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2

Themes? Identify core concepts of environmental health (such as toxicity, risk, dose, exposure and individual susceptibility) these concepts are clear- often common sense and they are universally applicable to broad audiences. Individual who know to these concepts can protect their own health and the health of others. Also, schools have been required to prioritize AIDS awareness, drug awareness, sex ed (... albeit perhaps not accurately). Use this opportunity to make Environmental Health Education part of the schools' health education mandate.

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3

The PEHP is well positioned to pursue the following kinds of scientific themes, exposures, health outcomes:

- Integrated exposure and health assessments (gauging vulnerability in terms of genetics along with multiple stressors arising from the quality of one's living arrangements and larger built environment)
- The globalization of science (highlighting the need for more coordinated efforts linking the coproduction of environmental health sciences internationally, but also tying in EHS to new insights about the globalization of disease vectors, transnational flows of hazardous wastes and toxicants, climate change, etc)

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4

The partnership should be conducting research that can then be transferred to practical use. This should follow the new NIOSH initiative focused on the transfer and translation of research findings, technologies, and information into highly effective prevention practices and products which are adopted in the workplace (into the community in the case of the partnership).

Health outcomes that should be considered include how exposures affect future generations, the best preventative measures for the exposures, and how planning/prevention can affect any potential adverse outcomes from exposure.

The partnership should not address research for the sake of research. While laboratory type research is essential, there are many other agencies and groups conducting this type of research. The partnership should use these findings to further the tactical to the practical or using this high level research to implement practical application.

Specific topics for research that promise to be major issues in the near future are nanoparticles, their potential health effects. Another area that can have a hugh impact on public health is carbon emissions. Research to determine the best way to operate buildings and facilities more efficiently and "greener" to reduce the "carbon footprints".

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5

We recommend that the PEPH Program incorporate attention to both social and physical environments, and that emphasizes the interface between socioeconomic inequalities, physical and social environmental exposures and their cumulative impact on the health and well being of

low-income communities of color. Such a framework will encourage the development of research that will increase understanding of social and physical environmental exposures, their unequal distribution across economic and racial/ethnic groups, as well as a more comprehensive understanding of the mechanisms through which they influence health disparities. Evidence-based interventions and policy change to mitigate and prevent, reduce and eventually eliminate these exposures should incorporate attention to the role of social and economic processes that contribute to disparate environmental exposures that lead to disparate health outcomes. Such a framework can guide research that examines and develops an evidence base for policy and programmatic interventions to reduce disparities in social and physical environmental exposures that contribute to health disparities. Topics that we suggest as priorities focus on the intersection of social and built environments for health, and could include, for example: 1) understanding the cumulative impact of neighborhood social and built environments on health outcomes (e.g., independent and joint contributions of crime and pollution to walkability of neighborhoods and related health outcomes); 2) socioeconomic conditions and economic restructuring and their implications for neighborhood stability and siting of polluting land uses (e.g., oil refineries); 3) impact of air quality on physical activity, obesity and cardiovascular disease; 4) the effects of community and policy interventions (e.g., community mobilizing, policy change, green economic development) on environmental conditions and health disparities; 5) economic, social and political processes that shape environmental justice issues (e.g., social and political processes that contribute to disproportionate siting of noxious land uses in low income communities of color); and 6) social and economic impact of environmental pollutants and their cumulative implications for health disparities. Such initiatives could extend or build upon past NIEHS initiatives that explicitly examine the interface of socioeconomic and racial disparities, and the social and physical environments, such as Centers for Population Health and Health Disparities, Environmental Justice: Partnerships for Communication, Health Disparities Program, and the Obesity and Built Environment Program. We also recommend that the PEPH Program's funding initiatives require the dissemination and translation of research findings into programs and policy. Such a requirement will help to assure that the research conducted contributes to actions taken to improve health and reduce inequalities in health. Toward this end, the PEPH Program should build in health literacy components to assure positive health outcomes in communities most negatively affected by environmental exposures. Health literacy efforts should encompass multilevel actions, encompassing actions taken to promote individual health, community level change, and policy change strategies that aim to build capacity to address environmental justice issues. Finally, the PEPH Program could make a valuable contribution to the prevention, reduction or elimination of environmental exposures that contribute to adverse health outcomes in communities through encouraging active engagement of those communities in the research process, and in the development and implementation of programmatic and policy efforts designed to reduce those exposures. Programs that build and sustain the capacity of community-based organizations to take the lead in intervention efforts, to participate in review or proposals, and to take the lead in the development and implementation of proposed activities would help to build and sustain a broad base from which to prevent, reduce or eliminate environmental exposures that contribute to adverse health outcomes, with a particular focus on low income and communities of color currently disproportionately affected. Furthermore, programs aimed at enhancing the capacity of community, health profession and academic/research partners to work effectively together toward these ends are an important component of reaching this goal. This could include the development of funding mechanisms to support training and capacity building efforts aimed at, for example, developing and maintaining successful community-based participatory research

partnerships; and enhancing the competencies of community-based organizations to address environmental issues (e.g., through submission of grant proposals to NIEHS). In the latter instance, the PEHP Program might provide technical assistance to community-based organizations so that they may apply successfully for NIEHS funding, or to academic/research or health professional organizations to build capacity to work effectively in partnership with community groups. Such efforts would build on past NIEHS initiatives such as Environmental Justice: Partnerships for Communication and the Community-based Participatory Research initiative.

