



NTP Board of Scientific Counselors Meeting

DNTP Strategic Portfolio

December 8, 2021

DNTP Strategic Portfolio

Scott Masten, PhD, DABT

Division of the NTP

National Institute of Environmental Health Sciences

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Outline

- Portfolio strategy – structure, planning, management
- Delivering on strategic research priorities
- Addressing contemporary topics
- Increasing our impact – focus on stakeholders, products, execution



(1) Collaborate with public stakeholders and global partners to identify and address public health issues



(2) Generate and communicate trusted scientific information to support decision-making on environmental hazards of public interest



(3) Lead the transformation of toxicology through the development and application of innovative tools and strategies



(4) Educate and train the next generation of translational scientists to be innovative leaders in the field

DNTP Strategic Objectives

- Accelerate our progress in the evolution toward a more predictive, precise, and preventive science through the deliberate application of a translational toxicology pipeline of capabilities
- Provide an evidence-based approach to identifying and understanding potential environmental contributors to contemporary and common diseases
- Improve our ability to conduct and communicate substance-based hazard evaluations that are more translational, innovative and responsive



Goal 2 - Generate and communicate trusted scientific information to support decision-making on environmental hazards of public interest

Exposure-based
Research Programs



Responsive Research
Programs



Goal 1 - Collaborate with public stakeholders and global partners to identify and address public health issues

Health Effects
Innovation Programs



Goal 3 - Lead the transformation of toxicology through the development and application of innovative tools and strategies

Strengthening
Capabilities Programs



Exposure-based Research Programs



Responsive Research Programs



Health Effects Innovation Programs



Strengthening Capabilities Programs



- **Combined Exposures and Mixtures (CEM)**
- **Consumer Products and Therapeutics (CPT)**
- **Occupational and Inhalation Exposures (OIE)**
- **Emerging Contaminants and Issues of Concern (ECIC)**
- **Safe and Sustainable Alternatives (SSA)**
- **Carcinogenesis (Carci)**
- **Cardiovascular (CV)**
- **Developmental Neurotoxicity (DNT)**
- **Novel Tools and Approaches (NTA)**
- **Scientific Cyberinfrastructure (SCI)**

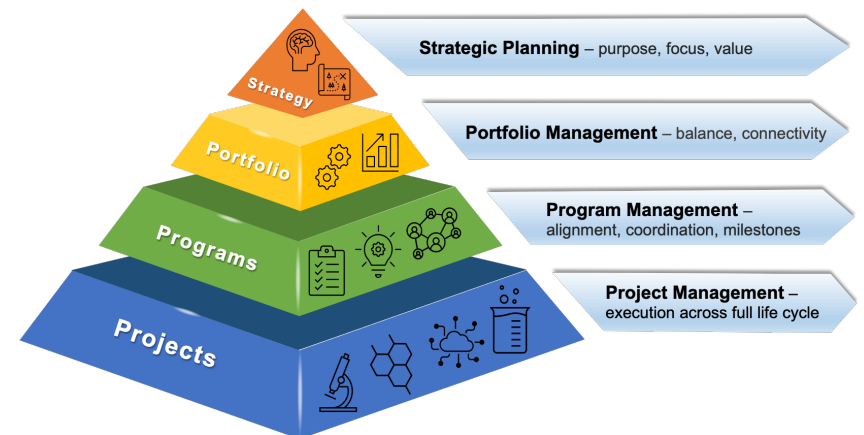
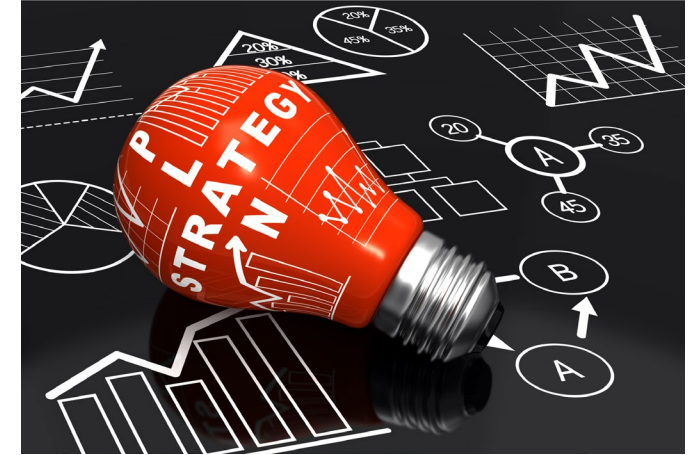
Portfolio Composition

- Not 10 independent programs
- Intersections of projects, people, and processes
- Connectivity is necessary and intentional
 - Leverage => feature
 - Dependency =>



