commodities
- Originally developed in collaboration with USDA
 - ❑ USDA's Food and Nutrient Database for Dietary Studies (FNDDS)
- Recently updated for use with NHANES/WWEIA 2003-08

WWEIA Food -> FCID Recipe

Oatmeal, cooked, regular, made with milk, fat added in cooking from: Oatmeal, NS as to regular, quick, or instant, made with milk, fat added in cooking

Cereals, oats, regular and quick, not fortified, dry

- Oat, groats/rolled oats

Milk, NFS

- Milk, water
- Milk, nonfat solids
- Milk, fat

Margarine-like spread, tub, salted

- Sunflower, oil
- Safflower, oil
- Cottonseed, oil
- Milk, nonfat solids
- Rapeseed, oil
- Corn, field, oil
- Soybean, oil

Salt, table

WWEIA

FNDDS

FCID

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Does not map to FCID Commodity

WWEIA

FNDDS

FCID

JIFSAN Foodrisk.org Website

- Web application with USDA's Food Safety Inspection Service and U-Maryland's Joint Institute for Food Safety and Applied Nutrition (JIFSAN)

Functionality

- Improve transparency of coded fields
- Make recipes fully searchable
- Make recipe format more user-friendly
- Enable users to estimate consumption of food commodities

Weighted mean and percentile calculations

<http://fcid.foodrisk.org/>

Food Commodity Intake Database

What We Eat in America

Welcome



Welcome to the U.S. EPA's What We Eat in America - Food Commodity Intake Database, 2003-2008 (WWEIA-FCID 2003-08). WWEIA-FCID 2003-08 was developed by U.S. EPA's Office of Pesticide Programs (OPP) to improve the utility of the WWEIA food consumption survey for dietary exposure assessment. WWEIA-FCID 2003-08 translates food consumption as reported eaten in WWEIA (1999-08 survey cycles) and CSFII (1994-96, 1998) surveys into consumption of U.S. EPA-defined food commodities. Such food commodity intakes are expressed as grams of food commodity consumed per kg bodyweight per day for over 500 commodities derived from more than 6000 different foods and beverages reported in the two surveys. The database is intended to complement the CSFII and NHANES/WWEIA databases in that it reports food consumption as commodities as opposed to foods "as eaten" per se which can in some exposure and other situations be of more utility. The database also includes WWEIA 2003-08 food consumption and demographic data that is available through CDC's National Center for Health Statistics at [this page](#).

[Read more...](#)

Getting Started

Click the buttons below to get started.

- The **FCID Recipes, 2003-2008** button provides a form that can be used to search FCID recipes and generate a printer-friendly report.
- The **Database Contents** button provides a navigatable list of tables and forms in the database.
- The **FCID Commodity Weight Percentiles (BETA)** button is a test version of an application that uses NHANES/WWEIA food intake and FCID recipes to estimate food commodity consumption. We anticipate that the application will be made final in Spring 2013.

[FCID Recipes, 2003-2008](#)

[FCID Commodity Weight Percentiles \(BETA\)](#)