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6

Education and information that is provided through occupational health and safety training frequently is transferred to workers’ families and communities. By raising worker awareness of environmental and public health issues, there is a multiplier effect in terms of impact on the larger community.

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7

The scientific theme in this program should address basic research performed by the public health laboratories in collaboration with university and/or private sector researchers/scientists (Delaware Cancer Consortium, etc.). The share of ideas in a state laboratory with outside expertise creates innovation and fosters interdisciplinary interactions. This creates "out of the box" thinking and vision to stimulate and shape the NIEHS.

Four areas of scientific interest for DPHL include:

- 1) pesticide exposures (applicators, workers, residues, crop/feed exposure, animal, water systems, including runoff, does this contribute to the increased algal blooms, oxygen deficient zones, and decrease in mollusk and crustacean populations?)
- 2) volatile organic compound exposure from home and work environments (paint and flooring emissions, long term vs. short term impacts, does this contribute to the desk induced obesity issue?),
- 3) radiological and nuclear monitoring (radon and radium exposure, natural elevations due to geologic abundance in prescribed areas, pharmaceutical and/or industrial discharges, lack of routine monitoring of increased risk areas, such as ports, airports, major corridors, nuclear power generation stations, how do the environmental impacts or perceived impacts affect localized populations? ), etc.
- 4) clinical and environmental toxicological testing for areas not current addressed including estrogenic and other pharmaceuticals (waterways, human and animal exposure, how do this link to fertility and/or potential birth defects? How prevalent are exposure to specific drugs of use/abuse from the environmental and food systems? Is a specific population more at risk?), elements of nutrients and toxicological interest, such as metals (are there consistent elevated metals in a primarily freshwater or seawater seafood diet transferred to the human and animal population, what is a safe level? Do environmental emissions affect monitoring or response crews?)

Education on elimination, reduction, or avoidance should be developed are part of this program. However, due to political and legal implications, areas that should not currently be addressed under this program include point source monitoring. Identification of areas of exposure, specific hazards, and potential sources should be considered, however, due to the heavy industrial lobby, assignment of responsibility of cleanup, remediation, and reappropriation should be excluded from this project. While a goal of this project is the determination of routine

or exposure specific monitoring, this project should not replace occupational exposure monitoring (i.e., annual evaluations and monitoring).

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8

Chemical exposures in food, water, homes and workplaces due to various materials, processes, etc.

Environmentally acquired cancer.

Global climate change solutions and evaluation of resultant diseases created or re-emerging.

No response to not addressed other than focus on those with the greatest public health impact.

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9

How environmental factors contribute to health disparities among underserved populations, such as minority and immigrant communities, rural communities, children, and the global health environment. Also, nurses often serve as the key educators and risk communicators in healthcare and community settings. Increasing their knowledge and capacity in both environmental health education and risk communication is essential. This would effectively serve to address the translation of environmental health research and policy into practical efforts to decrease toxic exposures and develop surveillance efforts. Further, nurses have not yet been fully engaged in health risks associated with climate change. They will be an essential profession to prepare in terms of prevention, early assessment, and interventions for this problem both in the U.S. and internationally.

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10

Exposure: EMFs (electromagnetic fields), BPA (Bisphenol A)

Outcomes: pregnancy outcomes, pediatric outcomes, and sperm quality outcomes.

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11

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12

People are most interested in locally important environmental health issues. (i.e., Baltimore City teachers more interested in lead paint and asthma; teachers from the Eastern Shore of Maryland were more interested in water quality issues related to agriculture.)

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13

The public needs to understand the limitations of risk assessments and the difference between risk assessment and risk management decisions. The public also needs to understand the Precautionary Principle and Alternatives Assessment.

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14

Assessment of environmental hazards/ patient exposures and effective responses/ plans for care

Prevention through support of behavioral changes which help to preserve natural resources, individual & public health & immunity

All hazards disaster preparation & response

Global health & disease issues which increase hazards to all

Climate change issues

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15

Climate change and environmental health is a promising 'umbrella' because it embodies interactions, preparedness, education, and adaptation. Issues like lead and asthma should not be excluded because they are 'well understood' - this may be true of the medical research, but solutions to these problems have a significant local component so they are 'new' to each community that has to deal with them.

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16

Synergistic effects from multiple chemical exposures and their impact on overall health status. Appropriate policy development to address cumulative impacts and population health at the local level.

