

Priority Topic 7: Exposure

Convener: Sacoby Wilson

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Subtopic numbers:

- 5 Environment/geospatial informatics
- 14 Wireless technologies to assess environmental exposures
- 19 Does/response application to environmental health
- 21 Human variability: sources and contribution to differential susceptibility to exposures to environmental agents
- 27 Environmental justice and health disparities strategy and grant program
- 30 Traffic related air pollution and human disease
- 31 Healthy buildings and communities
- 32 Indoor Air Quality
- 33 Novel modeling techniques in environment and health science
- 47 Exposure science
- 58 Develop novel technologies and methodologies to detect and analyze (real-time) multiple exposures and their human health effects
- 71 Environmental pressures over space and time—taking advantage of novel technologies
- 79 Exposure science and the exposome
- 82 Environmental light: is NIEHS research focused enough on environmental light and its interaction with chemicals, compounds and organisms in the environment?
- 84 Workplace exposure to particulate agents
- 88 Next steps for exposure biology
- 93 Remotely-sensed and GIS data

Recommended Strategic Goal:

Characterize exposures to improve health and prevent disease

- Address totality of exposures: physical, chemical, biological agents, psychosocial stress, lifestyle factors, etc.
- Use State of the art approaches
- Take a multi-level systems approach: Focus on multiple levels of organization: Systems science approach.
 - o Need to understand what the determinants of exposures across individuals, organizations, biological systems, etc.
- Exposure assessment is more than biological monitoring – not a panacea
- Having these tools can change the way we do environmental epidemiology to promote health better
- Promoting health = facilitating prevention, intervention and treatment
- Need to collect relevant exposure data to make decisions

Three major sub themes were identified:

1. Developing new Tools: 5, 33, 93, 58, 14, 72, 71
 - a. Challenge = antiquated tools currently used. Develop state of the art exposure assessment tools and technologies
 - b. Ability to quantitate personal environment, space and time, and the provision of exposure technology to environmental epidemiology and the community
 - c. Integrated complex exposures to multiple agents and stressors over the lifecourse
2. Exposure science: 79, 47, 88, 19, 21, 87, 27
 - a. Understanding environmental components of disease
3. Specific environments and populations (Air pollution): 31, 32, 30, 84, 82
 - a. Safe living and working environments

Why now:

Having exposure data will allow us to better focus limited resources to have the greatest health improvements

Exposure information is a fundamental input for decision making

POTENTIAL BENEFICIARIES OF THIS STRATEGIC GOAL:

Populations that benefit the most: Disproportionately burdened, disproportionately exposed, differential risks, differential health outcomes, differentially burdened, everybody benefits because it is a fundamental input; Various life stages (children, pregnant women, elderly); SES status; researchers advancing knowledge;

User groups/Partners: Policy makers, health researchers, vulnerable groups, decision makers, advocacy groups, planners, community developers, health departments, clinicians working on env medicine, risk assessors

NIEHS CAPABILITIES AND PARTNERS NEEDED

Partners

Technology partners include: Government Agencies: CDC/NHANES, NIOSH, DOE, USGS and Census, OSHA, DOL, DOD NASA other NIH ICs, NSF, NOAA, HUD,

We need multidisciplinary training and research funding initiatives for academics. Various disciplines to be included are: Engineering, Epi, Statisticians, Medicine, Planning, Electrical, Chemical engineers, geographers, informaticians; behavioral and social scientists.

Community engagement at all levels of research and public health messaging to nurture and support partnerships

Capabilities and innovations needed

Intramural exposure science program in this area is needed

Prioritize resources to fund exposure research that expand focus on mechanistic toxicology driven research program (both intramural and extramural)

Expand exposure assessment expertise to NIEHS Staff and Council

Add focal point in the office of the director to coordinate exposure science across agencies

Add requirements for exposure science cores in center and training grants

Advocate for an exposure science study section

Support discovery science

Ensure exposure science people are included in the October distillation of the strategic plan