1

I begin with the premise that any efforts to evaluate the effectiveness of public health/EH education seek to establish a connection between those educational interventions and behavior changes that favorably influence human health and/or the health of the environment. In the context of K-12 public education, this can be extremely difficult to do using the traditional scientific paradigm of a randomized clinical trial. I propose that NIEHS fund an effort to develop a menu of standardized, scalable protocols and materials for enrollling schools or districts in such trials and make these available to those of us in the field wishing to evaluate the success of our various interventions. This would save a great deal of duplicated effort, as well as make it possible to compare a variety of studies that share similar criteria. It might also make it easier to get schools or districts on board, as the various forms, protocols, etc. would have been validated by the NIEHS.

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2

A thoughtful assessment plan is imperative. It would benefit this new program to review the range of assessment measures before it chooses one. The current 'gold standard' in education is scientifically based, randomized trials. This works well in laboratories but does not have direct application in school rooms. The variables are too great and cannot be controlled for in a way to trust ones results. Assessment methodologies for behavior change may well have value for this program and might be considered. Certainly, this could be used to see if children's behaviors can manage their levels exposures.

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3

In terms of new opportunities, I think we can do much better tapping into the new biomolecular tools being produced by SBRP programs nationally. For this reason, under the leadership of KC Donnerly, we created the National Bioassay Network. The hypothesis to be investigated by core partners (at least four SBRPs nationwide) in the bioassay network is that chemical class specific bioassays or biomarkers can identify degraded sediment quality at lower sediment concentrations than standard aquatic toxicity bioassays. The chemical specific bioassays being produced by SBRPs nationally may also be capable of detecting biologically significant endpoints that are not measured in standard aquatic toxicity bioassays. Data will be obtained on sediment chemistry, aquatic toxicity, bioavailability and chemical specific bioassay response. While it is recognized that aquatic toxicity bioassays are the foundation for ecological risk assessment, the use of chemical specific bioassays may provide complimentary data and a more accurate representation of site characteristics. All of these data will be integrated to develop a tool for Project Managers to use in setting site-specific criteria for sediment quality. The bioassay network is a promising example of networking at a national level that joins the university-based research with government research and policy-making.

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6
Additional funding (targeted specifically towards the development of Spanish language training materials and trainers) would help the UAW to continue this outreach effort to the underserved Puerto Rican community. NIEHS is active in raising awareness of environmental issues in the immigrant and non-English speaking communities, but similar activity targeted towards the Commonwealth of Puerto Rico is noticeably absent.

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7
The research needed for this program is multi-fold. To best identify the preliminary study participants, a population-based approach needs to be considered. Which populations (human, animal, environmental) initially identified will be dependent on the class of analytes (pesticides versus estrogenic pharmaceuticals) and the potential impact on specific populations. A large component resulting from identification of the analyte levels (or lack of levels) is evaluation based. Education based programs will need to be developed upon identification of the impacted population. The nature of the impact (occupational, continuous exposure from identified sources, etc.) will drive the development of the second phase, intervention or prevention based research. This presents an opportunity for NIEHS to collaborate with the Expert Working Group to best identify legislative priorities and research directional modifications to the testing algorithm (population, analyte, etc.) to better the evaluation of the program. A potential roadblock is political sensitivity, i.e, the area or population of study may be considered an issue in and of itself depending on the influence of external lobbies, groups, or organizations. An approved and organized project with Federal partner (EPA, CDC, FDA, DHS, etc.) buy-in can alleviate this potential roadblock.

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8
Convene health professionals to learn of the latest research about and keys in prevention of environmental disease.

Continue research on the interaction of environment and human disease. Also include risk communication to health professionals who can assess patient's for early signs of environmentally exposure related illnesses.

Work with nurses on various research projects related to public health and environmental exposure including tools for assessment of homes, workplaces and individuals.

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9
Many researchers in nursing are engaged in health disparities research. NIEHS should work with such nurses to develop ways to prioritize the study of environmental factors that contribute to disparate health. Expanding funding opportunities for research projects that address environmental health particularly among vulnerable populations would encourage nurse researchers to pursue this line of research.

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10
Population-based human studies (epidemiology) with would have direct application to public health.

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13
Community members need assistance in understanding the meaning of biomonitoring and environmental monitoring results. I'd like to see researchers focus on the issues involved with moving from cumulative impacts assessment to cumulative impacts prevention and mitigation.

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14
Please reference " Environmental Health Nursing Research" found in Nursing & Environmental Health Roundtable August 26-27, 2002 Research Triangle Park, North Carolina. Final Report.

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15
Evaluation research (particularly of preventive innovations, policies, and educational approaches) is difficult to fund but is critically important to improving the efficiency and effectiveness of our work.

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16
See comments under 2A.

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17
See the above proposal (2.A) to create more opportunities to combine education/outreach and community-based research.

Additionally, basic and applied research will require improved translation and dissemination of information to the affected communities, including public information and awareness campaigns through channels that effectively reach affected populations.