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17

Transport of goods - impact on workers and community; impact of both long-term chronic exposures to air pollutants and to acute exposures to releases or spills of hazardous materials during transport. Funds for communities and workers to work with researchers to document exposures and their impact, and to "test" the effectiveness of existing policies (i.e. community and worker right to know)

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18

Exposure assessment of traditional and emerging toxins should be a focus and exposure reduction should be an acceptable outcome alone. Health outcomes include developmental and respiratory outcomes in children.

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19

Start focusing on reducing environmental hazards, reducing risk and preventing disease rather than on reducing the damage already done by environmental hazards. See my answer to #1

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20

The main theme I would emphasize is to fix your home if it has elevated radon levels. Installing an Active Soil Depressurization System is very effective and costs less than home repairs to roofs and furnaces, etc. It's cheaper than cancer treatment, and can actually prevent the disease among nonsmokers.

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21

Climate change and human health effects – there are constant questions about how the environmental changes and to what degree these changes and over what period of time these changes will impact personal health. Linking the anthropogenic causes and changes in environmental conditions is important.

Nanotechnologies and chemical development has been demonstrated to have important impact on economics; we do not always have a clear idea of how these innovations, once adopted and put into “production and use” impact human health. More attention needs to be given to this area.

Since Consumer Product Safety Commission seems unable to address many of the concerns with products that pose threats to health and safety of the public, perhaps this is another area of focus.

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22

Radon exposure issues are critical.

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23

Currently the children in this country are evidencing serious problems related to environmental toxin, such as asthma and likely the advent of the increasing number of autistic and ADD and other learning disorders.

Research and prevention strategies are needed to interrupt this cycle of increasing problems.

The program should be developed so that there is a logical coherence. The data is rapidly developing and NIES should support efforts to develop the materials so that they are locally appropriate but incorporate national standards. Research, dissemination of known assessments, interventions that are reasonable and relevant is essential,

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24

Physical and social environmental factors that bear on the disparity between black and white infant mortality.

Metals exposures and neurological diseases.

Chelation therapy.

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25

The realm of risk assessment and analysis.

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26

A key issue to be addressed is how to predict health outcomes from exposure to multiple types of environmental materials with potential health affecting properties. Even more to the point

would be a theme that could lead to guidance on what levels are acceptable and what types of administrative or engineering controls could be included in transformational projects that would help to achieve them.

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27

Most important: The effects of a variety of toxic chemicals on cognitive development of children, on autism, and on chronic illness.

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28

Care should be taken that the recently introduced concept of community participatory research (CPR) in environmental health research does not get in the way of the science. The prime emphasis must be on the science, and the CPR should be looked as complimentary to the science in facilitating its application. Good scientific ideas should not be jeopardized by CPR.

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29

Incorporation of community-level risk into individual risk assessment programs and protocols.

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30

Prevention as highest step on hierarchy, prevention = re-routing, ultimately switch to safer chemicals

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31

common household safety issues, enhanced use of the poison control centers, protection of migrant and seasonal farmworkers, coordination of state and federal agencies

binational threats and rapid communication support to recognize, confirm and treat patients and also protect the environment

community wide antipollution awareness

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32

To Be Addressed:

- (1) Risk factors for disease acquisition based on the delivery vehicle (e.g., water).
- (2) Risk factors for disease acquisition based on individual human behaviors.

To Be Avoided:

- (1) Discussions of liability

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33

1) Environmental Justice, including a health component (not just documenting differences in exposures)

- 2) Prioritizing communities with variations in race and SES--so that we can work to disentangle the roles of race and class.
- 3) Encouraging community-level exposure assessment as pilot studies--including biomarkers and personal exposure monitoring to gain a strong sense of community-level exposures. These would require substantial funds to allow adequate characterization of community (N~200-300).
- 4) Follow-up the pilot studies with hypothesis-driven assessment of exposure-disease relationship (N~1000-2000). Hypotheses cannot be determined until community exposure assessment is conducted.

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34

Support for policy-relevant research with less emphasis on clinical intervention and more emphasis on the underlying science linking pollutants to disease.

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35

Many in the field perhaps thought that lead education was blase. The recent headline stories suggests that we may have become too complacent about our messages. Perhaps a plan to routinely revisit EHS issues on a regular basis is needed.

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36

See 1.

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37

The most important scientific themes are a) prevention, b) health disparities, c) early interventions, d) joint impacts of the environment and psycho/social factors, e) environmental justice.

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38

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39

exposures that we know have a direct affect on health (all ages).  
What not to be addressed is a really interesting question and I wish I could think of something useful to say. I need to ponder that one and that is a question to ask a group of graduate public health or nursing students who would be equally challenged to thing about it.

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40

Because this is a relatively new area for public information, stick with only the best documented, highest risk health and wellness themes for public information. Focus only on those factors that have the largest population, health and financial impacts. Be selective rather than comprehensive at this stage.