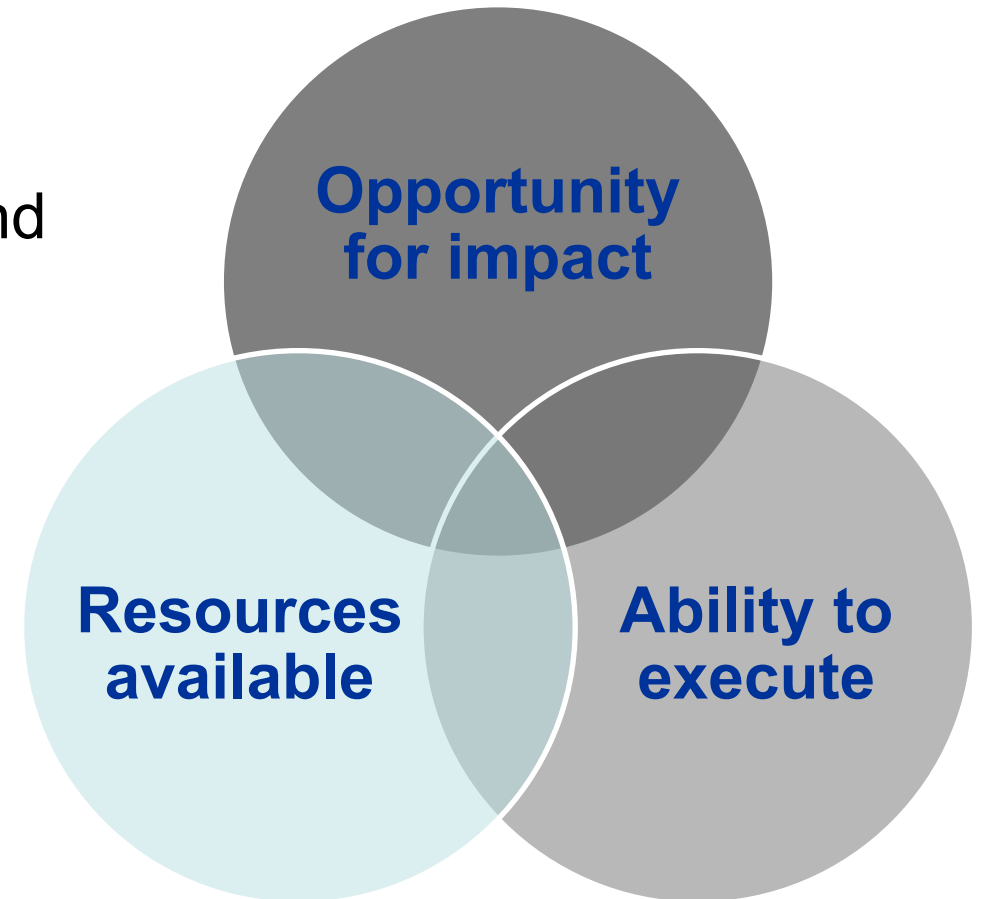
Strategic Program Planning Outputs

- Program Management Teams (PMTs) formulated strategy, objectives, projects, milestones
- Engaged with NTP Board of Scientific Counselors (BSC)
 - Completed 5 meetings in 9 months, reviewed all 10 programs, effort from >60 DNTP staff
- Program Plans (10)
- Objectives (30)
- Strategic Research Priorities (12)



Determining Strategic Priorities

- Opportunity, need, importance
- Capability, capacity, feasibility
- Resources and effort required, staff expertise and availability, timelines, external pressures
- Integrative, leveraging capabilities and partnerships
- Not overly broad topics e.g., “mixtures” or exposome
- Not specific exposures or substances or approaches
- Not formulaic – no scoring, ranking, etc.



Cross-Cutting Topics

Output and outcome metrics

How to best measure success and ensure DNTP science is impactful?

