

***Report from
Yesterday's ISEA Symposium "Exposure
Science for Community-based
Cumulative Risk Assessment"***

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Brief Overview

- CARE overview by CARE co-chair
 - Coordinates EPA Program & Regional offices
 - Supplements EPA regulations
 - Coordinated with CDC; MoU, joint efforts
 - To support community-driven risk assessment & risk management
- CARE Level 1: risk ranking/prioritization & selection of risk reduction activities
- CARE L2: risk reduction (& quantifying effects)

Overview (cont'd)

- CARE technical issues overview by environmental health assessment co-chair
- Region 1 (New England) case studies
- Region 6 cases & status of EPA cumulative assessment guidance
- EPA lead on NCS gave NCS overview
 - Basic science info. on the environmental exposures related to health effects
 - Both individually & in combination with other chemical exposures & non-chemical stressors

Overview (cont'd)

- NERL PI on research program
 - Exposure tools research
 - Collaborate with health scientists, risk assessors, CARE program (L1 & L2)
 - Many exposures – **focus on exposures leading to highest risk** and most in demand by communities
 - NCS exposure assessment research
 - Chemical stressor primary expertise
- Summary of some NERL activities
 - Survey of CARE POs for needs
 - Measurement methods research
 - Modeling research

Community Needs & Research Needs for Community-based Cumulative Risk Assessment

- **Community monitoring/low cost techniques** (NERL & NCER)
- **Is the action having an impact on health?** (NCER)
- What does monitoring mean, once we do it?
- What do modeling results mean?
- How to get community involved: relationship between exposure and health? Local partnerships.
- Communities need someone who understands
 - Need to include local conditions, often only visible in person
 - Need to include local values
- **Non-chemical stressors and vulnerability** (NCER)
- Guidance for choosing appropriate methods for measurement collection

Research needs (cont'd)

- Better ways to **quantify** local non-chemical information: lifestyle; access to health care; exposure to violence
- **Inventories/protocols for assessing non-chemical stressors as well as chemical stressors**
- Tools to characterize dietary exposures at community level (diet, sources of food, food preparation, storage) for unique cultural groups
- Simple, user-friendly tools to characterize/translate/use sources/emissions to assess risk and risk reduction scenarios (e.g., simplified version of RAIMI)
 - Documentation on how to select models
 - Documentation on how to use models

Research needs (cont'd)

- Models that start at local/neighborhood level
- Better local source identification/emissions inventories in the community; tools to facilitate that (e.g., GPS; checklists)
- **Quantify benefits so that other communities can apply findings**
- **Note: 1000s of communities & community-driven assessments**
- **Research should be directly usable by community or their local health or environmental department**
 - EPA cannot serve every community individually
 - States may not be able to serve every community individually

Summary

- Community-driven assessment of importance
- Research needs to be usable by communities/local health depts.
- Cumulative risk important
 - Including non-chemical stressors, vulnerability
- Focus on main contributors to risk/health impact to address cumulative risk
- Also, focus on recurring community Qs
- Non-chemical stressors: less in-house expertise
- Protocols for non-chemical stressors needed
- Low-cost measurements important
- Dose-response for risk prioritization important
 - Comparison with other chemical risks
 - Comparison with non-chemical stressors
- Quantifying benefits important for future applications by communities

Objectives

- 1) To develop tools for estimating human exposures to multiple chemical stressors that are most likely to impact cumulative risks.
- 2) To apply, evaluate, and demonstrate these exposure tools through selected community case studies.
- 3) To communicate research findings and provide the tools to stakeholders.

Approach

- Identify partners, stakeholders, research needs
- Collaborate with partners who are focusing on other components of human health source-to-outcomes paradigm
source->concentration->exposure->dose->risk->outcomes
- Develop exposure tools to address science questions
- Identify initial case studies for collaboration
- Evaluate, apply, demonstrate tools through case studies
- Communicate research and provide tools

Potential Partners/Stakeholders

- EPA Community Action for a Renewed Environment (CARE) program partners (e.g., EPA regional offices, state and city agencies, community groups)
- EPA Cross Program Project Teams (e.g., CARE, accountability, environmental justice, urban environments, tribal)
- Regional risk assessors
- National Children's Study, Vanguard Centers, future Centers
- Researchers in ORD labs/centers
- EPA program office risk assessors/managers
- Other EPA Groups (e.g., OEI, OEJ; RAF; OCHP)
- Academia
- Other federal agencies (e.g., CDC, NIEHS)

Science Questions

- 1) How to systematically identify and prioritize key chemical stressors within a given community?
- 2) How to develop individual estimates of exposure to multiple stressors for epi studies?
- 3) How to use exposure tools to assess community level distributions of exposures:
 - a. to develop and evaluate the effectiveness of risk management/mitigation strategies?
 - b. to provide better links between reduction actions, exposures, risks, and outcomes?