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41

NIEHS should not fund more biomedical research on century old hazards such as lead, asbestos, mercury, etc. If the focus is environmental public health, then NIEHS should support programs that lead to public health solutions to the many well known hazards that are responsible for thousands of death. New areas that need support include nanotechnology, smart growth, design for the environment, green building, sustainable development, organic food production, etc. More research needs to be done about the alternatives to the existing unhealthy production and consumption systems. NIEHS would have to support policy research to generate new knowledge that would allow us to move in a different direction, toward healthy cities, healthy schools, healthy hospitals, healthy buildings, healthy supermarkets, healthy workplaces, etc.

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42

I think that gene-environment interactions are the new topic that needs more attention and funding. I also believe that more resources should be available for developing effective outreach materials for communicating about gene-environment interactions.

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43

To Address:

global climate change, behavior change, risk communication, science communication, best practices in partnerships/outreach, leading causes of death and how related to environmental health, research literacy (what is research and how is it conducted)

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44

Important: timing of exposure, age at exposure, identifying relevant causal pathways

Not important: rodent models that are not relevant to human cancer

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45

(a) NIEHS funding should be made available for efforts where partnerships could be most effective in addressing problems, rather than directed at specific health outcomes or exposures.

These include:

- Unique or unusual exposures to a community, or unique vulnerabilities
- Unique or unusual opportunities to access a target group for environmental hazards, including communities that are poor, minority or otherwise under resourced.
- Opportunities to develop and evaluate novel interventions to reduce exposures, or address potential health effects related to environmental exposures and to improve translation of research results.
- Situations where independently funded research is needed to address environmental health efforts and gain community acceptance of results.

(b) The program should not be focused on situations where there is no novel aspect to the activities and no potential contributions to science or community benefit, or where effectiveness cannot be adequately evaluated

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46

Exposures:

Airborne exposure to PM, hydrogen sulfide, and other pollutants in communities impacted by municipal solid waste landfills and industrial hog operations.

Waterborne exposure to chemicals (volatile organic compounds, and metals) and microbes in low-income communities of color lacking adequate municipal water and sewer services.

Health outcomes:

Impacts on health and quality of life due to malodor.

Waterborne infectious disease (cryptosporidiosis, giardiasis, norovirus infection, skin rash, eye irritation).

Chronic outcomes such as reduced renal function, liver failure, diabetes, high blood pressure.

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47

Ionizing Radiation is not healthy in every day doses. Every one living inside the built environment has the potential to be exposed to radioactive conditions ten to a thousand times stronger than outdoors and never sense it.

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48

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49

Themes: Partnerships are needed to increase efficiency. Increase the perceived value of translation/impact. Measure impact. Measure and reduce exposure.

Health Outcomes: Include outcomes that may not be life-threatening but that decrease the quality of life and may be related to environmental exposures.

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50

A few ideas that would relate to general environmental health information for lay audiences (and K-12):- Basic toxicology concepts ("The dose makes the poison")- Synergistic effects (you are exposed to MANY potential toxicants)- What can individuals do to limit exposures (example: lead poisoning prevention)- What is known about gene/environment interactions- How do environmental toxicants effect body systems

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51

The first theme that needs to be stressed is the simple connection between humans and their environments. While this may seem simplistic, this connection usually is missed by lay audiences of all ages. In addition, the following themes/issues are relevant: everything is a chemical—exposures are what make the difference (the NIEHS triangle model); there are two (or more) sides to almost every environmental debate; scientific knowledge changes over time, and these changes affect our knowledge about environmental connections to health; genetic susceptibilities play an important role in how individual organisms react to exposures; there are ways in which a person can reduce his or her exposures to harmful elements in the environment (sunscreen, diet, etc.). Finally, general scientific literacy is crucial to promote better understanding and decision-making by people of all ages.

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52

While the focus of our earlier comments is on process, we also believe that the content of PEHP projects should be shaped to address NIEHS' core mission. One important area of focus should be on emerging environmental pollutants, including endocrine disrupting compounds, with a goal to provide the knowledge base for precautionary environmental health policies and interventions. Our interest in breast cancer makes us keenly aware of the difficulties of conclusively linking specific chemical exposures with a disease end point. We know breast cancer is multi-factorial with risk factors that occur over many decades of the life cycle. Thus, we urge NIEHS to fund studies that focus on exposure to chemicals for which there is a plausible biological link to disease, even if the proposed study does not directly include a human health end point. We also encourage development of new personal exposure measurement and biomonitoring techniques and studies of cumulative impact and effects of mixtures. In addition to basic science, PEHP should include translational research focused on environmental public health policy, including recommendations for individual behavior, corporate practices, and regulation. Translational research will have great impact if it translates science into public health policy rather than adding to already over-burdened medical care systems. In some cases, this research may be fundamentally descriptive, and only loosely hypothesis-driven. The enormous public investment in the human genome project must be matched by mapping of environmental exposures and discovery of their biological effects, including effects on gene expression, hormone signaling, and so on.

