US EPA Office of Research and Development

ORD Call on Chemical Safety and Assessment Research Planning with ECOS

May 3, 2018

Objective

Inform development of EPA Office of Research and Development's (ORD) next set of Strategic Research Action Plans (StRAPs) by identifying the research, assessment and information needs of our state partners

Guiding Questions for Discussion

- Are there any clarifying questions about our capabilities and/or the kind of research we do related to chemical safety and assessment?
- Do the areas on which we are focusing align well with your states' science and technical needs?
- Are there areas you would suggest emphasizing or de-emphasizing? Is there anything missing?
- Do you have any other feedback as we formulate our Strategic Research Action Plans?

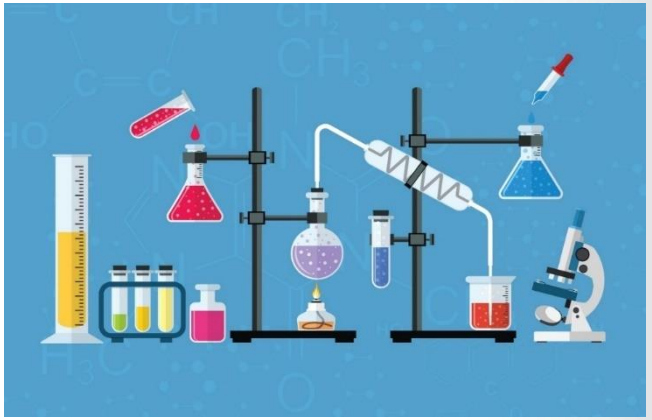
ORD Strategic Research Action Plans

- Describe our research program over 2016-2019 for internal and external audiences
- Developed in consultation with EPA program and regional offices, other stakeholders and advisors – our guide for resource planning activities
- Implemented by ORD's Labs and Centers
- Planning and progress are reviewed by ORD's Board of Scientific Counselors

http://www.epa.gov/research/strategic-research-action-plans-2016-2019

Drivers for StRAP Revision

- Agency priorities and focus have changed
  - EPA 2018-2022 Strategic Plan
  - Administrator's priorities
- New/Revised regulatory drivers
  - Revised Toxic Substances Control Act (TSCA)
- Increasing pressure for new chemical assessment methodologies (better, cheaper, faster)
- Advancements in the chemical sciences
- Anticipated resource reductions
- Desire to engage more with state partners



CSS Vision

- **Chemical Safety for Sustainability (CSS)** Research Program provides methods, data, information and tools to EPA partners and stakeholders enabling more informed, timely decisions about chemicals, many of which have not been thoroughly evaluated for potential risks to human or ecological health

- CSS develops tools for chemical evaluation, advancing understanding of complex systems, providing information translation and delivering a chemical knowledge infrastructure

