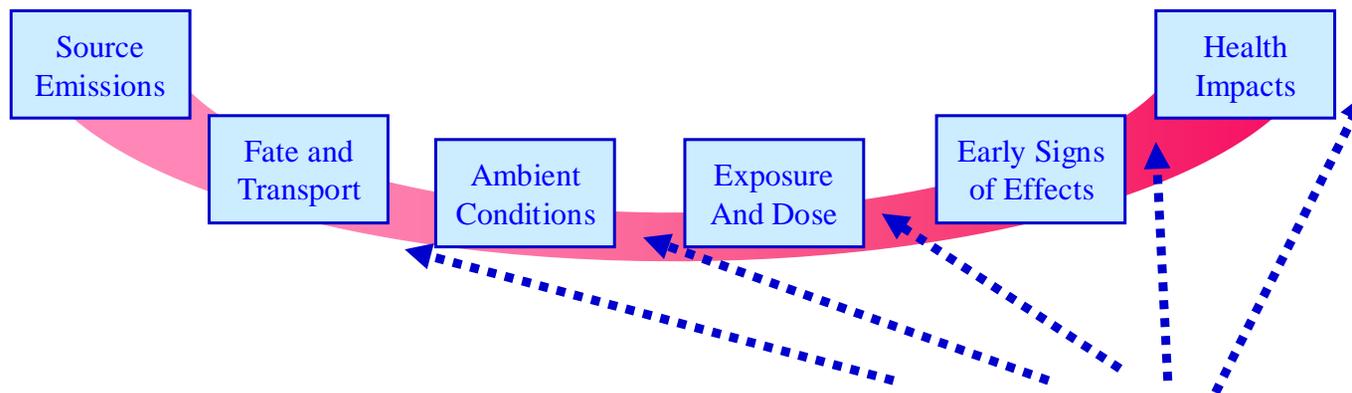


Over-Arching Goal: To Help EPA Protect Human Health



- Human health research develops the **methods, models, & data to characterize and reduce uncertainty** in the ‘critical links’ across the exposure-to-effect paradigm;
- and, explores **fundamental determinants of exposure and dose, and the basic biological changes (effects)** that result from exposure to environmental contaminants and lead to adverse health outcomes

4 Inter-related Long Term Goals: Risk assessors and risk managers USE ORD's methods and models to...

- Understand and reduce uncertainty in risk assessment using mechanistic (mode of action) information
- ↕
- Characterize aggregate & cumulative risk in order to manage risks to humans exposed to multiple environmental stressors
- ↕
- Characterize and provide adequate protection for susceptible populations
- ↕
- Evaluate the effectiveness of risk management decisions

Human Health Research Program
Multi-Year Plan
(FY 2006-2013)