Science Question #1 - Overview

- Rationale
 - research planning
 - systematic approach for community assessments
 - guidance for collecting community information

- Stakeholders
 - ORD/NERL, EPA CARE program and Level I projects for tools review tables
 - EPA CARE, Region 4 and OEI for CARE questionnaire data
 - EPA Region 5/CARE for Detroit exposure modeling

Slide 13

JQ4

you may need to explain this (then again, it may just be me)

James Quackenboss, 10/10/2007

Science Question #1- Planned Tools

- Summary of relevant programs, guidance, research needs
- Summary tables for models, data, and methods, to enhance CARE Community Screening Workbook
 - Models: fate/transport, exposure, dose, risk
 - Methods: community level, individual level, under development
 - Data: biomarkers, outdoor air, indoor air, UV, drinking water, house dust/residues, food
- Quantitative community level 4-model comparison with Detroit case study
- EPA CARE program survey results

Detroit CARE Level I Case Study

- Identify and prioritize cumulative air toxic sources in the community and seek ways to reduce exposure and risks
- Initial meetings between NERL leads and Region 5 CARE Project Officers
- Gathering available information
- Exposure model comparison with Detroit case study
- Planned GIS mapping of emissions, concentrations, and exposures

Science Question #2 - Overview

- Rationale
 - Need exposure tools to support the National Children's Study (NCS)
 - Need refined tools for individual-level exposures to multiple "agents" over time in epidemiological studies
- Stakeholders
 - NCS, specific Study Centers and communities, academia
- Status
 - Review of NCS Research Plan –identified role for models; needs for methods and approaches
 - Initial efforts to identify potential case studies

Science Question #2 – Potential Case Studies

- Air pollution
 - Community-level air measurements
 - Relate to ambient measurements and models

- Diet
 - Community dietary measurements
 - Questionnaire and checklist to identify unique dietary patterns and food consumption

- Multimedia exposure and dose assessment
 - Relate to biological measurements and models (e.g., for Arsenic)

Science Question #2 – Planned Tools

- Methodology, strategies & guidelines for epidemiological study-related measurement collection, e.g.,
 - Biomonitoring and interpretation
 - Environmental methods
 - Model inputs and evaluation
 - Exposure field study designs

- Dietary exposure model for individuals

- Cumulative inhalation model(s) for epi studies

- Cumulative multimedia model(s) for epi studies

Science Question #3 - Overview

- Rationale
 - Exposure tools needed to refine risk assessments
- Planned Tools
 - Linkage of refined tools for emissions, concentrations, and exposures for community risk assessments
 - New methods for continuous monitoring of multiple pollutants in communities
 - Cumulative community inhalation exposure model(s)
 - GIS tools for illustrating reduction scenarios
 - Approaches for area source risk assessments
- Stakeholders
 - CARE program, Regions, ORD labs/centers, Program Offices (e.g., OAQPS, OPPT), CDC

2006 Boston CARE (Level II) Case Study

- 2-year risk-reduction project (BPHC Safe Shops)
- Regulatory and community focus on auto shops; EPA/CDC pilot study
- 600 shops clustered in diverse, low-income neighborhoods
- Goal: measurably reduce negative environmental and public health impacts by auto shops on workers and residents by reducing emissions
- Current tools to measure results are surveys for changes in best practices and pollution prevention
- CARE lead has requested ORD assistance to help quantify impacts of program; enhance science

Boston CARE: Progress

- 7/07 Meeting to discuss EPA auto shop efforts
 - NESHAP auto body area source rule
 - OAQPS Collision Repair Campaign
 - OPPT DfE Auto Body Program
 - CARE Program (Boston Safe Shops, others)
 - Lawrence, MA RARE auto body project

- 8/07: cross-ORD meeting to discuss project support

- Meetings between ORD/NERL and stakeholders

- Research on available studies and tools to assess cumulative risk from auto shops

- Drafting ORD research plan to be finalized and shared with collaborators, stakeholders

EPA/ORD/NERL Communities Project Timeline

Develop tools to assess community risk	2009
Project Research Plan	2008
Review of available tools (models, methods, data, approaches) for community-focused cumulative risk assessments	2008
Apply tools to assess community risk	2011
Develop and apply exposure tools to help communities and to enhance science related to community cumulative risk assessments	2010
Provide tools to stakeholders and demonstrate tools' utility through selected case study applications	2011

Expected Results/Benefits

Research outputs to

- “Facilitate identification of environmental stressors that pose an unreasonable risk to human populations,
- Reduce exposure of humans to multiple environmental stressors through multiple pathways,
- Reduce exposure of populations at risk to environmental stressors, and
- Improve effectiveness of risk management decisions”
(EPA/ORD Human Health Multi-Year Plan, p. 14)
 - Exposure assessment tools to address project goals, objectives, science questions
 - Effective transfer and communication of research and tools through published results and presentations

Disclaimer

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