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18
In general, there is a need to document environmental exposures that occur indoors, including traditional and emerging chemicals (PBDE's, pthalates, etc.). In housing quality, it is important to conduct exposure assessments of the indoor environment and to study the health effects of these exposures, paying special attention to pregnant women and children. Also for housing quality, we need intervention and translational research to turn research results into effective

programs for improving housing quality and reducing adverse health effects that result from poor housing quality.

In the early childhood education program, research is needed to document the exposures that happen in these environments. Early childhood education programs and preschools represent a diverse array of situations, including government-sponsored facilities, private operations, and formal and informal situations. Thus, there is a need to understand the issues in all of these contexts. We know very little about the exposures happening in these environments. Policies regarding sanitation and hygiene may require the use of many sanitizers, disinfectants, and cleaning products and we do not know what kind of exposures these create for children in these places. In addition to understanding the exposures, we need policy-oriented research to determine the most effective programs, whether they be policies, voluntary certifications, or other programs.

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21

Nutritional research on obesity – causes and interventions/prevention.
Endocrine disruptors – we have good research on the hazards and the exposure, but less so on the human health effects. We have data on environmental/ecological impacts, but how does this translate to human health impacts?
General population exposures and health effects from electric and magnetic field (ELF, EMF). There are occupational exposure limits, but measuring residential exposures, computer, cellular, etc. exposures is less concrete. The public is concerned about the health effects; there are generally multiple exposures, yet we don't have good data to advise the public on the acceptable risk levels.

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23

. NIESH should ensure that all nursing researchers (not just environmental health nursing researchers,) meet regularly to promote research in environmental factors - i.e./ risk factors for children in urban schools, outcomes of exposure to toxins through foods, school, home and neighborhood environments, best advocacy and educational approaches for the community, citizens, and the corporate community. Also consider ways to research the cost savings and outcomes of prevention interventions.

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24
See 2.A.

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25
Working with Centers of Excellence can connect you into the programs that are in the fore-front of development materials.

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26
A key research need is the development of multi-media approaches to scan and characterize the entire set of environmental exposures which a community is currently facing. This provides a baseline to which public health data can be linked. Moreover, it will facilitate a necessary ability to link exposure levels of specific contaminants with sources. The source-exposure linkage will promote a focus on problematic areas or locations that are ripe for improvement as part of a Smart Growth initiative. Moreover, it will facilitate planning of the Smart Growth project to avoid any actions that will increase environmental exposure levels.

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27
As a public health official, I am very focused on prevention. Any research that would aid me in prevention of chronic disease or illness would be helpful. On the other hand, the specific Mn project that needs to be done locally would be evaluation of the dangers of exposure to a substance. Either way, I feel that there are many research activities that could be helped through adequate funding. Research is, in my opinion, the best use of your funds.

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28

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29
Evidence-based intervention research to demonstrate effectiveness of a community-based approach.

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30
Yes

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31
work with locals through partnerships to get input from the field on what needs to be developed for research, again coordinate better between all federal and state agencies but work through locals for the development of specific research.

Communication has to be done through both formal and informal means (schools, students, web based) and through the use of local outreach lay workers who have been trained.

Train locals through local medium where there is the biggest impact - daycares, schools, health departments city council, and business sectors

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32
(1) As the US population ages, there will be an increasing incidence and prevalence of a number of water borne diseases, such as pulmonary mycobacterial disease and Legionaires' Disease. This increased incidence and prevalence is fueled, in part, by existing water treatment strategies that eradicate water borne gastrointestinal disease (i.e., chlorination and other disinfection methods), but select for survival of mycobacteria and legionella.
(2) Population-based studies are needed to accurately measure the incidence and prevalence of these diseases to identify trends (e.g., increased or decreasing incidence) and identify the factors of water quality and delivery that influence disease. Further, such studies could identify risk factors for patients.
(3) There have been no systematic studies to measure the presence and number of emerging waterborne pathogens.
(4) Methods need to be improved for the rapid detection and enumeration of emerging waterborne pathogens that can be directly included in the tests performed by water utilities at present.

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33
Community-based population research is key. Emphasis on GPS, GIS, and Exposure Monitoring is key for improving exposure assessment and giving validity to study findings.

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35
Evaluation is a tremendous need for all educational/outreach activities. The truth is that we cannot budget enough for an effective evaluation plan. Somehow the community of EHS educators needs to share resources and plans for effective evaluation.

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36
See 1. I am not a scientist and do not feel qualified to suggest appropriate research strategies. Communication tools to help disseminate the research will always be useful.

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37
• Biomedical research. “Centering” approaches to intervention and behavior change need additional focus. Non-traditional venues for intervention/training (congregations, community events, etc) need additional emphasis, given the difficulty of reaching the public through the overburdened health care system.

Roadblocks. The time lag between bench research translating into health benchmarks "from the bench to the benchmark". This makes it difficult to translate this research into intervention activities in a timely way.