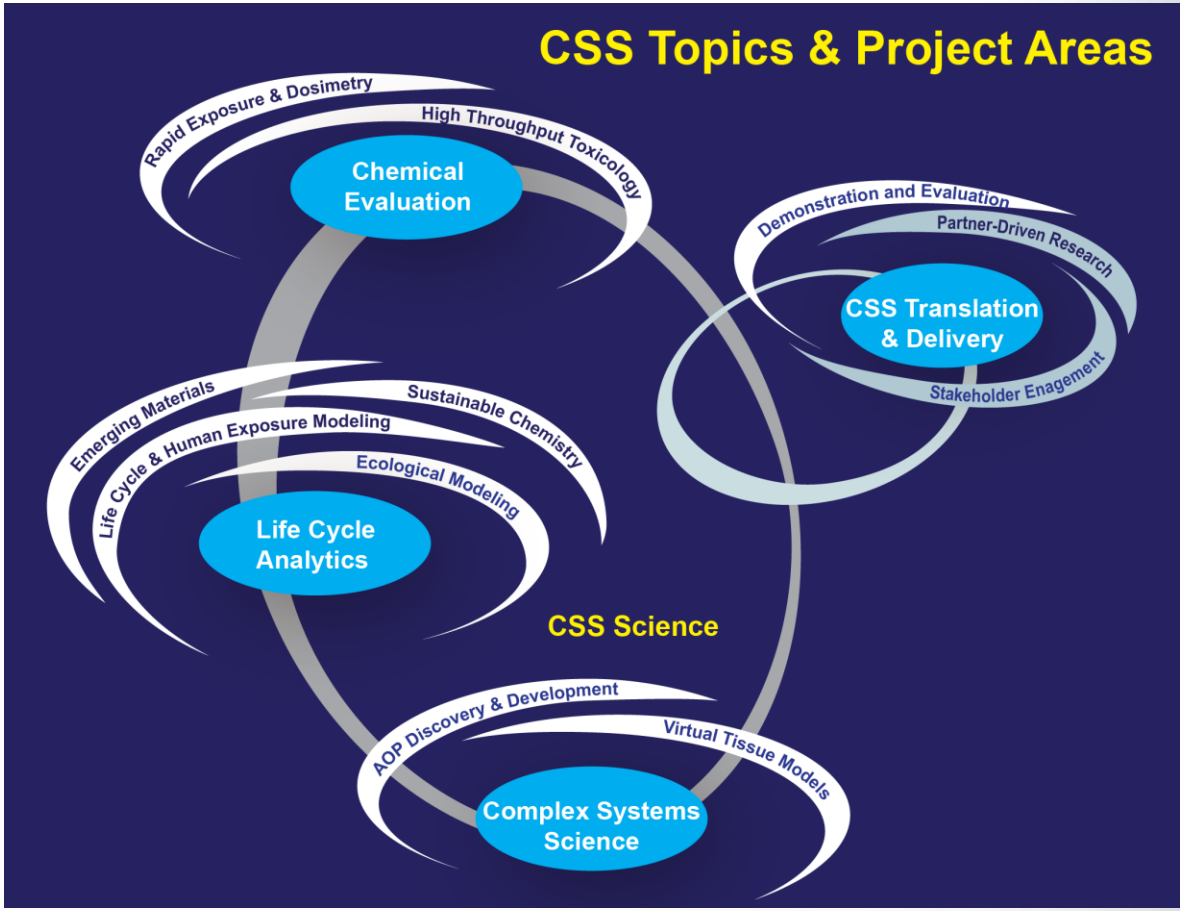
CSS Structure

Three Research Topics

- Chemical evaluation
- Life cycle analytics
- Complex systems science

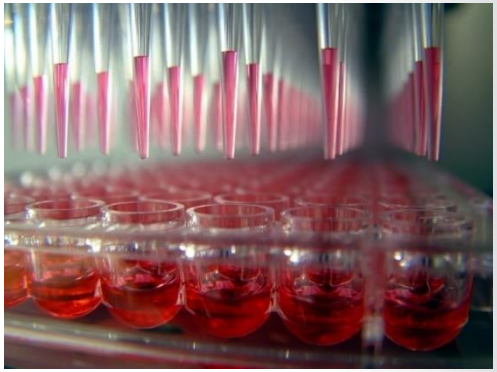
One Translation Topic

- Solutions-based Translation and Knowledge Delivery



CSS Topic: Chemical Evaluation

- **High-throughput Toxicity Testing**
  - Develop and apply rapid, efficient and effective methods to evaluate chemical toxicity
  - Increase depth and breadth of chemical information
  - Support TSCA chemical prioritization, screening, and evaluation
- **Rapid Exposure and Dosimetry**
  - Characterize potential for real-world exposures to chemicals
  - Evaluate exposure associated with consumer product use
  - Inform development of exposure scenarios needed for exposure assessments



CSS Topic: Complex Systems Science

- **Complex Systems Science**
  - Adopt a systems-based approach to examine the complex interactions among exposures and biological effects

- **Adverse Outcome Pathways (AOP)**
  - Predict adverse outcomes resulting from exposures to chemicals
  - AOP framework links molecular initiating events to endpoints of interest

- **Virtual Tissue Modeling**
  - Develop experimental and computational models for predictive toxicology
  - Tissue on a chip approaches

CSS Topic: Life-Cycle Analytics

- **Life-Cycle Analytics**
  - Address impact of existing and new chemicals, materials and products across their life-cycle
  - Address critical gaps in tools and metrics for quantifying risks to human and ecological health across the life-cycle of chemicals, materials, and products
- **Sustainable Chemistry**
  - Advance methods to efficiently evaluate chemical alternatives and support sustainable chemical design and use
  - Large emphasis on chemical curation and chemical informatics (DSSTox)
- **Emerging Materials**
  - Develop approaches to screen environmental nanomaterials
  - Identify critical properties of nanomaterials
- **Ecological Modeling**
  - Evaluate ecological impacts associate with use of manufactured chemicals
  - Evaluate chemical impacts on populations of vulnerable ecological species
  - Pesticide fate and behavior modeling

CSS Topic: Translation and Knowledge Delivery

- **Solutions-based Translation and Knowledge Delivery**
  - Actively translate the results of research, from data to information to knowledge to application
  - Integral to developing solutions to meet the needs of the Agency and its partners and stakeholder communities
  - Example: Chemical Dashboard - https://comptox.epa.gov/dashboard

