# Effective Use of Models and Pollutant Monitoring for Exposure Tracking

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# Overview

- Tracking environmental hazards that contribute to disease is
  - Important
  - Difficult
- Current methods for tracking hazard exposure--data and models
  - capabilities
  - limitations
- An alternative approach and it prospects

# Hazard Tracking and Hazard Indexes

- **According to current concepts:**

  **Hazard tracking = Measuring the sources, amount, concentration, geographic distribution and trends of known or potentially harmful chemical, physical and biological agents the environment**

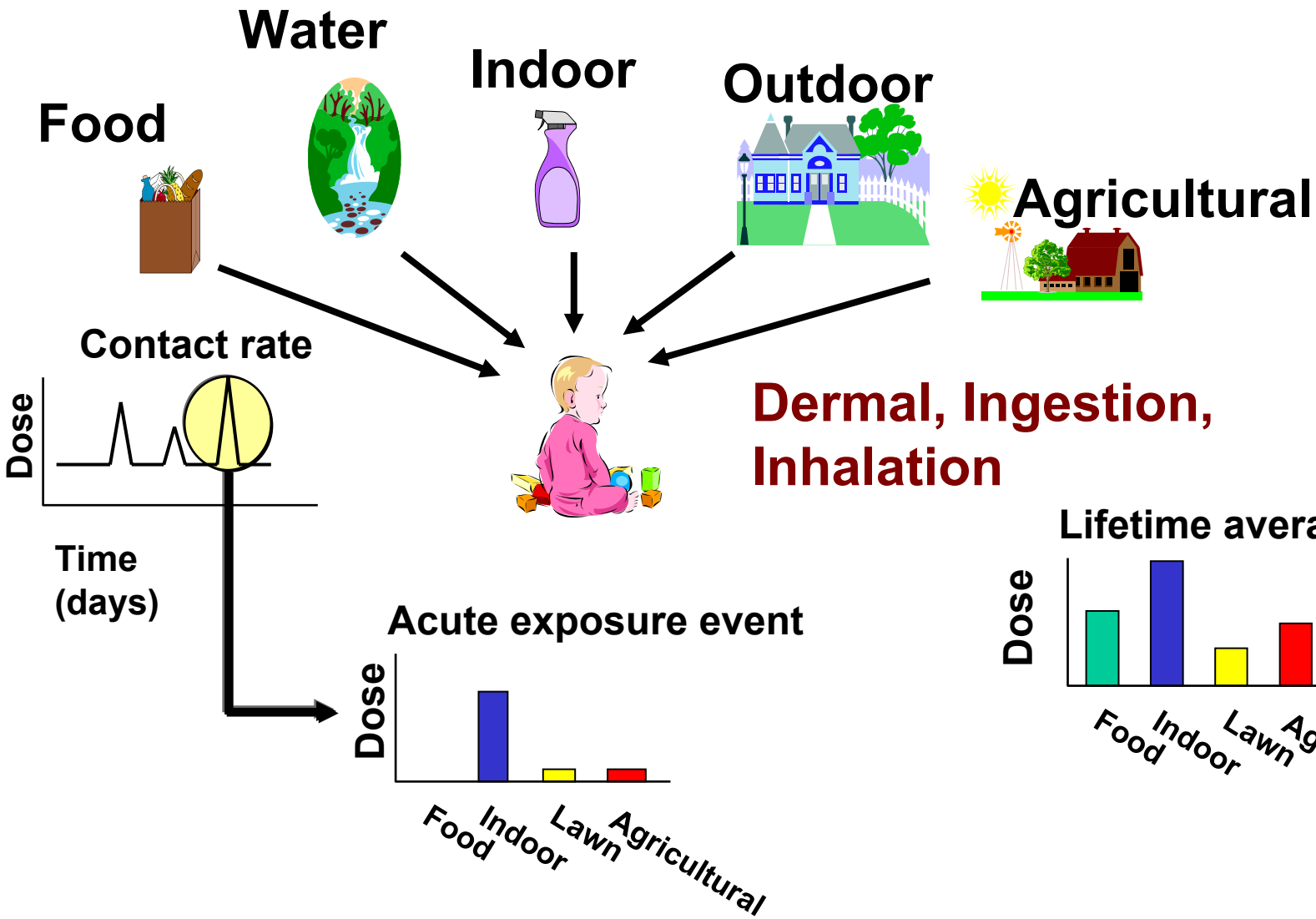
- **Hazard Indexes address comparison of releases of several chemicals and exposure scenarios.**