• Evaluation research. Web-based evaluation tools would help, especially for scientists who are not accustomed to evaluating endpoints such as behavior change.

Roadblocks. NIEHS has not defined metrics for evaluation of "research translation" and "outreach". What constitutes success? There is also considerable difficulty in measuring and achieving behavior change without significant follow-up with recruited populations. This is not always feasible (e.g., migrant populations, limited funding, limited or no access to participants).

• Communication/Dissemination research. Methods to communicate complicated environmental messages to non-english speaking and/or low-literacy populations are essential. Non-traditional communication channels (church meetings, informal visits, promotoras, etc), need to be identified, funded, and tested. Research into how to "reach" population is needed ("informatics").

Roadblocks: Identifying issues of concern to populations and making those the scientific priorities

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38
There is a need for practical research on impacts of development options on health. Too much of the public health research is either too narrowly focused or so specific as to be useless in policy discussions.

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39
Research that is applied and applicable to the location focus. Reduce lingo to lay terms or at least explain the lingo until it becomes part of a lay vocabulary. Not dumbing down for the sake of that but rather to educate everyone with the correct information.

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40
I will defer to the researchers for most of this, but reiterate that there is already a communications infrastructure in place which includes state and local health departments, the medical community, academia, federal health and environmental agencies, and others who can disseminate information.

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41
NIEHS should encourage researchers to think about translation in all phases of research projects. The typical environmental research project only focus on translation after all data is collected and all conclusions reached. There is no reason for all research projects not to include a translation component in all phases of the project, especially if they are community-based and participatory in nature. Communities are hungry for information on environmental issues and

have a hard time to understand why they have to wait for researchers to do all their scientific work before they communicate with them about their research.

Evaluation research can also be participatory and include communities. NIEHS should fund projects that include community members in the evaluation of project accomplishments, which will require training of community members, of course. I have been involved for many years now in training workers to evaluate training provided by worker trainers through the NIEHS Worker Training program. It has been a very successful experience that should be expanded to other NIEHS programs. We called this experience Participatory Evaluation.

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42
I think that that NIEHS can help with the development of more evaluation tools and materials for projects that involve complex gene-environment interactions. I believe it is important to help the lay public understand how to interpret susceptibilities related to the complex diseases currently being studied. Researchers are often without guidance and little has been published on how to ethically perform research involving gene-environment interactions and how, when, and what genetic information should be shared with research participants.

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43
1) Research on changing people's environmental health behaviors. Do the standard behavior change theories apply? Are EH behaviors unique?

2) Environmental health communication (science communication). What are the best practices in translating and disseminating research information to various public stakeholders? What do they need know?

3) Long-term effects of integrating environmental health issues into K-12 education. Do students have increased awareness? What does this translate into when they have families? (NIEHS should strive to be a leader in science education and determining what the effects are in the long-term.)

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44
Opportunity: human genome
Obstacle: which markers to choose

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45
Research of several types is needed. Activities by partnerships should not be conceived as primarily education, but other potential advantages recognized including improved research questions from community input, better community participation, improved translation of results, improved communication, enhanced compliance with recommendations for behavior change, and exposure reduction etc.
Particular research needs include
• Population-based research on exposures and effects from environmental hazards to health

- Research on interventions directed at prevention of environmental health effects
- Research on better ways to communicate and disseminate information on environmental health hazards and prevention or health effects
- Evaluation of prevention activities in various target communities

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46
NIEHS is in a position to fund research in any of the above-mentioned areas (biomedical, evaluation, and dissemination). The true opportunity that would be missed is if NIEHS did not consider funding community-driven and/or CBPR projects to address environmental exposures that impact public health in low-income communities of color across the US. Populations in these communities tend to suffer greater exposures and have less utilization of healthcare services. The road-blocks involve a large lack of understanding of scientific findings from research by the impacted community.

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47
Support the understanding of long term behavior of radon systems and methods associated with reducing exposure to ionizing radiation sources. Fund demonstration projects that serve to improve indoor air quality of schools and homes for the less fortunate.

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49
We applaud the comprehensive NIEHS portfolio: basic research, the Community Outreach components of the Center Grants and Super Fund Basic Research Program and the Worker Training initiatives. This combination of activities provides a unique mix of capabilities to position NIEHS as a leader in environmental public health.
We encourage development of a focus on the use of generated knowledge to formulate science-based policy. The NIEHS should not "just leave it to others", but should lead in the development of a structured. national program with other agencies. Responsible science requires that action result and be measured: exposure reduction, decreased disease, increased quality of life.
See Opportunities and Roadblocks (above) for ideas regarding several aspects of communication/ dissemination research.

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50
NIEHS should fund projects to evaluate K-12 environmental health educational materials.

