1
As an outreach and education specialist, my focus is on educating the public about how intimately our health is connected to the environment on which we depend. In order to do this effectively, I need there to be broad-based support for the inclusion of environmental health (EH) education at all levels of public education. This should include funding opportunities and institutional support for both K-12 interventions and initiatives to help raise awareness of EH issues in diverse adult populations.

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2
Public heath goes hand in hand with public education. I frame my responses in the context of K12 public schools and the critical need that exists specifically related to education about environmental exposuresin schools and in the communities that surround the schools. Over the past ten-plus years schools across the country have narrowed classroom focus to reading, writing and mathematics and the accompanying companion testing measures. Science, health, social studies and civics are a few of the subject areas that have paid the price. At the same time youth today are experiencing exponential increases in the occurrence of diabetes,asthma and other illnesses that have environmental ties. It is imperative that an institute like the National Institute of Environmental Health Sciences directs resources and funding to work with this most sizable and vulnerable population of our society. In the US we have over 40 million youth in public schools today, we recognize that their environmental exposures can include dangerous levels of lead in water, asbestos in ceiling tiles, chromate copper arsenate and pesticides in the play area structures, the poor indoor air quality- including exhaust on buses and a host of health issues related to built environments.The availability of school nurses to students is a fraction of what it was two decades ago. Teachers are tasked with a responsibility for their students' health that is beyond their training. It is important to note that the infrastructure to give professional development to teachers and educate children already existsin the educational system of our country. Data show that health/environment issues can be effectively addressed within a range of mandated subject areas. The NIEHS itself has already proven a

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3
I am the Core leader of UCSD's SBRP Research Translation Core and Community Outreach Core. The needs we have include: • Comparative data on the efficacy of various biomolecular tools to measure toxicants in soil, sediment and water
• technical support for information, visualization and communication systems
• help doing science communication (good science writing for research translation and outreach purposes)
• Funding to cover the costs of environmental monitoring using new bioassays developed by our program

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4
Not all stakeholders (community) play a single role within the community. Workers as part of public health should be tapped because of this uniqueness. Workers may have environmental exposures due to their job, the community they live in, at home, and because of their lifestyle. As an example, a worker may have noise exposure from working with loud equipment, noise exposure because they live in the flight path of an airport, noise exposure from cutting their

grass, and noise exposure from riding motorcycles for a hobby. The cumulative effects of exposures from all of these sources is unknown and needs further investigation. Longitudinal studies over the life cycle of a group that would represent working men and women could offer a great amount of valuable information on exposures' effects when multiple exposure to a single hazard or exposure to multiple hazards when these occur in the "real world".

Training workers to respond to these exposures - everyday or emergencies - to lessen or mitigate public exposure. They will take the lessons they learn home to their families and communities and the people they influence will in turn influence others and so on and so on.

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6

As a NIEHS grant recipient under the Worker Education and Training Program (WETP), the International Union, United Auto Workers (UAW) has an interest in advancing the Partnerships for Environmental Public Health program in the following area:

-Increasing the resources devoted to Spanish language Occupational and Environmental Health and Safety training of workers including the underserved population of Puerto Rico.

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7

In order to address the effects of environmental exposures on public health, we need policy and legislation much like the one that passed in California to begin planning a statewide environmental health-tracking network for environmental hazards and exposures in order to monitor trends in health conditions. An Expert Working Group in Delaware should also be established and included to address the effects of environmental exposures. This group should meet a minimum of biannually to discuss areas in public health that the state should and/or needs to address and actively work towards the project goals. The National Environmental Public Health Tracking Program should also be included to address the state's needs.
The Delaware Public Health Laboratory is striving to better develop biota-monitoring applications. That is, consider the whole environment for the exposure. This includes biomonitoring of human and animal subjects for analytes of interest, monitoring of the physical environment sources (air, water, intake sources such as food, water) and discharges (runoff, septic, aquifer, air, etc.). To be able to perform this whole environment testing, DPHL will need to purchase additional equipment, such as air intake canister systems (SUMA or Tenex) with sorption/desorption components, additional instrumentation to handle the increased sample load (GC/MS, LC/MS, liquid scintillation counters, etc.), and minor facility work (piping for gases from current system, support benches). In addition, DPHL will need to contract and/or hire additional staff to serve in several capacities. Staff to perform intake of both potential subjects and location demographics are needed, sample collectors may be needed in addition to current personnel or training of current staff to perform the collection. Two to three additional analysts may be required depending on the scope of the study (localized population versus statewide assessment). The four areas of DPHL need to address for environmental exposures are: pesticides, air monitoring (VOCs), radiological and nuclear monitoring, estrogenic pharmaceuticals, and toxins.

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8

Education is an important component of realizing the effects of environmental exposures on public health. NIEHS would be an excellent source of funding to nursing schools for the integration of environmental health issues into the programs to impact the outcome on public health.

Need to have continued support and funding of the Hazardous Waste Worker Training and Hazmat Disaster Preparedness Training programs.

The effects of environmental exposures needs to continue to be studied to find solutions to eliminate environmental diseases. Attention needs to be focused on those diseases expected to increase due to global climate change.

Creation of nursing research centers focused on environmental health.

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9

NIEHS should partner with nursing schools to find ways to incorporate environmental health into both undergraduate and graduate curriculums. One of the best ways to facilitate this is for NIEHS to fund education and research centers (such as Environmental Health Nursing Research Centers) at academic institutions. A model for this is the National Institute for Occupational Safety and Health's (NIOSH) extramural program that funds education and research centers (ERCs) across the U.S. NIOSH ERCs are funded to provide traineeships for students interested in occupational health. The same could be done effectively for environmental health sciences. As a faculty member in a school of nursing, I come across many students at both the undergraduate and graduate level who are very excited about environmental health as it relates to nursing practice and research. Providing resources to nursing schools would increase the capacity to capitalize on this student interest and produce graduates that will devote their careers to environmental health issues. Nurses, in a variety of specialty areas from public health to acute care settings, are often the first point of contact for the public when it comes to environmental health concerns. Nursing, as a whole, would be a strong partner to advance NIEHS' mission and goals.

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10

More research funding in this area and review panels with scientists who are visional and like out-of-box thinking.

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12

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13

I need to have research result in the adoption and implementation of policies that reduce and prevent pollution. I need regulatory agencies to adopt cumulative impacts policies that protect our most highly impacted communities. I need the Precautionary Principle and Alternatives

Assessment (O'Brien, MIT Press, 2000) to take the place of risk assessment and risk management decisions.

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14
Funding for integration of EH into nursing education at all levels
Education re: advocacy & political action
Education on environmental justice issues & effective response
Education re: activities focused on prevention
Materials to educate health professional peers & laypersons

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15
Undesignated funding that is not tied to specific research projects or products. Having a core of staff who are able to 'stand ready' to respond to community needs, develop relationships, follow through on small issues, etc. is the single greatest need we have. The small amounts of funding allocated through the COEC and similar mechanisms have huge multiplier effects in terms of community good will, capacity building, and development of larger projects/programs. These projects take a long time to develop and it is not always possible to anticipate how they will evolve. This is also essential because most of what local communities want to know about is not related to 'new knowledge' or even 'new approaches' - usually well-established scientific understandings are sufficient to meet the practical needs, and often other communities have addressed similar problems. Mechanisms that require generating 'new models' or 'new knowledge,' therefore, often work directly against the goal of meeting community needs. There are other situations, however (phthalates) where there is a lot of concern and little scientific consensus about 'what to do'. In this case, being able to work together to help forge research agendas and inform policy in the absence of clear scientific gudiance is useful.

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16
It would be helpful to receive assistance in working through various local and state-wide political levels to implement policies that incorporate the concept of cumulative impacts to affected communities as part of the environmental permitting processes. Further, research that looks at the cumulative impacts of environmental contaminant sources on affected persons and the correlation with overall stress levels and impaired health. For example, unless community residents demonstrate a cause and effect relationship between a specific industrial emission and health outcome, a permit will proceed given that it meets air quality criteria air pollutant standards. Little consideration by the permitting agency is given to the cumulative impact of numerous air quality emissions on the affected community's health.

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17
Resources are needed in the environmental health field to address several critical issues:

1) Disproportionate exposure and high risk of adverse health outcomes among the large immigrant and minority working population that a) confronts daily exposure with little or no training and protection (e.g. day laborers, workers employed at hazardous waste generators, etc.) and b) confronts exposure when employed during disaster site cleanup operations such as the World Trade Center, Gulf Coast hurricane cleanup efforts and, most recently the California

wildfires (a new wave of workers will begin demolition and cleanup and a state agency has requested assistance with trilingual training for Latino and Somalian workers)

2) Alliances between labor and community groups to develop policies to limit occupational and environmental exposure. For example, a new county chemical policy ordinance in California will address exposures from chemical releases emanating from refineries and chemical plants. Similar policies should be adapted in other counties; a key pre-existing condition for success is education and involvement by workers and community members so they can participate in formulating and evaluating those policies at the table with labor, environmental justice groups, universities and government agencies.

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18
We are interested in the effect of environmental exposures to pregnant women and children. Within this area, we are specifically interested in addressing indoor exposures to pregnant women and children. Indoor environments in housing of low quality and in early childhood education programs and preschools are two priorities. Little attention has been paid to the public health effects of poor housing quality, specifically in inner cities and rural farmworker populations. Environmental exposures in early childhood education programs and preschools have also been ignored.

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19
It is crucial that researchers begin to study the effects of cumulative exposures of various chemicals that we are exposed to and harbor in our bodies in relation to risk assessment for cancer and other diseases. The one chemical-one disease model has been proven ineffectual in identifying causes of cancer and in the identification of prevention strategies. We know that certain chemicals display a synergetic effect on health impacts (radon and smoking and lung cancer). It is obvious that the multitude of chemicals that we are both exposed to and harbor in our bodies interact and affect our risk for disease--we must begin to direct resources toward that research.

It is also crucial that our country adopt the Precautionary Principle, as Europe has done, in the regulation of chemicals. It is vital that we reverse the current approach of assuming chemicals are harmless unless proven otherwise (which has failed for the last 50 years) to one that assumes chemicals are harmful unless proven safe. It is time we force industry to prove the safety of chemicals before they enter the products we eat, the air we breathe, the water we drink and the objects we interact with.

We must focus a majority of our nation's resources on preventing cancer, not on its treatment--which only provides billions of profits to pharmaceuticals. No one wants cancer and no one wants to endure the pain and long term harm of cancer treatment. We must begin to focus on preventing cancer without fearing the wrath of industry and pharmaceutical lobbyists. We know that the chemicals in our environment play a significant role in the large number of cancer cases--it is time to change the status quo, in more ways than one: focus on prevention, identify the effects of multiple chemical exposures over time; identify the effects of multiple; low-level combinations of chemicals; identify the effects of chemical exposures during different stages of life, conception, fetal development, childhood, and adulthood; and re-evaluate the cancer cluster investigation protocol and to address the wrongful assumption that one chemical

exposure of a certain dose causes one type of cancer. We know that people manifest disease differently when exposed to the same bacteria or virus--the same should hold true for cancer. It's time to rethink the investigative model to address the possibility that a group of people exposed to the same chemical may manifest a different cancer or different disease. Again, the one chemical-one disease model is ineffectual to explain the state of our nation's health and to identify ways to help us become healthier and make cancer the rare disease it once was.

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20

As a residential Radon tester and mitigation contractor, and having been a Home Inspector for 11 years in North Carolina, it is apparent there is a need for further public education about the radon risks. Radon in homes is the #2 cause of Lung Cancer Deaths, according to the U.S. Surgeon General. But almost nobody has heard of it outside of the real estate professions. (and some of them try to minimise or obscure radon for financial gain.)

Unfortunately, the LAW REQUIRING TESTING of homes financed through federal mortgage programs such as VA, FHA, FannieMae, etc has been ignored and not implemented. THE LAW IS IN PLACE ALREADY ! President Reagan signed it around 1988, I believe. If you contact AARST (american society of radon scientists and technologists) they can provide more details.

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21

Greater opportunity for data collection on human exposures to contaminants

• Disaster response – ability to monitor emergency responders and public exposures during/after disasters, applying best practices in guiding clean-up and recovery to protect workers and residents

• Some of the top issues for KS for environmental exposures include hazards such as radon, drinking water (combined public and private water supplies, diminishing quantity and quality of water supplies such as arsenic levels, nitrate/nitrites, endocrine disrupting compounds, microbial counts, etc); indoor air hazards including radon, carbon monoxide, chemical exposures

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22

Continue to expand education regarding radon.