- **Intermediate between simple toxicity-based hazard ranking and a detailed, site-specific chemical risk assessment.**

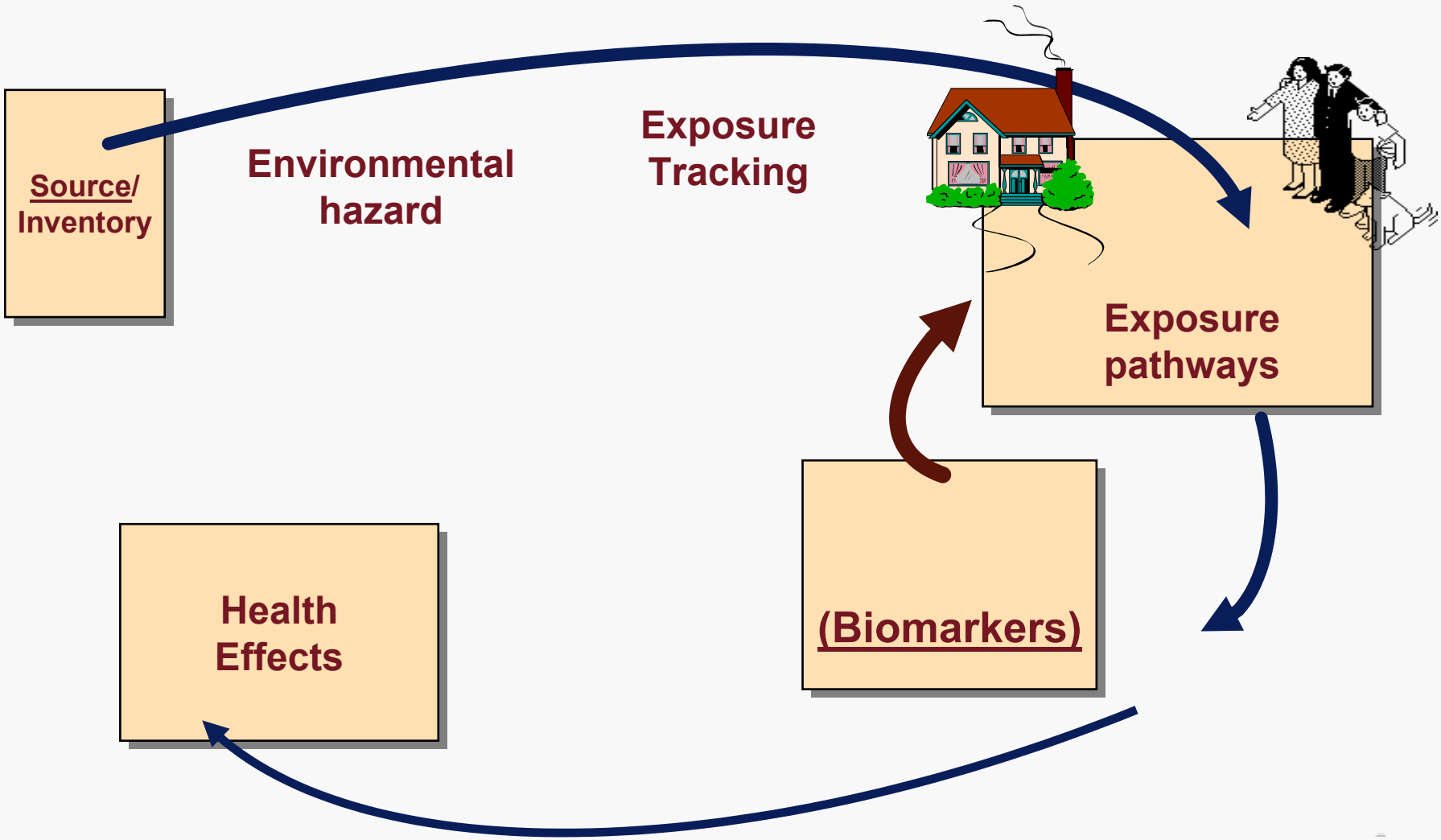
# Data for Hazard and Exposure Tracking

- There are a number of available data sets that provide for the US population exposure indicators for toxic substances
  - Toxic Release Inventory
  - National Emissions Inventory
  - National Toxics Inventory (NTI) Database
  - Pesticide Use Reporting (PUR)
  - Indoor Air Emissions and Concentration Data
  - The National Human Exposure Assessment Survey (NHEXAS)
  - National Human Activity Pattern Survey (NHAPS)
  - The National Health and Nutrition Examination Survey (NHANES)
- But these data have not been evaluated for use in health tracking