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51
Since we are engaged in science education activities, I will address this question from that perspective. We struggle in science education to find evaluation models that are sufficiently rigorous to demonstrate that instructional programs are effective with teachers or students and

also are cost efficient. Most programs do not have sufficient budgets for longterm follow-up of behaviors, career pathways or achievement. In addition, hardly any programs have yet been able to demonstrate whether science education on environmental health (or any health topic, for that matter) actually changes future behaviors. In fact, we do not even have a strong body of evidence that inquiry-based teaching on environmental health science topics leads to enhanced problem-solving skills by students or their teachers (although content knowledge changes have been documented by mulitple projects).

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52
Lack of financial resources is the single greatest barrier to addressing the effects of environmental exposures on public health. The proposed "Partnerships for Environmental Public Health" program must be substantially funded and given priority. The NIEHS remains too small within NIH. Within NIEHS, the recent diversion of attention to "bench to bedside" research distracts from NIEHS's essential role in prevention.

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53
Biomedical research (population-based, intervention, prevention, translational, behavioral),Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other
One excellent opportunity is for NIEHS to expand upon NIH's Public Trust effort. It has the potential to act as a good framework for involving communities burdened by environmental health issues to get more involved in the research process. NIEHS should review some of there academic-funded research centers who are doing work in the above research areas using the partnership model. Look for best practices and model research centers and developing funding and support mechanisms that require future research partnerships to use their model. Similarly, NIEHS should review community-university partnerships and develop funding and support mechanisms that require groups to meet specific partnership criteria.

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54
Training institute focusing on science concepts and methods for lay advocates
Evaluation of public health campaign/activities is really necessary yet there is no capacity at centers. Outside evaluation should be part of the budget and mandated.
Communication and dissemination depends on skill at translating science to lay language and low literacy.
One way to increase evaluation capacity is for the NIEHS to "loan" evaluators or offer evaluation as an agency service to grantees
Development of evaluation mechanisms or curricula so that grantees know the sort of records to keep or statistics to track.
Provide evaluation training to grantees, especially CBOs, so that groups have a good idea of the information necessary to conduct an evaluation.

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55
Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other(Not my area of expertise)

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56

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57
Additional attention to innovative and effective evaluation and impact assessment for a variety of Outreach/Educational activities and programs should be a high priority.

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58
The whole bench-to-bedside concept is building at universities but people are also recognizing that translational research really should be bench-to-community, especially for the benefit of public health. In the bench-to-community spectrum, the biomedical research examples listed in the question are all important. Which approach is used would need to be appropriate for the research and should be left to the investigators to decide. The main concern is that grant reviewers have experience in those types of biomedical research and can appropriately address the quality of the proposal.
In general, EH needs to better utilize public health research to determine prevention activities/approaches that work, however, there are two big challenges with public health to keep in mind. One, that people may be aware of a danger but not change their behavior. Two, that true impacts of interventions may be very difficult to measure. For example, a high school student is introduced to EH via a curriculum and 3 years later he becomes a manager of a company and decides to get trained in EH to protect worker health. In addition, many exposures in EH are not exposures of choice, thus "traditional" public health outreach and measures that rely on individual behavior change are limited and new outcome measures (long term and intermediate) may need to be defined for EH.

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59
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research.
There has been a paradigm shift so that an increasing number of researchers and practitioners now see the need for dissemination as a critical part of what they do. Yet, few have the real academic Background needed to go beyond intuition and move to empirically-based dissemination methods. Encouraging interdisciplinary research on dissemination would be an important activity with the potential for substantial ROI. My sense is that far too much money has been spent producing materials that don't get used or don't get used enough. It is time

to start thinking about how to create user-centered products that fit environmental needs. These should not be assumed to be print. Some should be directed at low literacy and non-English speaking populations. Opportunities in research include paradigms that truly reflect the social ecological model, collecting data from multiple disciplinary perspectives and intervening on multipe levels as well, including policy and behavioral but also genetic and using new methods of monitoring that put tools in the hands of people in communities. With concerns about water shortages and global warming, it is the right time to intervene on behaviors.

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60
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research
Opportunities
*Translation efforts specific for each research consideration
*Connection with the National Children's Study into implementation and long-term
*Connection and support of Healthy and High Performance Schools Act
Roadblocks
*Focusing heavily on the Gene and Environment Study (or just one large research study versus making general connection to a variety
*Workforce development
*Resources

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61

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62

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63
An area for communication science research results from the increasing multilingual and multicultural nature of our communities. What is the essential environmental health knowledge needed for immigrant populations and how best can we engage them?
While there has been increasing research on risk communication in crisis or emergency situations, risk communication for low-level chronic environmental exposures would benefit from additional research on how individuals and communities perceive, evaluate and make decisions about taking action.
A new and growing challenge is posed by new technology and scientific knowledge far outpacing our ability to interpret and discern the real life implications of these developments for the public. For example, though we can measure minute amounts of chemicals in blood, interpreting those results for individuals and communities is problematic. Or, as our ability to

find lower and lower levels of chemicals in drinking water improves, how do we place those results in a public health context for citizens?
In combination with a decrease in the general public's health/science literacy, this situation threatens individual, community, and government support for decisions and actions necessary to protect public health.