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23

As they did for Medical Schools, NIEHS should provide funding for the integration of environmental health into nursing schools as nurses are the most involved with the population and the ones who work most closely with vulnerable populations in schools, in communities, in acute care facilities.

. NIESH should convene a meeting of nursing researchers (not just environmental health nursing researchers, but national leaders in nursing research) to encourage research engagement in environmental factors - i.e./ disease outcomes as a function of exposures, best approaches to educational interventions for environmental health, economics of prevention versus treatment.

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24
Public and private source drinking water quality issues: risk assessment for low level, chronic exposures. Risk communication support. Comparison data from other US communities. Fuller background on estimation of risk for especially at-risk populations (infants, individuals with chronic diseases, immune compromised, ect.)

Disease specific environmental questionaires useful in the field for exposed populations.

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25
Modeling of exposures to include economic consequences.

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26
The increasing emphasis in the United States on Smart Growth shows significant potential for improvement of economic, environmental, and quality of life issues in urban areas throughout the nation. From the perspective of saving undeveloped rural and suburban land areas from the threat of development, the Smart Growth initiatives should be beneficial. From the perspective of revitalization of cities, as well, the initiatives have promise of benefit by fostering vital urban economies, high quality environmental conditions, and a fulfilling and sustaining quality of urban life. However, for these companion sets of benefits to be truly an advance for the well-being of the nation, the people who are currently living in the cities must share in the improved conditions--taking full part in all of the indicators of progress.

With regard to the effects of environmental exposures on the health of this section of the public, that is those residents already living in urban areas designated for Smart Growth, it must be realized that they are already being exposed to a number of environmental concerns and represent in many cases disadvantaged populations from other perspectives as well. One of the public health challenges therefore is to assure that the existing populations in urban areas identified as recipients of Smart Growth projects actually benefit proportionately from the community changes that will result from the Smart Growth initiatives. For example, new sources of environmental hazards or new exposure pathways may result from new commercial or industrial activities that are located in the community, emissions resulting from new transportation patterns for example if new traffic patterns reroute a high density of vehicles to the perimeters of Smart Growth projects that are adjacent to existing housing, new structures may alter air flow patterns changing the concentration of particulates and contaminants in the air at specific locations, and Brownfields approaches emphasizing engineering and administrative controls may fail resulting in unexpected community exposures.

To address these needs appropriately it will be important to identify and put into place in existing urban environments a program to detect and monitor the types of levels of environmental contaminants that already impact or potentially impact the health of the current populations. With such baseline information—particularly if the contaminant levels can be linked to sources, then the plans for Smart Growth redevelopment can also include approaches to reduce problematic levels of contaminants.

In some ways this may be seen as analogous to some Brownfield approaches where administrative or engineering controls are implemented in order to reduce risk. This approach

to reduction of public health risk through thoughtful implementation of Smart Growth initiatives would be quite beneficial to both the existing and the newer populations of the area.

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27
I am concerned with the exposure of residents in my district to Mn. We have a ferro-alloy plant based locally that emits more Mn to the air than any other facility in North America and Canada. Mn is a neurotoxin, and there is not a large body of research on the effects of chronic exposure, especially on children. Exposures routinely exceed the levels listed as "safe" by ATSDR and the USEPA, sometimes by a factor of 30 (monthly average). The effects of a neurotoxin are subtle, and could easily be overlooked. I need to find out if the current exposures are causing a health effect. If they are causing a health effect, I need to have a safe level determined.

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28
If not already in place there should be means for prioritizing research in environmental health with importance being given to exposures that although they occur at low levels in the environment they may potentially have high public health impact because they are very common or affect susceptible groups. There should be an intentional approach to have zero tolerance in the environment for xenobiotics known to have harmful effects

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29
Funding to evaluate the degree which communities understand the comparability of environmental exposures and behavioral change.

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30
Need to prevent WMD cargoes --especially TIH cargoes -- now traveling freely through 46 target cities from being used to kill tens of thousands.

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31
better trained health, medical and public health professionals on environmental health with a priority to support providers in the field for rapid recognition, detection and treatment support especially for chemical and pesticide exposure.

increased environmental health training in academic institutions with long distance learning and support for underserved areas such as rural and US-Mexico Border.

Binational US-Mexico Border training and communication to share data efficiently and rapidly.

Enhanced research and detection strategies that can aid the practitioner in the field.

Laboratory testing support in the field

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32
Funds outside of normal, local public health channels to recruit physicians, patients, and public and private utilities (water suppliers) in studies tracing environmental sources of infection; particularly those that are waterborne like mycobacterial pulmonary infection in the elderly and Legionaires' Disease.

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33
Strong Exposure Assessment Techniques Must be Required.
Good data on health outcomes and funds for sufficient power (e.g., often 1000-2000 participants are required to assess the relationship between environmental exposures and common diseases (e.g., diabetes, asthma, obesity) using a community-based design.

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34
Interdisciplinary studies combining atmospheric science, environmental biology, and human toxicology on the effects of energy and transportation policy options on environmental exposures to particulate, acid gases, polycyclic aromatic hydrocarbons, and radionuclides.Same as above for the effects of global climate change on environmental exposures.

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35
Financial support is the obvious. Univeristy budgets have been hammered the last several years and the competition for federal funds has gotten increasingly harsher. Programs that aim to connect with the public on issues of environmental health concerns requires building of long-term collaborations. Once established the community partners need to have reassurances that the IHE partner will not be leaving once the funding runs out. Perhaps some way to make universities accountable for picking up the responsibility for effective (research verified) programs post grants is desirable.

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36
Research that quantifies specific health benefits resulting from community planning efforts. Here is a quick list of the typical elements that community planners deal with every day. It would be very helpful to have research quantifying the health benefits derived from including any of the elements on this list. I know that some (or all) will be very difficult to isolate for health impact because they are all interconnected. Planners trying to build "healthy communities" will find research supporting improved health outcomes related to any of these elements to be very helpful.

1) Circulation
- Interconnected street and path networks also connected to external circulation systems
- Safe sidewalks
- Safe bicycle/pedestrian trails and related facilities (bike storage, comfort stations)
- Accessible public transit
- Traffic calming techniques in appropriate locations, including: Lane neck-downs at corners and crosswalks, Sinuous lane alignment, Traffic circles/round-abouts, Signage, Highly visible pedestrian crossings (raised surfaces, highly visible patterns or colors, lights, all-way crossings), Physical elements that visually narrow the street (street trees, street furnishings, paving edges and patterns

2) Open space network
- Outdoor recreation and social spaces serving as community destinations linked by paths (e.g. parks, plazas, courtyards, play fields, etc.)
- Paths and open space network is linked to circulation system beyond project boundaries
- Plant pallette emphasis on woody plant communities with minimal pollen, especially near residences

3) Mixed land uses
- Co-locate residential, office/commercial, and open space uses for healthy lifestyle opportunities that reduce dependence on single occupancy vehicle trips

4) Planning for basic community services
- Identify sites for a retail, including grocery (20-50K gsf with sufficient loading/parking)
- Identify sites for public and service institutions incl. schools, health clinics, community centers, child care, etc.

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37
The ideal data for assessing environmental health risks is human biomonitoring data with particular emphasis on multiple exposures. Given that collecting these data is feasible only for targeted studies in specific locations, the NHANES data can be used. However, because NHANES data are designed to represent national exposures and not specific geographic areas, their usefulness is limited. In moving forward, human biomonitoring studies should be designed to oversample certain at-risk populations (depending on the contaminant of interest), and be representative of multiple geographic areas. In addition, current human data collection represents a snapshot in time. A critical need is exposure measurements across a lifetime to assess the impact of early childhood exposures on early and adult disease onset.

Given that human biomonitoring data are, and likely will be limited, additional monitoring data are needed to adequately ground-truth in silico exposure models. The design and implementation of national monitoring networks, especially for air toxics is needed. In addition, the development of health benchmarks needs to be drastically increased, not only for air toxics, but for pesticides, pthalates, and other ubiquitous chemicals now in our environment. A critical need for health effects work is to assess exposure to pollutant mixtures. Development of these health benchmarks and associated federal health guidelines also needs to be more timely. It is of limited value to measure exposure to pollutants when there is nothing to be said about whether such exposures are harmful.

Working partnerships between communities, public health professionals, physicians, and research centers are also a critical need, both to advance the collection of human exposure data, but also to engage all stakeholders in environmental health issues. Furthermore, these are the professionals that are in contact with the exposed public, and as such are critical in terms of evaluating exposures, treating patients, and acting as a resource for information. Environmental health literacy must also be improved in the general population, as well as research into how best to change behavior.

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38
The key issue in controlling environmental exposures is to have better tools and requirements related to community development. That means incorporating environmental concerns into transportation, housing, and zoning decisions at an early level.

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39
Currently I think air pollution is a very serious matter given the number of people with congestive heart failure and associated pulmonary problems and children with asthma.

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40
Well, where to begin? There is a very large information gap between the researchers in toxicology and ecogenetics and decision makers and the general public. A national effort to get appropriate exposure information out to decision makers and the public (like the efforts for diet, smoking, and exercise) is overdue.

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41
I need NIEHS to support applied community-based partnership research that enables members of the immigrant communities to participate in decision-making about the solutions to the effects of the harmful exposures they face at work and at home. Quite often environmental health researchers spend much time and money to identify the effects of environmental exposures on population health but not enough in finding solutions to the problems identified. NIEHS must fund research projects that aim at finding solutions to the effects of environmental exposures with participation of the communities affected in all phases of the projects. It is not enough to ask for community participation once the Request for Proposals already defined the issues to be addressed.
Funding is needed for communities to define their own research agenda prior to the specific RFPs.
It has been my experience that communities often disagree with the RFP focus on data collection and analyses for problems that are well known to the community. The main need in those cases is for funding that allows research around solutions to the problems felt and perceived by community members. For example, if immigrant housecleaners know that they are exposed to toxic chemicals when cleaning houses, NIEHS must encourage community-based intervention research that contributes to reducing and/or eliminating these hazardous exposures.
If communities know that they have high rates of obesity, NIEHS should fund studies that focus on changing food environments that contribute to poor diets and lack of exercise, beyond individual behaviors.

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42
As a graduate student performing research through one of the NIEHS university centers, my work in environmental health focuses on understanding the risks associated with various environmental exposures that have important genetic susceptibilities. I believe that this type of environmental health research is relatively new, and the translation of this research into meaningful public health messages for community groups, schools, physicians, and public health officials is of paramount importance. It would be great if there were more funding to explicitly

expand basic science research projects to incorporate additional outreach components. Outreach to all relevant audiences and stakeholders is necessary to help explain how to understand the risks associated with genetic susceptibilities and other newly emerging issues that are important for the public to understand regarding gene-environment interactions and public health.

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43

1) Identification of what environmental health knowledge and/or literacy skills children, adolescents and adults should know and be able to do (even health professionals) would help prepare the public to address environmental issues. A document or resource similar to AAAS' Science for All Americans materials would serve as a good tool to plan and evaluate educational and outreach programs.

2) An analysis of the public's understanding of environmental exposures. What misconceptions or preconceptions do they hold? Are they different for various age groups, races, or ethnicities?

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44

Better exposure biomarkers
Better surrogate endpoints
Increased knowledge of genetic susceptibility and what candidate genes are relevant

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45

The principal need is for funds that are realistically available and accessible for partnerships to conduct research at the community level. It has been almost impossible to access such funds recently.
There are roadblocks are at the research program announcement and funding, and review levels. Few RFA's have been available directed at such research, those that have been by NIEHS promote community research as educational efforts rather than as research with unique potential to address scientific questions about human exposure and effects and to develop and evaluate effective preventive practices and solutions at the level of a specific community, that may be generalizable to other situations. Funding has been intermittent with limited opportunities for scientifically appropriate competitive renewal.
The scientific review process has not been friendly to research applications from community partnerships.

