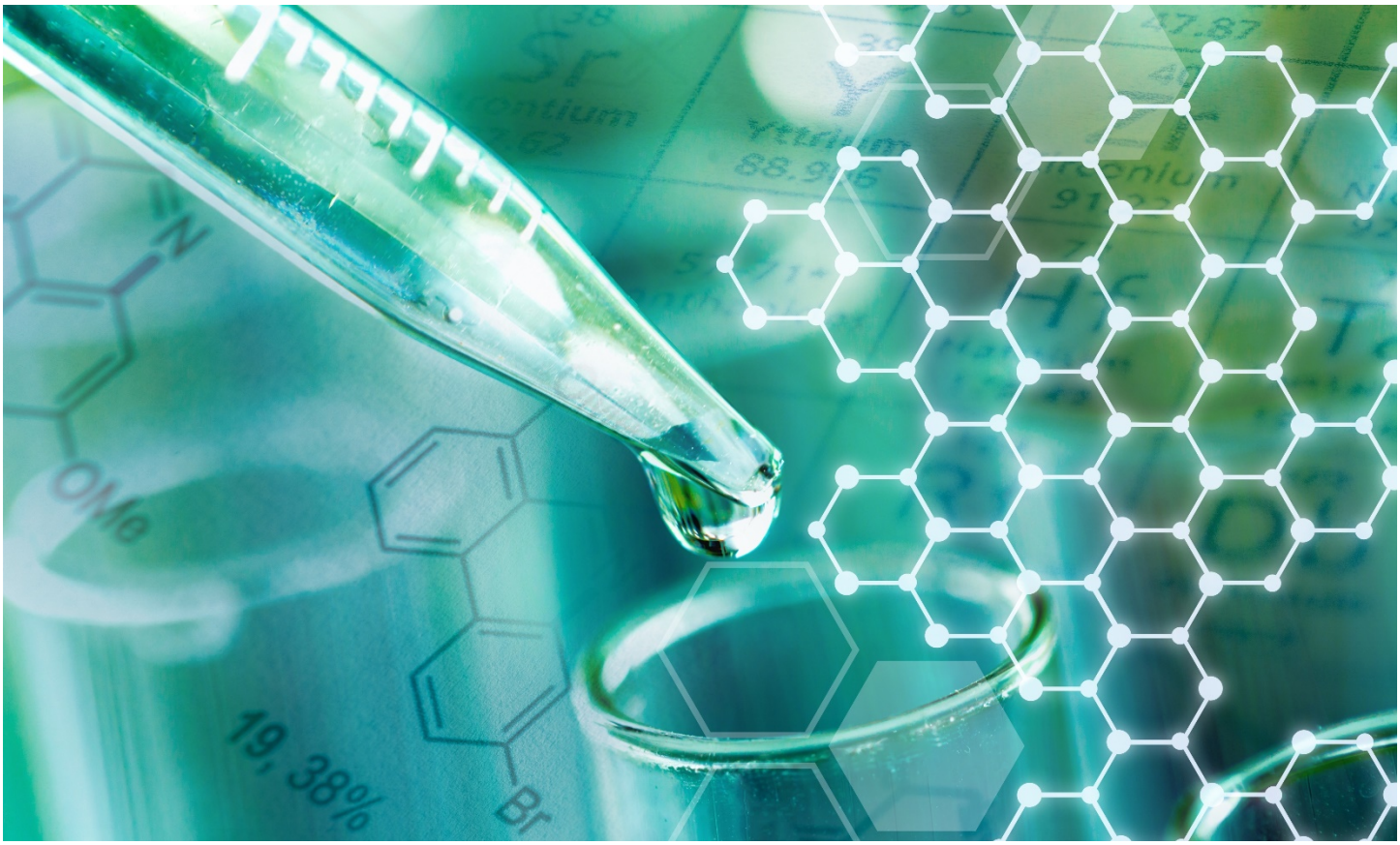
Division on Earth & Life Studies
Board on Environmental Studies and Toxicology