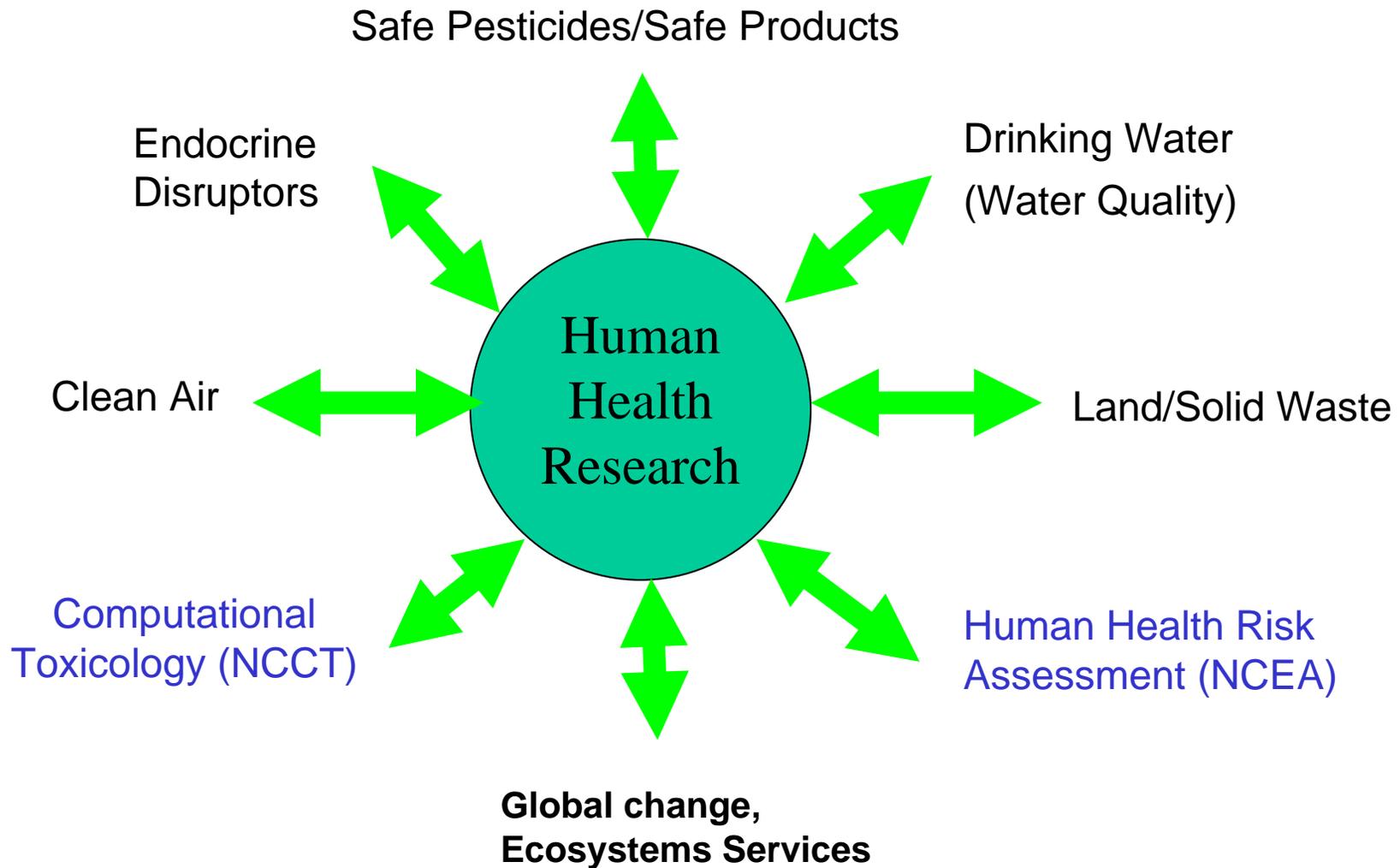


Office of Research and Development
US Environmental Protection Agency

2 June 06

BOSC review January 2009

Interdisciplinary, Cross-Program (“Core”) Research



HHRP products are broadly applicable to many partners and stakeholders

- Research informs risk guidance and assessments by NCEA, and computational toxicology modeling in NCCT
- Relevance/utility of research is not program office specific (OAR, OPPTS, OW, OSWER)
- Projects solve problems in Regions (States) and Tribes
- Close ties with Office of Children's Health Protection and Environmental Education (OCHPEE)
- Stress Cooperation with Federal Agencies: NIH, CDC, NIEHS, HUD
- International: WHO, OECD, IPCS

Mode of Action Research Accomplishments

- Cancer vs. non-cancer mechanisms: Conazoles (2012), Arsenic, Neuro-endocrine
- Interpretation of Biomarkers using PBPK modeling (2008 RFA)
- Strategic directions: Increasing emphasis on Key Events and Toxicity Pathways; Collaboration with NCCT
- Transition to Systems Biology Approaches
- Predictive Toxicology using “virtual organs”
- Responsive to NRC’s “Toxicity Testing 21st Century”and EPA’s “Strategic Plan for Evaluating the Toxicity of Chemicals” (2009)

Cumulative/Community Risk Assessment

- Cumulative risk assessments (OPP SAP)
OPs, Carbamates, Pyrethroids (2012)
- Exposure models: SHEDS, ERDEM, HEDS, CHAD
 - Characterize exposures in specific environments (homes, daycare, playgrounds)
- Strategic Directions:
 - Community based risk assessment: Regional-ORD workshop CBRA (July 2009)
 - Interpretation & Use of Biomonitoring Data (collaborations with CDC)
 - “Understanding the Role of Nonchemical Stressors and Developing Analytic Methods for Cumulative Risk Assessment” (2009 RFA)
 - Next generation of exposure models (SHEDS multi-media); translate to Regions and States (user-friendly web tools)
 - Collaboration with NCCT on exposure database

Children's Health Research

EPA-NIEHS Children's Environmental Health & Disease Prevention Centers
 Asthma, Autism, Gene-Environment
 Socio-Economic Factors