- **Case study approach to conduct research and translate information**

CSS Response to State Needs

- **Deliver information on perfluorinated chemicals**
  - ORD is focusing effort to develop and deliver toxicity and exposure information for selected PFAS chemicals
- **Improve access to chemical information**
  - ORD is increasing investment on the development of online chemical dashboard to provide chemical information and support chemical risk assessment
  - Chemistry Dashboard: https://comptox.epa.gov/dashboard
- **Address emerging chemicals of concern**
  - ORD is developing and advancing non-targeted chemical analytical approaches to improve monitoring and inform exposure estimates

National Research Programs

Air and Energy (A-E)

Sustainable & Healthy Communities (SHC)

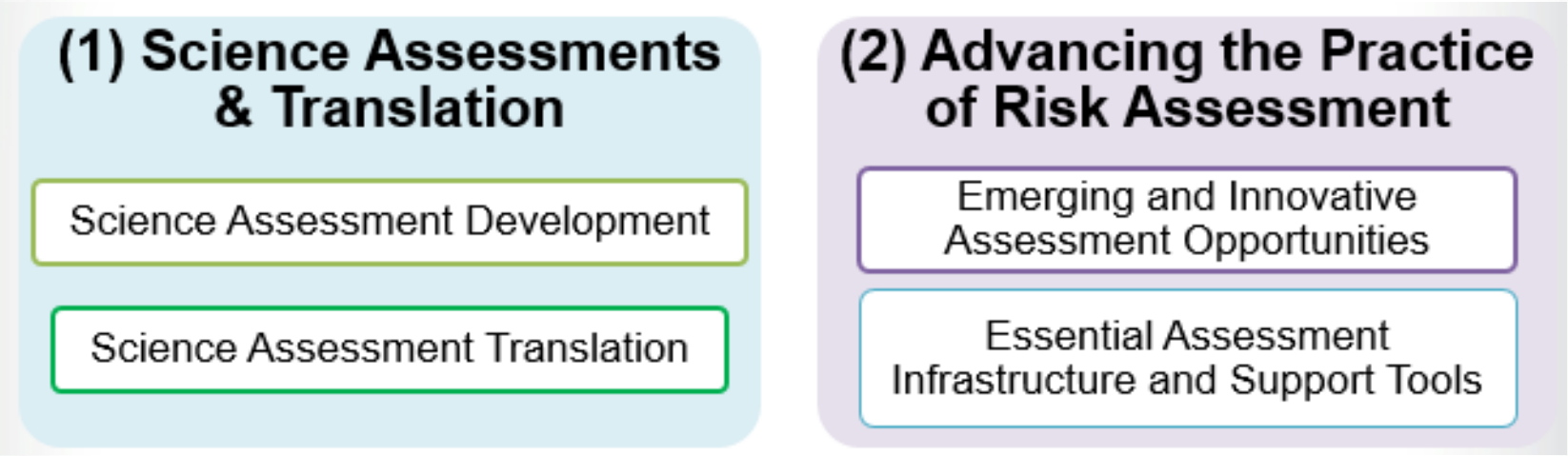
Homeland Security (HS)

Chemical Safety for Sustainability (CSS)

Human Health Risk Assessment (HHRA)

Safe & Sustainable Water Resources (SSWR)