COMMITTEE TO REVIEW EPA'S TSCA SYSTEMATIC REVIEW GUIDANCE DOCUMENT

Virtual Meeting 2.1: June 19, 2020 (10a-1p EDT)

Public Handout



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COMMITTEE TO REVIEW EPA'S TOXIC SUBSTANCES CONTROL ACT (TSCA) SYSTEMATIC REVIEW GUIDANCE DOCUMENT VIRTUAL MEETING 2.1

PUBLIC AGENDA

MEETING OBJECTIVES

- Learn EPA's innovations in literature searching and screening to identify relevant scientific studies

FRIDAY, June 19, 2020

10:00 PURPOSE OF OPEN SESSION AND INTRODUCTION OF COMMITTEE MEMBERS
Jonathan Samet
Chair, Committee to Review EPA'S TSCA Systematic Review Guidance Document
Dean, Colorado School of Public Health

10:05 OVERVIEW OF TSCA RISK EVALUATION PROCESS
Stan Barone, Deputy Director, Risk Assessment Division, EPA Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention

10:20 INNOVATIONS IN SEARCHING AND SCREENING LITERATURE
Kellie Fay, Risk Assessment Division, EPA Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention

10:50 COMMITTEE DISCUSSION

11:20 **BREAK**

11:25 AUTOMATED LITERATURE PRIORITIZATION METHODS IN SWIFT REVIEW
Chantel Nicolas, EPA Office of Chemical Safety and Pollution Prevention, Office of Pollution Prevention and Toxics

ELECTRONIC SCREENING IN DISTILLERSR AND SWIFT ACTIVESCREENER
Francesca Branch, EPA Office of Chemical Safety and Pollution Prevention, Office of Pollution Prevention and Toxics

11:50 COMMITTEE DISCUSSION

12:00 **BREAK**

12:05 INTERACTIVE BREAKOUT SESSIONS

- These breakout sessions will discuss videos which are prerecorded and posted on the TSCA Systematic Review study website. Viewing of these videos prior to participating in the session is

necessary to fully participate. Discussion moderators will pose questions from the committee and the public during the breakout session to the poster presenters.

BREAKOUT SESSION 1: THE ROLE OF PECO STATEMENTS, SEARCH CRITERIA AND TEMPLATES IN SEARCHING AND SCREENING
Moderated By – Karen Robinson

Videos discussed:

- Evidence Mapping of Gray Literature Under TSCA: A Gray Literature Decision Tree Framework
  - *Yousuf Ahmad, Risk Assessment Division, EPA Chemical Safety and Pollution Prevention, Office of Pollution Prevention and Toxics*
- Strategy for Developing Literature Search Strings to Identify Publications Containing Environmental Fate and Transport and Physical-Chemical Property Data
  - *Amina Wilkins, EPA Office of Research and Development*

BREAKOUT SESSION 2: EVIDENCE MAPPING THROUGH PRIORITIZING, PRE-SCREENING, AND BEYOND
Moderated By – Katya Tsaioun

Videos discussed:

- Evidence Mapping for Engineering and Exposure: Literature Search, Prioritization and Pre-Screening Strategy
  - *Katherine Phillips, EPA Office of Research and Development*
- Evidence Mapping for Engineering and Exposure: Part B – Title/Abstract and Full-Text Screening
  - *Yadi Lopez, Risk Assessment Division, EPA Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention*
- Evidence Mapping of Environmental and Human Health Hazard Evidence: Phthalic Anhydride Example
  - *Kellie Fay, Risk Assessment Division, EPA Office of Pollution Prevention and Toxics, Office of Chemical Safety and Pollution Prevention*

12:55 REPORT BACK FROM BREAKOUTS

1:00 **ADJOURN PUBLIC SESSION**

Committee to Review EPA's TSCA Systematic Review Guidance Document

In 2016, the Frank R. Lautenberg Chemical Safety for the 21st Century Act updated the Toxic Substances and Control Act (TSCA) of 1976. The Act required that the US Environmental Protection Agency (EPA) conduct risk evaluations for chemicals designated as "high-priority substances" to determine whether they present an unreasonable risk to health or the environment under the chemical's conditions of use. The preamble of the TSCA Risk Evaluation Rule identifies systematic review as an evaluation method to ensure that literature reviews are complete, unbiased, reproducible, and transparent. The method is defined as ". . . a scientific investigation that focuses on a specific question and uses explicit, pre-specified scientific methods to identify, select, assess, and summarize findings of similar but separate studies."