New Children's Center RFAs 2009

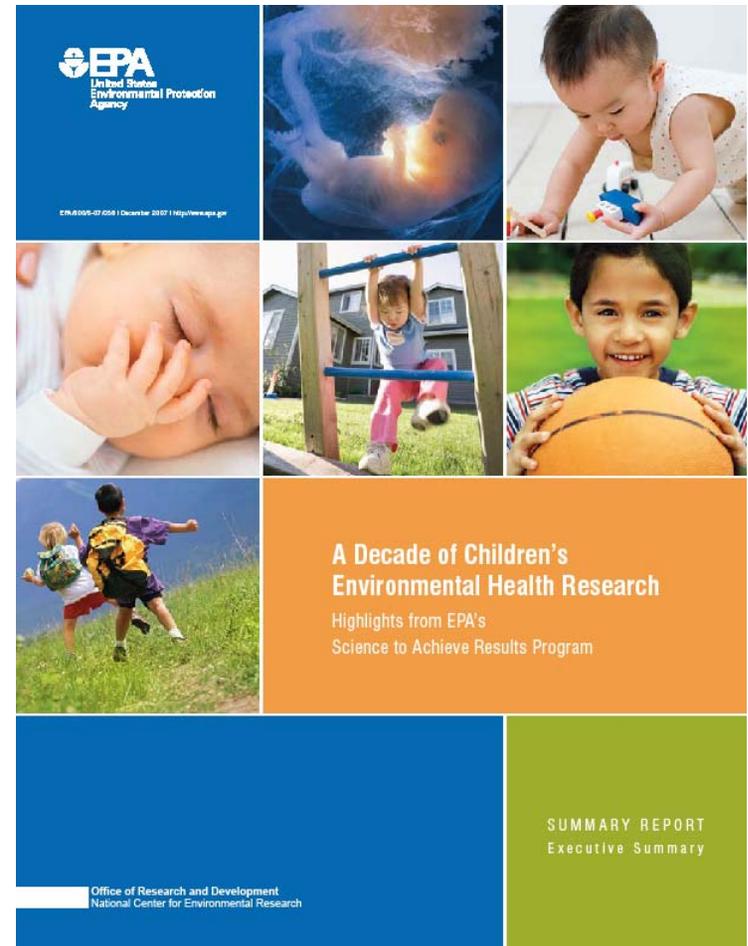
Vulnerability & Susceptibility based on life stage; Home/school environments

Child-specific exposure factor handbook (NCEA, 2008) all age groups

Methods: Breast milk; Biomarkers

Animal model: Developmental Basis for Health & Disease

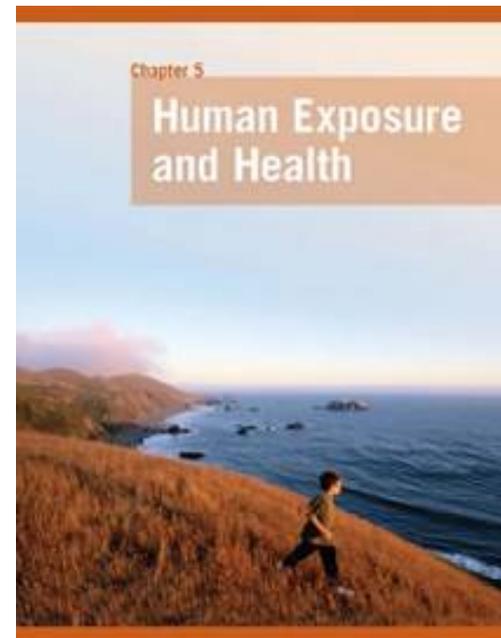
Active partnership/collaboration with National Children's Study



NCER 2007 Report

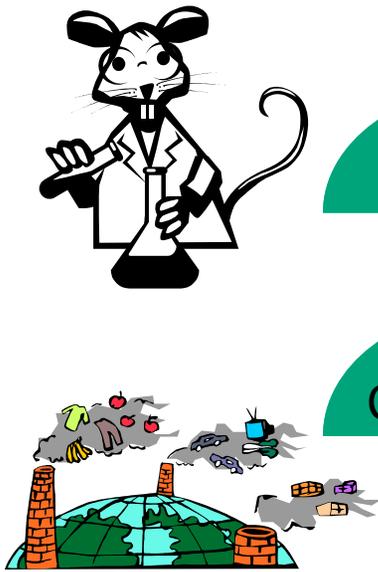
Evaluate Effectiveness of Risk Management Decisions (“Closing the Loop”)

- Framework & workshop 2008
- Public Health Indicators RFA, 2005
- Demonstration Projects (“Accountability”) with R1(2012)
 - **MA Water Plant Upgrade & Water Borne Illness**
 - **Clean Air initiative in New Haven**
- Exploring Linkages between Health Outcomes and Environmental Hazards, Exposures, and Interventions for Public Health Tracking and Risk Management 2009
- Tools & Public Health Indicators to understand disproportionate risk and impacts of climate change at community level (e.g. Tribal grants)



EPA Report on the Environment 2008

Managing Risks of Environmental Contaminants



Mode of Action

Cumulative Risk

Susceptibility Vulnerability



Address uncertainty and characterize variability to improve risk assessment

Assess the public health impacts of risk management decisions

To help EPA protect human health