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53

There are many themes that this program should address. I believe that the program should have a funding approach that focuses holistically on how the environment impacts health. The program should move away from a reductionistic, biomedical approach and put a lower priority on individual level factors such as health behaviors and genetics with a focus on context. The program understand the importance of the social, physical and built environments in impacting and driving population, neighborhood, and individual level health. The program should fund work that assesses the intersectionality of environmental and social determinants of health, disproportionate burdens and impacts of land uses, environmental health hazards, and pollution on communities of color, poor and disadvantaged populations, marginalized and disenfranchised groups such as Native Americans and immigrant groups who all can be classified

as vulnerable populations. More work needs to be invested to research the impact of the environment on the health of susceptible populations such as children particularly children with underlying health conditions and elderly, indigent, and medically underserved populations. Elderly populations are particularly important because of the aging of baby boomers in this country.

This program should focus on funding research that performs more comprehensive exposure assessment that takes into account cumulative impacts and aggregate exposures for disparately burdened populations from multiple emission sources, across multiple pathways, and through air, water, and soil media. This research needs have the study and reduction of environmental health disparities as a primary focus. PEHP should fund research on the built environment, urban planning and transportation issues such as diesel exhaust, pollution and schools, pollution and birth outcomes and maternal health, neighborhood health (brownfields, green space, active living, physical activity, obesity, diabetes, cardiovascular disease, asthma, indoor air pollution). More funding should look at the impacts of climate change on air pollution levels and health risks of vulnerable communities. There is a strong need for NIEHS PEHP to fund goods movement research (ports, ships, diesel truck traffic, transportation hubs and expansion, railways/railyards) and related industries and emissions. In addition, more funding is needed for agricultural issues and rural health such as industrial animal production, pesticides, food safety and microbes, water pollution from runoff. NIEHS could partner with USDA and FDA on this work. More funding needs to be invested in research on natural, man-made, and technological disasters such as hurricanes, fires, floods, chemical spills, etc. NIEHS could work with NSF to fund this work. Additionally, there is a need for more work on the relationship between non-compliance with environmental laws by pollution-intensive facilities, or compliance in non-attainment or areas with heavy industries. and impacts on exposure, community health, and health disparities and also policy.

This program should definitely focus on traditional EJ issues such as landfills, incinerators, traffic pollution, Superfund sites, sewage treatment plants, coal-fired plants, chemical production facilities. In addition, this program should fund new areas of EJ inquiry in urban environments such as crime and violence, smart growth, sprawl, access to healthy food and public transit, fast food restaurants and liquor stores, parks, green space, etc and how these things drive chronic disease, air pollution levels, negative quality of life, and negative mental health outcomes.

This program should try to fund systems research, research that is ecological or multi-level in nature, and research that focuses on intervention, translation, dissemination, and replication. A major objective of this program should be more capacity-building, infrastructure development, and training for community-based organizations.

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54

Issues that should be address:

- \* Pesticide use in indoors
- \* Pthalates in home care, personal hygiene, and household products,
- \* Built environment and health
- \* Land use and health
- \* Policy implications of genome discoveries for environmental protection and regulation

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55

Scientific themes of existing health outcomes related to exposures in children, particularly neurological outcomes. Topics that are poorly understood by the public and also many nurses

consequences of exposure to lead, mercury, hazardous drugs (NIOSH – Alert), pesticides, cleaning agents, glutaraldehyde, formaldehyde. Since they are not educated by their employers or during their nursing education so this would be a great place to start as noted above.

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56

I don't know why everything wouldn't be on the table.

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57

Additional attention is needed in the investigation of complex health issues and conditions that are both affected by environmental exposures and affect the responses to them, in particular, obesity. This is a significant problem in the US that is not being completely or effectively addressed by current mechanisms. The NIEHS had an early opportunity to take lead on this issue, but it has not progressed. In addition to understanding how the changing parameters of obesity impact susceptibility to environmentally related diseases, like cardiovascular disease and cancer, there is also the arena of investigating and how and if education and translation of research results can impact this growing health problem in the US.

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58

I don't necessarily agree with restricting issues so long as the activity advances the goal and/or research in the field.

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59

Defer to others but include strong integration of environmental and health outcomes with specification of intermediate measures and markers

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60

\* Asthma, obesity(overweight), learning disabilities, endocrine disruptors, Exposures to carcinogens, built environment considerations

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61

More emphasis on global warming, sustainable food (especially in light of both global warming and the use of corn as a biodiesel), nanotechnology, effectiveness of alternative pest management for a range of pests (rats/mice, lice, cockroaches), neurotoxican exposures to the developmentally disabled community (in their homes and workplaces).