In May 2018, EPA released a document *Application of Systematic Review in TSCA Risk Evaluations*. This document has been used and refined as EPA has been conducting risk evaluations under TSCA. This committee will evaluate EPA's guidance document and will consider public comments on the document, EPA's responses to public comments, and enhancements to the systematic review process reflected in documentation of the first 10 chemical risk evaluations. The committee will use the strategy to make a determination about whether EPA's process is comprehensive, workable, objective, and transparent. Recommendations for enhancements to EPA's 2018 guidance document will be made.

Committee Membership

Jonathan M. Samet, MD, MS (Chair), Dean and Professor Colorado School of Public Health

Deborah H. Bennett, PhD Professor, Department of Public Health Sciences, University of California, Davis

Bryan W. Brooks, PhD Distinguished Professor, Department of Environmental Science, Baylor University

Jessica L. Myers, PhD Toxicologist, Texas Commission on Environmental Quality

Kristi Pullen Fedinick, PhD, Director, Science and Data & Senior Scientist, Natural Resources Defense Council

Karen A. Robinson, PhD, Professor of Medicine, Director, Evidence-based Practice Center, Johns Hopkins University

Joseph V. Rodricks, PhD Principal, Ramboll

Katya Tsaioun, PhD Director, Evidence-based Toxicology Collaboration Johns Hopkins Bloomberg School of Public Health

Yiliang Zhu, PhD Professor University of New Mexico Department of Epidemiology and Biostatistics

NASEM Staff

Elizabeth Boyle, MPH, CIH Project Director

Clifford Duke, PhD BEST Board Director

Andrea Hodgson, PhD Program Officer

Tamara Dawson Program Coordinator

Committee to Review EPA's TSCA Systematic Review Guidance Document

Biosketches

Jonathan M. Samet (NAM) is a pulmonary physician and epidemiologist. He is the Dean of the Colorado School of Public Health. Dr. Samet's research has focused on the health risks posed by inhaled pollutants. He has served on numerous committees concerned with public health: the US Environmental Protection Agency's Clean Air Scientific Advisory Committee; committees of the National Academies, including chairing the Biological Effects of Ionizing Radiation (BEIR) VI Committee, the Committee on Research Priorities for Airborne Particulate Matter, the Committee to Review EPA's Draft IRIS Assessment of Formaldehyde, the Committee to Review the IRIS Process, and the Board on Environmental Studies and Toxicology, among others; and the National Cancer Advisory Board. He is a member of the National Academy of Medicine. Dr. Samet received his MD from the University of Rochester, School of Medicine and Dentistry and master's degree in epidemiology from the Harvard T.H. Chan School of Public Health.

Deborah H. Bennett is a Professor in the Division of Environmental and Occupational Health at the University of California, Davis School of Medicine. Her research focuses on the measurement and modeling of organic compounds in the indoor environment. She has served on various U.S. Environmental Protection Agency Science Advisory boards, panels, and advisory committees related to the Exposure Factors Handbook, and Exposure Metrics for the National Children's Study. She has served as Estimation Associate Editor for the Journal of Exposure Science and Environmental Epidemiology. She has served as an Elected Councilor, Treasurer, and Chair of the Awards Committee for the International Society of Exposure assessment. She has an MS and PhD from the University of California, Berkeley.