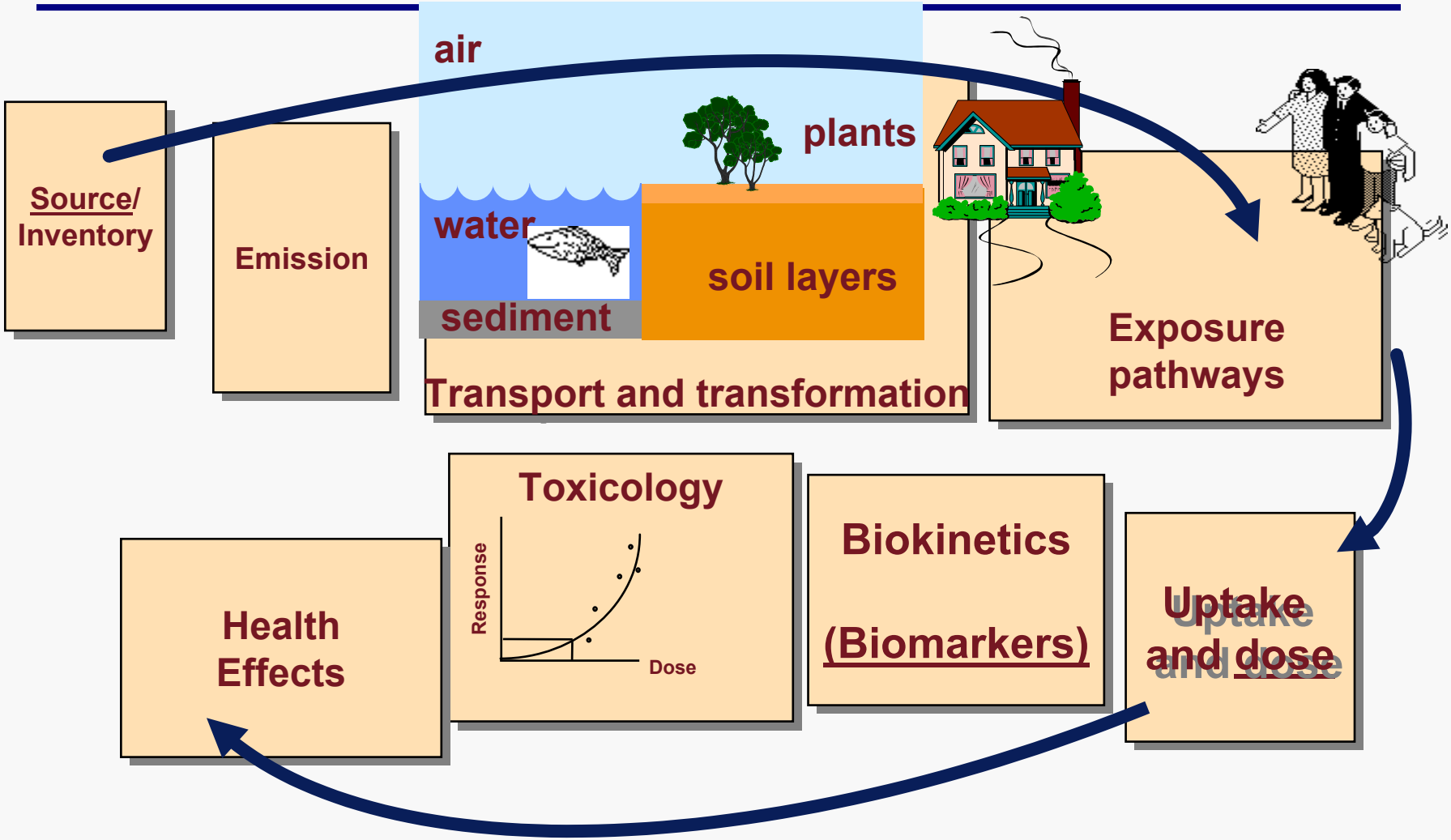
# Problems with Data



# Available Data
# "Empirical (Statistical)" Models



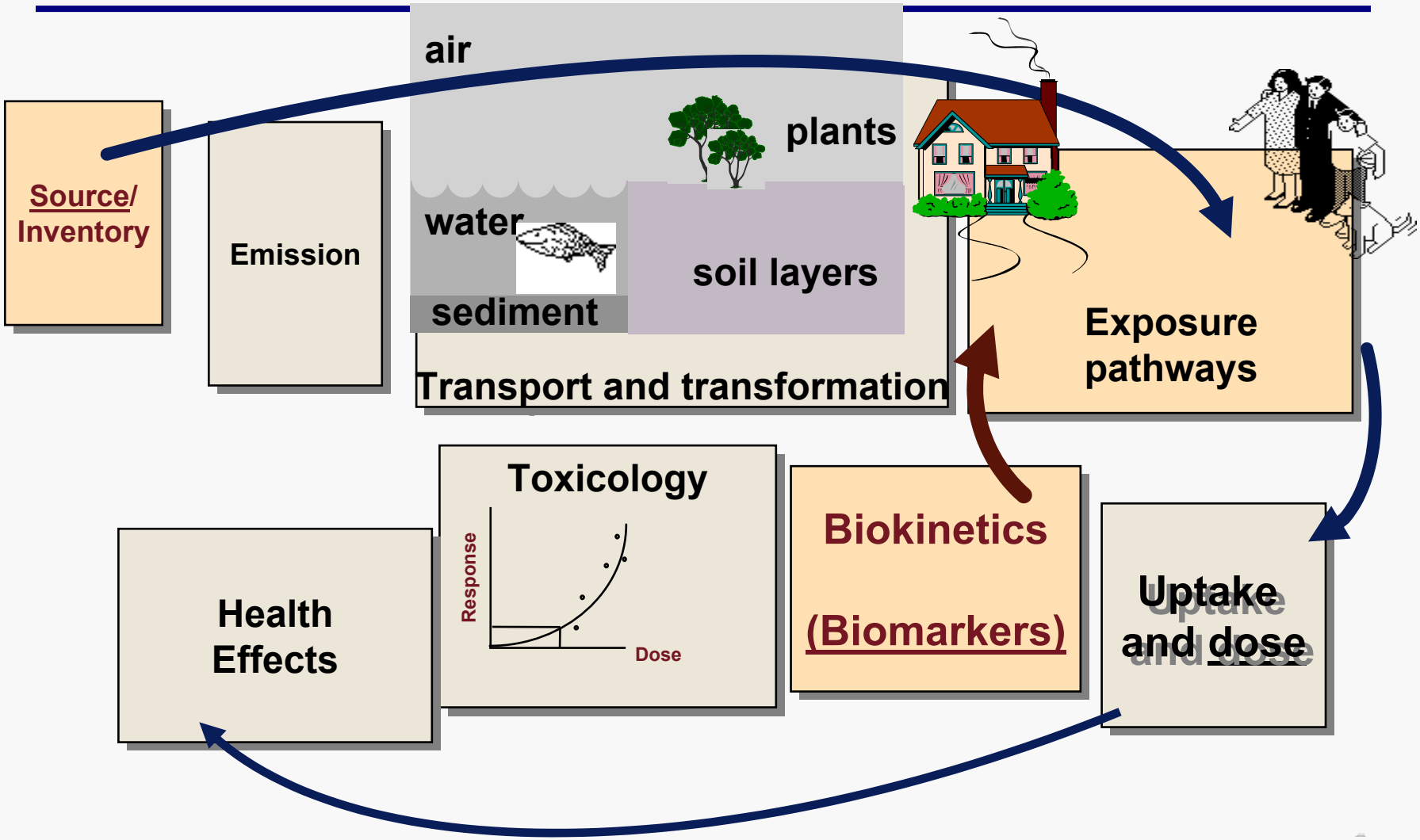
# Models (Process Approach) in Health Tracking



# What can we get from models?

- ~~Accurate predictions of exposure~~
- Insight
- Integrated metrics of source/dose relationships
  - Intake fraction
  - Persistence
  - Proximity metrics
- Repositories of existing knowledge
- Exploring plausible exposure pathways