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64
NIEHS could help advance the environmental health community but helping to map the funding streams and sources within the community. It is clear that there is not enough funding for environmental health at the federal level but this inadequacy is not well documented. Where are the pockets of environmental funding within other agencies? Other areas of NIH? How is NIEHS coordinating with the EPA and CDC to ensure that the limited funding is being used most effectively and programs are not repetitive? How can these sources be more transparent to the general public? Showing the holes in federal funding is required and will help groups and individuals advocate for more.
The California Breast Cancer Research Program provides an innovative model for priority setting in research. The Program invited the public to help them decide where to invest $18 million in breast cancer research. Environment and disparities rose to the top of the list and after many gatherings, these areas were sorted our and priorities set. The team at CBCRP has learned a lot from this process and it would be worth NIEHS's time to explore pros and cons of this model.
There are key methodological challenges in exploring the environment connections to disease. Many of these challenges are outlined in the June 15, 2007 Cancer Supplement: Environmental Factors in Breast Cancer (Volume 109 Issue S12, Pages 2627 – 2751). The two reports by Brody et. al. and Rudel et. al. highlight methodological hurdles. Though the authors focused on breast cancer research challenges in particular, their observations are transferrable to many area of environmental health research.

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65
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research – been sure that community advocates are involved is important, the community is then more willing to support research funding if they feel they have a say!

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66
Research: such as - Biomedical research
(population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research

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68
We believe that community-driven research projects are the most effective strategies for engaging affected communities and creating a high level of success. Too often, well-intentioned research projects are presented to communities from a client/service provider point of view. Projects that meet a community need and come out of a community-driven process are, in our opinion, more likely to resonate with the audience (in our program this was parents, school officials and community members) who have to engage in the program in order for it to be successful.

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69
It is probably redundant to point out funding issues - but I will anyway. There, done. State health departments may find it difficult to get involved in "research" because of 1) HIPPA, 2) considered out of the normal scope of state health department activities, and 3) lack of ability to recruit qualified researchers.

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70
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research

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71
Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and
Other Opportunities:
* Research methods of measuring effectiveness of community
* Involvement activities in terms of modified behavior or
* Increased understanding and participation in site decisions.
* Research the effectiveness of Technical Assistance grantee's (Individual or organization providing technical assistance). *
Outreach efforts.
Roadblocks:
Behavior change extremely hard to measure.

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72
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research

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73
We believe that for many types of environmental exposures, research has been done extensively, and in fact, some of this research has proposed ways to disseminate the date that was developed. In these cases additional research should only be pursued for a specific niche as needed. Where this is the case, it may be important to look at the successes and failures others have had trying to distribute the existing information and build on the successes. NIEHS could follow up with audiences in these cases and find out what the audience member has done with the data since they received it.
In areas of emerging environmental exposures and where data is not abundant, e.g., children's environmental exposure, the environmental health relevance of nanotechnology, etc., more data may be needed before we can put together outreach materials in those areas. By this we suggest that we may not know how a similar amount of contaminant may affect a child differently compared to an adult, or how nanotechnology may affect exposure (i.e., toxicokinetics, toxicodynamics).
NIEHS should collaborate with organizations like NEHA to convene expert panels and focus groups of environmental health practitioners and academicians to identify research and community needs, methods for evaluating public health and science education activities, and health literacy strategies.

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74
Biomedical - New/best opportunities: the use and development of GIS methods for mapping health disparities, environmental stressors and health resources. Specifically, I refer to the use of spatial statistics to map patterns of disease and the association with the spatial distribution of stressors and resources/services. In general, there is a priority to take a system-based approach to health that identifies drivers of disease, and integrates prevention and treatment policies and practices. We also need to go beyond the single endpoint, single risk agent approach, and characterize the interactions among endpoints and agents.
Evaluation - Develop methods that ensure different stakeholders define appropriate indicators of outcomes or process in their own terms, not simply NIEHS driven.
Communication/dissemination - New/best opportunities: the use and development of GIS methods for mapping health disparities, environmental stressors and health resources.
Roadblocks: institutional inertia on the part of NIH/NIEHS, and disciplinary biases within and between biomedicine and public health, e.g. quantitative risk assessment, epidemiology, clinical science, medical anthropology etc.

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75
Behavioral and biomedical research are still needed. We still have many untested hypotheses and questions about OP pesticides and farmworkers. Further, there is little being done to disseminate what is known to the population most influenced by the problem—the farmworkers and their families.

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76
Translational research that has worked effectively for us has included development of land use guidance at the California state level: recommendations on buffer zones to separate residential

populations from air pollution sources, based on health and environmental research on air pollution. Continued translational research that influences land use policies is a promising direction for having immediate and long-term impacts on public health. Translational research focused on energy generation and transportation policy could also inject very useful public health perspectives into these policy areas. Good evaluation methods are needed, but I do not have specific suggestions on promising areas for research. In our work, promotora and other popular education methods have been effective, but we work on a small scale. Research to identify if/now popular education and promotora-led educational methods can work on larger scales would be valuable.