Bryan W. Brooks is a Distinguished Professor, Environmental Science and Biomedical Studies at Baylor University. His scholarship incorporates laboratory and field studies in environmental toxicology and chemistry, environmental health, hazard & risk assessment, and water resources. He leads harmful algal blooms research for the Center for Oceans and Human Health and Climate Change Interactions (OHHC2I), a NIEHS Center based at the University of South Carolina. Prof. Brooks serves as Editor-in-Chief of Environmental Science and Technology Letters. Dr. Brooks has an MS from the University of Mississippi and a PhD from the University of North Texas.

Jessica L. Myers is a toxicologist and risk assessor. She is currently working at the Texas Commission on Environmental Quality where she has drafted guidance on the development of systematic reviews for toxicity factors. She has a bachelor's and PhD in cell and molecular biology from the University of Texas at Austin.

Kristi Pullen Fedinick is a Senior Scientist and the Director of Science and Data in the Healthy People & Thriving Communities (HPTC) Program at the Natural Resources Defense Council. She also serves as part-time faculty in the Department of Environmental and Occupational Health of the Milken Institute School of Public Health at The George Washington University. Dr. Pullen Fedinick's research career includes experience in environmental health and policy; molecular, structural, and computational biology; biochemistry; and population health. Prior to joining NRDC, she worked as a scientist for a Chicago-based environmental non-profit, where she focused on air and drinking water quality, science communications, and environmental justice. Her current work focuses on the use of high-throughput technologies, predictive toxicology, and

computational approaches to chemical risk assessments. Additional work includes the geospatial and statistical analysis of chemicals in the environment, with a particular emphasis on drinking water and on the disproportionate impact of chemical exposures in vulnerable populations. She holds a bachelor's degree in biochemistry and molecular biology from the University of Maryland Baltimore County and a Ph.D. in molecular and cell biology with a focus on structural biology and biochemistry from the University of California, Berkeley. She was a Robert Wood Johnson Foundation Health and Society Scholar at the Harvard T. H. Chan School of Public Health.

Karen A. Robinson is a Professor of Medicine at the Johns Hopkins University School of Medicine. She is also director of the Johns Hopkins University Evidence-based Practice Center and is a member of the core faculty in the Center for Clinical Trials and Evidence Synthesis at the university's Bloomberg School of Public Health. Dr. Robinson's research focuses on evidence-based health care and evidence-based research. She conducts systematic reviews that are used to develop clinical practice guidelines and to inform other health decisions. She served on the National Academies Committee on Endocrine-Related Low-Dose Toxicity, the Committee to Review Advances Made to the IRIS Process, the Committee to Review DOD's Approach to Deriving an Occupational Exposure Level for Trichloroethylene and the Committee to Review EPA's IRIS Assessment Plan for Inorganic Arsenic. Dr. Robinson received an MSc in health sciences from the University of Waterloo, Ontario, and a PhD in epidemiology from the Johns Hopkins Bloomberg School of Public Health.

Joseph V. Rodricks is a founding Principal of ENVIRON (now Ramboll), and an internationally recognized expert in toxicology and risk analysis. He has consulted for hundreds of manufacturers, new product developers, and government agencies in the evaluation of health risks associated with human exposure to chemical substances of all types. Joseph came to consulting after a 15-year career as a scientist at the US Food and Drug Administration (USFDA). In his last four years at the USFDA, he served as Associate Commissioner for Health Affairs. His experience extends from pharmaceuticals, medical devices, consumer products and foods, to occupational chemicals and environmental contaminants. He has served on the National Research Council's Board on Environmental Studies and Toxicology, and on more than 40 boards and committees of the National Academy of Sciences and the Institute of Medicine, including the committees that produced the seminal works Risk Assessment in the Federal Government: Managing the Process (1983), and Science and Decisions–Advancing Risk Assessment (2009). Most recently he served on the National Academies committee that issued Guiding Principles for Developing Dietary Reference Intakes Based on Chronic Disease. He has more than 150 scientific publications and has received 11 honorary awards from professional societies and other academic and non-academic institutions. He is author of the widely-used text, Calculated Risks, now in its second edition, published by Cambridge University Press, and has presented more than 300 lectures in countries around the world. Dr. Rodricks earned his PhD in Biochemistry from the University of Maryland, College Park.

