

NIEHS Spring Workshop Notes
Thursday, April 3, 2008

9:30 am

Keynote Address

Phil Landrigan, Professor & Chairman, Dept. of Community and preventive Medicine, Prof. of Pediatrics, Children's Environmental Health Center, Mt. Sinai School of Medicine

- Working together SBRP & WETP
 1. shared base in science, i.e., toxicology, exposure assessment, and epidemiology
 2. shared education
 3. shared interest in vulnerable populations: children & workers...(this third shared interest is the MOST important to this alliance, that is protecting one vulnerable party helps create a trained infrastructure.

- Vulnerable Populations: synthetic chemicals, there are a raise in these from the chemical production.
 - Some have no basic toxicity information
 - Failure to test chemicals for toxicity
 - Developmental and system toxicity for developing kids
 - Lead transfer to kids
 - In the U.S., it is like conducting a toxic experiment where kids are the “unwitting” participants
 - In workers, there are heavily exposed populations, prolonged exposure, work that is done under difficult conditions, exposures to new “untested” materials introduced at the work place...there is no base of medical knowledge or information on these newer introduced synthetic chemicals.

- There is a new disease recognition, showing it is first present in worker populations, and that they have heavy exposures.

- Disease in communities of workers: recognized to cause worker poisoning.
 - In antiquity, Pb (miners, smelters)=> lead to environmental disease...
 - Later, 1700s, Ramazzini recognized as a substance that poisons mine workers...high doses lead to Pb-poisoning, acute exposure

- Selikoff, Father of Asbestos Research in the U.S....recognize asbestos as pulmonary doctor in the 1950s/60s.
 - Patterson NJ, noticed Asbestosis in workers in textile manufacturer, which was originally a silk manufacturer
 - Asbestos exposure vs. lung cancer:
of workers:
11.3 (developed neither)
58.4 (Asbestos related)

127.6 (Smoking related)
601.6 (Both, causing a synergistic interaction)—

-The question is, how often does this occur?

The Future of Risk Assessment:
Community-based Cumulative Risk Assessment (RA)

Mike Callahan: “Defining Cumulative Risk”

- Community-based (cumulative risk assessment –RA)
- What is it?
 - Combination risk-forms:
 - e.g., SBRP=holistic (more so than the original analysis)
 - combines risks
 - how chemicals work together
 - non-conventional stressors
- Environmental Justice (1980s) asked about Cumulative RA...
- Now agencies are forced to deal with Cumulative RA
- Missing something in RA, chemicals, etc., known as the “risk modifiers”
 - NAS Red Book, 1st standard of RA book, 1983)
 - new in Fall (community-base cumulative RA), with multiple stressors affecting the population
- EPA sponsored RA reports
- Things going on behind the scenes
- Community-based => chemical agent stressor affects the community and the community functions as the center of socialization, the center of the community
- More than one stressor
- Challenges:
 1. talk to the community
 2. accounting: when a stressor takes place, as a result of something else, know about when the exposure(s) take place; there also needs to be more research on non-chemical vulnerability
- Single chemical assessments are not enough
- The national environmental justice council looks at communication risk (e.g., Katrina)
- The tribal’s security council say RA does not work for them because a former “Superfund” site messed up the community, and the tribe’s losses are not

considered in RAs according to the tribe...by using the cumulative risk assessment strategy, these issues are identified as a result of the more holistic nature of RAs

- in the tribes there were cascading effects; there were also non-conventional stressors
- Another example, the health effects were on a community were never considered when an “energy conversion unit,” that is a trash incinerator was placed in a residential community:
 1. increase in rat population
 2. the truck traffic increase, along with pollution from idling diesels
 3. a small “prostitution” business opened in the area
- Discussion of Non-erosive, erosive, and failed coping
- Cumulative RA looks at vulnerability in coping...it is population focused; not just chemical; includes non-conditional stressors; and answers larger questions from decision-makers.