Equity, diversity, and inclusion

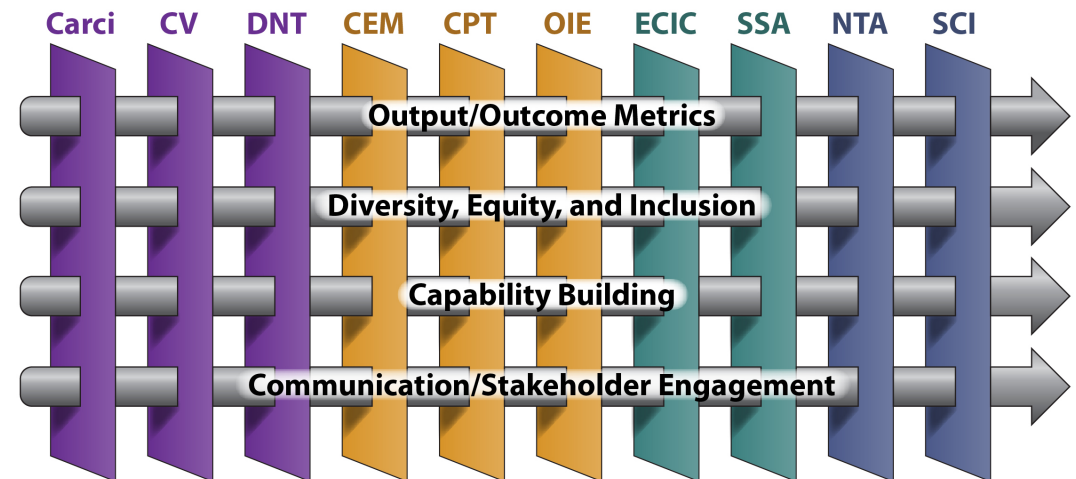
How to account for sociocultural factors that lead to environmental health disparities?

Capability building for the future

How to foster a culture of innovative, forward thinking?

Optimizing stakeholder engagement and communication

How to tailor approaches and products for diverse audiences and purposes?



Program Research Priorities

Objective 1. Accelerate our progress toward becoming a more predictive, precise, and preventive science through the deliberate application of a translational toxicology pipeline of capabilities

Exposure-based Research Programs



Responsive Research Programs



1.1 Define and apply an innovative approach to identifying and characterizing hazards of complex and/or combined exposures for existing project areas (botanical dietary supplements, natural mineral fibers, HIV therapeutics)

1.2 Develop and apply defined approaches to infer hazard across specific structural (organohalogen flame retardants) and functional (personal care products) substance classes

1.3 Develop and qualify effective tools and approaches to support timely research responses to emerging public health issues and the assessment of safer alternatives

Program Research Priorities

Objective 2. Provide an evidence-based approach to identifying and understanding potential environmental contributors to contemporary and common diseases

Health Effects Innovation Programs



2.1 Define and apply a suite of screening approaches to evaluate bioactivities critical to understanding carcinogenicity, cardiovascular toxicity and altered neurodevelopment

2.2 Characterize the likelihood that specific environmental exposures represent human-relevant carcinogenic, cardiovascular and developmental neurotoxic hazards by defining, developing and adapting a pipeline of internal and external laboratory and computational assessment capabilities

2.3 Develop and apply an approach to identify and characterize the contributions of environmental exposures to a specific cardiovascular disease (gestational hypertension) and cancer (early onset colorectal carcinoma)

Program Research Priorities

Objective 3. Improve our ability to conduct and communicate substance-based hazard evaluations that are more translational, innovative and responsive

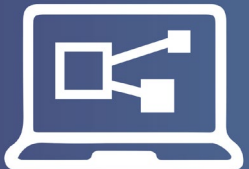
Strengthening Capabilities Programs



3.1 Develop and evaluate a suite of complex in vitro 3D cellular systems (spheroids, organoids) to model human-relevant organ-specific toxicity to support current portfolio priorities



3.2 Develop and evaluate a suite of multiscale computational models to support current portfolio priorities



3.3 Assemble and support a robust scientific cyberinfrastructure and advanced informatics tool set to enhance and expand the delivery of DNTP knowledge products

Delivering Priorities

Objective 2. Provide an evidence-based approach to identifying and understanding potential environmental contributors to contemporary and common diseases



2.1 Define and apply a suite of screening approaches to evaluate bioactivities critical to understanding carcinogenicity, cardiovascular toxicity and altered neurodevelopment