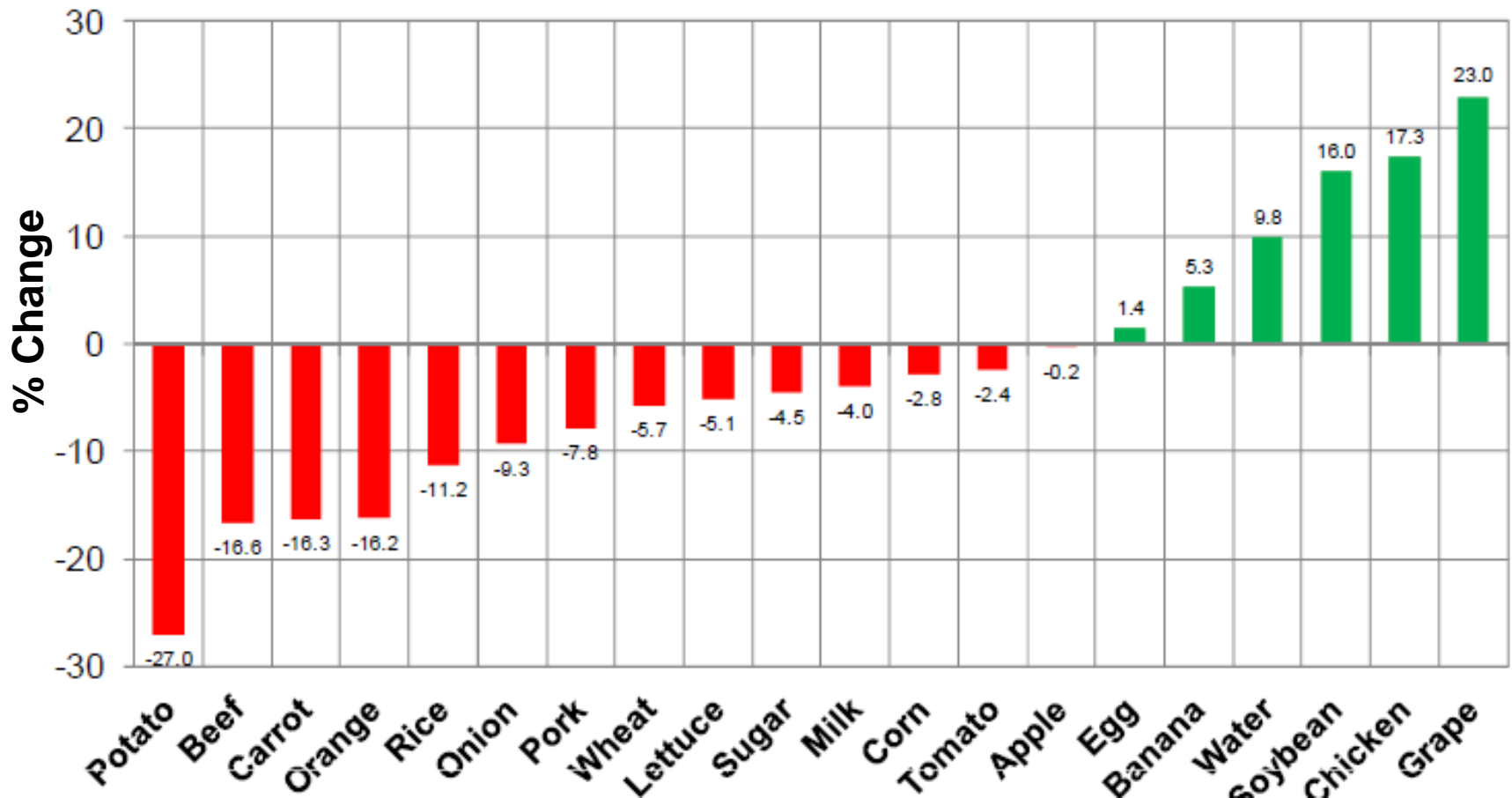
[Database Contents and More Information](#)