****The Cumulative RA presents the WHOLE (HOLISTIC) Story****

R. Bullard: “The Importance of Cumulative Risk: ATSDR’s Activities in Superfund”

- Environmental justice and garbage workers today (April 3rd)
- His book, “Dumping on Dixie”
 - Vulnerabilities do not always get caught in RA
 - Where you live can impact the quality of life
- 20 years since toxic wastes and race; risks not randomly distributed
- Possible to quantify hazards-threats
- Fenceline Communities => direct path of accidents, etc.; fences don’t stop contamination
- Special Community at Special Risk
- Toxic wastes and race reports:
 - proximity for the community
 - residents even more pronounced
- Cumulative RA => one more will make a difference
- Not just a southern phenomena
- Lead paint, not solved, in residual (aka-older housing) that is still used for the public, and the housing is still not safe.
- There are currently still toxic sites near schools, playgrounds; toxicants may also be responsible for pollution
- Ozone standards, the EPA need to strengthen the standards to 60, but they just went to 75

- Just because you have the science, does not mean that you will get the results—the reason: politics
- everyone has the right to breathe
- Cumulative RAs done before and after storms show contamination, i.e., Katrina
- Louisiana’s toxic dumps, contaminated homes denied funds
- levels of formaldehyde
- endangered health safety net
- Environmental health threat issues: water, air, school, job: how does science affect issues?

For more information, visit the Environmental Justice Resource Center (See Slide for contact information).

Pamela Tucker: “Chronic Stress as a Risk Modifier in Cumulative Risk: ATSDR’s Activities in Superfund”

- Chronic stress: biomedical and physical topic
- psycho-social turmoil related to hazardous substances

*Posed Question: not just psychological incidents, but also psychological effects on biological stress and physical stress?

- There has been work with 15 communities on stress mgmt. programs after being exposed to substances
 - Stress mgmt, the neuroendocrine system: the mind and body are one
 - Stress caused by neurotransmitters
 - 10 years: disease, heart & blood vessel
 - -journal of heart, lung and blood, impact of psychological stress on the heart
 - -acute psychological stress caused by MI
 - Hot reactors, under psychological stress, hypertension increased
 - Stress=> triggers autoimmune disorders
 - Impacts of stress on autoimmune system
 - Elemental mercury vapors—acute elemental mercury intoxication
- Cumulative RA not just toxic
- Impact of stress and toxic exposure on tadpoles (experiment)—high kill rate (___%); following release of bass 100% kill rate.
- Public Health Question: Impacts of effects on public health: burden from chemicals, stress; cells respond to chem. & physical; more information/research is needed on stressor reactors

Lee Hofmann: “Changing the RA Paradigm in EPA’s Activities in Cumulative Risk”

- EPA working on different aspects of cumulative risk
 - 1997: Planning/scoping cumulative RA
 - 2003: Framework for cumulative RA (Phase 1)
 - Current: Phase 2 for cumulative RA
 - Future: Agency
- Current Work:
 1. help risk assessors in planning/conducting
 2. eco & human health
 3. follow 2003 document for problems with formulation
 - “issues-papers”
 - 5 papers “topics” of things being worked on in Cumulative RA
- Case studies in documents: 12, looks at variety of eco & human health sites: integrated human health and eco RA
- Risks for cancer/non-cancer effects of case studies
 - Number of case studies, all published; took information and call out from it to compare
- Format used for case studies: Baltimore CS, Reg. CS
 - Different elements part of cumulative approach
 - No one case study has every element
 - How to approach different issues and different elements
 - How to combine metrics for dissimilar stressors?
- Overarching research needs: need for GIS tech to retrieve data
- Future:
 - toxic genomics
 - bio-modeling
 - comm. Tox. Cntr. (virtual human): model effects from different stressors
- Community-based RA =>
 - EPA, national center for envirn. Research
 - *Research needs:
 - infrastructure to share database and methodologies
 - understand stressor interaction
 - new framework integrating chem. and non-chem. into cumulative RA
 - approx. “models” tools => look to research
 - Models = EPA to do assessments

- National Academy of Sciences (NAS) & EPA advisory board:
 - Looks fwd to cumulative RA to form general risk guidance, enforce theory and practice and improve communication, while building tools
 - Why it matters?
 - Community-based RA will come to Superfund Site soon?
 - What kind of research will be done?
 - What does equal vulnerability mean to how we train workers and clean-up?
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Session Questions Posed to Panel for Discussion:

Q1 & A1 (question[s] answered with more questions): If we go to this model, don't we open the door more to look at economic benefits...that is, applying economical and environmental...?

- For extensive cumulative RA, how does it get applied and to what extent?
- What does it mean when data and science are not enough?
- More decisions should be based on science
- what economic model could be used for cost-benefit analysis?

Q2 & A2: Psychological stress helpful, so as to take action; please expand on your definition of psychological stress?