Relevant Projects

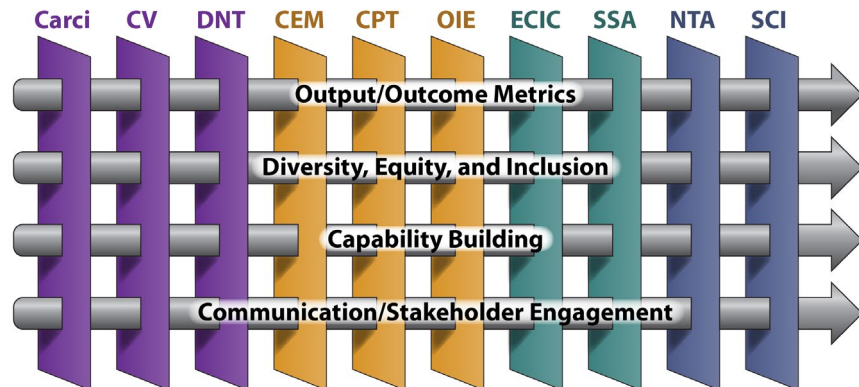
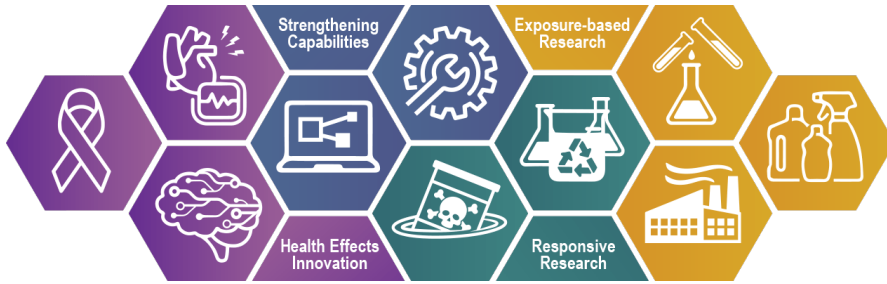
- High-throughput bioactivity assessment via CardioToxPi
- In silico model of hERG inhibition
- In vitro assessment of cardiovascular toxicant mechanisms
- Utilization of microphysiological systems to incorporate xenobiotic metabolism in cardiovascular toxicity screening



- **Key Actions**
- **Outputs**
- **Timeline**

Thematic Research Priorities

Identify high value opportunities to strategically implement contemporary and/or cross-cutting topics across all research programs



4.1 Refine current toxicology study and assessment approaches to better understand and account for social determinants of health

4.2 Selectively adapt current projects to address the disproportionate impacts of climate change on individuals and populations

4.3 Define creative approaches to effectively engage scientific, policy and community stakeholders to increase the impact of DNTP research products

Social Determinants of Health (SDOH)

Healthy People 2030

“Social determinants of health (SDOH) are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.”

- Intricately tied to physical determinants of health e.g. natural and built environments, exposure to hazardous substances and conditions



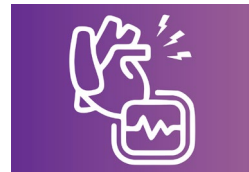
4.1 Refine current toxicology study and assessment approaches to better understand and account for social determinants of health

Social Determinants of Health



DNTP Projects Relevant to SDOH

- Geospatial exposure, disparity, and risk mapping (K. Messier)
- Hazard characterization and assessment of substances/exposures with evidence of disproportionate impacts e.g., glyphosate, PAHs
- Scoping reviews of the association between chemicals in personal care products and timing of fetal growth and puberty
- Literature review on impact of psychosocial stressors related to health disparities and Environmental Exposures on cardiovascular health effects in women of U3 populations



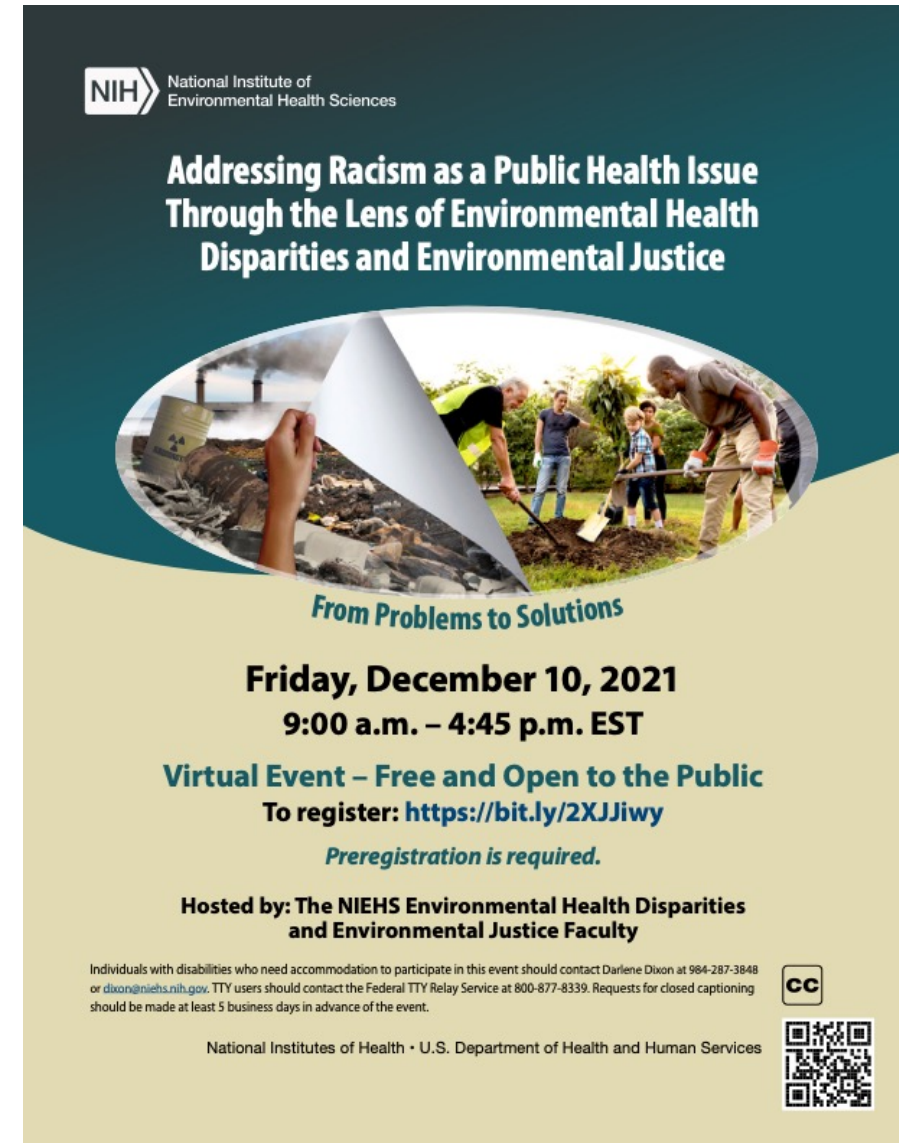
4.1 Refine current toxicology study and assessment approaches to better understand and account for social determinants of health