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46

As a Ph.D. candidate in environmental epidemiology, I often find myself working as a liason between researchers and community-based organizations (CBOs), and a major challenge is identifying funding for community-driven research that equitably distributes resources between universities and the CBO. The USEPA Collaborative Problem-Solving program, USEPA regional Environmental Justice small grants program, and the USEPA CARE program are some of the few opportunities that allow CBOs to be the lead PI on community-driven research. Having the CBO funded directly ensures that the priority-setting for the research questions that will be asked will

address environmental exposures that are a high priority of the impacted communities'--this is especially important when attempting to produce findings that can be used by the CBO to educate the public and seek corrective action of undue exposure burdens. For example, in Mebane, NC the West End Revitalization Association (WERA) is a CBO with high organizational capacity that sets the priorities for research that reflect the concerns of the local affected low-income and minority populations. WERA is a trusted organization in the local community and the information and research that it generates has a direct benefit for the impacted local residents.

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47
Indoor data related to radon and other toxic chemical and particulate exposures to the worker and occupants. The broader understanding of the relative risk of premature death due to exposure to ionizing radiation compared to smoking, living in an industrial city, near a busy highway, etc

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48
What are concentration levels and durations of exposure to asbestos and heavy metals that will affect health of general population and sensitive populations (children, pregnant women, elderly, etc.).
What are adequate mitigation methods for these health dangers other than removal from site which is often most expensive, e.g., encapsulation, contain under soil, pavement.
What are recommended personal health,and contaminated site monitoring guidelines.

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49
Funds to accomplish the following:
1. technology capacity building (example, virtual reality experiences)
2. better population based research on links (or absence of links) between environmental exposures and disease, including gene-environment interaction and multiple/mixed exposures
3. studies to identify communication methods/tools for specific audiences that result in an improvement in public health
Agency leadership
1. to sustain and enlarge the growing understanding of environmental health as a key element of public health
2. developing balanced partnerships--those affected by environmental agents as well as those who produce chemicals that enter the environment
3. establishing community environmental health planning as a national priority

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50
My own needs are ongoing funding to create, evaluate and disseminate educational materials for lay audiences.

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51
Most schools, museums, informal science institutions, and community organizations still do not adequately educate teachers, students or families about the connections between the

environment and human health. We regard education, particularly education from a scientific point of view, to be the first line of defense in changing personal behaviors, community actions and decision-making at all levels. Our needs for education are: 1) high visibility, national-level support for inclusion of environmental health science concepts in state science education standards and school curricula; 2) broader communication with schools and the community to promote deeper understanding of environmental health sciences issues; 3) promotion of the development of critical thinking and problem-solving skills by students, so that they are able to evaluate complex environmental issues and make well-informed decisions for their own health and that of their families.

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52

We urge NIEHS to continue successful programs in order to build on the capacity established by previous grants. Specifically, the existing Environmental Justice grants program is a model for implementation of many of the priorities we have addressed in our other comments. This program has developed exceptionally successful partnerships, and additional funding would extend this success. By designating funds for EJ grants and convening annual meetings of grantees, this program stimulates environmental justice work and improves the capacity of grantees to do it well. The program generates science and communications relevant to EJ communities that often are not addressed by other grants programs. In addition, it creates opportunities for students and community members to make career commitments to areas with disproportionate need and limited resources. NIEHS should commit to continued funding in this area to support development of long-term research and outreach relationships with EJ communities.

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53

As a new faculty at the University of South Carolina, I am establishing a research program to study various environmental justice, built environment, environmental health, and health disparity topics. Unfortunately, there is not alot of startup funding available for researchers at my stage. It would be great if NIEHS PEHP program provided more small grants (2 to 3) for new investigators to study these topics. Some of this money could be designated for research and some of this money could be designated to fund staff and graduate students in order to build the research infrastructure and core projects. THE NIEHS ONES program is a great program. It can be used as a model for a smaller grant program for new investigators particularly investigators who are studying the linkages between environmental justice, disproportionate and increased exposure, and environmental health disparities.

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54

* funding for environmental health professionals on staff of community-based organizations (CBO's)
* fellowship placement of or other mechanisms to help recruit environmental professionals on staff of CBOs
* capacity building funds from grants to CBOs
* need access to economists, health policy and social scientists, and other experts in centers to adequately translate findings
* funds for communications professionals to help develop messaging in order to disseminate environmental health findings

* provide environmental engineering expertise to CBOs in order to help with review and development of practical mechanisms to implement programs/policies to prevent environmental exposures

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55
Fact sheets, brief articles, continuing nursing education programs. I work with nurses who work long hours, many have family responsibilities and as we all are in this era - are pressed for time.

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56
Easier access to data with public health significance that is routinely collected and maintained by health agencies, including both the public and private sectors.
Increased routine collection of more data with public health significance that would be formatted for research purposes (not just billing) and more readily accessible to researchers.
Ready access to the findings of researchers in understandable terminology

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57
Obviously, resources are needed to continue with effective programs and to develop and implement new ones. Additional grant funds, particularly involving RFAs that focus on partnerships and educational activities targeting communities, policy makers and the general public are a pressing need. As evaluation becomes an increasingly important component of educational and outreach programs, it is critical that grants include sufficient funds to allow effective assessment to be conducted.
Additionally, new communication strategies are needed. Currently there are relatively few journals that accept articles on successful outreach and educational activities. Perhaps EHP could have a section and/or selected
issue(s) that focus on this type of activity?

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58
Because of the broad range of exposures (in terms of dose and chemicals) in all sectors of the public, outreach and public health research should be multi-pronged reaching all ages, ethnicities, and communities. The level and type of information and research should be targeted, informative, and appropriate based upon need.
There are three types of public EH partnership activities needed: 1) general outreach on scientific literacy and common chemical exposure; 2) specific community or regional outreach based upon site-specific issues (e.g. TCE at a nearby Superfund site, access to medical practictiioners); and 3) translational research activities to advance the EH field generally. Each of these is described below.
1) General common exposures, such as particulates, formaldehyde, parabens, PBDEs, lead, etc. are the types of chemicals about which the public needs to be aware. The general public also needs more guidance in scientific literacy, especially regarding scientific processes as they apply to NIEHS research and advances (this will help the public understand where their tax dollars go). Broad public outreach such as this could take the form of a well-coordinated approach with the NIEHS Office of Communications and Public Liaison and a national network of EH outreach

professional and offices (e.g. with COECs at NIEHS centers or a separate RFP to establish many small outreach offices across the U.S.).
This type of outreach could use a well-developed and coordinated set of materials and approaches based upon the larger community needs and based upon the skill sets of the people conducting the outreach (e.g. some people are particularly adept at public speaking or writing articles.)
2) The specific community outreach would probably best be served via grants (e.g. EJ) to allow community organizations, universities, and/or government agencies (city, county, state) to partner and address a local issue of current concern. These would be educational in nature, utilizing best practices and having some outcome measure.
3) Translational research activities would be like those listed under question 2(B). These activities would advance understanding of EH risk, exposure, etc., as well as, help find and define best practices in EH public health efforts. This is addressed in more detail below.

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59
I believe we require a new cadre of environmental health professionals who receive interdisciplinary training in key areas needed to undertake the kinds of research and outreach you have indicated. For example, they need to know something about the latest methods of assessing exposure and understand the role of genetics in determining susceptibility while also having skills in community engagement and risk communication. This is not a standard educational paradigm but it is an exciting time to train a new breed of people.

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60
*Highlighting the most vulnerable and susceptible communities first.
*Identify the links to environmental hazard exposures and environmental health outcomes
*Increased science basis to support core fundamental linkages *Increased funding sources for advocate organizations grounded in science *Increased opportunities to collaborate with Federal and community interest partners
* Protective policy efforts at state and national levels

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61
Overview:
The health care profession that has the greatest interface with the public and especially a wide range of vulnerable populations is nursing. Several years ago, NIEHS and several other federal agencies convened a meeting of national nursing leaders to help develop a plan for NIEHS programming and funding with a focus on the nursing profession. I have attached the report which consists of 3 short, commissioned papers and the consensus-built recommendations that were developed. I would urge you to consider (reconsider) how the recommendations from that earlier document could apply to your current strategic planning, information gathering. I answered a couple of the questions directly and then provided general and specific comments below.
General and specific comments for consideration:
* As they did for medical schools, NIEHS should provide funding for the integration of environmental health into nursing schools
* NIESH should convene a meeting of nursing researchers (not just environmental health nursing researchers, but national leaders in nursing research) to encourage research engagement in environmental factors - i.e./ disease outcomes as a function of exposures, best

approaches for educational interventions regarding environmental health, economics of prevention versus treatment.

* NIEHS should create a set of Environmental Health Nursing Research Centers.
* Many tools have been created for exposure assessment in homes, schools, and communities. NIEHS should assist with evaluation, broad dissemination within the nursing community, and a mechanism for continuous up-dating (via web-based) these tools.
* Tools that are appropriate for nurses should be evaluated and broadly disseminated regarding effective exposure reduction for environmental risks - i.e./ lead and mercury exposures, integrated pest management, reduction of asthmagens and asthma triggers, communities living with Superfund and Brownfield sites.
* Given the emerging science about a great many known and potential toxicants, nurses should be engaged in reducing exposure through environmentally-preferable purchasing - in their hospitals, in the schools where they are school nurses, and in the homes in which they may visit as community-based nurses.
* NIEHS should work with nurses in addressing the most vulnerable populations by increasing assessment tools, educational programs, and prevention activities - children, the elderly, the ill/frail, those with developmental disabilities, etc.
* All health professionals have advocacy and policy work as part of their professional responsibility. Advocating for the most vulnerable is a common theme. But many health professionals are unaware of the way in which environmental health protection policies are developed or implemented and therefore they are not as effectively engaged in environmental health policies as they are in general health policies. NIEHS should convene a workshop for health professionals on the modes of advocacy for environmental health - zoning issues, local/state/federal legislation and regulatory mechanisms. This would not be a program to support any specific bills/regulations but rather a program to enhance health professionals' skills to help translate emerging science into effective, informed policies and regulations.
* Nurses represent the key educators and risk communicators in the health care setting and in the community. Increasing their capacity in both environmental health education and risk communication is essential to help with the translation of environmental sciences into practical efforts to decrease exposures and develop surveillance programs. Creating a funded program to develop and evaluate effective materials would be very helpful.
* Nurses need to be much more aware of the potential relationship between exposure and disease outcomes in order to assist in early case findings - integration of environmental health content into basic and advanced nursing education, as well as professional development.
* Nurses work with a huge range of vulnerable populations in the community - children, the elderly, the infirm, those with developmental disabilities, poor people, those with poor/no access to health care, people in border communities. Because of this extensive reach into the population that NIESH is concerned about, NIESH should create an initiative to work with this sector of the nursing profession to increase their awareness and skills regarding environmental health.
* Nurses have not yet been fully engaged in issues relating to preparation for health risks associated with climate change. They will be an essential profession to prepare in terms of prevention, early assessment, and interventions associated with global warming both in the US and internationally.

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62
In general, in order to continue to improve our assessment of exposures to various agents in the microenvironments people across age groups and race/ethnic categories spend time in, and potential health effects resulting from exposures, we need more dedicated resources from the federal government, given most state governments tend to fund educational, training and/or policy analysis related activities per legislative mandates. These would be three priorites, based on our
experiences:
-- More funded opportunities for researchers across public health disciplines to work with clinical professionals, including allied health sciences like respiratory therapy and nutrition (even physical therapy if focus is on built environment), and community-based groups like coalitions as well as engineers, architects and/or urban planning professionals;
-- More two-part funding opportunities such as created by the NIH/NCMHD that account for the fact that community-based participatory research, sometimes called participatory action research, occurs in three phases:
1.) communications through multiple media and/or in person meetings to determine priorities among exposure agents and health outcomes of concern; 2.) planning proposed pilot studies or intervention projects with evaluation components; 3.) conduct the project and analyze data; -- More funding for research by engineers and basic laboratory scientists to develop field-ready, lower-cost, non-invasive, less intrusive exposure, dose and effect monitoring capabilities that explicitly incorporate the guaranteed opportunity to then apply for a second round of funding to collaborate with applied researchers and health educators for validation field studies in communities in microenvironments of emerging concern. Of course, a proposal for more funding would go through peer-review.
The NIEHS could and should be involved with other NIH institutes and centers in sponsoring these initatives for extramural research, and as applicable given current staff for enhancing intramural research activities. In addition, NIEHS, with existing and newly funded university-based centers, could support (do and/or fund) more topic-specific, science-based educational fact sheets (one-page, double sided), written at eight grade level, and updated at least once per year by Internet and once per two years in print for dissemination at no cost to the public. The candidate centers to work with would include those listed below:
Breast Cancer and Environment Research Centers Centers for Children's Environmental Health Centers for Population Health and Health Disparities Environmental Health Sciences Core Centers: Community Outreach and Education Program.