- there is a lot written on good of psychological stress as a motivator
- my talk today focused on the negative impacts of psychological stress, but there are also positive activists in stress too.
- realize that the absence of stress is death

Breakout Session #1: Preventing Exposure through Research and Training

Victoria Persky: "Communicating the Risks of Pb in Demolition Work"

- Aspects of demolition, construction and renovation
 - particulate, before and after demolition
 - silica
 - Pb
 - air-borne PCBs
- real-time monitoring
- iDOT & EPA (QC)

- Highway silica =>576 cases (by NIOSH)
- Demolition, higher Pb-dust forms when compared to structure removal
- PCBs-Great Lake Region, Michigan and Illinois
- Possible airborne sources, measuring PCBs and water, landfills, industrial sites, caulking
- PCBs before and after dredging of Indiana Harbor
- Reducing risks =
 - identifying sources; establishing surveillance sys.; eliminate sources; isolate exposure; increase local ventil.

John Morawetz: “Worker Health and Safety Considerations When Setting Acute Exposure Guidelines: A Case Study”

- AEGL = Acute Exposure Guideline Levels
 - planning- LOC
 - threshold for given health effects after exposure for a set time period
- AEGLs note repeated exposures; not “short” term, but constant dose at a discrete time period
- start with health effects, LOC depends on two numbers:
 - how much chemicals exposed?
 - how long exposed?
- AEGL Health Outcomes:
 1. notable discomfort
 2. irreversible or serious, long lasting effects
 3. death or life-threatening
- 5 time periods; 10, 30 minutes, 1 hour, 4, 8 hours; 15 levels per chemical
- the greater the exposure, the increased hazards there are
- LOC-ERPGs:
 - *intended to be used as planning tools
- data avail., primarily animal studies
- animal expertise, human studies
 - uncertainty factors
 - use the base-10 system
- human studies-few w/ reliable exposure and effect data
- Alternatives:
 - use number of limits w/ caveats
 - limits not a firm line between safe and unsafe philosophies:

- expand and enforce regularly
- precautionary principle, enough evidence, control exposure to take action

do not trust all scientific standards, unless appropriate to the study!

- There is a need for a multi-disciplinary panel:
 - Science can be used, but there is a safety factor
 - Use numbers with caution
 - Look toward Safety

Ron Snyder: Haz-Map

- Health and safety environmental professionals
<http://hazmap.nlm.nih.gov>
 - site provides training for trainers, workers, energy resp.
- Typical challenge for those to find information after being exposed, or have health effects, from toxicants
- How workers recognize and prevent diseases cause by chemical and bio agents
- Database to comprehensively collect and index information
- Quickly get necessary information: browse, using hazardous agent; occupational disease; high risk jobs
- Goal: to protect workers' safety and health
- Example of intelligent database to store information for easy retrieval and decision support
- Usefulness of mapping a complex database

Clement Furlong: "Exposures to Tricresyl Phosphate"

- present in jet fuel engines
- 1930 TOCP: cause paralysis (ginger jake syndrome)
- 1954 TOCP: converted to toxic metabolite
- 1961 TOCP: structure of toxic metabolite determination
- cabin air quality
- the need to develop a method as to whether an individual has been exposed to TOCP
- Exposure takes place:
 - health of pilots and cabin crew
 - contamination by engine oil chemical
 - organophosphates

- Engines => turbines => atmosphere => recycled air + plane's AC system => release into cabin
 - effects pulmonary system
 - filters can be installed on planes to prevent this
 - hydrocarbon fuels and aerosols
- Exposure can occur typically in aircrafts and plane crash sites
- Biomarkers of Exposure:
 - Proteins => modified proteins => digest with specific proteases => separate fragments => aged and unaged residues

Smaller Breakout Session, Room H, Dr. David Osterberg:

- human data comes from mistakes
- more human/animal data
 - data for chemicals:
 - 9/11 dust & silica (more important as a researchable toxicant)
 - EPA "deadly" dust
- training materials produced from research on silica
- researchers to let you know something is there
- detergent manufacturers/refinery (basic chemical industry)
 - benefits for the two programs:
 1. population exposed to a unique set of substances
 2. source of possible studies
 3. data to change working conditions
- acute effects, long term:
 - concerned about both safety and health first
- science => politics
- research would be better as partners (SBRP & WETP)
- exposed laborers to chemicals
 - short-term workers exposed
 - use research
 - high levels of protection even with low levels in environment
 - contractors do, usually, what is least expensive
 - there is wide variability