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79
Research. For us the most needed research category is recruitment of an information dissemination/communication specialist, who can work with the coordinator for outreach to develop a most effective EHS information databank.

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80
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research:
* Vast research, evidence based findings, by making use of sound methodology. Idejntifying problem.
* Forming a team persons with goal oriented mindeset.
* Funding options,
* Community friendly attitude, with a good understanding of it and its meeds.

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81
TEAL was a population based approach that worked well. I'm not sure how the idea of intervention would work. The main impacted site is in its second round of voluntary buyout- maybe something could be used with this.

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82
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies)
NIEHS needs to continue to be a strong and loud voice regarding prevention of exposures. Most of NIH dollars are directed towards basic mechanistic or curative research. The idea of preemptive research is very important for NIEHS and I believe could be its signature. NIEHS

should take a lead role with research of the impact of global warming on communities. The focus on genetics is important, but to date, the implications of this research for communities is still not well delineated. The communities don't understand it and it's doubtful that the results can be translated to communities. It's a very important area to continue to assess.

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83
Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research.

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84
Research: Biomedical research (population-based, intervention, prevention, translational, behavioral),Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other Again, I suggest translational research to address basic questions such as "what's the potential benefit of buying organic fruits and vegetables," based on collaborations between researchers with expertise in changing personal behavior, subject matter scientists, and biostatisticians.

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85
There is a three fold research criteria:
a) Research the technological advancement of building and construction materials,
b) Test the tolerance of these materials with hyper sensitive people living with MCS, particularly children and the elderly,
c) Test the tolerance of the holistic assemblage of these building materials.
Mobilizing our collective team's academic knowledge unites a broad base of public and private resources, creating the vantage needed to successfully accomplish the project objectives. [2]CIIN will be the project link to the MCS community improving each participant's involvement in and their understanding of the project. A survey will be used to identify the MCS study participants .With our medical team conducting the clinical testing of our chemically sensitive patients; we will be able to ascertain their reaction to various building materials as they are introduced. The participants in the study will undergo intensive test with the pre-selected building materials in order to better understand the triggers of MCS with regard to each building material. This will improve the ongoing communication between researchers and the effected community, while efficiently disseminating the project findings.

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86
Look at what research is out there already to develop the interventions (if they haven't been developed), and educate people beginning in kindergarten on how they can be instrumental in effecting change in their own lives and in their communities; barriers: uneducated public health professionals-every PH worker, including the receptionists need to understand they are integral parts of the bigger picture and need orientation to PH (like train.org) to share the vision develop tools that are easy to use in evaluation of interventions-allow people who participate to voice

their opinions in how the intervention or information affected them and how it could be made better (and give them time-value their input-to thoughtfully respond to the evaluation questions). barriers: MANY people do not appreciate the value of evaluation and prefer to do the prescribed teaching or intervention without thought or change to make their activities more effective. providing easily reproducible materials for dissemination of information would be great-even if it was just something that included the 'bullets' that we could use and put into the language (border Spanish here in southeast Arizona)that is used barriers: time-lack of knowledge in developing materials that will reach the intended audience; ONE SOURCE of information for issues that involve public health-easily digested by public health professionals.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and other research.

Health literacy/outreach/communication is the number one priority. When we live in a country so full of scientific ignorance that large portions of our population are against the use of genetic modification in our food, yet fail to recognize that the majority of their diet is genetically modified, we have a problem.

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Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other

• Educational materials, for "non-scientific" stakeholders, needs to be anchored in evidence-based translatable science. One of the principal road blocks, therefore, is the generation of the evidence base that will provide the fodder for risk communication and outreach activities.

• Tools to systematically assess knowledge attitudes and beliefs among key-stakeholders need to be developed and conducted. We need to be more systematic and "scientific" in our approach to outreach.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science