Addressing Racism as a Public Health Issue


NIEHS and community partners organized this workshop to –

- Raise awareness of the problem of systemic racism in America and its contributing role to Environmental Health Disparities (EHD)
- Inform the NIEHS community of current EHD research and outreach activities in Environmental Justice (EJ)
- Engage regional and local community leaders involved in EJ advocacy networks to discuss best practices for community engagement



NIH National Institute of Environmental Health Sciences

Addressing Racism as a Public Health Issue Through the Lens of Environmental Health Disparities and Environmental Justice



From Problems to Solutions

Friday, December 10, 2021
9:00 a.m. – 4:45 p.m. EST



Virtual Event – Free and Open to the Public
To register: <https://bit.ly/2XJjiwy>

Preregistration is required.

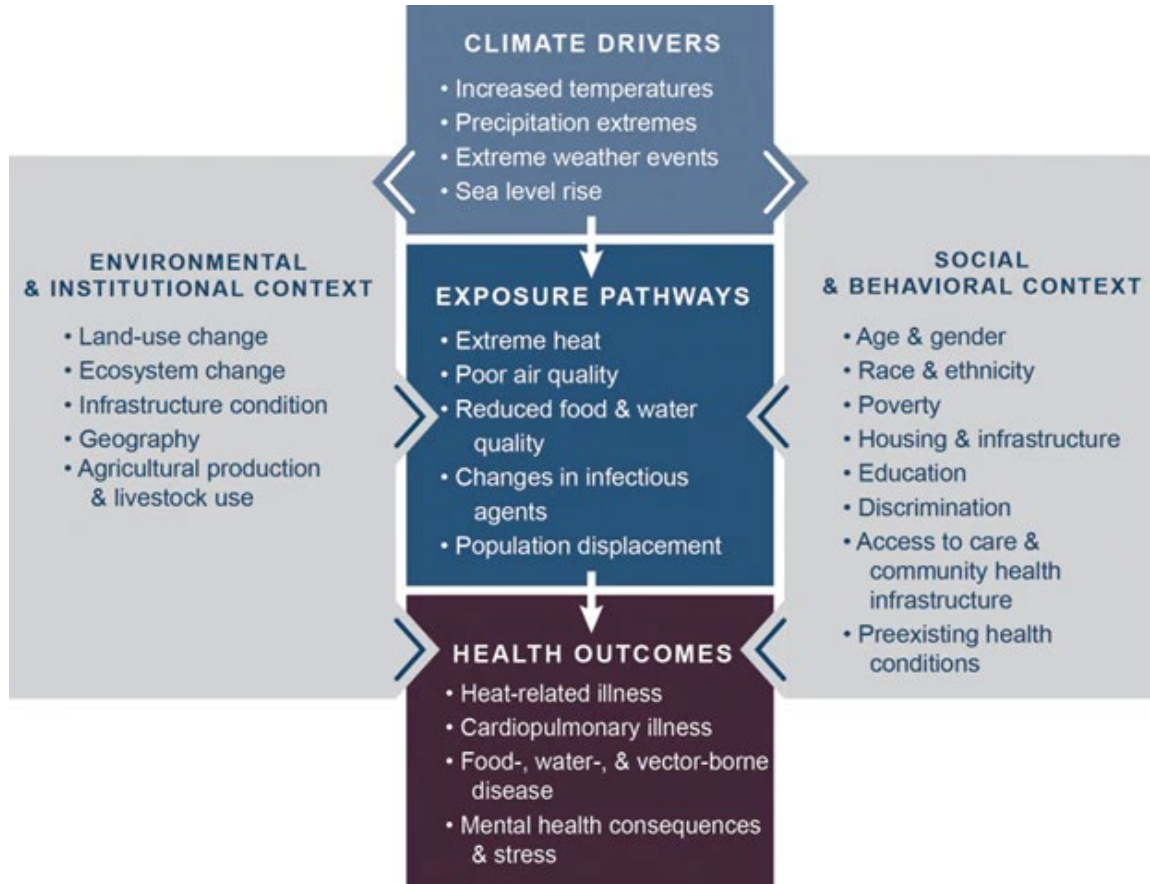
Hosted by: The NIEHS Environmental Health Disparities and Environmental Justice Faculty