<http://fcid.foodrisk.org/>

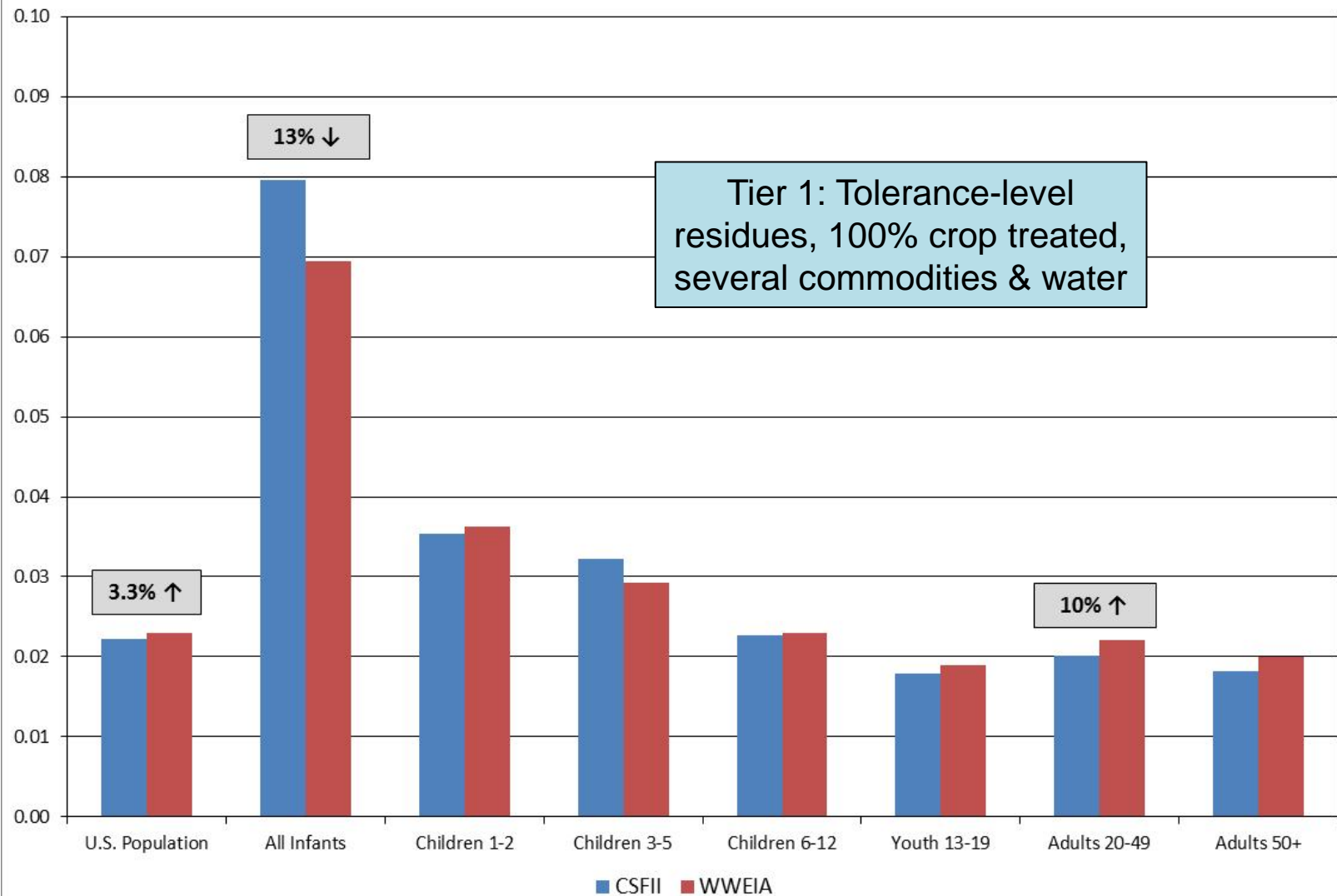
Dietary Exposure Evaluation Model (DEEM) Update

- **EPA/OPP has acquired DEEM license and made freely available to the public**
 - Improve accessibility
 - Increase transparency of EPA/OPP regulatory decisions
- **DEEM Updates and Release**
 - DEEM previously based on CSFII, 1994-96/98
 - Updated version incorporates more recent WWEIA 2003-08 consumption data
 - OPP has performed exploratory analysis examining impact of DEEM update on both consumption and exposure

