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HUMAN HEALTH RESEARCH PROGRAM

BUILDING A SCIENTIFIC FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS

Long-Term Goal 3 ***Susceptible and Vulnerable*** ***Populations***

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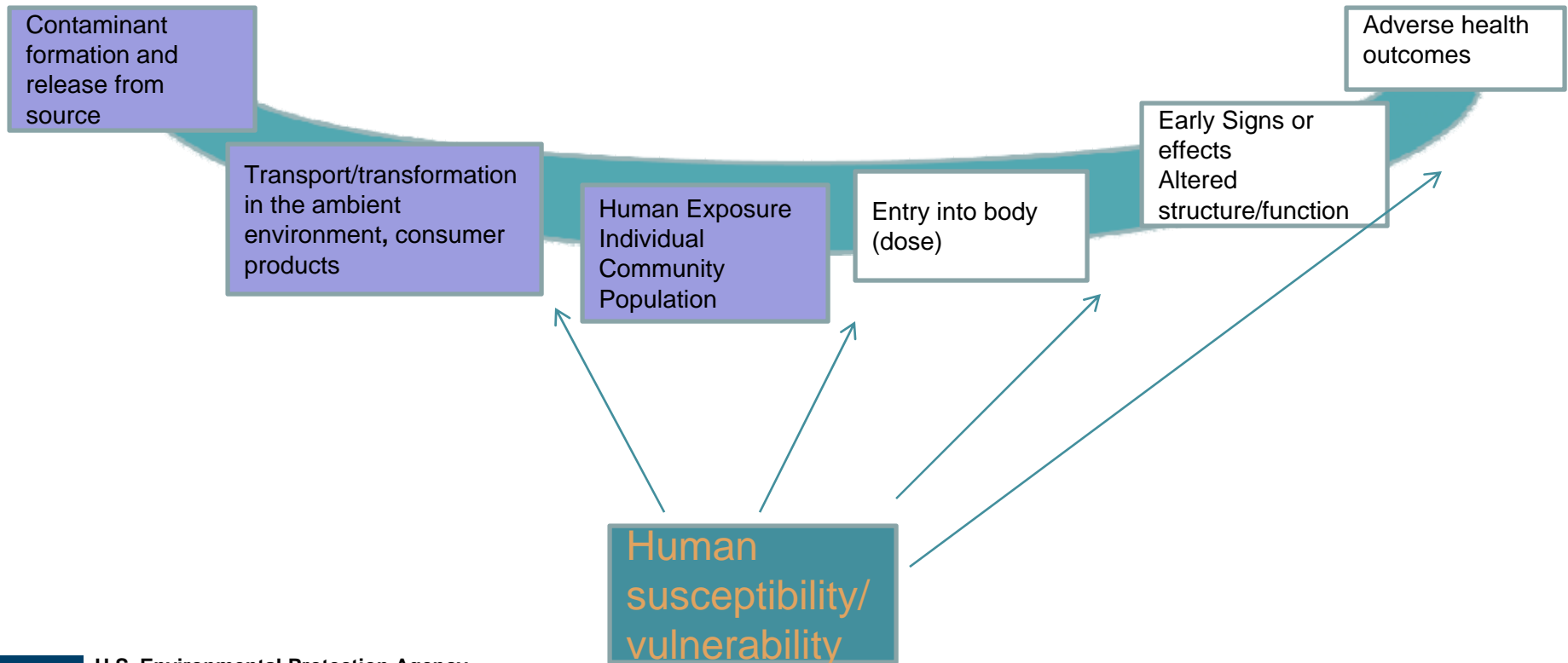
Long-Term Goal 3

ORD's research plan for LTG-3 is defined in the Human Health Research Plan (2006-2013) as addressing the requirements for risk assessors and risk managers to use ORD's methods, models, and data to characterize and provide adequate protection for susceptible and vulnerable populations.

Key Research Questions

- Is there differential life-stage responsiveness or exposure to environmental contaminants?
 - What are the long-term effects of developmental exposures to environmental contaminants?
 - How does aging affect responsiveness to environmental contaminants?
 - Why are some children especially vulnerable to environmental contaminants?
 - How can we model exposure and effects to protect susceptible groups, especially children?
- Which methods and models are appropriate for longitudinal research with children?
- What are the predisposing factors for diseases such as asthma and how does the indoor air environment affect susceptible populations?