Individuals with disabilities who need accommodation to participate in this event should contact Darlene Dixon at 964-287-3848 or dixon@niehs.nih.gov. TTY users should contact the Federal TTY Relay Service at 800-877-8339. Requests for closed captioning should be made at least 5 business days in advance of the event.

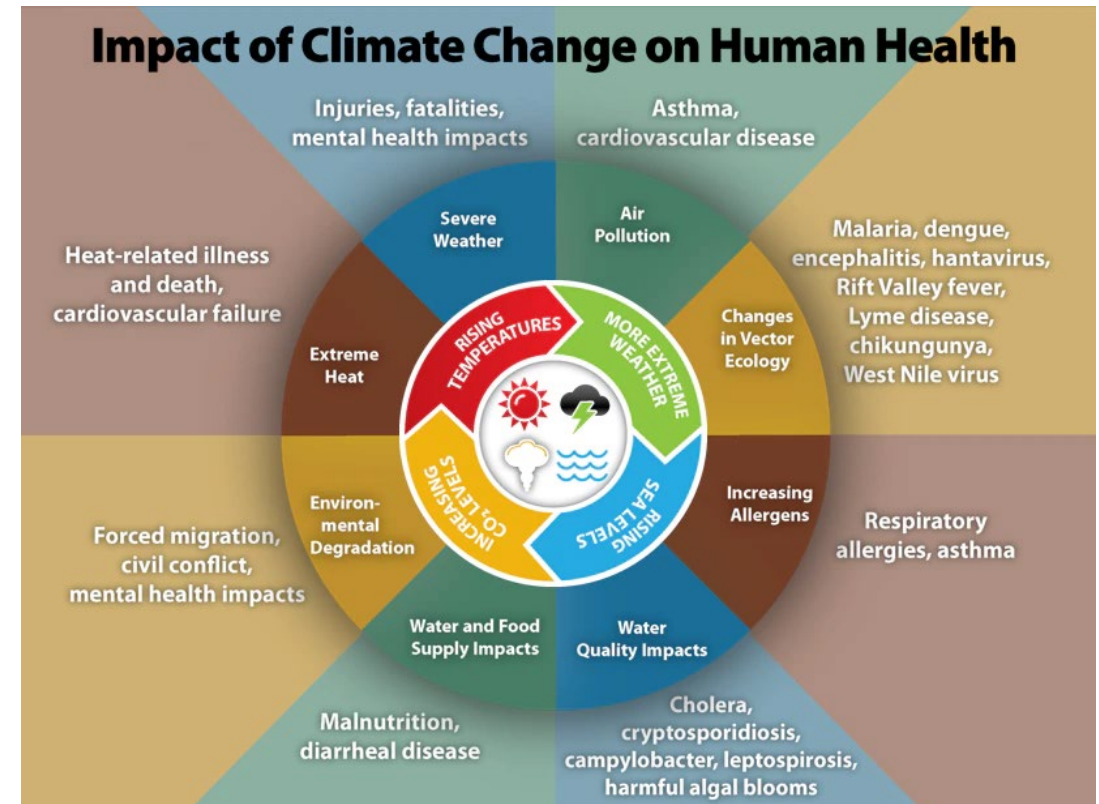
National Institutes of Health • U.S. Department of Health and Human Services



Climate Change and Human Health








4.2 Selectively adapt current projects to address the disproportionate impacts of climate change on individuals and populations



Climate Change Health Impacts Research in DNTP



- Harmful algal blooms – cyanotoxins drinking water toxicology studies 
- Molds and mycotoxins – fungal aerosol inhalation toxicology studies 
- Wildfires – woodsmoke cancer hazard evaluation 
- Heightened risk of vulnerable populations – susceptibility to immune dysfunction 
- Emergent diseases – chronic kidney disease of uncertain/nontraditional etiology (CKDu) 