education activities), Communication/Dissemination research (Health literacy strategies), and Other research. Development of educational and outreach materials for the lay public:
The purpose of environmental public health research is to translate scientific findings into useable health information for those communities and individuals who are being disproportionately exposed to environmental pollutants. Specifically, effective education vehicles are needed to inform low-literate parents and families of environmental health risks to their children and recommend simple, low-cost methods for reducing harmful exposures at home.
Examples of current initiatives that ought to be continued and expanded upon include the following: a) the development of visually descriptive posters and take-home tip cards to display in local physician offices, free clinics, and private practices alerting communities to health risks for individuals exposed to common environmental pollutants. Accompanying take-home tip cards show how to reduce exposures; b) newsletters for study cohort families on the impact of environmental hazards on human health c) interactive web pages geared to individuals and communities most vulnerable to environmental pollutant exposures; describing environmental toxicants, related health effects, and how they can keep their exposures low.
Development of educational and outreach materials for healthcare professionals:
One of the best opportunities for the PEPH program to be engaged in is that of medical education. The severity of environmental exposures on child health has been well established by the scientific community. However, few actions have been taken to alleviate the many environmental health concerns that are currently affecting human health. There is therefore a direct need to effectively employ clinicians and health care providers as educators and community leaders to minimize the impact of environmental exposures on child health. It is the role of public health professionals to provide health care providers with the tools and resources necessary to provide effective education to their patients. Physicians have direct access to patients on a regular basis. They are a convenient and already established educational vehicle and they are respected among both the local and scientific communities. Together this allows physicians to effectively serve as the link between scientists, policy-makers, and those areas of our country that are being disproportionately affected by environmental health problems.
Examples of current initiatives that ought to be continued and expanded upon, include the following: a) Grand Rounds by scientific investigators to physicians of current scientific results and their relevance to medical practice b) provision of local physicians with new scientific publications and talking points for physicians to relay to patients that reinforce key health messages.
In additional, a relatively untapped opportunity to educate health care professionals is to develop formal relationships with professional medical societies, such as the Academy of Pediatrics. The Pediatric Environmental Health Specialty Units have been a good step in this direction, but do not reach the great majority of clinicians. There is a need for some type of professional training programs targeting clinicians possibly as part of their graduate medical education process.
Roadblocks: One of the primary roadblocks is that bridging clinical and public health approaches is difficult. Specifically, most physicians have less than ten minutes to spend with a patient. It is therefore necessary to develop educational resources that the patient can bring home with them and that will subsequently reinforce key health messages.

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There is a need to have expert nurses on biomedical research review panels. Nurses view the world differently and focus on whole people and whole communities, not just on specific diseases. To this point it has been difficult for nurses who apply for funding through NIEHS to be funded because of the lack of nursing representation on the research review panels. Public health and environmental health are multi-disciplinary practices and thus should have adequate representation from these disciplines.

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Research: Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other

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Research: such as - Biomedical research (population based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and other research

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research
As mentioned about I feel the best and most productive opportunities for NIEHS is in the area of biomedical and public health based research.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research
Molecular-based biomarkers and epidemiological studies would be critical to move forward in answering these public health questions. But in isolation of models that link ocean events to environmental biomonitoring, biomarkers of exposure and early effect, and disease surveillance we cannot translate these findings. Thus modeling integrative framework tools are essential. Tools to evaluate risk communication materials relevant to oceans and human health, such as fish consumption advisory materials issued by states, are vital to gauging the impact of outreach and education efforts on, for example, dietary choices. The major roadblock that agencies face in evaluating such advice issued, however, is adequate resources. Fostering partnerships with other parties, such as nutritionists, pediatricians, health care advisors, academic researchers, to evaluate these outreach materials by engaging community members in focus group settings would be helpful.

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(2.B) Research: such as - Biomedical research—specifically population-based, intervention, prevention, and translational research, and research on effective health literacy strategies.
o The primary roadblock is inadequate funding.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research
Needs: Development of methodologies to better assess combined exposures and cumulative impacts, and be able to integrate that information into the regulatory framework as well as policy and prevention strategies. Need for methodologies acknowledged by the review committees as valid for assessing small, community-sized samples. Needs for improved exposure and risk measurement and modeling.
Barriers: First is a paucity of appropriate and scientifically accepted methods to look at mixed qualitative and quantitative data in relatively small samples – limits the ability of funding small studies. While much progress has been made, the methods are not broadly known, understood or accepted by those likely to review grants, therefore limiting funding to the methods accepted within discreet parts of the scientific community. Second is the lack of comprehensive exposure assessment information – either in the form of personal monitoring, biomarkers, or comprehensive environmental monitoring data at a scale acceptable for modeling exposures.

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• Evaluate the effectiveness of current training materials and require a core in evaluation research to guide the production of future training materials. Funds have not been available for this in the past, nor has NIEHS solicited the participation of evaluation research specialists to assist in this process. This should be a high priority for PEPH funds in the future, with the understanding that those who are qualified to develop training materials may not have the expertise to develop the evaluation methodology.
• Conduct a systematic, scientifically-based third-party longitudinal impact study.
• Disseminate best practices as well as highlight the tremendous achievements of the NIEHS WETP initiatives.
• Establish a committee of evaluation experts to determine if other types of educational materials than those currently in use, such as video programs and PowerPoint formats, may represent more effective means of communication.
• Support efforts that will provide baseline screenings of the communities' environment. Because there were no baseline measurements of environmental pollutants in New York City, for example, it has not been possible to accurately assess the level of contamination that may have resulted from the collapse of the World Trade Center.
• Establish baseline databases for all workers engaged in emergency response efforts as well as periodic follow-up screening of participants (supported by the Federal government). Provision should also be provided for medical screening for other workers within the community who, although not emergency response personnel, may be exposed to environmental contamination.