Katya Tsaioun is Director of the Evidence-based Toxicology Collaboration at the Johns Hopkins Bloomberg School of Public Health. The collaboration's mission is to bring together the international toxicology community to facilitate use of evidence-based toxicology to inform regulatory, environmental, and public health decisions. She received her PhD in human nutrition science from Tufts University Friedman School of Nutrition Science and Policy.

Yiliang Zhu is a Professor in the Division of Epidemiology, Biostatistics, and Preventive Medicine, School of Medicine at the University of New Mexico (UNM). He directs the biostatistics, epidemiology, and research design cores for the Clinical and Translational Research Center of UNM and for the Mountain West Clinical and Translational Research Infrastructure Network, a consortium of 13 universities in seven states. His research focuses on quantitative methods in

health risk assessment, including integrative modeling of biological systems, dose-response modeling, benchmark-dose methods, and uncertainty quantification. He also conducts research in biostatistics methods, clinical- and health-outcome evaluation, and impact assessment of healthcare systems and policies in northwestern rural China. Before joining UNM Dr. Zhu was a professor at University of South Florida College of Public Health where he directed the Biostatistics PhD program and the Center for Collaborative Research. Dr. Zhu has served on several National Academies committees, including the Committee on EPA's Exposure and Human Health Assessment of Dioxin and Related Compounds, the Committee on Tetrachloroethylene, the Committee to Review EPA's Draft IRIS Assessment of Formaldehyde, and the Committee to Review the IRIS Process. He received a PhD in statistics from the University of Toronto.

NASEM REVIEW OF EPA'S TSCA SYSTEMATIC REVIEW APPROACH:

VIRTUAL MEETING 2.1 - ABSTRACTS

ORAL PRESENTATION: **Overview of TSCA Risk Evaluation Process** (Stan Barone)

- **Abstract:** This brief overview provides context for how different elements of systematic review are integrated into TSCA's risk evaluation process. The U.S. Environmental Protection Agency (EPA's) Office of Pollution Prevention and Toxics (OPPT) is implementing systematic review of its Risk Evaluations under the Toxic Substances Control Act (TSCA), as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act. Neither the Act nor the Risk Evaluation Rule explicitly defines systematic review, but each contains pertinent language that require EPA to use a systematic review method to assure use of best available science. TSCA requires that EPA use data and/or information in a manner consistent with the "best available science" and that EPA base decisions on the "weight of the scientific evidence." The EPA's Final Rule, *Procedures for Chemical Risk Evaluation under the Amended Toxic Substances Control Act* (82 FR 33726), defines ''best available science'' as science that is reliable and unbiased. This involves the use of supporting studies conducted in accordance with sound and objective science practices, including, when available, peer reviewed science and supporting studies and data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies use of the data). The Final Rule also defines the "weight of the scientific evidence" as a systematic review method, applied in a manner suited to the nature of the evidence or decision, that uses a pre-established protocol to comprehensively, objectively, transparently, and consistently identify and evaluate each stream of evidence, including the strengths, limitations, and relevance of each study and to integrate evidence as necessary and appropriate based upon strengths, limitations, and relevance.

  To meet these scientific standards, EPA will use the PCE draft risk evaluation as an example of how applied systematic review approaches and methods were used to support the first 10 Risk Evaluations. Information on the approaches and methods used in the Perchloroethylene risk evaluation are as follows:
  - *Strategy for Conducting Literature Searches for Perchloroethylene: Supplemental File for the TSCA Scope Document, (EPA-HQ-OPPT-2016-0732)*
  - *Perchloroethylene (CASRN 127-18-4) Bibliography: Supplemental File for the TSCA Scope Document, (EPA-HQ-OPPT-2016-0732)*
  - *Perchloroethylene Problem Formulation (EPA-HQ-OPPT-2016-0732)*
  - *Application of Systematic Review in TSCA Risk Evaluations*

  EPA has solicited peer review and public feedback from the Science Advisory Committee on Chemicals (SACC) on the systematic review approaches and methods applied in drafting the first 10 chemical risk evaluations.