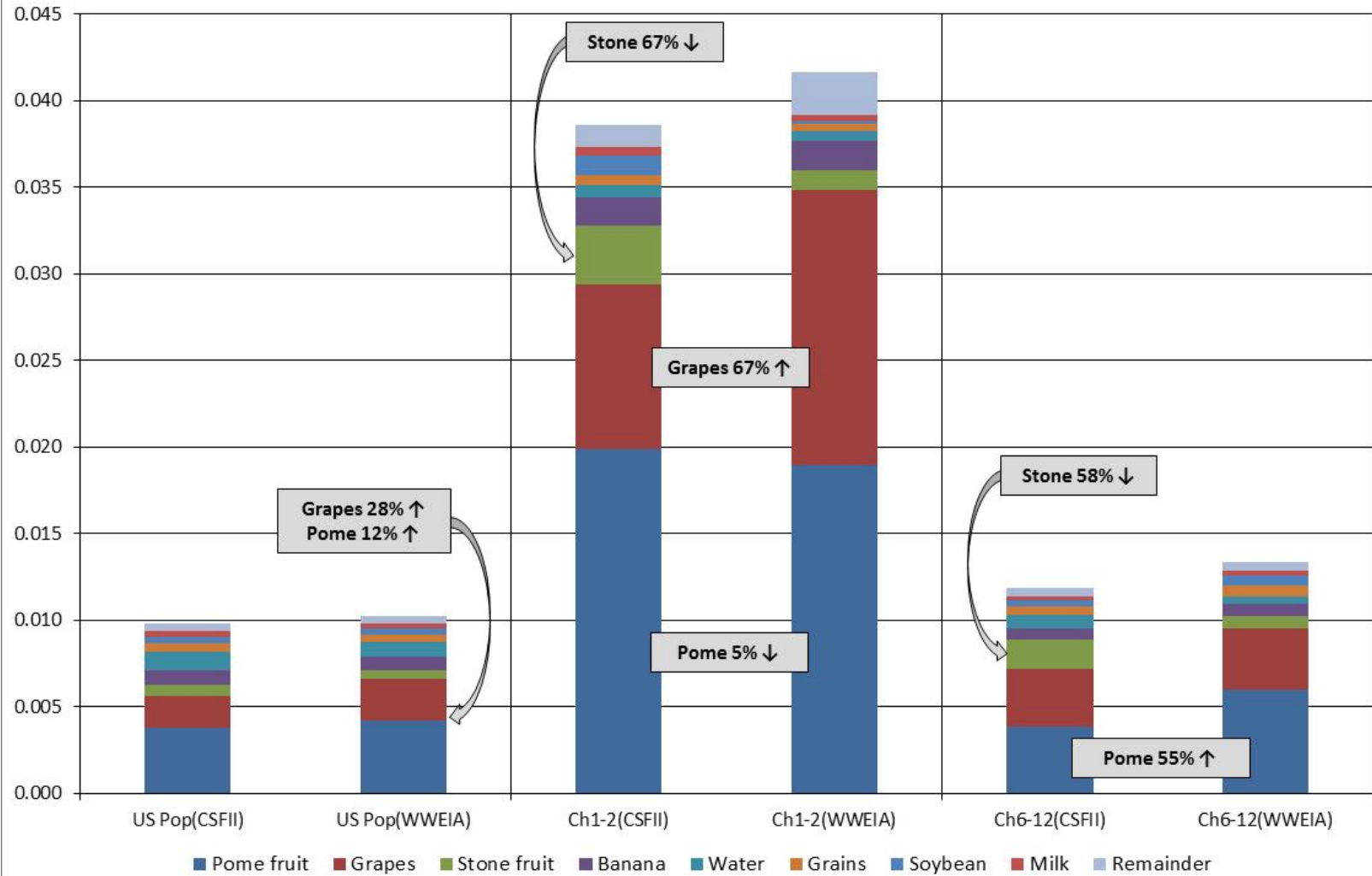
Change from CSFII 1994-98 to NHANES/WWEIA 2003-2008 for **U.S. population per capita**