4.2 Selectively adapt current projects to address the disproportionate impacts of climate change on individuals and populations



NTP TECHNICAL REPORT ON
THE TOXICITY STUDIES OF
ASPERGILLUS FUMIGATUS
ADMINISTERED BY INHALATION
TO B6C3F1/N MICE (REVISED)

NTP TOX 100

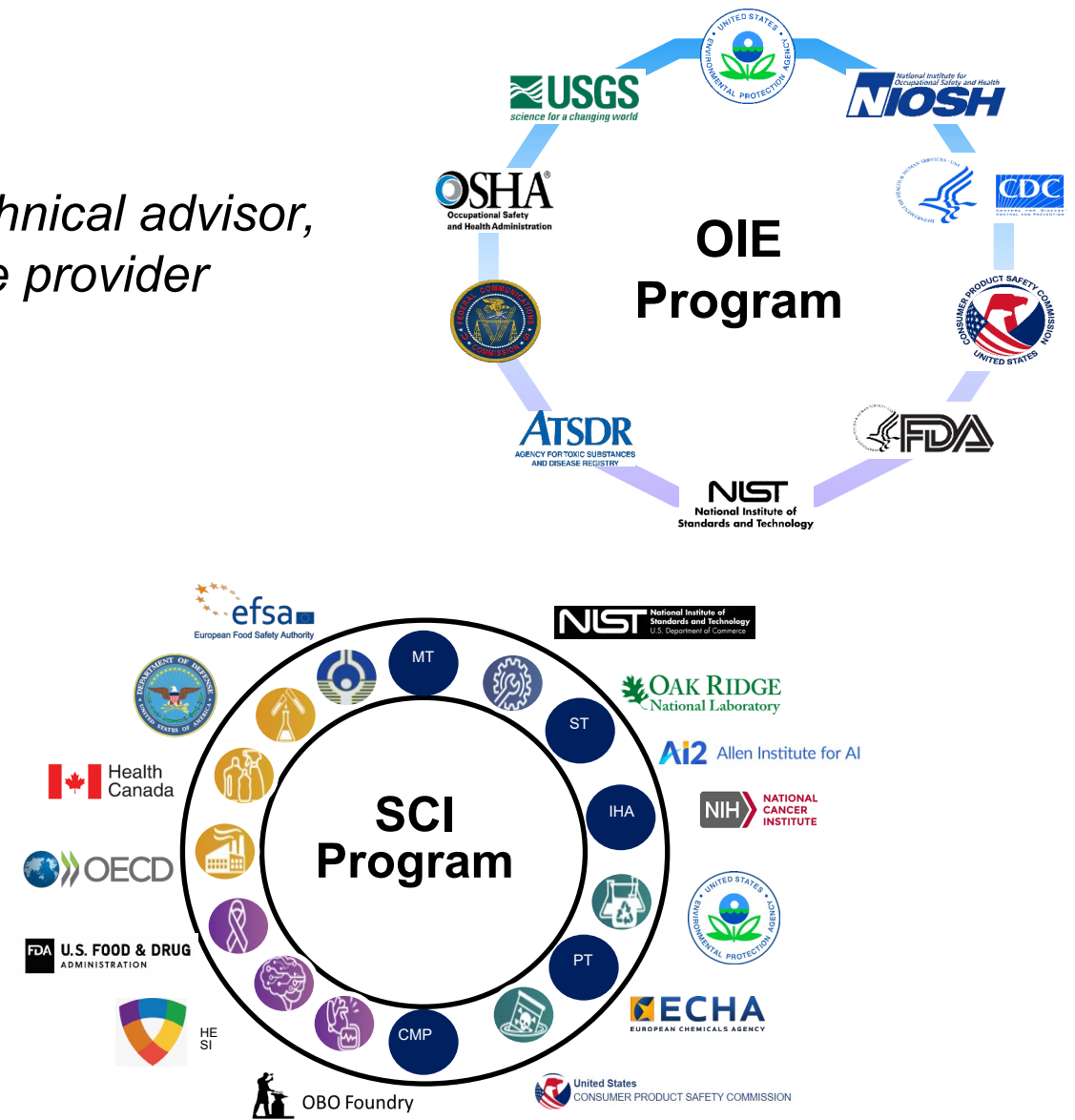
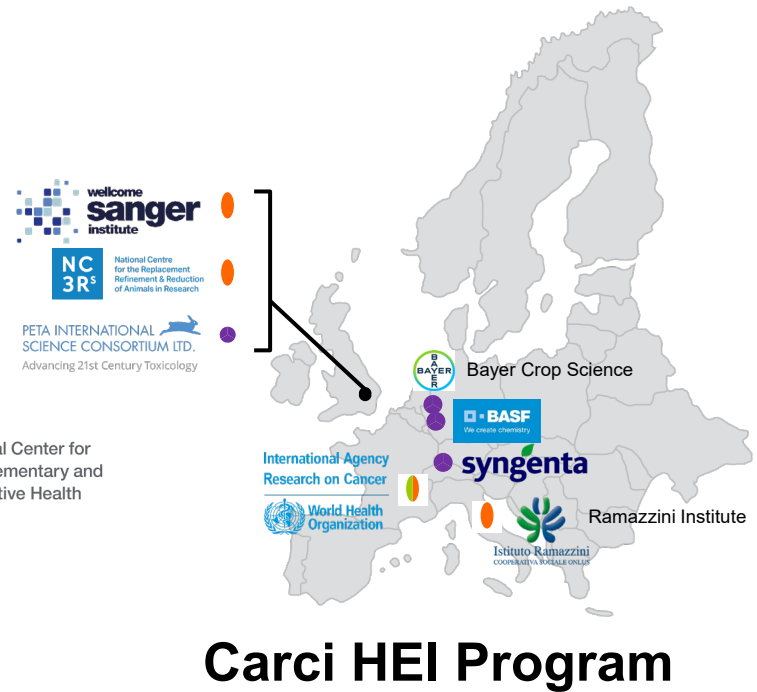
JULY 2021