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63
Long-standing gaps in our knowledge and practice that continue to need to be addressed include;
● limited ability to measure exposures (both by technology and
because many exposures are historical),
● need to shift from existing measures of exposure designed to
inform regulatory decisions to measures of exposure that can inform population health perspectives and decisions,
● lack of links between low-level chronic environmental exposures
and specific health outcomes,
● lack of effort to identify, define and reduce the environmental
health contribution to health disparities, and

● lack of collaboration between environmental health and other
areas of public health; need greater ability to gauge the impacts of environmental exposures on public health in relation to other public health impacts.
These perennial issues hamper our efforts to impact public health in the communities we serve.

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64
The Breast Cancer Fund's mission is to identify – and advocate for the elimination of—the environmental and other preventable causes of the disease. Our work at the state and federal levels on legislation and corporate accountability and sustainability campaigns focuses on minimizing the public's environmental exposures to toxic chemicals and radiation that may be playing a role in breast cancer etiology. We work in coalition with the environmental health, women's health and breast cancer communities to push for these changes. All of our advocacy work rests on a solid scientific foundation. We produce State of the Evidence: The Connection between Breast Cancer and the Environment every two years. This report helps us identify what we know and what we still need to know about these complex relationships between environmental exposures and breast cancer. There are always holes in our knowledge. There are big areas of environmental public health research, however, that we know need to be more deeply explored, for example, endocrine disruption, low dose effects and environment-gene interactions to name just a few.

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My needs are to look at possible links from the environment to cancer.

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We need more funding from our government to not only continue the work we are doing with existing centers, but to develop new centers.
Where are the new and/or best opportunities for NIEHS to be engaged in the following areas?
I hope the NIEHS will continue to set a high priority on work in the area of the environment and breast cancer.
Additionally, we need to continue to involve advocates as partners in this research process.

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67
* Clearinghouse/Network of national programs (with local affiliates) that need research-based outreach for their particular constituents.
* Resources to pursue increased outreach with non-English speaking constituents.
* Continued collaboration with other COEPs in their outreach to community, policymaking and health professional audiences. -Increased use of researchers and their assistants in outreach initiatives ? some hands-on exposure at outreach initiatives, particularly to show how their research is most useful to various audiences.

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68
In order to address the effects of environmental exposures on public health, we need dedicated resources like the NIEHS Environmental Justice program. Because our community based participatory research strategy is community-led and university supported, we find that many

traditional government grant programs cannot support our work. (Many traditional programs only fund CBPR efforts that are university-driven.) The NIEHS EJ program is unique in that it truly supports projects that bring a community-led approach to this work.

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69

Many of the effects of environmental exposure are based around "national wisdom." For example, health effects for air pollutants are based on nationally derived Concentration-Response ("CR") functions. The derivation of those CR functions are heavily driven by eastern sea-board air pollution and population which are different both in the speciation of air pollution (driven heavily by sulfur containing coal fuel and traffic) and population risk factors, from our state. Even within the state, there are differences between populations and environmental pollution that warrant the need for regionalization or localization of the "wisdom" (derivation of local CR and related functions) for more accurate assessment of the local effects of local environmental exposure on the local public health. This is important because, increasingly, the state health departments are being asked for accountability on these assessments by industry. Increasingly the Utah state health department is stronger in environmental health surveillance activities. The area that has not been growing is intervention - beyond the production of health education materials. There are occasional grant funded programs that focus on a specific environmental health outcome (i.e., breast cancer) but that does not constitute a comprehensive intervention strategy. Work would be useful in helping states define more robust and comprehensive environmental health intervention strategies that should include model policy development.

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70

In our studies, we are interested in environmental exposures, especially those that affect children. For that reason, we feel that support for longitudinal studies is most important for addressing the potential long-term effects. We also conduct studies to address health disparities. It is known that environmental justice issues can be part of the etiology of health disparities. Community partnerships are especially useful for addressing these issues.

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Information on health effects of cumulative risk for locations affected by multiple contaminants and/or multiple sites.
Information regarding Environmental Justice Standards (identification and definition of EJ criteria and disproportionate burden) across government, non-profit, and private organizations.

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72

Development of a new generation of personal monitors that can record/report real-time data on environmental exposures to determine potential relationships with health outcomes.
Development and validation of biomarkers for exposure to numerous environmental chemicals, especially PAHs.

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73

Money is tight and getting tighter. To pay for environmental health programs, we have to more and more show what we are getting in the way of results from our efforts. Any research that

NIEHS could perform that would shed some light on exactly what we are getting back from environmental health investments and efforts would be helpful to our cause. This would give environmental health professionals something that they can then take to their policy makers in terms of showing cost-benefit.

There is a lot of information already available on environmental exposures for many different research areas. Many of these studies have concentrated on specific types of exposures. For NEHA to address the effects of environmental exposure on public health, it would be important to have existing research compiled so that environmental health professionals could use the data to help elected officials with policy making and the lay public with outreach programs. There always will be some areas that emerge as new concerns in which research will have to be done. Environmental health professionals need to have information from emerging research readily available for use in the field. As an example, CDC produces "Fact Sheets" for several different diseases and ATSDR produces profiles of toxic chemicals for use by professionals and the lay public.

NEHA is collaborating with the Centers for Disease Control and Prevention/National Center for Environmental Health (CDC/NCEH), as one of numerous national partner organizations, on the development and implementation of the Environmental Public Health Tracking (EPHT) Network. The health-tracking network aims to better protect communities from adverse health effects through collection, analysis, integration, and interpretation of data about environmental hazards, exposure to environmental hazards, and human health effects potentially related to exposures. The goal of tracking is to provide information that can be used to plan, apply, and evaluate actions to prevent and control environmentally related diseases. Characterizing the effects of environmental exposure is an important aspect of public health tracking because it allows environmental health professionals then to be able to assess risk, and make and/or implement recommendations to protect the public. Thus, NIEHS can support this effort by collaborating with NEHA and the Environmental Public Health Tracking community to identify environmental agents of interest whose hazards need to be characterized through research and other investigative efforts.

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74

To address them we first need to characterize, then prioritize them, by building sufficient capacity to capture a fuller range of health outcomes associated with a fuller spectrum of environmental risk factors: physical, chemical, biological, social, economic. We need to have a surveillance system that tracks changes in disease patterns and rates, and at the same time tracks environmental changes that may be driving the diseases. Too often, they are looked at separately.

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75

Environmental exposures are surrounded by questions that continue to perplex scientists. My research concerns organophosphate pesticide exposure among children of farmworkers. After eight years, we continue to try to answer questions related to how deleterious the effects of chronic, low-level exposure are to children of farmworkers and farmworkers themselves. More studies at the community level are needed to address public health questions. Most studies focus on very small groups over a short-term. Longitudinal studies of community members are needed.

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76
Tools to assess environmental exposure and health impacts at small, neighborhood scales, including measuring or modeling of ambient concentrations of pollutants and development of measures of health impacts. Measurements or estimates of earlier, more subtle effects of exposure to pollution, such as lung growth deficits or skin and eye problems. Research into links between democracy and public health, and between neighborhood blight and health. Being able to model or measure the co-benefits of CO_2 emission reduction levels at local scales – what are the expected drops in levels of PM2.5 and NOx for greenhouse gas emissions that are avoided, and how do we quantify the health and economic benefits? Standard methodologies for estimating cumulative impacts. A community-friendly software program for estimating PM and NOx emissions from roadways at a neighborhood scale, such as a new, improved Caline.

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77
* Grant funding that supports research about the inter-agency systems that maintain environmental exposures within already vulnerable populations. An example of such a system is how bureaucratic agencies, policy-makers, executive administration (President, governors, City/County managers) and interest groups influence rule-making processes. Another example is how intra-bureaucratic agency policies constrain responsiveness and adaptation to population needs (i.e., standardized policy systems versus dynamically adaptable policy systems).
* Grant funding that supports education and dialogue toward improving the inter-agency systems that maintain environmental exposures within already vulnerable populations.
* More evaluation research on the actual impact of exposure policy (2-5 years after enactment).

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78
As a grantee of NIEHS – BMWTP program, our priority is on Brownfields Communities. Consequently, our focus is on training workers to clean up contaminated properties in economically disadvantaged communities.

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79
The most pressing need is to establish a central and solely dedicated "Environmental Health Support" organization in California.
Frankly, the whole field of EHS suffers from the lack of any "support/advocacy group", unlike the case of tissue-disease centered advocacy groups such as those solely aimed at breast cancer, diabetes etc.

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80
* Identify the problem, cause of the environmental exposure and its health effects.
* Know the community and its perception about the problem.
* Identify community representatives who can be educated and trained on the concerned issue. They can be used as peer- educators or for dispensing information in the affected community, for arranging camps and focussed group discussions in the community.

* To prepare the educations/ information material in the way and language that the community would understand.

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81
The Tribe still feels that the community based door-to-door methods for information exchange works well in our rural communities. The needs would still include, staffing, training and educational materials.

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82
My needs are simply funding opportunities. It is helpful for RFA's and RFP's to ask specifically for indications of community involvement and to require community based participatory research methods and particularly dissemination of findings to the community. I am still finding strong resistance from my scientific community in sharing research findings with communities, in aggregate and particularly with individual study participants.

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83
Complete authoritative to basic questions, to ensure the science precedes the policy. Questions such as the actual harm from pesticides, causes of cancer (is it primarily hereditary?), harms from consumer products, the ability for persons to uptake these harms in consumer products.

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84
Instead of looking at outcomes in isolation, we need methods for looking at life course epidemiology and complicated outcomes that develop over time. Studies of single outcomes are often reported in the media over time, with somewhat conflicting results that can be confusing to the public (e.g., is red wine good for you, or bad?). In order to give individuals good information about potential lifestyle or environmental changes and their impact on health outcomes, future studies should concentrate on providing "whole picture" information for the general public, so they are able to evaluate what is best for them.In addition, it would be straightforward to develop more online or computerized prediction rules based on statistical models and current expertise, such as Harvard's innovative "Your Disease Risk" website. It would be interesting to show, for example, the potential impacts of spraying pesticides in your home when you have young children (are you better off with mouse dander or cockroach matter asthma-related risk than you are with pesticide residue cancer-related risk?); showing cost-benefit breakdown of lead remediation in the home; evaluating potential developmental impact of buying organic fruits and vegetables for a young child; or moving from a high pollution area to a low pollution area. For example, can you rank the "healthiest" areas of the US in terms of air, water, and soil pollution combined with access to good medical care? (The air in Mississippi is pretty good, but the farm chemicals are probably not!) These are very practical, basic questions that are of broad interest to the general public (and environmental health researchers with kids for that matter!).
As an aside, the media always tend to jump on some screwy, oddball study that comes from some sideline researcher, instead of reporting the better stuff. I see a lot of stories on the web that cause me to look up papers, only to discover the sample size was 12 or the study was otherwise bunk. Check out the story on Becky Goldin [redacted] at George Mason, who picks apart media reporting of science. She had a great article/letter to editor on breastfeeding (showing exactly what scientific evidence there is, compared to what is socially encouraged).

http://gazette.gmu.edu/articles/9191.

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85
Bio-Solar Proto, Inc., (BSPI) is an organization developed for the purpose of creating a prototype of a salubrious, affordable; indoor environment using the holistic approach of [1]Bau-Biologie™. The primary objective of BSPI is to research building (construction) products and their impact on chemically-sensitive subpopulations.

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86
a) Know what the environmental exposures that are known to cause problems are in any given area b) Give public health or an agency authority to address/repair the issue
c) Develop the tools needed to educate professionals, the public, and those dealing with the issue-including media (psa's, fact sheets-easily reproducible materials).

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87
Data!!! NIH is funding many large studies now, but it is still difficult to obtain this data. Standardization would be nice. If we could get the big exposure researchers to fill out something similar to HapMap, or some other standardized databases…….wow, could we do research then!
HIPPA needs to be addressed for what it really is (making our data available to insurance companies so they can deny coverage) and removed as an impediment to research.

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88

Combined, or comprehensive, exposure measures. It is usually possible to get one or the other (local air, urinary biomarkers) in a study population, but each gives a limited picture of environmental exposure that is useful in risk assessment or in remediation. This limitation then further restricts additional approaches to risk assessment or intervention. Some combination of ambient levels (maybe by block, or building, or neighborhood, such as PM2.5) with indoor levels (indoor PM is > outdoor, but can either be used?), and individual exposures (air or biomarkers). Some combination is essential to have an integrated measure that reflects true past exposure. It might require predicting individual level exposures in a population based on more complete measurements in a subset.