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62

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63

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64

The PEHP should be clear about how it is defining “environmental.” The environmental work of many agencies at the federal level stops short of exploring toxic chemicals and radiation while focusing solely on lifestyle exposures like smoking, diet and exercise. While all of these exposures are important, it is critical that we begin to study and appreciate the complexity of environmental public health and help the public understand that in almost all cases, health is determined by a combination of genetics and many environmental exposures. Themes that are important to cover are: complexity, interactions (synergistic and cumulative effects), low dose exposures, endocrine disruption, the importance of prevention (not detection and screening but truly preventing disease), epigenetics and precautionary approaches to public health.

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65

We need to keep looking at our young people to prevent them from getting cancer. What issues should NOT be addressed?

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66

Environmental links to breast cancer

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67

- \* Climate change and the health effects from it must be addressed in coming years. Particular attention should be paid to how populations with varied socio-economic backgrounds are affected and to note if there are any apparent health disparities resulting from climate change-related health outcomes.
- \* Effective outreach methods that effectively demonstrate the relationship between climate change and health should be addressed, especially for underserved populations and communities. -Enhance outreach to various audiences that show relationships between NIEHSs key research foci ? such as childhood asthma and obesity, heart disease/breast cancer factors. COEPs can enhance work with researchers in developing materials that show any existing relationships or correlations.

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68

Our project focuses on health disparities in the Latino community around asthma and obesity. We think that projects that address health disparities in both the Latino and African American communities are important. In Chicago, as in many other cities, there is a great deal of neighborhood segregation by race and ethnicity. Taking this into account when addressing issues of environmental exposure and opportunities for healthy food, physical activity and nutrition education, is important when developing effective policies that lead to improved health.

Less useful for us are surveys and data collection processes that don't result in a plan of action for addressing the disparities, issues and conditions that are uncovered in the survey/data collection process.

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69

Any. Different state partners have demonstrated different interests. In Utah, the interests have generally been around children's environmental health and particularly health disparities for children. For example, we have looked at the effects of road networks on asthma, leukemia, and birth outcome. We have also looked at birth defects and environmental hazards. Utah has also been very involved in methodology development and particularly the application of Geographic Information System (GIS) technology and methodology on the assessment of environmental health, exposure, and hazards.

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70

Some of the themes that should be addressed are: endocrine disrupters, the effects of mixtures of agents, methods for exposure assessment such as biomarkers, and especially global environmental health issues. Ones that should not be addressed are agents that are already known to be toxic such as pesticides and lead. These agents should be addressed in the context of finding alternatives and finding new ways to reduce exposures.

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71

Themes that should be addressed:

- \* Effectiveness of outreach activities
- \* Cumulative Risk
- \* Environmental Justice
- \* Comparison of standard risk-assessment activities and
- \* Activity-based risk-assessment.

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72

Theme:Continued support for translational research to better inform stakeholders, risk assessments, technology development and public policy.

Exposures: nanomaterials, PAHs, coarse particulate matter, residential use of insecticides

Health outcomes: asthma in children, relationship between obesity and response to environmental exposures, potential role of environment in ASD.

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73

The idea of cost-benefit, as presented in question 1, also applies here. If NIEHS can help environmental health professionals by developing tools and/or methods to address this issue, that would be an advancement for the profession.

Children's Environmental Exposures and resulting effects are important areas that need further exploration, especially since at the same exposure levels children may be affected differently from adults. Other emerging exposures and environmental health concerns include pharmaceuticals in the waterways and many different agriculture/animal related exposures in our food sources.

Current issues of interest to NEHA (and active NEHA programs) include: all-hazards preparedness - terrorism, indoor air quality, drinking water quality, onsite wastewater systems, emerging pathogens, swimming pools - recreational waters, environmental health research,

vector control, food safety and protection, water pollution, general environmental health, workforce development, hazardous materials and toxic substances.

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74

Important to address: The spatial distribution of health disparities, and their relationship to environmental stressors and health resources. The quantification of multiple exposures using methods with rigor but also with efficiency. The posing and investigation of a key central question: How much evidence, and what type of evidence, is sufficient to support policy interventions related to situations of high risk/high environmental injustice?

Do NOT address in this program: research into genetic or epigenetic factors that affect health risks - these should be done in another part of NIH, in another program, with the results of both programs integrated in a third program or through special integrative grants.

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75

The single most important theme is so what? We have established that farmworkers and their children are exposed to OP pesticides. We know that the take-home pathway is one cause of such exposure. What we don't know is what the deleterious effects of such exposure are. We need studies on the health outcomes of exposure to OP pesticides.

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76

Methods of quantifying cumulative impacts, and creating the data needed for cumulative impact assessment, are still in early stages of development, and could use more research. Air pollutants continue to be the most significant environmental exposure in our communities, and research that can be used for land use, zoning, and building code guidance is needed. The development of standards for counts of ultrafine particles would be valuable for communities that are close to freeways or other combustion sources that produce very high levels of ultrafines close to the source, whereas current air quality standards are based on PM2.5 mass. Indoor levels of mold, fungal spores, and fungal toxins also continue to be difficult to address because of the lack of standards for acceptable levels; this is another area where more research would be valuable. What issues should NOT be addressed? Research into gene markers of disease vulnerability seems to be getting more research attention than it should, based on estimates of the amount of disease that is related to genetic rather than environmental variables. In addition, this line of research is useful more for clinical treatment methods rather than public health approaches.