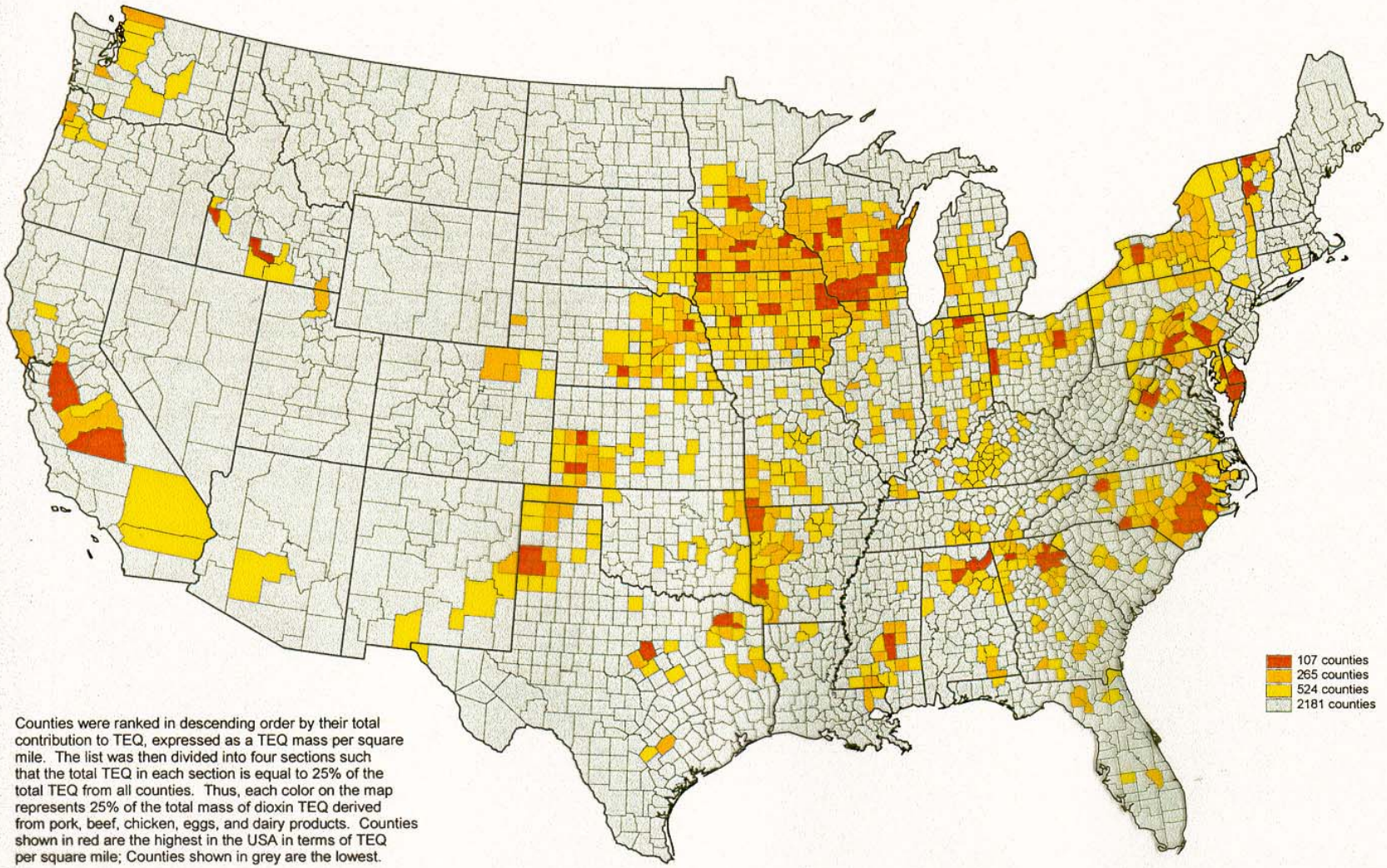
# Information Gaps
# Empirical vs. Process Approaches