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89
The community-academic partnership nature of our research endeavors has significantly improved our ability to conduct high quality environmental health research activities. In order to continue to perform such environmental health assessment and environmental health intervention research, we need the financial resources which will provide sufficient compensation for all partners involved. This means ensuring resources to adequately compensate community partners involved in the research as well as academic researchers. In recognition of the expertise of community partners in many areas that complement university expertise, this also means allowing research in which community-based organizations are able to apply and compete on an even footing with academic institutions for grants, and that some

Request for Proposals be earmarked for community-based organizations rather than academic institutions.
One of our particular needs involves support for intervention research, where resources are needed for the initial development and implementation of the intervention as well as the costs of data collection (e.g. bio-monitoring, environmental monitoring, survey data collection),data analysis to evaluate the effect of the intervention, and dissemination and translation of the results of the intervention. Funding that covers the costs required to conduct intervention research that involves a community sample size large enough to detect differences and includes staff and materials necessary to carry out the intervention itself and associated evaluation research activities would be helpful, particularly if intervention research could qualify for exceptions to the $500,000 annual cap, if warranted.
We also need access to a cadre of scientists who are equipped to address the complex interrelationships between social and physical environmental exposures and their implications for health. This requires scientists who have both basic environmental health training and also understand epidemiology, population health, community-based participatory research, health inequalities, and social factors that both influence exposure to physical environmental pollutants and the impact of those exposures on individuals and populations. Given that no one individual is likely to have the level of knowledge and skills necessary in all of these areas, it is important that scientists be trained in how to work in integrated, interdisciplinary teams (e.g., involving physical, biological, environmental, clinical and social scientists) in partnership with communities. Such training needs to occur at both the doctoral and post-doctoral levels and support for mechanisms such as training grants could foster such interdisciplinary training.
We need continuing access to a cadre of community partners who are well-trained and knowledgeable about research, CBPR and the processes of developing environmental health programs, and NIEHS funding processes. Thus, the provision of funding mechanisms for enhancing the capacities of community-based organizations to address environmental issues (e.g., through submission of grant proposals to NIEHS), and the provision of technical assistance to community-based organizations so that they may apply successfully for NIEHS funding is also needed.

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90
• The most important need for effective partnerships is a well informed public. Many barriers to effective partnering can be traced to a lack of understanding of the impact of environment on health on the part of many stakeholders.
• Better exposure assessment tools are needed to assess personal exposures (directly or through biomonitoring). These methods have to be minimally burdensome to those individuals being assessed.
• Better access to study populations is needed. Significant resources are committed to recruitment that could be redirected to data collection if we could gain easier access to participants.
• Disease registries for common environmentally diseases would be of great utility. Asthma registries for example would facilitate the study of environmental impacts.

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91

Probably the largest single need in the area of oceans and human health is the lack of a credible indicator that can be used by public health authorities in monitoring work to determine whether recreational waters are safe for water contact. The presently used indicator organism, enterococcus, has been shown to be present in soils, and its abundance in waters impacted by nonpoint source pollution shows no correlation with the incidence of public health endpoints associated with fecal pollution. And the focus of monitoring programs on indicators of fecal pollution completely ignores aquatic pathogens such as vibrio bacteria and Naegleria fowleri that are found naturally in the environment and whose presence in most cases bears no relationship to fecal pollution.
Independent of this first issue, there is clearly a need to determine when seafood is safe to eat. The recent series of incidents of ciguatera poisoning associated with the consumption of fish caught in the northern Gulf of Mexico is a case in point. There is no way to determine whether a fish contains ciguatoxins without carrying out sophisticated and time-consuming analyses that well beyond the resources and expertise of individuals, fish markets, and restaurants. The same concern applies to a variety of other toxins and to pathogens such as vibrio bacteria.

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92

To effectively address the effects of environmental exposures on public health, sufficient funding is needed for the following resources: research staff including a full-time bilingual research staff to effectively retain study participants over a long period of time, laboratory costs including storage facilities for biologic specimens, statistical support, community outreach and educational materials, and an effective policy and translation staff,.

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93
In order to fully improve the health of the public related to environmental exposures there is a need to expand the capacity of health care professionals so that they understand the risks of environmental exposures, and the importance of policy and community-level advocacy to minimize exposures as well as the importance of teaching the public about the risks. Nurses are the largest group of health care professionals in the Nation and often work within communities and with the most vulnerable of populations including children, the elderly, and the poor and disabled; those most at risk from environmental health exposures. Nurses, to this point, have not been fully engaged when it comes to environmental health. They are an essential population to help prevent the effects of exposures on health. To that effect there is a need to expand the capacity of nurses to understand these risks. It is imperative that all student nurses have one class on the effect of environmental health. Also, there is a need for more faculty to teach environmental health, more nurses who conduct environmental health research and tools for nurses to use with the various populations they work with. Nurses are "do-ers". If given informaion on the importance of issues, and tools to make a difference they will be able to protect the health of vulnerable populations.

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94
As biomedical research becomes more sophisticated, it is not always a simple issue to "translate" the scientific research results for broad consumption. There is a need to develop high, medium and low literacy communication techniques, depending on the audience being addressed. In addition, as demographics change in the U.S., there will be an increasing need to communicate research findings in languages other than English.
Also, in communicating the science there is a need for community outreach and translational experts to work with investigators so that the scientists can develop the policy and health implications of their work and present their data in a manner that a member of the public can understand.
There is a need to develop social marketing techniques for some environmental health threats (such as "air pollution from traffic"or "port pollution" or "endocrine disruptors") using techniques that have been successful in anti-tobacco campaigns, where billboards, sin taxes, t.v. ads, legislation to ban smoking in certain venues, and other techniques have been utilized. One question is how to institute such "outside the box" mass media techniques on other environmental issues, and another is whether or not NIEHS or Center investigators would see them as being too controversial. There are significant differences among the possible types of social marketing campaigns: the anti-tobacco campaigns and those, let's say, against fast food or in favor of exercise, are largely aimed at "changing an individual's own behavior." Reducing air pollution by discouraging one-occupancy automobile driving also involves behavioral change. (See this site for a successful social marketing campaign in Boulder, CO to stop single-occupant automobile driving
http://www.humboldt.edu/~ccat/appropriatetechnology/ZachSP2005/index.html#CBSM:_a_four_step_process).
Reducing "port pollution," on the other hand, would be outside the control of an individual's behavior; it is in the hands of policymakers and industry. Encouraging the policymakers and industry to reduce pollution, however, is in the hands of the public and community leaders. One might envision a campaign to educate the public on port pollution, followed by a well-publicized social marketing campaign arguing that a particular port should stop expanding until it reduces air pollution is endangering the health of residents. This type of social marketing that demands policy changes and industry compliance will undoubtedly be viewed as "advocacy," however, whereas an anti-smoking campaign or anti-obesity campaign would be viewed as a public health necessity. These conflicts need to be addressed since reducing port pollution (in our example) is also a public health necessity.
NIEHS could hold a conference on using innovative social marketing techniques, focused both on changing individual behaviors and also changing policies, and then issue an RFA in this area.
Another need is better research on mechanisms for effective communication. Most community outreach directors are scientists or have degrees in public health or public policy, and many outreach staff have undergraduate science degrees. Few have extensive experience in effective communication techniques. Again, NIEHS might hold a conference for all those involved in outreach in various centers to describe the pros and cons for various communication techniques and what evaluations have shown. E.g., are videos better than fact sheets? Are in-person meetings better than videos? These types of evaluative comparisons are hard to locate in the literature, but are critical to the choices and the success of outreach efforts.
Similarly, NIEHS could develop a list of experts to advise centers on the most successful mechanisms – and choices of audiences – for successfully getting across scientific information and messaging. Is it valuable to speak to church groups, the Rotary, bowling clubs; or would an

outreach program's time be better spent partnering with targeted environmental groups or businesses that might be potential allies?

From doing web searches and talking to NIEHS-funded scientists, it is clear that, in general, the scientific community is not keeping up with the wave of innovative electronic communication and networking techniques being used by the 14-30 age group, and increasingly others. These include podcasting, blogging, Facebook, MySpace etc. When is it wise to develop podcasting as a way to reach a larger audience? By using these techniques, are we missing too much of the "population?" What is the rate of computer use by Latinos and African-Americans in different states in 2007? Is it allowable under IRBs to use the network of Facebook (as an example) to recruit college students for a study? In addition, how successful is distance learning? Do these new techniques allow easier methods for distance learning? These are questions for which many scientists, as well as outreach and translation core directors and others could use assistance. An RFA on use of, and subsequent sharing of, innovative techniques for (1) educating colleagues in academia; (2) educating the public about research findings; and (3) evaluating the techniques would yield useful ideas and replicable models. Some examples: the University of Washington shares lectures via podcasts: http://sphcm.washington.edu/podcasts/. A public health blog airs scientific controversies and latest environmental and occupational health news stories: http://thepumphandle.wordpress.com/contributors/

A non-profit group sends out its Environmental News Service daily, with the latest new stories concerning environmental health issues. http://www.environmentalhealthnews.org/. The parent non-profit group that publishes Above the Fold also awards Science Communication Fellowships to scientists. http://www.environmentalhealthnews.org/2007scicommfellows.html. NIEHS might follow the lead of this group and consider awarding $5-10,000 science communication fellowships to scientists at NIEHS-funded centers and programs. It is likely that each center has one investigator whom everyone believes "really knows how to tell a story about his/her research so that the public understands it." These scientists should be rewarded – and lessons should be learned from them. NIEHS could select several "communication mentors" who would be paid to oversee the fellows. Like the Science Communication Fellows, these NIEHS fellows would each write on a selected topic for EHP to help the public better understand a complicated new area of research or endeavor.

On the policy level, there is a need for NIEHS-funded investigators and outreach staff to develop relationships with state and local agencies that have responsibility for environmental health or standards-setting so that they are aware of the latest research findings to incorporate into their decisions. These would include City, County and State Health Departments; air quality regulatory agencies; cancer surveillance agencies; state agencies that cover toxic substances, air and water pollution, etc. In California, the Chair of the state's Air Resources Board hosts a monthly research seminar that is webcast. Similarly, the NIEHS could host an NIEHS Director's Research Seminar and webcast/podcast it. A major stipulation would be that the seminar would have to be understandable to a non-scientific audience and would have to discuss both public health and policy implications of the research.

A significant difficulty that outreach programs are facing on the policy level with regard to "built environment" issues is that when they attempt to introduce the latest scientific research on a new project (school, highway, rail yard, port expansion) that is undergoing environmental review, both environmental consulting firms and and state/federal agencies argue that "air pollution modeling"or "health risk assessments" were conducted according to accepted protocols and there is no requirement for considering "the latest research." Partnerships with the agencies described above might be particularly helpful in this regard.

For public education, it is important to identify and communicate with organized groups and work with the leadership of those groups. Most importantly, outreach programs should identify "rooted community leaders" who have constituencies and who have a "reason to care" about the science. These community leaders are listened to in their communities. In the Latino community, these may be lay health leaders or promotoras. Several community outreach and CBPR programs have had successful results in training and using promotoras in their educational efforts.

Community residents and members of community groups feel empowered when they do their own community monitoring, such as counting traffic or using ultrafine particle counting devices. Meanwhile, one of the most expensive parts of exposure assessment studies is finding residents willing to have a monitor in their yard or in their home and then having staff go out to place the monitors in multiple locations. Interested and trained community residents offer a huge cadre of "community monitoring volunteers" that are being underutilized because there are few validated community level monitoring tools for air pollution constituents. Funding the development of affordable and portable monitoring instruments, sensors, GPS devices, etc. would greatly enable the ability of outreach programs to engage community members in community-based "pilot studies" and potentially enable trained volunteers to participate in formal scientific studies with stipends for placement of monitors (which could be verified by cell phone photos). Exposure to pesticides and traffic-related air pollution seem like two useful community exposure assessment projects to pursue in this regard.

Presentations to policymakers by community members who been trained in understanding air pollution and its health effects; have done their own traffic volume counting; and conducted their own ultrafine particle counting are extremely effective.

An RFA focused on community-based monitoring techniques and model programs for pesticides and air pollutants would be well-received.