Human Health Risk Assessment (HHRA) Research Areas



Vision: To advance the science and practice of risk assessment

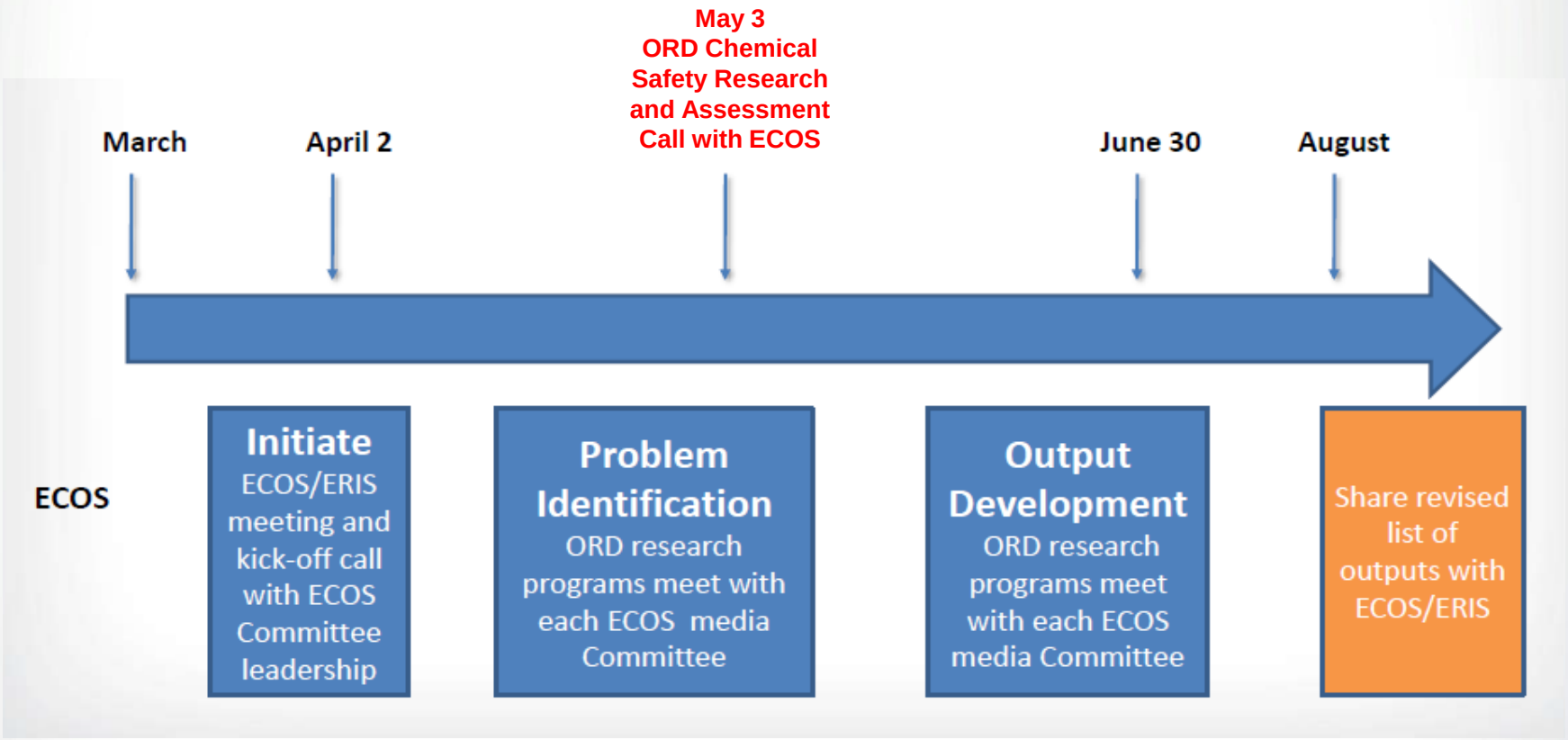
Key Outputs: A portfolio of fit for purpose assessment products that meet the needs and priorities of customers, including the states, tribes, and EPA region and program offices

- Focus on priority pollutants (PFAS, lead), criteria pollutants (to support NAAQS), drinking water contaminants, clean up of contaminated and hazardous waste sites
- Integration of new approach methods and emerging data into assessments of data poor chemicals

A Portfolio Approach

- Moving away from a ‘one-size-fits-all’ approach to risk assessment towards a spectrum of assessment products to meet specific decision contexts
- Facilitating the incorporation of new data and science into risk assessment and decision-making
- Enabling assessments to be better tailored to meet needs of decision makers
- Increasing the number of chemicals that can be evaluated for their effects on human health by utilizing constrained resources in the most efficient manner
- Anchoring in systematic review
- Integrating key components of existing portfolio – Integrated Risk Information Systems (IRIS), Integrated Science Assessments (ISAs), and Provisional Peer-Reviewed Toxicity Values (PPRTVs) – to inform future assessments

ECOS/ERIS Engagement in StRAP Development



Guiding Questions for Discussion

- Are there any clarifying questions about our capabilities and/or the kind of research we do related to chemical safety and assessment?
- Do the areas on which we are focusing align well with your states' science and technical needs?
- Are there areas you would suggest emphasizing or de-emphasizing? Is there anything missing?
- Do you have any other feedback as we formulate our Strategic Research Action Plans?
- Other?

Contacts

Jeffrey Frithsen

National Program Director

Chemical Safety for Sustainability (CSS) National Research Program
US EPA Office of Research and Development
frithsen.jeff@epa.gov; 202-564-3512

Tina Bahadori

National Program Director

Human Health Risk Assessment National Research Program
US EPA Office of Research and Development
bahadori.tina@epa.gov; 202-564-7903

Lisa Matthews

Senior Advisor and State Liaison

US EPA Office of Research and Development
matthews.lisa@epa.gov; 202-564-6669