ORAL PRESENTATION: **Innovations in Searching and Screening Literature** (Kellie Fay *et al.*)

- **Abstract:** The TSCA systematic review approach applies a structured, transparent and thorough process to search, screen, evaluate, extract and integrate information to support the TSCA risk evaluations EPA is conducting on existing chemicals.

  This presentation will provide details about the fit-for-purpose systematic review approach used by OPPT with examples from the first 10 TSCA risk evaluations, lessons learned, and recent innovations to literature searching and screening. Discipline-specific examples of the process, as well as approaches used to consider different information sources (i.e., peer-reviewed, gray literature and TSCA submissions) are also addressed. Innovative data visualizations are

presented, including interactive literature inventory trees and evidence maps, in order to provide greater process transparency and clearly convey information gaps.

INTERACTIVE DEMONSTRATION: **Automated Literature Prioritization Methods in SWIFT Review** (Chantel Nicolas)

- **Abstract:** This demonstration interactively shows the application of new automated techniques to identify a subset of a chemical's literature pool that is most likely to have relevant information for a given discipline area (e.g., hazard, fate, exposure). The identified subsets of data sources are then prioritized for title/abstract screening. This session will include brief demonstration of the two types of prioritization process applied under TSCA: 1) the search string filters to prioritize data for environmental and human health hazards and physical-chemical/fate properties and 2) the use of a training set (or seeds) to cluster relevant data sources for the exposure and engineering disciplines.

  The process of applying keyword search strategies for narrowing down peer reviewed literature reference lists continues to be perfected for various disciplines. SWIFT Review software was employed for prioritizing titles and abstracts for manual screening. This was done in one of two ways depending on the effectiveness of keyword search filtering for particular disciplines. Search string filters were used to prioritize literature for environmental and human health hazards as well as physical-chemical and fate properties, whereas a training set (or seeds) was used to cluster relevant literature for the exposure and engineering disciplines. This demonstration will highlight the key differences between these two strategies and cover the process of successfully prioritizing titles and abstracts for manual screening with machine learning.

INTERACTIVE DEMONSTRATION: **Electronic Screening in DistillerSR and SWIFT-ActiveScreener** (Francesca Branch)

- **Abstract:** This presentation interactively demonstrates the tools used to manually screen titles and abstracts and full-texts of data sources across all TSCA discipline areas (e.g., exposure, hazard, fate), with a focus on demonstrating the workflow of two screening tools and utilization of active-learning techniques used in SWIFT ActiveScreener to speed the screening process.

  Multiple systematic review software was used in the systematic review process for screening the literature identified to support risk evaluations for the next 20 high priority chemicals under TSCA. The SWIFT ActiveScreener software uses statistical models designed to streamline screening by automatically prioritizing articles as they are reviewed, using user feedback to push the most relevant articles to the top of the list. This innovative tool was utilized for the first time in TSCA systematic reviews to gain efficiencies during title/abstract screening.

  DistillerSR is another systematic review software used primarily for the later stages of TSCA systematic review (e.g., full-text screening, data evaluation, and data extraction). This sophisticated tool has previously been used for the first 10 chemicals. Both DistillerSR and SWIFT ActiveScreener are used to conduct systematic review in other offices at U.S. EPA, including the Office of Research and Development.

Virtual Poster Session for Meeting 2.1: (5-10 minutes recorded poster presentations)

POSTER: **Evidence Mapping of Gray Literature Under TSCA: A Gray Literature Decision Tree Framework** (Yousuf Ahmad *et al.*)

- **Abstract:** This poster contains the decision criteria and workflow for gray literature identification and screening. Gray literature is defined as the broad category of data or information sources not found in typical peer-reviewed published journals and literature databases (e.g., PubMed and Web of Science). Sources of gray literature may include white papers, conference proceedings, technical reports, reference books, dissertations, as well as information on various stakeholder

websites and databases. Gray literature sources pose a challenge to the systematic review process because they are not amenable to typical title/abstract screening approaches for myriad reasons, including the lack of abstracts, format of the literature (e.g., databases), and/or robustness of the source information. These sources generally require full text screening to determine relevancy for inclusion.