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Identify differing effects on different age groups or population sectors.
Overcome the problem that failure to reject the null hypothesis stems from lack of data
1. Experimental designs outside the lab don't have enough power to produce results.
2. No population-based data on critical information relevant to environmental exposure.
3. No widely accepted standards for data collection.
Lack of funding for conducting and replicating rigorous, independent research.

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Research: such as – Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities). Communication/Dissemination research (Health literacy strategies) and Other research.

a.) Access to easy-to-read and easy-to-navigate web-based information.
b.) Researchers assigned to educate the impacted group and the policy makers.
c.) Advisory boards reflective of all the "stakeholders" and with requisite authority to impact.
d.) Meaningful public participation on advisory boards.
e.) Community-Based Participatory Research (CBPR).
f.) Medical monitoring programs that include a-e above.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and other research.
An important target group that has been woefully underserved is the immigrant and refugee populations. While a few WETP grantees have the experience and expertise, there is a lack of funding and capacity within the entire WETP to adequately serve them. For example, there is a growing concern for the health and safety of Asian immigrants/refugees who work in nail salons and dry-cleaning establishments. However, they are unable to access information and training because of cultural and language barriers, fear of authority, compounded by their lack of native language literacy, in some instances.
Current educational and training providers are best qualified to develop educational materials for most of the groups listed above. Roadblocks involve appropriate funding support for development, and a short development, approval, and update process. A streamlined system for disseminating and improving high-quality public domain materials that include cross-culturally and linguistically products, responsive to the underserved groups, would be an appropriate service for NIEHS to provide.
The effectiveness of any material depends on how it is used. The WETP has developed an exemplary peer-training model that should be examined for replication in other similar programs. To reach the underserved population, materials to be developed must take into consideration cultural and linguistic obstacles and should include, native language support, key elements of bilingual instruction and understanding of both first and second language acquisition.

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Research: such as - Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), and Other research

We have a great need for population based characterization and research to draw a real picture of what is the extent of environmental impact on peoples health. That is very locally defined. It has to be done on the site, it's a job that requires social characterization skills and the ability to link peoples perception and experience to causes and effects. Basically epidemiological studies.

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Research: Biomedical research (population-based, intervention, prevention, translational, behavioral), Evaluation research (methods for evaluating public health and science education activities), Communication/Dissemination research (Health literacy strategies), Other

• Researchers need to have forums to share their best practices with each other in these areas such as regional meetings or events.

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NIEHS should continue to expand on its past history of encouraging interdisciplinary training and research programs. This has been an unique strength of NIEHS because good environmental health research and training NECESSITATES inter/multi-disciplinary participation -- - environmental health questions are too complex to be addressed by any single discipline or group of disciplines. Also NIEHS has had a reputation for encouraging the participation of basic, clinical, and public health researchers as well as social scientists to address environmental health issues and for environmental health training -- and this is another strength and should be continued and broadened.

Again evaluation research and communication/dissemination research and training are necessary if environmental health outreach and education are to be successful.

Again collaboration with partners such as NSF and CDC can expand the resources and incorporate some of their existing funding and training mechanisms (e.g. the NSF Research Experience for Undergraduates (REU) Program)

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All water quality data, research, analysis and assessments will be documented in great detail to be available to and for all purposes to the above mentioned entitites. This is the mission and passion of the TRES. Our methods will be following all professional, appropriate protocols, recognized, and accepted methods required in this field of operation. TRES has also been innovative in its approaches in acquiring results. We are also open to any and all suggestions that can be offered to produce the best and most accurate results to meet all expections.

Our research and business is to be broad and population besed, which we hope will be utilized to the extent of prevention, intervention, and to be applied to all avenues that will improve the health and productivity for a broad based prespective.

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It would be difficult to evaluate educational efforts but not impossible. Changes in behavior (whether child care programs have a policy for instituting IPM, are involved with local/state environmental health officials, etc.) could be tracked.

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• Research, in partnership with NCEH, on the ability of the environmental public health service system to anticipate and take a lead role when understanding and addressing emerging environmental health problems. For example, research could focus on the effectiveness of leadership and/or emergency response education/training for environmental public health practitioners.
• Research in partnership with NCEH/EHSB on the environmental public health delivery system and its preparedness to address emerging issues that affect environmental public health (e.g., climate variability, environmental health impact from the global economy [e.g., lead in toys, toxic ingredients found in remedies]).
• NIEHS should partner with NCEH/EHSB and AEHAP member universities to develop new technologies in the environmental health sciences and promote knowledge of new technologies to faculty and students in those universities.

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• ATSDR's Division of Health Assessment and Consultation works closely with communities to identify and evaluate their concerns about potential exposure to environmental contaminants released at a facility and to provide information about how the community can reduce potential exposure. Additional information is needed to address a number of concerns such as the following: 1) the potential health effects from long-term exposure to contaminants at concentrations routinely found in the neighborhoods around hazardous waste sites; and 2) the overall effectiveness of strategies commonly recommended to communities as actions they can take to reduce exposure to environmental contaminants.

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