- more suited to surveillance =>collect data:
*question from this: how to find a matching population of study:
clusters?
- researchers set standards, both organizational set of standards for stronger measures
- when suspicious of chemical problems, get a hypothesis; it may be real and thinking about how to test it?
- 1 isolated situation can help another
- helpful—funded research

Katrina Grant

- teachers, workers
- both sides have world beyond NIEHS
- all players' at this meeting are not everyone who would be involved; remember that NIOSH is there.
- people are not interacting
- follow-up involving other key organizations
- plan beyond this meeting - what will we do 6 months from now?
- theme/focus: more focused on language, and use of acronyms; there needs to be a collaborative effort(s) between both organizations to talk/communicate
 - next topics of next meeting should focus on the successes of merging the two orgs.
 - a regional committee should be formed
 - communication enhancing SBRP, list-servs
 - organizations have ideas/comments about funding
 - dates, objectives, demonstrate successful interaction on the grants of both; there should be a cognizance of contracts and a broader communication style
 - economic situations of the members of the participating organization should be known—Superfund has contracts up at different times, whereas WETP all work and receive money and compete on the same five-year cycle.
 - WETP grants are not U-45S (aka-cooperatives)

Wrap-up of Prevent Exposure Breakout Section #1

1. Collaboration:
 - involve org. labor
 - sources of good information for the media
 - access to research

2. WETP Evaluation:
 - get data to help SBRP researchers
 - identify issues-investing
 - share research
3. SBRP Research: sharing across program
 - help dissemination of information
 - NIEHS coordination town meeting
 - sharing meeting
4. WETP- much experience in “translating technical information”
5. SBRP-could create a matrix of need WETP
6. Sharing Information: from environmental health perspective
 - Education-EHP, use it to bring WETP and other programs together
7. Publications, social networking, and ethical issues
8. Use MDB and see other information to expand their contract and agendas
9. Research to practice and communicate:
 - identify science knowledge; know that there is still uncertainty
 - match SBRP investigations with WETP...SBRP has Spanish materials
10. Sometimes separate is better—don’t cooperate on everything, be strategic.
11. It is premature at this time to figure out matches between the organizations...
 - it’s good to meet, but when will be the next big meeting?
12. Priority issues for WETP and SBRP...pick a priority and make it do-able
13. The compilation of forces takes time, it is a process, for the long term, we need to find out what works, and what doesn’t work
14. Successful programs continue to change and evolve in time.
15. Who would you call—what’d you talk about?
16. Need a motivator, new collaboration, resources from this meeting...

Breakout Session 3: Clean-up, Green-up, and Nano-technologies: Emerging Issues in Remediation, Clean Production and Engineered Nanomaterials

Intro:

Wendell Ela, environmental engineer replacing Jay Gandolfi

- There are enormous amounts of pollutants that have not had their toxicity tested
- Emerging pollutants of concern –global organic contaminants, pharmaceuticals, endocrine modulating chemicals, nanoparticles, industrial chemicals
- Concerns/risks of toxic chemicals: are they slowly building up? Do they elicit toxicity without being inherently toxic, difficulty in remediation

Remediation of Contaminated Sediments: Current Challenges and Emerging Technologies

Upal Ghosh

- Priority organic (PCB) pollutants are the leading cause of concern, sticking to sediments, thus getting into food system and causing risk
- Sediment elimination is leading to risk reduction in the short and long term
 1. Dredging can actually cause more risk by bringing up pollutants that were buried deep within a body of water's sediments further up. This leads to a huge problem with high concentrations of the toxins exceeding the initial PCB concentration before the dredging began
 2. There are huge uncertainties in predicting long term risks
- PCB reduction in pore water and worm tissue, looking at worms and how they take up PCB to see how fish will digest the worm
- Has a demonstration project in Hunters Point, CA-a superfund site,
 1. Getting 50% reduction in PCB's by adding carbon molecules
 2. Grass River, NY
 3. Trondheim Harbor, Norway
- Looking at geo-engineering as an appropriate alternative in dealing with PCB and DDT risks in sediments

Questions/Comments:

What do you know about the affects of activated carbon has?

The longest study has been 18months and the carbon has still decreased the Amount of PCB in the water

What is the time period until the carbon becomes effective in water?

The fastest has been one month

What is the cost of carbon vs. dredging?