Environmental Public Health Paradigm



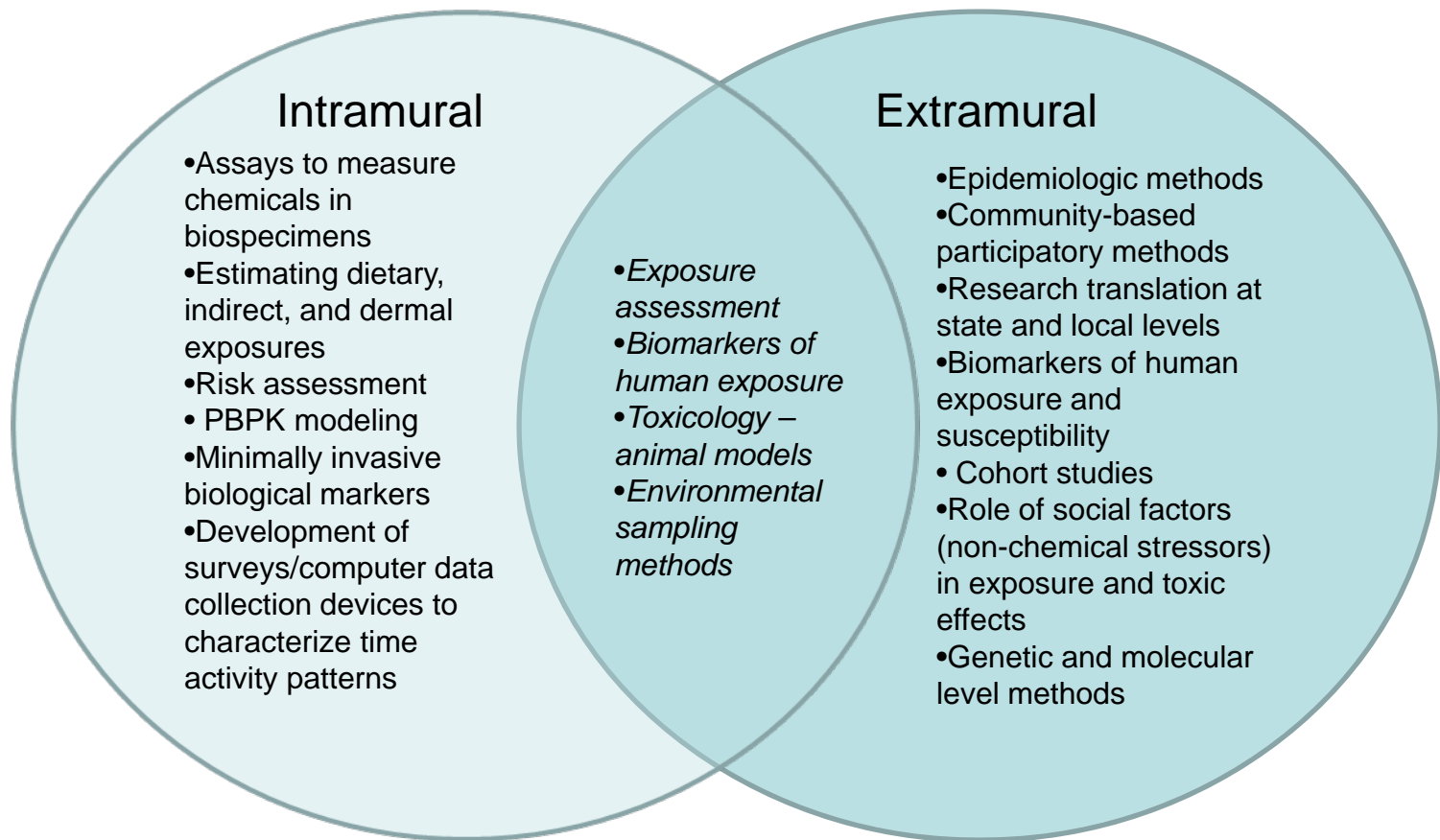
Populations may be vulnerable based on

- **susceptibility/sensitivity** (e.g., age, gender, genetic pre-disposition, pre-existing health conditions, etc.)
- **differential exposure** (e.g., structural inequalities, lifestyle factors, cultural practices, dietary factors such as subsistence fishing, activity patterns and proximity of homes, playgrounds or farms/gardens to a pollutant source, etc.)
- **differential preparedness** (e.g., disease immunizations, adequate nutrition, social capital, etc.), and
- **differential ability to recover** (e.g., quality healthcare access, general health and nutritional status, psychosocial stressors/support etc.). (U.S. EPA, 2003).