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I and others need to address the effects of environmental exposure to elemental mercury and mercury vapor as a result of its magico-religious and ethno-medical use in Caribbean and Latino communities here in the U.S.A., Puerto Rico, and in countries in the circum-Caribbean region. (Wendroff "Magico-Religious Mercury Use in Caribbean and Latino Communities: Pollution, Persistence, and Politics" Environmental Practice 7:2: June 2005)

These magico-religious mercury exposures were first described in 1990 (Wendroff, "Domestic mercury pollution" Nature 347 October 18, 1990). At that time, "There seem[ed] ample justification for a programme to measure mercury vapour levels and to test exposed individuals." Yet to date, 17 years later, such research has yet to be conducted.

Eight years ago, the ATSDR suggested that ritualistic mercury use posed an environmental health threat that needed to be investigated:

"A unique exposure pathway that has received little research attention is the exposure to children
from religious and ethnic uses in homes and cars or in remedies containing metallic mercury (ATSDR 1997; Johnson [in press]; Wendroff 1990, 1991). In some religious practices of Latin American or Caribbean origin, there are traditional rituals or remedies that involve mercury. These include intentional sprinkling of liquid elemental mercury on the floor, burning candles made with mercury, using mercury in baths, adding it to perfume, or wearing small containers of mercury around the neck for good luck. There is an urgent need to obtain information on the levels of exposure from these practices to determine if children or adults are at risk. Mercury

vapor concentrations may be much higher after use during the winter months when the heat is turned on and the windows are closed, so data that reflect a variety of possible exposures are also needed." (ATSDR Toxicological Profile for Mercury, Update, March 1999 pp. 480-81 http://www.atsdr.cdc.gov/toxprofiles/tp46.pdf)

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96
Introductory Paragraph
The Detroit Community-Academic Urban Research Center (URC) Board offers the following comments in response to the Request for Information: Partnerships for Environmental Public Health. The URC Board discussed the RFI at our December meeting and we are delighted that the National Institute of Environmental Health Sciences is developing the unified "Partnerships for Environmental Public Health" Program. We appreciate the opportunity to share our input towards the establishment of a vision for PEPH. As you are aware, the URC partnership is comprised of representatives from eight community-based organizations (see list of organizations on the left), the Detroit Department of Health and Wellness Promotion, Henry Ford Health System, and the University of Michigan Schools of Public Health, Nursing and Social Work. The URC was established in1995, and uses a community-based participatory research approach to examine and address the social and physical environmental determinants of health inequities in Detroit (see attached brochure). Our comments below respond specifically to questions number four through seven in the RFI.

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We need government regulatory agencies to prioritize research and interventions of environmental exposures that impact underrepresented and vulnerable communities, particularly low-income and immigrant and refugee communities. Government regulatory agencies need to have clear and accessible pathways in which those communities can be part of identifying and creating solutions to mitigate the harmful environmental exposures on their lives. Additionally, we need greater resources for community-based organizations that have or seek to sustain long-term relationships with impacted communities where together they can identify the most pressing issues of environmental exposure on public health and work toward innovative and long-term solutions. Building long-term community-based support that prioritizes health needs is essential because often times when the solutions come from the communities the change is more relevant, significant and is more energetically supported by those impacted.

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The project partners of Assessing and Controlling Occupational Health Risks in Immigrant Populations in Somerville present our consensus responses to the Request for Information (RFI) seeking comment on the projected NIEHS activity entitled, "Partnerships for Environmental Public Health". Two broad themes framed our discussions concerning the Environmental Justice work that shapes our principal interests. These are that; 1.Environmental justice is complicated greatly by the lack of sustained funding for the mounting of programs and training. Once activities are implemented funding halts and the activity ends. This produces a discontinuity in the agencies providing the activity but also discourages the populations who grew to value the

content previously provided. 2. Emphasis should be placed on the coupling of scientific and research activity which addresses questions of importance to at risk populations with an action step. Increased knowledge must lead to increased meaningful corrective action.
The project partners first considered the definition of community as offered by the NIEHS and identified that the variables of culture and or language are missing from the existing definition. The consensus which emerged is that race and ethnicity do not capture the full import of culture and language.
Question 1- This question was difficult to interpret. The following suggestions emerged. The populations served by the project partners would greatly benefit from greater dissemination of science information and education leading to increased awareness/ prevention of environmental exposures. The partners felt that efforts must be increased which engaged affected populations in investigating and documenting of environmental and occupational exposures. The main focus of the work should be in the development of effective interventions. It was concluded that an extremely beneficial artifact of the process of working with communities is the generation of new questions which can support scientific analysis. It is important to identify issues of interest to the community.

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101
We need a stable source of funding, based on a return to environmental health study panels to review grant proposals. The membership of such panels must be open to public and community health approaches as well as community-based participatory research.

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102
Preface to response to questions.
The Child Health Centers were initially structured to have an essential Community Based Participatory Research component hence I feel in responding to this RFI on Partnerships for Environmental Public Health it is important to emphasize what that component allowed us to accomplish in terms of research translation to public health.
First, from the start of the center projects, a two-way dialogue was formed with our communities and our Yakima pesticides field project was developed in partnership with these communities. This affected every aspect of that project including research design as well as continued community communication, intervention and design of follow-up studies. This was made possible because funding was specifically allocated to this effort in the form of salaries and funds for developing communication dialogs and meetings and materials development. One only needs to look at the CHEERS study which was started and withdrawn by USEPA to see the importance of having community dialog and input from the start for public health research to proceed effectively.
1. What are your needs to address the effects of environmental exposures on public health?
As mentioned in the above preface a commitment from the start of research for community based participatory research is needed for effective public health partnerships. This requires funding of specifically focused and conceived studies with salaries, community interaction plans and materials development. This is possible through a Center grant mechanism but usually not possible with RO1s unless they are linked to center structures.
Other needs include mechanisms for research to be integrated. This is accomplished by having the ability to have tools, models and frameworks that allow for translation of environmental public health research from exposure to early response to disease. The Center structure

designed in our Children's Center which was based upon a risk assessment framework allowed us to address and test complex hypotheses regarding the interaction of environmental factors with genetics, lifestyle and age- related factors and to translate and interpret these finding with the community. For example, the UW-CHC is composed of four research projects (Molecular Mechanisms, Genetic Susceptibility, Exposure Pathways, and Community Based Research) and four facility cores (Neurobehavioral Assessment, Exposure Assessment, Risk Characterization and Community Outreach and Translation). This structure allowed us to use a risk assessment framework (Faustman et al. 2000) to integrate molecular mechanistic research with biomarkers of exposure and genetic susceptibility, test these hypotheses in the field, and directly assess translation via assessment of community and individual interventions. Such an integration of basic research through a continuum to clinical application was only possible with a Center structure. In RO1s the funds or structure infrequently provide a mechanism for direct translation or interaction with the user communities, i.e., clinicians or community public health specialists. Likewise, frequent activities in a Center, such as development of a course or Continuing Education (CE) program, rarely could be realized through an individual RO1 mechanism.

Thus, a critical need for effective partnerships are integrative frameworks and integrative research within a Center structure mechanism to be available for researchers.

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The University of Washington's Pacific Northwest Center for Human Health and Ocean Studies has striven to promote interdisciplinary research and forge partnerships that enhance our insights into connections between public health and the health of the oceans. This has been difficult as there were no funds for outreach and education included in the Oceans and Human Health (OHH) program.

The operational term in this RFI regarding Partnerships for Environmental Public Health is "Partnerships" and this entails a dialogue and two-way communication that extends well beyond just the development of educational and outreach materials into a more sustainable, and I would argue, scientifically robust relationship. Thus our need is funding for outreach and translation activities.

This is especially true for the OHH Centers whereby the Centers' definition was required to bring two very different scientific cultures together each with their own pre-existing public constituencies and stakeholders. This requires mechanisms of interaction that include workshops and roundtables. We have had the opportunity to have some of this at the University of Washington because of the NOAA-funded Center for Ocean Sciences Education Excellence (COSEE) and have high hopes to expand this through a recently funded NOAA training grant that will facilitate dialogue even between the two scientific communities with academic and training outreach.

In regards to the broader public and concerned communities, these are also very complex for OHH. First of all for our Center to answer questions of environmental exposures on public health we need to understand our most underserved and high exposure groups. Our partnerships are diverse and include tribal nations as well as Asian and Pacific Islander (API) populations. As tribal nations represent separate governments we have had to ensure our university and university researchers at a state university understand how to interact with other governments. This has required special training and more intense human subjects review than standard.

The need to facilitate these interactions thus have included specialized training, including one-on-one dialogue, and group dialogue. Development of context-specific materials has been significant as has outreach communication staff time. Travel to tribal locations has been essential.

Translation costs have also been needed. We have partnered with our state and county health departments to maximize our impacts but dedicated personnel working in communications and outreach are essential.

In order to further enrich our understanding of these connections, however, and to address the effects of relevant environmental exposures on public health, we have had to look beyond single exposures and consider potential for interactions and impacts of concurrent exposures of humans to algal toxin (e.g. domoic acid), chemicals (e.g. methyl mercury, PCBs, etc), bacteria, viruses etc. Integrative studies, "translational" models, and risk-based translational frameworks are needed in order to effectively translate the research findings and new genomic biomarkers for investigation and intervention.

There is still a gap between lab-based studies and communicating results to the public that requires improved linkages between biomarkers of exposure, response, effect, and disease, hence translational research funding is needed in order to address and not just describe the effects of environmental exposures on pubic health.

One thing we have found is that the public health questions can be deceptively simple – for example they ask "Can I eat the seafood?" whereas our research centers are restricted by the wording of the RFA to deal with only parts of the broader environmental picture. For example, the public asks us whether it is safe to eat the shellfish and to answer that question we must have scientific information about all the multiple agents (toxins, chemicals, and pathogens) in order to answer that question. Flexibility in the "responsive categories" for the Center RFA are needed.

Exploring public health effects by considering the role of all of these factors is necessary to identify ways to prevent, reduce, or eliminate harmful exposures that may occur through, for example, fish consumption. Our Center, one of the four NSF/NIEHS Oceans and Human Health Centers, is currently limited in scope to examining the health implications of algal toxin exposure. Expanding this scope to include other exposures is key to responding to your question.

Our Center has identified several other key needs to address the effects of relevant environmental exposures on public health. These include developing tools and techniques for integrating exposure and risk models relevant to public health with models relevant to ocean sciences, such as ocean circulation and nutrient models. In addition, investigators require dietary exposure estimates for sensitive populations (e.g. newborns, children, the elderly, etc) and high-end consuming communities (e.g. tribes) that can be used in conjunction with toxicological information on environmental contaminants to model risk more accurately and to propose means to reduce the potential for adverse health effects. These kinds of programs have been well received by our communities, better than brochures. These tools and approaches are not traditionally thought about as outreach and translation tools yet we have found these to be essential elements of our effective outreach activities.

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Environmental health problems affect all sectors of the population, but communities that are ethnically diverse and socially disadvantaged are also more likely to be exposed to environmental toxicants and built environment features—environmental injustices—that

urgently need to be addressed. Children are the most vulnerable group who suffer environmental injustices because they are physiologically developing from conception onward and any environmental assaults on their development are likely to have lifelong adverse social and health consequences. In the case of germ cell mutations, adverse effects are even incurred by subsequent generations. The resulting public health problems will only be addressed through a scientifically-informed and environmental health-savvy public and evidence-based community and public health action. Translational research and outreach and education are urgently needed to address environmental public health problems, and the greatest impact will occur when the collective efforts target children's environmental health. Thus, our research and outreach and education priorities are:
o K-12 Science Education Program
o Centers for Children's Environmental Health
o Environmental Health Sciences Core Centers: Community Outreach and Education Programs
o Environmental Justice: Partnerships for Communication
o Obesity and the Built Environment
o Community-based Participatory Research (CBPR)
o Health Disparities Program

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105
Time and financial support to build and expand partnerships, cross-train partners. Building mutual trust requires opportunity for planning and at least one demonstrated success in collaboration. There is also a need for the partnerships to be expanded to include decision-makers in health care and in policy/regulatory decision-making in order for any results to effect change.