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77

To attain system-level change, it would be helpful for NIEHS to consider this type of program more of a governance topic. Data, methods, and investigator experience should be matched accordingly toward a governance-change agenda.

Rather than bio-medical systems, this would incorporate environmental governance systems.

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78

Again, since our primary area of focus is Brownfields, we would encourage NIEHS to consider exploring all of the environmental impact issues (i.e., research issues, health outcomes, etc.,) surrounding Brownfields projects.

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79

The issues to be addressed must be of great concern to the citizens of California, which could change rapidly (e.g. paints on children's toys, pancreatic cancer cluster in Northern California etc). The information specialist should be able to collect those quickly and disseminate those thorough the network established by this center. I would not set the main theme too rigidly at this stage.

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80

Sanitation, Infectious diseases, life style related problems, prevalent non- communicable diseases.

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81

The health and environmental issues of the mining district are always a top priority- especially Lead poisoning. Some other issues are diabetes and smoking since the rates are so high in the Tribal communities.

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82

Relationships between exposures and health should be the major priority. Study of animal models impacted by exposure should only be supported if there is a clear translation to human health. The research that NIH supports in terms of remediation is an example that's difficult to justify. Too often it is so far removed from actually improving health in any significant way, it's priority for NIEHS could be questioned.

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83

Focus on the efficacy of current environmental laws and policies to impacts on human health (i.e., results from the Clean Air Act in reducing asthma; removal of lead from gasoline in reducing blood lead levels; how tobacco control policy has reduced lung cancer).

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84

Themes: (1) Mixtures of exposures (the "real life" scenario); trying to identify interactions and overall effects due to exposures of different types, including interactions between genetic and lifestyle factors; (2) Better methods to "make sense" (biological, clinical, public health) of studies using emerging high-throughput technologies (SNP chips, microarrays, etc.) -- including emphasis on replication of results, but also greater emphasis on clinical importance of results (e.g., study identifies 20 important SNPs but it is difficult often to tell from a single reported study what the potential public health impact of having 2 SNPs would be)

Health outcomes: across the entire life course (not single outcomes) Do not address: single exposures or single outcomes in isolation (most exposures do not occur in isolation!)

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85

Building a house for the multi-chemically sensitive poses a unique challenge. Due to compromised immune systems, a hyper-sensitive individual can develop intolerance to the external environment around them. Once over sensitized, something that was once tolerable becomes toxic and causes an adverse reaction with subsequent exposures. A person with MCS lives with an intolerance to the environment because they have lost the ability to process everyday toxins. Research has shown that these people have defective redox systems and as a result, those who get MCS usually get a plethora of other chemically-induced health problems including porphyria, multiple sclerosis, autoimmune diseases, and neurological problems. In addition, the sensitivity variations from one person with MCS to another can be spectral; organic human biology is constantly reacting to the environment outside of the body. Therefore, it is necessary to develop as neutral a building envelope as possible that can be tolerated by a wide spectrum of chemical sensitivities. Numerous tests will be conducted in order to identify the correct composite of materials that not only meet innocuous, energy efficient, green standards but also present a tolerable atmosphere for people disabled by chemical sensitivities. It is crucial to build a house with a foundation of material that has the integrity to support the inclusion of non-toxic home furnishings and house hold products with low to no VOC. A building foundation or envelope that does not prevent the growth of mold cannot sustain a healthy quality of indoor living, making all other efforts ineffective.

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86

ANYTHING that affects the future of our country-infants and children should be addressed-oral health and its affect on pre-term labor, cavities..ANYTHING that is a cheap and effective prevention tool-like Xylitol, fluoride varnish for prevention of cavities, lead exposure, pesticide (home) exposure, bullying, drug prevention (successful school careers). BT already has its own funding stream and is easily accessible. PH should play a heavy prevention role in diabetes, obesity and other chronic disease primary and secondary-it should address what physicians and hospitals do not/cannot address. It should prevent hospitalization or 'crisis intervention' and re hospitalization-including injury prevention.

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87

I actually have the problem of being too broad in my issues. I think safe driving should be an NIEHS issue, as automobiles are the number one killer of children ages 1-15. I think of NIEHS as being separate from the other Institutes as the one that tries to understand the impact of the environment—be it exposure to toxins or putting the stairs in a reasonable location—on health. In “Kope’s World,” NIEHS investigators would study real environmental risks (what leads to more pancreatic cancer, diet or exposure to PAHs?) and ways to reduce AND COMMUNICATE those risks. The average lay person knows that smoking increases your risk of lung cancer. They don’t know that it increases your risk for many other cancers, as well.