It is 20% of project costs and less expensive than dredging

Gerald Poje, suggested for us to be careful in dealing with a solution for PCB's because it does not take into account disasters like hurricanes, which will mix the sediments again and cause the PCB levels to rise again

Nanotechnology for Treatment of Contaminated Water

Dibakar Bhattacharyya

- Detoxification of Chloro-Organics, such as TCE, PCB
-nanomaterials speed up the breakdown of these chemicals from 45 days to 1 hour at room temperature!
- Not one technology will work in the breaking down of toxins, green chemistry
- 28 grams of nanoparticles can break down 38,000 liters of contaminated water
- Addressed the question of detoxifying PCBs at room temperature
- Nanostructure materials change the pathways of toxins

Questions/Comments:

How do these technologies affect wildlife?

It could kill bacteria

How persistent are the nano-chemicals?

Depends on coating, palladium coated iron will

Health and Safety of Nanotechnology

Bruce Lippy

- Nanotechnology defined
1-100 nm range in at least one dimension
- Will have an enormous effect on the future
- 2008 Nanotechnology budget is 1.5 billion
- The promises of nanotechnology
Examples of it in the medical aspect, nanoparticles killing prostate cancer
Nano Radio
Particles can be manipulated at an atomic level
Nano foods
- Europeans are adopting nanotechnology and America needs to hop on the bandwagon as well
- Sampling for wrong things when it comes to nanoparticles, too much focus on mass instead of surface area
- Discussed there needs to be a better way in data exists in the effects of nanometer sized particles on the body

Comments/Questions:

If one were to develop standards how will you characterize materials being used?

Unsure because there are many chemicals in the materials

There is a lot of variability on the cautions of nanotechnology

Improving Patient, Worker, and Community Health: Examples from Maryland Hospitals

Joan Plisko

- Making hospitals true place of health and healing, program name MDH2E
-It provides technical assistance and networking that promotes environmental sustainability in health care
- Making the jobs in hospitals dealing with environmental issues a lot easier and pointing them in the right direction
- Hospitals can choose from a plethora of environmental programs
- Work closely to eliminate mercury in the environment, i.e medical incinerators and the hazards that they cause
- Assist in the assessment of products containing DEHP and PVC, making sure to reduce the human health risks, especially in the NICU and PICU units
- Nurses and clean-up crews in hospital are one of the most vulnerable populations to diseases like cancer and even birth defects
- Advocates a cleaning plan for hospitals that that are non-harming in certain areas of the hospital, changing what chemicals vendors who clean the hospitals carry
- Hospitals who have embraced holistic approaches, i.e green hospitals have seen and improvement of patient health and less employee errors
- Working in the area of treatment technology and assisting with alternatives i.e autoclaves

Questions/Comments:

How do you know if the treatment technology?

Currently there is no criteria, most hospitals use autoclaves. There are no real standards.

Gerald Poje, commented on the fact that pharmaceutical companies need to have better strategies for patients/ people that defecate and urinate that are consuming drugs will have a profound effect on the earth. They are not being properly treated as contaminated substances.

When looking at nanotechnology, looking at safety issues is very important and using the right type of technology is affecting workers.

What are the routes of entry of nanotechnology into the body?

Skin absorption, inhalation are definitely a question

Old toxicity paradigms are being used to evaluate new materials, and that is a problem, there can be no comparison between the materials of today.

How confident can one be in teaching workers how to handle nanotechnology, is protective clothing enough?

That has not yet been addressed and no real answer

Are there any good cutting edge programs as far as preparing people to handle nanotechnology?

There is a chemical engineering group that has developed protocols and standards, but there is no concrete material on handling these materials

What if we do if we don't know? Do we take the most extreme measures in protecting workers? There are very many unknowns in developing this technology, especially when it comes to exposing workers.

How are Europeans handling this technology?

Applying the precautionary principle to their approach

No one is thinking about this technology is doing to workers let alone the environment. There is 1.5 billion dollars spent on this technology, but no one has taken the time to take a minute and say this can be greatly hazardous to construction workers that are pouring concrete with nanomaterials.

Superfund cleanup is not just reactive, but also proactive

Break out session:

How can we build partnerships?

- Meet again
- Speak with one another, researcher, engineer, and safety all coming together
- Groups who are geographically close to one another can collaborate
- Build into next RFP
- Provide info on available HAZWOPER? Advise on specific toxicity of materials
- Creating and offering more specific training
- Provide access,