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106
Support is needed for our Center to continue to provide training programs that will enhance workers understanding of public health and how environmental factors may impact health. It is critical that workers be trained to understand why and how they can effectively protect themselves and their community settings from environmental exposures that are detrimental to their health. Consequently, support for education and hands-on training for the workforce that address environmental exposures is essential.
Based in New Jersey, New York and Puerto Rico, the experience gained by this Center during the past six years following the response to 9/11 has shaped our perspectives on the link between environmental exposures and health. As a result of that tragic event, tens of thousands of workers who responded following the collapse of the World Trade Center are ill today; thousands more are expected to become ill in the future based on the latent effect of their exposures. Consequently, the 9/11 event demonstrated that there is a need for the following actions: 1) support to provide safety and health training to skilled support personnel, workers not normally considered to be emergency responders; 2) expand the definition of emergency response personnel to cover clean up workers - either first responders or skilled support personnel; 3) develop standards that are protective of human health while working in environments with unknowns exposures; 4) update current OSHA standards which are out of date and do not reflect the current state of knowledge about the effects of exposure to toxic substances; 5) require stringent enforcement of applicable OSHA standards – respiratory

protection, hazwoper – and applicable EPA standards; 6) require medical screening prior to and following participation in emergency response programs and institute federally funded medical treatment programs for workers who participate; 7) develop special emphasis, language appropriate programs that includes training and enforcement for vulnerable workers; 8) expand training, industrial hygiene and medical screening and treatment programs to all affected communities (including residents of impacted areas); 9) expand mental health services for workers and their families who are involved in responding to such events; and 10) develop new standards to govern the length of shifts that individuals can work on such sites.
For the emergency responder community, training resources are currently focused on initial training. The hazardous waste standard is less descriptive of the required refresher training for emergency responders than the specifications for clean-up refresher courses. Consequently, there are minimal efforts to provide the refresher training. A more structured form of mandatory continuing education regarding the public health needs is needed.
Addressing the inequities in the physical location of hazardous waste sites with respect to low-income communities, as well as the disparities in economic opportunities that accompany the remediation of environmentally-contaminated properties, is also needed. Working with community-based organizations, organized labor and academia, the education and training components of this Center reach out to those very communities most impacted by hazardous waste sites through a comprehensive curriculum of environmental awareness and hands-on skills training in HAZMAT remediation.
Resources and training support are needed for municipal public employees. For example, fiscal constraints in New York City have led to a low number of NYCDEP and NYCDOH agency inspection personnel being trained. While NY State DEP has provided training to a range of their employees, the fiscal restraints in New York have resulted in local agencies providing minimal level training for their employees.
Finally, support to translate scientific information into lay language, as well as into foreign languages, is needed. The ability of the lay public to understand scientific data and its relationship to the health of the public will only happen if the data are articulated in useful and appropriate ways. Additionally, the information must be available in languages other than English.

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107
WERA's community-owned and managed research (COMR) data collection, dissemination of data, and reporting; parity in community-based research facilitation/management and equity in grant funding; and compliance and enforcement of violation of US EPA public health statutes when local, state, federal government agencies and universities have liabilities.

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109
o Understanding the impact of environmental exposures on pregnancy and fetal development.
o Understanding the dose-response effect of carcinogens on infants, children, youth, adults, and vulnerable populations.
o Understanding the impact of indoor and outdoor air quality on pregnancy outcomes.

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110
a.) Fair access to funding: This includes all communities that have been impacted by exposures to
toxic and hazardous chemicals, radon and/or radioactivity, no matter who owns and/or operates the facility. Specifically, possible adverse health effects caused by local and private industries, or by contractors and/or operators of federal or state agencies/departments, should be within the purview of NIEHS-funded studies. Impacted communities and researchers should have access to NIEHS funding to study the potential health effects associated with these exposures.
b.) Inclusion: Meaningful participation of affected communities on advisory boards and subcommittees is very important; however, these need to be mechanisms to educate and train community "stakeholders" so we're not used as pawns by lawyers, regulators and/or researchers. Community-Based Participatory Research (CBPR) is the gold standard for conducting health research that addresses real public health problems.
c.)Education: Impacted communities need access to researchers who are interested in working with them on local health issues. This interest translates into working closely with community groups to educate us in the objectives, methods and limitations of good scientific research. Without this knowledge, impacted communities cannot assess for us or our families the health risks associated with the exposures.
d.) Awareness and access to information: Access to web-based information that is presented in layman terms is critically important.

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111
We appreciate the opportunity to respond to the NIEHS Request for Information (RFI): Partnerships for Environmental Public Health. We strongly support NIEHS's commitment to community-driven collaborations.
Support for partnerships for environmental public health takes place in the context of high levels of support for research on the genetic basis of disease. It is a truism that all disease results from an interaction of genetic and environmental factors. It is also a truism that the percentage of risk attributable to genes vs. environment is not fixed, but depends on the extent of variation in environmental exposure and genetic diversity in a specific population. When most people have similar environmental exposures, genes account for more variation in disease risk than when environmental exposure varies substantially. Widespread exposure to environmental contaminants that impact human development may result in large contributions of genetic variation to risk due to similarities in exposure, but this does not imply that genetic and clinical interventions are an appropriate public health strategy. Genetic research of NIEHS should be focused on its important potential to contribute to investigation of the role of environmental agents in disease causation, but not on its role in clinical care, which is a more appropriate focus for other agencies.
Health status in the United States of America is far lower than in most other industrialized nations, primarily due to health disparities that adversely affect the poor and people of color. Increased emphasis on clinical and genetic determinants of health cannot address our country's low international ranking, nor can it address our persistent and shameful health disparities, because of the high cost of medical services and lack of access in those populations with the poorest health status. However, environmental improvements, which have been the greatest force behind public health throughout human history, do have the potential to address the

major acute and chronic conditions that contribute to our nation's poor health report card. Environmental improvement holds the greatest hope for global health as well, since most of the world's population lacks access to advanced medical services. These are exactly the areas in which partnerships for environmental public health are most needed.

We strongly urge NIEHS to increase its attention to health disparities as a fundamental aspect of environmental health, and to increase its emphasis on research into social inequalities in environmental exposures and the role of these exposures in mass disease. Health disparities clearly cannot be explained by genetic factors. Their persistence through generations and through historical transitions in epidemiologic profiles points to the importance of fundamental and broadly defined environmental conditions, including the built environment, nutrition, occupational exposures, and other environmental factors. Research will most effectively lead to increased scientific understanding and public health improvement if it is undertaken in collaboration with communities adversely impacted by environmental threats.

NIEHS has provided leadership in supporting partnerships for environmental public health. This is of special importance because such partnerships are not well integrated into the culture of science. Support for such partnerships is also important as a balance to increasing support for environmental health science that responds to the interests of large industries. Because partnerships for environmental public health are a relatively recent phenomenon, and because they require nurturing in the context of the dominant focus on genetic and clinical research, we urge NIEHS to commit to long-term, sustained support of community-driven partnerships that will increase their capacity to be self-sustaining and to impact public health.

We encourage NIEHS to expand its emphasis on environmental justice, community-driven and community-based environmental health research, health disparities, and impacts of the built environment. This emphasis is consistent with NIH's commitment to cross-disciplinary collaborations and holds the greatest promise for impacting our most intransigent public health problems.

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112

Because a key training goal for Worker Education and Training Program (WETP) is to train Superfund site workers, there is a great need for just-in-time, user-friendly, coordinated and reliable single data source on active Superfund site activities (e.g., name of prime and sub-contractors, levels of efforts, phases of work, types of remediation, projected date of completion, etc.).

During the early years of the WETP programs, which began in 1995, OAI made sustained efforts to identify and utilize several existing EPA data sources such as the Superfund Information Systems and others. OAI also attempted to established relationships with EPA regional offices and EPA-lead prime and sub-contractors including the Army Corps of Engineers involved in superfund site management and remediation but to no avail—the data sources were not up-to-date and time-consuming to piece together and the EPA Remedial Project Managers, Site Coordinators and contractors were non-responsive. Since our grant was neither intended for data collection/data development nor relationship building, OAI realized that an effort in this direction was yielding no return. As a result, OAI had to redirect the program to serve emergency responders and non-Superfund site workers.

The need for useful, timely and accessible Superfund data source as a tool continues to exist, which would greatly facilitate grantees' outreach, recruitment and training efforts. It would also be more meaningful for researchers, the community and the general public as a whole. Further, there is a need for better communication and information sharing/dissemination

channels between NIEHS and the EPA Superfund division to increase awareness of and market the WETP programs among EPA contractors and Superfund staff. These endeavors would go a long way to increase grantee's efficiency and effectiveness in planning and shaping more responsive site-specific curriculum and training of Superfund site workers as well as securing viable employment for Minority Worker Training (MWT) programs across the country.
Under the Brownfields/MWT programs, OAI provides educational and employment opportunities that promote economic self-sufficiency and self-determination. The life and job skills that OAI currently offers are intended to address and mitigate environmental exposures. However, even though OAI has successfully placed graduates into employment, it is a constant challenge to ensure that the skills that are taught match the needs of potential employers. These needs are constantly changing with new and emerging economies.
Current trends suggest that 'green' jobs, or more appropriately formulated, 'jobs that address sustainable development', involve skill sets that will be in demand in the future. Much of the future sustainable development will most likely involve environmental issues related to NIEHS missions, including redevelopment of previously developed sites, climate control, carbon emission, greenhouse gas, etc. OAI and other NIEHS educational providers would be greatly assisted by several related topics that are suggested by the questions in this RFI. These include:
- Research into economic trends and industries that are likely to be promoted by government and private investment, such as green industry/green technology;
- Research into employment skills that are currently and prospectively required to meet the needs that will develop from economic trends;
- Shortfalls in current academic and non-academic educational models relative to the prospective job skill needs. Individuals who do not have access to the academic system could be well served by educational programs that involve relatively short-term (one week to 6 month) completion and that result in recognized certifications of job skills. Such certifications are best served by an accrediting agency that has specific criteria, such as the NIEHS Minimum Health & Safety Training Criteria for Hazardous Waste Operations and Emergency Response;
- Support for curriculum development for job skills programs in emerging green industry.

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115
We need to improve access to Information and resources that help us to systematically describe the effects of exposures in communities in specific cases such as dioxin, other toxic chemicals that result from industrial activities and gases in school environments.
Instrumentation and Software that help us identify risk factors

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116
• Need to be able to work with researchers who have tools to conduct environmental assessments.
• Be able to meet with the community in their neighborhoods or places where they are comfortable.
• We need to be able to compensate community members for their time and information.

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117

It is very heartening to see NIEHS ask for feedback on all the community-based participatory research and community outreach programs across the Institute. There has been excellent leadership for the programs, and this gives a strong opportunity to coordinate what has been learned. I believe that overall there has been a solid base of work, and NIEHS has played a formative role in spreading community-based participatory research through academic institutions, federal agencies, community organizations, independent research organizations, professional associations and groups, and government agencies at various levels.

1) Cross-program conferences and other activities for community outreach cores and research translation cores of the various programs- There is a wealth of excellent experience across NIEHS programs, and occasionally personnel working on outreach or research translation in one program conduct such tasks in another. But those commonalities are more likely to result in shared experienced within the institution that has multiple programs. Those commonalities are less likely to be shared generally across programs. Three ways to enhance the value of these components are:

-Specialized conferences for sharing experiences across outreach and research translation cores of all the programs.

-One small budget item would provide travel funds for a limited number of outreach and research translation personnel to visit grantee conferences of other programs.

-Produce an edited volume and/or special journal issue of articles describing the best of the outreach and research translation lessons.

2) Continue the very successful Environmental Justice program, with funding for more projects than previously funded – This program has developed not only a set of valuable projects, but has built capacity for a whole trend of environmental justice work that spreads far beyond the boundaries of the individual projects. Biomonitoring and household exposure for many often-unresearched chemicals is one particular contribution that has spread beyond the projects of grantee organizations like Alaska Community Action on Toxics and Silent Spring Institute, thus contributing to a burgeoning area of environmental health. Having served on two review panels, I know how many worthwhile projects have gone unfunded, and we are losing great talent.

3) Engage several contracts to summarize the collective benefits of NIEH programs' community-based participatory research and community outreach – Anecdotally we know of many successes, but we require a more formal set of evaluations. These could be of different forms, including qualitative assessments based on interviews, focus groups, and policy analysis; and qualitative assessments based on community-based organization productivity, academic productivity, and overall growth in the relevant research fields. In addition, some evaluations would focus on specific research areas, e.g. asthma, lead, hazardous facilities; others would focus on movement-wide, region-wide, or nation-wide capacity-building.