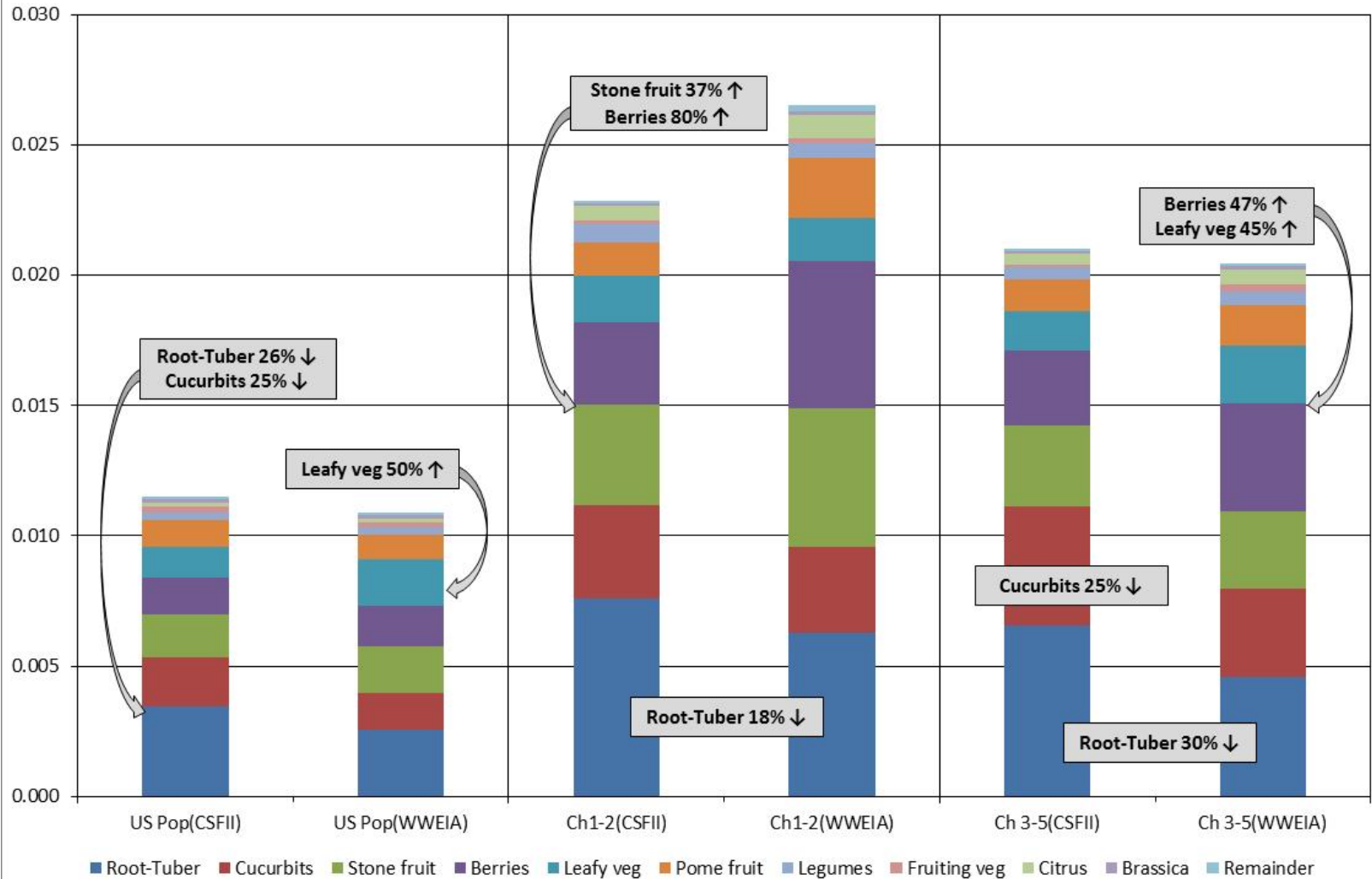
Acute 95th Percentile Exposures - Compound #3