For the first 10 chemical risk evaluations conducted under the amended Toxic Substances Control Act (TSCA), EPA generated a list of gray literature that went directly to full-text screening, bypassing the title/abstract phase of the systematic review. EPA proposes a decision tree framework for gray literature that generally acts as an equivalent to the title/abstract screening step in the systematic review process. This process considers potential relevance (i.e., the source has related quantitative or qualitative information relevant to TSCA risk evaluations), completeness (i.e., the source has an established procedure for data collection, communication, peer review, and/or reporting), availability (i.e., the source is publicly available) and duplication of the gray literature source prior to making a determination on whether to proceed with full-text screening for a given source.. EPA proposes to use this the decision tree to evaluate gray literature identified both through initial searches, as well as for gray literature submitted to the Agency.

POSTER: **Strategy for Developing Literature Search Strings to Identify Publications Containing Environmental Fate & Transport and Physical-Chemical Property Data** (Amina Wilkins *et al.*)

- **Abstract:** This poster highlights the development of search strings for the physical-chemical property and fate data. Data and information forming the basis for TSCA evaluations must first be identified and collected. Discipline-specific literature searches undertaken for the first 10 risk evaluations did not identify all relevant literature. A second round of searches was performed to improve this data gathering step with targeted literature searches related to the chemicals regardless of discipline. This challenge was addressed in the second round of search strategies for the next 20 scopes. EPA then applied literature search strings of key phrases to identify references containing discipline-specific information. This poster discusses the process for creating, testing and refining search strings for physical-chemical properties and environmental fate and transport information, as well as their implementation within SWIFT Review, a no-cost, systematic review software tool. Provision of these search strings will facilitate and standardize the approach for systematic review of scientific evidence needed for transparent chemical assessment.

  To develop the search strings, a team of Agency topic-specific experts and librarians was assembled and developed keyword lists. To create the physical-chemical string, librarians used the keyword list and a series of iterative exchanges with the experts to draft, and revise strings based on performance. For fate strings, librarians drafted strings utilizing the keyword list and analysis tools such as the Keyword Analysis Tool (KAT) and SWIFT Review's fingerprinting feature, and a set of on-topic references to evaluate search string performance regarding the accuracy and precision of resulting references.

  This presentation provides an overview of various approaches taken to develop the physical-chemical-physical property and fate literature search strings, including 1) development and testing of broad verses minimal search strings (where authors identified terms that are unambiguous and/or necessary to retrieve the greatest number of on-topic references while minimizing retrieval of off-topic references); 2) organization of keywords and search strings into main and subcategory headings; and 3) outlines a process for incorporating keyword analysis tools. The recall and precision performance results of the broad versus minimal search strings are also presented.

POSTER: **Evidence Mapping for Engineering and Exposure: Part A – Literature Search, Prioritization and Pre-Screening Strategy** (Katherine Phillips *et al*.)

- **Abstract:** This poster highlights innovations in prioritizing and pre-screening the peer-reviewed literature pool for TSCA exposure data using SWIFT-Review. Discussion will describe EPA's use of a training set of references (or seeds) to automatically identify subsets of the literature pool that are relevant for exposure assessments (occupational, environmental, general population, and consumer exposure). This presentation will also address EPA's validation of these machine learning processes.