Vulnerability is a Focus of HHRP

- **susceptibility/sensitivity (e.g., age, gender, genetic pre-disposition, pre-existing health conditions, etc.)**
- **differential exposure (e.g., structural inequalities, lifestyle factors, cultural practices, dietary factors such as subsistence fishing, activity patterns and proximity of homes, playgrounds or farms/gardens to a pollutant source, etc.)**
- **differential preparedness (e.g., disease immunizations, adequate nutrition, social capital, etc.), and**
- **differential ability to recover (e.g., quality healthcare access, general health and nutritional status, psychosocial stressors/support etc.).**

Strengths of intramural and extramural LTG3 Research



LTG 3 Abstracts are sequenced by “Research Tracks” in the MYP

- Posters 1-10 include Research on Life Stage (Track 1) & Methods for Longitudinal Research (Track 2)
- Posters 11-13 include Research on Asthma (Track 3)

LTG3 Abstracts can also be grouped into three (sometimes overlapping) themes

- Theme 1: Research to Understand Environmentally Mediated Disease and Life-Stage Susceptibility to Environmental Contaminants
- Theme 2: Exposure Factors (relates to LTG 2)
- Theme 3: Tools and Methods

Theme 1: Research to Understand Environmentally Mediated Disease and Life-Stage Susceptibility to Environmental Contaminants

- LTG3-01: How Does ORD's Research Improve EPA's Understanding of Children's Exposures and Risks?
- LTG3-02: Children's Health Outcomes and Susceptibility Research
- LTG3-06: Developmental Origins of Health and Disease
- LTG3-07: Why some children are especially vulnerable to environmental contaminants than other children
- LTG3-10: How is ORD Leading the Effort to Improve Our Understanding of Susceptibility in the Aging Population to Environmental Stressors?
- LTG3-11: How do combustion related products cause/induce asthma and what can we do about it?
- LTG3-13: Central role of Life-stage on induction/ exacerbation of asthma

Theme 2: Exposure Factors

- LTG3-03: Analyses of Observational Studies to Identify Exposure Factors Relevant to Children
- LTG3-09: Are Aging Adults at Risk from Exposure to Environmental Stressors?
- LTG3-12: Protecting the Health of Asthmatics: Indoor Bioaerosol Research Provides Hazard Identification, Exposure Risk Management and the Assurance of Science Based Regulations

Theme 3: Tools and Methods

- LTG3-04: Design and Ethical Considerations in Longitudinal Research Studies
- LTG3-05: Advances in Research Tools and Field Sampling Methods for Use in Observational and Longitudinal Studies
- LTG3-08: Overview of EPA's Continued Leadership for the National Children's Study

Summary: LTG 3 Research...

- Is multidisciplinary and builds on the strengths intramural and extramural research expertise
- Provides research findings that inform and use results of other LTGs
 - Tools and methods for cumulative exposure assessment (LTG2)
 - Specific mechanisms for disease susceptibility and metabolism (LTG 1)
 - Illustration of the source-exposure-effect continuum and impact of regulatory decisions (LGT4)

- Has impacts on
 - Exposure and risk assessment practice, especially the use of uncertainty factors to protect susceptible and vulnerable populations
 - Regulatory development at federal level
 - State and local interventions
 - Community-based participatory research practice and research translation

- Is forward thinking
 - Stable birth cohorts will allow examination of influence of social factors on exposure and toxic effects
 - Longitudinal studies (like NCS) will enable us to test the DOHaD hypothesis (developmental origins of adult disease)
 - New Duke Southern Center on Environmentally-Driven Disparities in Birth Outcomes will determine how environmental, social, and host factors jointly contribute to health disparities
 - Research results will contribute to the development of a community specific risk assessment program (LTG2)

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