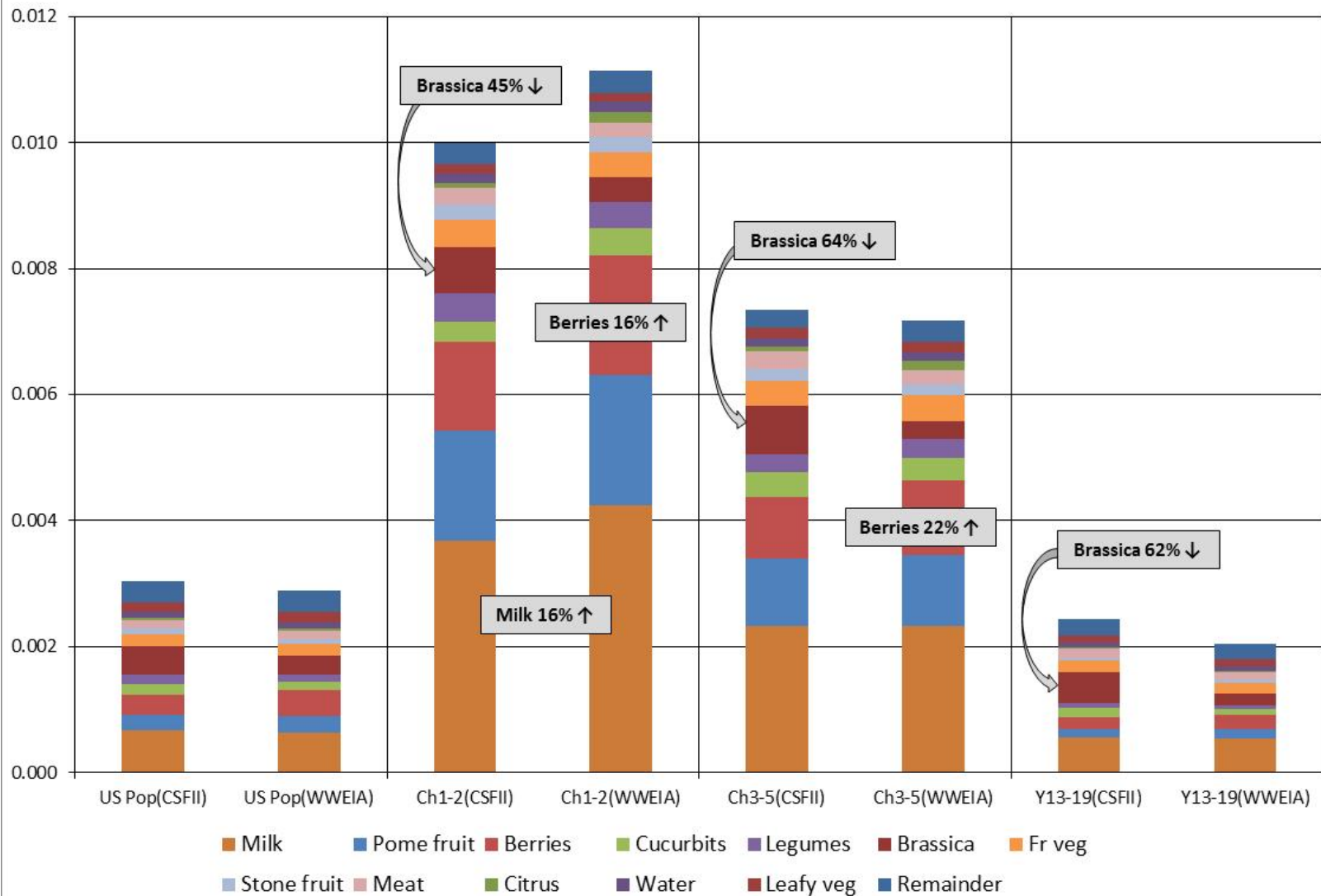
Acute 95th %ile Dietary Exposures: Commodity Contribution - Compound #5



Acute 99.9th %ile Dietary Exposures: Commodity Contribution - Compound #12



Chronic Dietary Exposures: Commodity Contribution - Compound #10



Trends (Preliminary Conclusions)

- **No distinct trends observed**
 - Increasing refinement & complexity not associated with any pattern in changes in exposure estimates
 - Magnitude and direction of change in exposure estimates will be situation dependent
- **Either Infants (<1 year) or Children 1-2 years old are usually the most highly exposed subpopulation**
 - Conclusion not affected by switch to NHANES
 - Exposure generally increased (9 of 13 acute & 8 of 11 chronic)
- **For U.S. population, exposures generally decrease (10 of 13 acute & 9 of 11 chronic)**
- **With few exceptions, absolute change in exposures within 20%, and frequently on order of <10%**

Exposure Assessment Resources

FCID Recipe Database

<http://fcid.foodrisk.org/>

DEEM-WWEIA 2003-08

<http://www.epa.gov/pesticides/science/deem/>

SHEDS-Multimedia

http://www.epa.gov/heasd/products/sheds_multimedia/sheds_mm.html

Questions