  For the engineering and exposure disciplines (i.e., occupational, environmental releases, ecological, general population and consumer), a machine learning approach was used to segment articles containing credible exposure evidence for completing TSCA chemical assessments (e.g., monitoring data, exposure routes, media). First, a list of successfully integrated pieces of literature from the first 10 risk evaluations was compiled, grouping these across exposure evidence space and ensuring full coverage. Second, the articles were validated as credible seeds (or training references), using the SWIFT Review software program, ensuring that the articles were consistently prioritizing relevant exposure content based on their titles and abstracts. Third, the individual chemical literature search databases were incorporated into the program in order to prioritize and then forward the exposure evidence-enriched segments to the SWIFT ActiveScreener tool for manual title and abstract screening.

POSTER: **Evidence Mapping for Engineering and Exposure: Part B – Title/Abstract and Full-Text Screening** (Yadi Lopez *et al.*)

- **Abstract:** This poster addresses innovations in the process used to screen prioritized peer-reviewed literature relevant to occupational, environmental, general population, and consumer exposure. This includes development and application of calibration methods, title/abstract screening, full-text screening, presentation of results, and lessons learned.

  Following a pre-screening step (described in Poster 1.5), titles and abstracts of prioritized engineering and exposure references were imported into the SWIFT ActiveScreener tool. EPA screened these prioritized references to determine whether they are on- or off-topic for the purpose of TSCA risk evaluation. The inclusion criteria for screening are defined by either the Receptor, Exposure, Setting or Scenario, and Outcome (RESO) statement for Engineering references, or by the Population, Exposure, Comparator, and Outcome (PECO) statement for Exposure references. Each reference is screened by two reviewers. Conflicts, if any, are resolved by a third, senior reviewer who performs an independent review of the title/abstract to determine the most appropriate screening decision. Prior to screening, all reviewers participate in a calibration exercise to ensure consistency and minimize conflicts in the literature review.

  In SWIFT ActiveScreener, manual review is expedited via a machine learning algorithm. The algorithm predicts and prioritizes articles based on uploaded discipline seeds and screeners' include/exclude decisions. This feature enables screeners to focus their screening efforts on articles that are likely to be on-topic for the discipline, thus saving time and resources. Subsequent full-text screening along with on-topic tagging were performed, followed by data evaluation and extraction, using the DistillerSR tool. The presentation also includes example results of evidence identification for EPA's next 20 TSCA high priority chemicals.

POSTER: **Evidence Mapping of Environmental and Human Health Hazard Evidence: Phthalic Anhydride Example** (Kellie Fay *et al.*)

- **Abstract:** This poster highlights the searching and screening process for environmental and human health hazard data sources. This includes a description of EPA's application of keyword filters in SWIFT Review to automatically narrow the literature pool to the references that are

most relevant for hazard, and discussion of the title/abstract screening process in DistillerSR and SWIFT ActiveScreener, with examples of the results.

As EPA is conducting a systematic review of studies to inform its hazard assessments of high priority designated substances under TSCA, the process begins with a comprehensive search for potentially relevant information in peer reviewed literature, gray literature and data submitted to EPA. The references identified during this process are filtered for general relevance to human health and environmental health hazard disciplines using an automated text-mining tool, SWIFT Review. Filtered references are then screened at the title and abstract level for relevance using specific inclusion/exclusion criteria laid out in a PECO (Population, Exposure, Comparator and Outcome) statement. Studies that adhere to the PECO criteria are tagged according to an evidence stream (human epidemiological, human health animal, environmental animal or plant) and moved to full-text screening. Studies that do not adhere to the PECO criteria, but may still have valuable information, are reserved as supplemental material and tagged according to a supplemental category (e.g., field study, mixture, foreign language). All other studies are excluded from further consideration.

Screening at the full-text level follows a similar process and the screening results are summarized and displayed in an interactive literature inventory tree for phthalic anhydride. For the PECO-relevant studies identified at the full-text level, SWIFT Review is used to predict the type of hazard information (e.g., neurotoxicity or carcinogenicity) from the words in each title and abstract. For each evidence stream (e.g., human epidemiological, environmental animal), the number of references with each type of hazard information, as identified by SWIFT Review, is shown visually in an evidence map (heat map). Phthalic anhydride is provided as an example to demonstrate the searching and screening process for hazard assessment as well as the data visualizations.