REVISED OCTOBER 2021

DNTP Has Many Stakeholders


With diverse roles and relationships -

partner, collaborator, advocate, interested party, technical advisor, data/information user, community, individual, service provider



Stakeholder Engagement

- Identification
 - Who is interested, affected, can help...
- Types of interactions
 - Consultation, information sharing, inquiries, referrals, briefings
- Mechanisms
 - Formal or informal partnership
- Levels of engagement
 - Connection, one-time, info exchange or technical input
 - Coordination, time-limited, specific topic
 - Collaboration, sustained, joint effort on 1 or more topics



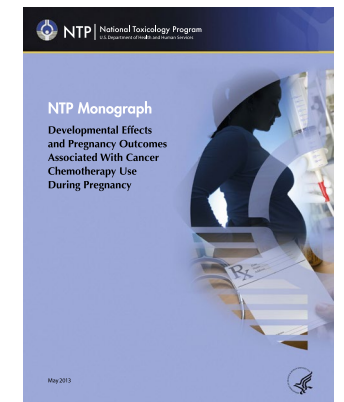
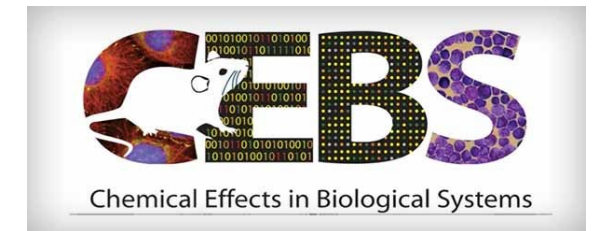
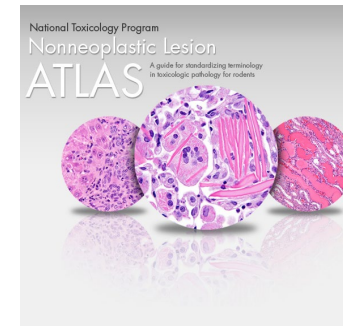
4.3 Define creative approaches to effectively engage scientific, policy and community stakeholders to increase the impact of Dntp research products



CPT Program, June 2021

Beyond Traditional Products

- Articles, reports, monographs
- Tools, datasets, knowledge bases
- Influence, service, training
- Advice and decision support
- Timing and pace of delivery
- Content and audience
- Scale and reach



Path to Impact Is Iterative and Interconnected



Translational Toxicology Pipeline

Implementation of Portfolio Strategy

- Define key actions, deliverables and timelines across all programs to guide tactical decisions
- Improve project and resource management
- Plan future BSC engagements focused on foundational and cross-cutting topics



Summary

- DNTP research portfolio is organized around overarching strategic objectives
- Individual research programs align to those objectives while tackling important opportunities in our mission space
- Strategic research priorities will guide focused effort over next 3 years, delivered by executing projects from across all programs
- Our strategy and operational model affords flexibility to apply resources and areas of strength to address timely and important public health issues
- Stakeholder interests and needs drive the work we do, establishing and nurturing these interactions at scale requires creative approaches
- Our knowledge products effectively reach traditional scientific and regulatory audiences, much greater impact could be realized by developing novel outputs