4) Centralized library of outreach and research translation materials – This would build on materials from all community outreach cores and research translation cores of the various programs, and perhaps include other materials from organizations such as Community-Campus Partnerships for Health. This resource would help spread the products of past and existing grants, rather than having groups build new materials from scratch or spend much time searching for what might be easily accessible. Ideally these would be searchable in various ways: type of exposure, type of disease or condition, race/ethnic constituency, language of publication, and age-level.

5) Community research centers – These would be somewhat modeled on academic centers of excellence. Just as academic centers build on a history of experience in grants, community

research centers would be based in community-based organizations that have had extensive experience in both collaborative grants and in grants on their own. Just as academic centers build further capacity for universities, the community research centers build capacity for community-based organizations. They would have a pot of funds to extend some existing work, to fund pilot programs in tandem with other collaborating CBOs, and to develop educational programs in their research areas for neighborhood residents along the lines of the "community environmental college" of the Alton Park/Piney Woods Environmental Health and Justice project in Tennessee, to provide public educational courses for residents of all ages.
6) Post-doctoral training centers of excellence in community outreach – These would be located in universities that have had at least two different outreach cores, and presently have at least one. These could be either stand-alone programs, or could be part of the above community research centers (item #5). The goal would be to offer advanced training to academics who already have some community-based participatory research and community outreach experience, in order to advance those skills, as well as to train promising academics who do not yet have the basic skills. This would also help legitimate community-based participatory research approaches among a greater number of academics.
7) Research program for specific research interest areas, primarily emerging contaminants and novel approaches to exposure assessment – this would include emerging (and re-emerging) contaminants such as PBDEs, PFOAs, BPA; and novel approaches such as community-involved exposure monitoring, combined with right-to-know type report-back of individual data in tandem with neighborhood/community meetings.
8) Focused conferences on emerging connections – This would include the connections between health disparities and environmental justice; climate change effects on health; personal product and household exposures in connection with campaigns to restructure corporate production and disposal methods.

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118
I am working in community outreach with nutrition programs. I would like to be able to perform more nutritional, clinical health assessments once we have established trust with a community group. This would allow us to assess health status before and after nutritional intervention. It may also allow some human studies of behavior changes, in relation to diet or smoking. This may include some invasive techniques, such as blood sampling or fat biopsies.

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119
The NSF NIEHS Oceans and Human Health Centers Program did not include monies for outreach and education – and this is a major issue in terms of the following questions. Having said this, all of the 4 Oceans and Human Health Centers, including the University of Miami Center, participate in outreach and education because we believe that it key to addressing the effects of environmental exposures on public health.
A major issue is the development of biomarkers of exposure and disease in humans that are usable and predictive of health effects.
Another issue with regards to public health, is the growing lack of funding and resources for environmental health in general as well as an aging environmental health infra-structure. This means that many traditional environmental health issues such as basic sanitation are starting to impact anew the public health of US citizens.

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120
The needs Talon Research and Environmental Services as outlined in our plan includes materials to be used to address educational entities, the general public, and health care professionals/researchers are as follows:
Water quality testing kits which will assess and diagnose various organic and inorganic toxic compounds that may be impacting human health in Western Washington.
The ability to create educational materials that can be used to address the diverse demographics of the targeted area. This includes elementary to college level students, the general public, tribal interests, public and private audiences.
We are seeking financial resources to meet and take a pro-active approach to these objectives. It will be our pleasure to submit our entire plan and vision for assessment.
It is the purpose of our business to function as a service and a cooperative, to promote awareness and to improve the water quality for all concerned which will elevate the scope of human health conditions as a preventative and sustainable reality.

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121
1) Establish collaborations with the scientific community to gather and dissseminate information to low-income populations served by the NIEHS Minority Worker Training Program.
2) Continue to provide worker education and training to this targeted population and enhance training components to include more public health information, impact of exposures, MSDs information, green building definitions and resources.
3) Establish a comprehensive and cohesive network to disseminate educational information.
4) Provide incentives and greater access to public services to help people adapt new behavioral perceptions and practices to reduce environmental exposures.

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122
In order to address the effects of environmental exposure on public health we need to develop effective methods of identifying the particular contaminants and their point sources in the community. Secondly, we need to be able to determine the actual effect on human health and its incidence in the particular community. And thirdly, we need to be able to quantify the main pollutants and develop methods of communicating the information to the affected communities and to the policy makers who may be able to make the requisite changes.

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123
As a federally funded training grantee that has developed materials for use in reducing environmental health risks and hazards in out of home child care settings (among other health topics), we would like to see outreach from your program to the child care community, in general.

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124
The mission of the Centers for Disease Control and Prevention, National Center for Environmental Health, Division of Emergency and Environmental Health Services (EEHS) is to strengthen the role of state, local, and national environmental health programs and

professionals to better anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures to human health. The majority of our activities focus on local environmental public health organizations. We engage local environmental health organizations in problem- solving activities that strengthen environmental public health service-delivery systems. We seek input from communities when identifying their local environmental public health problems of importance. In this manner, we identify the research that needs to be conducted. Therefore, we seek to work collaboratively with NIEHS and local entities to identify research-related activities that will benefit communities.

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125

ATSDR's Division of Health Assessment and Consultation performs public health assessments for communities near hazardous waste sites. These assessments evaluate the potential exposure of community members to environmental contaminants resulting from a facility's operations, material handling and disposal processes, or accidental release. The following are examples of items that would improve our ability to complete these assessments in a timely manner and provide helpful information to the community:

- Reliable, accurate, and cost-effective methods to increase our limited ability to gather environmental media (i.e., air, water, and soil) or biomonitoring (i.e., blood, urine, hair, exhaled breath) samples.
- More detailed information on soil pica behavior in children. Such information would include a better understanding of the amount and prevalence or frequency of the events by age and socioeconomic factors.
- Better understanding of the relation between biomonitoring results and the significance of that exposure on current and future health conditions. Among others, contaminants of concern include arsenic, mercury, and PCBs.
- A consolidated, comprehensive national database of environmental background levels for soil, sediment, ambient air, groundwater, surface water, biota, food, building materials—with some idea of how people access or use the designated background area.
- Research to identify where the most adverse contaminant exposures are occurring, by media and human activity, so that higher priority can be given to these locations and the primary cause of the contamination if they are other than hazardous waste sites or their contaminated offsite areas.
- Methods to assess the effectiveness of our recommendations and interventions.

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126

The NIEHS RFI for Partnerships for Environmental Public Health (PEPH) stimulated much thoughtful discussion at the December 2007 Boston meeting of NIEHS Environmental Justice grantees. Dialogue with Dr. Wilson, lunchtime discussion groups, and the closing plenary session provided forums for the exchange of ideas. In this letter, we summarize the input from those sessions. Approximately 120 participants attended the conference, including researchers and community leaders from more than 30 projects funded by NIEHS and NIOSH in the Environmental Justice, Superfund, and ELSI programs. These comments represent input from a diverse group of national leaders in environmental health. The first two sections below reflect integrated input from group discussions. Comments from individuals who participated in the discussions follow.

Problems to be addressed by PEHP

- Better evaluation of EJ/CBPR project impacts

o Individual projects
o Overall impacts of EJ/Community Partnerships program over 10 year history Individual projects do not have the resources to implement evaluations that reflect the contributions of the EJ and CBPR programs overall. This overall program evaluation should be undertaken as a separate project.
• Improved dissemination networks and infrastructure for:
o Educational and outreach materials
o Best practices for community-linked or CBPR approaches
• The timing and funding of grants should allow for the time/resources needed to build infrastructure and partner relationships before projects take off. For example:
o Identifying and bringing together the right partners, solidifying relationships
o Developing community advisory boards
o Refining research questions, methods and/or intervention strategies and evaluation approaches
o Resolving IRB challenges in oversight of academic community partnerships These issues imply the need for longer-term investment to account for planning/launching phase in projects. Multiyear grants and renewal opportunities with good success rates are essential.
• Resources to allow for better integration of science with community interventions/programming and evaluation.
• Scale of grants should encourage good intervention studies AND evaluation of their effectiveness
Areas for work and new initiatives
• Cumulative impacts, including synergies among pollutants from multiple media
• Emerging contaminants and community-based exposure monitoring
• Mental health consequences of poverty, immigrant life issues as compounded by occupational and environmental exposures.
• How social inequality and community psychosocial stressors amplify health impacts of pollutant exposures
• Built environment and hazard exposures
• Better integration of organizer expertise and scientific expertise to push for policy change
• Funding could be used to support community partnerships with regulatory allies, not just academic partners
• More integration of health disparities in projects
• Create a "Centers of Excellence" program for EJ Research and Intervention
• Post-doctoral training opportunities for scientists interested in community-linked research/interventions-- jointly hosted by community and academic partners
• Research and interventions that change people's lives and move policy not just collect data
Additional Comments
• NIEHS should conduct a needs assessment to identify the many communities that would benefit from EJ work and apportion funding to additional communities in need.
• Center programs should not become a "winner take all" in-group.
• Additional capacity-building is needed at academic institutions to spread knowledge about how to do CBPR. This could tie in to curricular development.
• Private interests are increasingly influencing the direction of research in academia in ways that are not beneficial to communities. NIEHS PEHP can help balance this trend.
• A national or regional gatherings to showcase EJ/CBPR projects could help educate about this work and support funding.
• In order to have meaningful partnerships with community based organizations (CBOs), sustainability and timeframe of funding are important. CBOs need sustainable resources to

avoid being spread too thin or losing funding after they have made a commitment. CBOs need resources to translate research into action. If they own the research, they are better positioned to move it into action. This requires longer-term support through NIEHS or another mechanism.
• CBOs are strengthened when they are the principal investigator. This also helps build community trust in the project.
• Every project should have a specific goal of reducing hazard exposures in a community. This avoids getting tied up in health studies and risk assessments.
• Evaluation criteria for projects need to reflect wider definitions of scientific knowledge and positive outcomes, acknowledging that research and science are not just done by academics but also by community members.
• Communities want access to scientists and lawyers.
• New grantees or teams should do trainings to get connected to established teams as a way to spread knowledge, experience, and lessons learned.
• Grantees need flexibility to respond to new information as it arises through the course of a project. Research programs must allow projects to be nimble and not necessarily tethered or strictly limited to the originally defined scope of the project.
• NIEHS should institutionalize community partnership programs, so that partners don't have to worry about funding disappearing. Community organizations and academic partners want to know that the funding mechanisms will continue to be there for a long duration.
• Science needs to be defined to include community questions/hypotheses and community data collection efforts.
• Investment in community partnerships has to be a two-stage process: First, data gathering, discovery, developing and testing hypotheses; then, translation into action or intervention. Possible actions include exposure reduction, regulatory changes, or ensuring that regulations that are in place are being carried out.
• Communities need to be involved from the beginning in projects.
• Acknowledge the importance and legitimacy of traditional knowledge
• Improve scientific literacy of communities and encourage community members to pursue scientific careers. Projects can be leveraged to build a better scientific pipeline over the long-term.
• Funding should encourage projects that are actionable, having impact directly in improving public health, answering relevant questions in a timely manner.
• Borrow from disaster response methodologies to make response quicker.
• Project funding should produce jobs for communities. Grants should pay for community work on the projects.
• Maintain collection of regular data, for example racial health data.
• Document and build on strengths and resilience of communities.
• Document the rich history of environmental justice.
• Encourage youth involvement and leverage youth involvement as an investment in the future and building community capacity.
• Encourage youth to be literate in science through both curriculum and research components. A long-term vision of projects should be to encourage community members to help feed the pipeline of future scientists.
• Projects should aim to increase the scientific literacy of all stakeholders. That means 1) Researchers thinking outside their traditional box in terms of scientific questions, methods, data collection and dissemination of results. 2) Training community to engage in a dialogue. 3) New methods developed and piloted within a neighborhood context.
• Exposure projects should be looking at peak as well a steady-state exposures. Add in stressors and their potential multiplicity of effects.

• Funding should encourage projects that better integrate social science with medical science.
You can see that the RFI generated an outpouring of ideas. These comments reflect a deep commitment by current grantees to building long-term partnerships between researchers and communities with the goal of concrete health improvements in communities disproportionately affected by environmental toxins and other environmental stressors. As a participant in the EJ conference, I am sure that you felt the renewed optimism that new NIEHS initiatives would bring resources to communities where prevention oriented environmental health research and interventions have enormous potential to address health and social disparities.

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