# An Alternate Approach

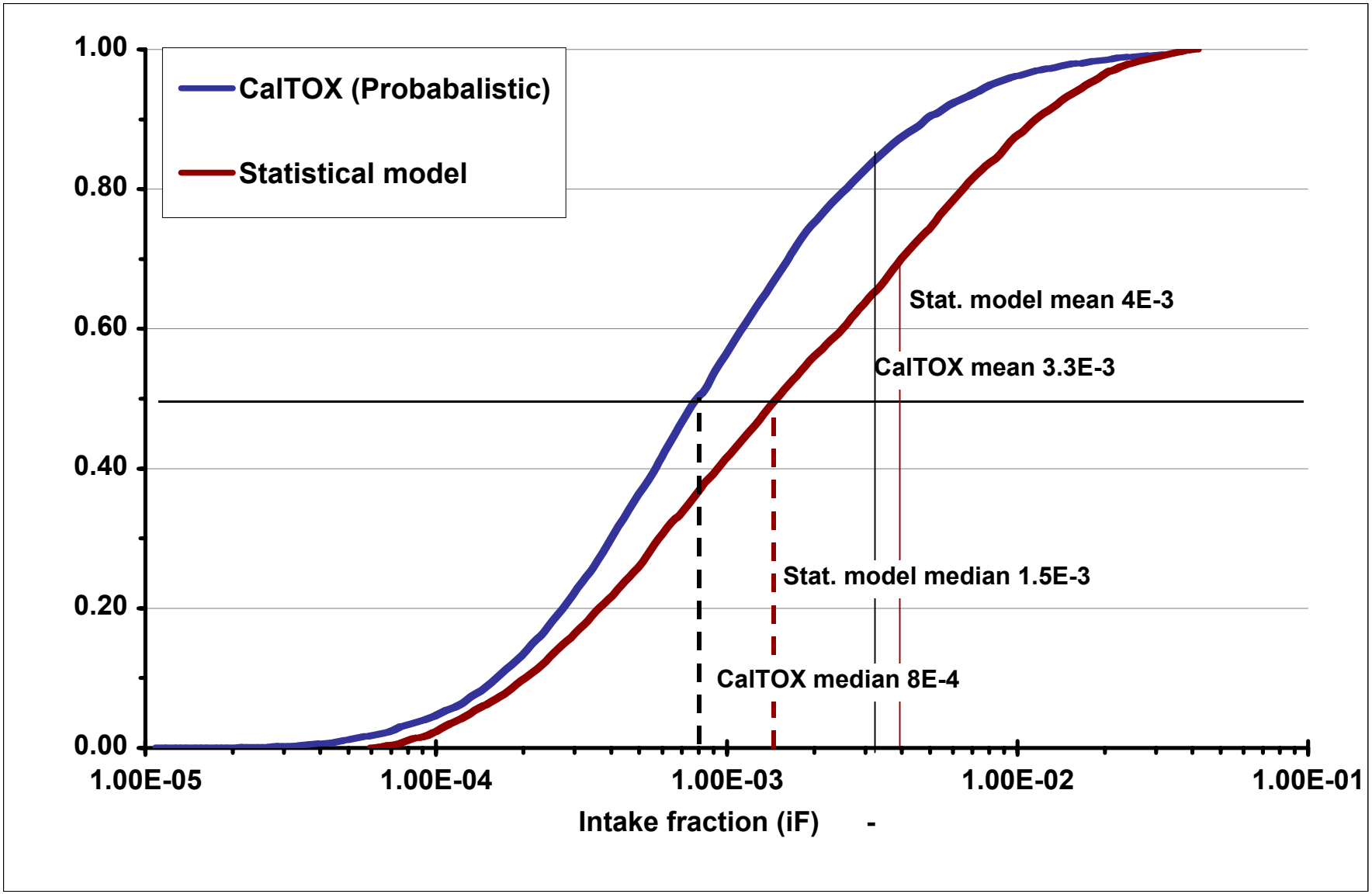
- Models provide a repository of prior but uncertain knowledge about source-exposure relationships
- Data provide alternative but uncertain knowledge about these relationships
- Merging these two information resources provides a process for constraining the universe of likely outcomes

# Major Contributors of Dioxin TEQ




Counties were ranked in descending order by their total contribution to TEQ, expressed as a TEQ mass per square mile. The list was then divided into four sections such that the total TEQ in each section is equal to 25% of the total TEQ from all counties. Thus, each color on the map represents 25% of the total mass of dioxin TEQ derived from pork, beef, chicken, eggs, and dairy products. Counties shown in red are the highest in the USA in terms of TEQ per square mile; Counties shown in grey are the lowest.

# TCDD iF derived from Models and Monitoring Data



# Concluding Points

- Persistence
- Proximity
- Mobility

# Relative values of Pov, Mobility, and CTD .