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88

The information listed in 1 and 2 is needed for high priority pollutants, not those where exposures have diminished to levels that do not constitute high risk. Therefore, a need exists to prioritize such exposures; a suggestion is PM2.5, phthalates, perfluorinated chemicals, and certain phenols where some or even most human exposures in the US are very high today. Let us downsize research on Pb and PCBs, and leave them to the enforcement agencies to keep low.

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89

It is of critical importance that we understand how the role of the social as well as the physical environment impact health and how the interaction of the two may contribute to differential exposures to environmental hazards or protective factors, and that we understand how social inequalities may interact with environmental exposures to modify (exacerbate or reduce) their effects on health. We need to understand how income inequalities and racial inequalities (separately and together) influence exposures to environmental health threats as well as access to resources with which to protect health in the face of those threats. We need to examine how risk and protective aspects of the social and physical environment: a) may be more prevalent in some neighborhoods than others and why; b) may interact with other factors to compound the effects of exposure; and c) may result in greater exposure of some groups based on, for example, location, economic status, ethnicity. In order to gain this understanding, it is necessary that the communities experiencing these inequalities and health disparities be actively involved in identifying the issues and diseases of importance to their communities, and to work in partnership with scientists in conducting the basic and intervention research efforts required.

We also believe that research on the interaction of genetics with physical and social environment is an important area of research in all populations. However, we do express concern about undertaking research in this area without participation of community members in the research design, particularly with populations who experience social inequalities and who thus may be less powerful and more vulnerable to researchers' requests. Based on our discussions about including a genetic focus in our work, we suggest that conducting research that examines gene-environment interaction will be of greater research and ethical rigor if done through the use of a community-academic partnership approach that allows community participation in the research decision-making process.

Finally, we are, by the nature of our name, particularly interested in environmental factors affecting asthma and feel that while much has been learned in this area, much remains to be learned, particularly about threshold effects of exposures (e.g. PM, ozone), how those threshold effects interact with social environmental factors, and how these findings may be used to design individual, community and policy interventions to reduce asthma exacerbation.

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90

- Interactions between social and physical factors need to be investigated. This will require more social science collaboration.
- There needs to be more emphasis on intervention studies as these studies will lead to translatable results. Clinical practice guidelines require high quality intervention (trials) evidence to change clinical practice recommendations.
- Basic mechanistic studies are of lower priority.

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91

The most important goal of this program is prevention. The strategy is to warn people when to stay out of the water and when not to eat a fish.

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92

With regards to environmental health concerns, common environmental hazards and pollutants (including air pollution from fossil fuel burning, secondhand smoke, pesticides, toxic chemicals in consumer products,mercury, lead, and mold) are of utmost importance and ought to be addressed in this program. Of equal, if not greater, importance is a solid understanding of vulnerable life stages and the impact exposures to these environmental pollutants can have on human health. Thus developmental exposures are of primary importance (fetal through adolescent periods)

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94

Research on disproportionate exposure to environmental risks and disproportionate health disparities are very important to continue funding. In terms of scientific areas, biological and chemical exposure assessment should be addressed, as well as population based epidemiologic studies, toxicokinetics, and studies that help to identify susceptible groups. Exposures: Noise, endocrine disruptors, air pollution, pesticides, and in-utero exposures. Research on noise and its effects has been underfunded since President Reagan killed the Office of Noise Abatement and Control at U.S. EPA in 1982. (See <http://www.lhh.org/noise/archives/23-1/voice.html> ) American cities are getting noisier all the time, affecting sleep, student learning and concentration. The effects of noise on cardiovascular disease and other health outcomes should be a high priority for study, especially in the context of CBPR, since this is a very common concern of residents and teachers near airports, marine ports, rail yards, rail lines, and industry. Disease outcomes important to be addressed include the following illnesses and diseases : cardiovascular, neurologic, respiratory, endocrine disruption, developmental and reproductive effects, lifetime impact of in-utero exposures, immunologic disorders, allergic airway disease (including asthma), stress-related illnesses.

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95

Exposure to elemental mercury and mercury vapor as a result of its magico-religious use in Caribbean and Latino communities is an important environmental health issue that needs to be addressed by the Partnership for Environmental Pubic Health. Adverse health outcomes from primary as well as second-hand chronic exposure to mercury vapor need to be assessed and addressed. In 1997, the NIEHS journal, Environmental Health Perspectives, published a letter of mine on this subject, in which I wrote: “If the environmental health research community continues to ignore magico-religious mercury exposure, its health effects will never be ascertained.” (Wendroff, “Magico-religious Mercury Exposure” 105:3:March 1997 <http://www.ehponline.org/docs/1997/105-3/correspondence.html> ) Although several papers and

letters have been published in the learned literature to date, none of them has addressed the fundamental issue, namely: To what extent, if any, are occupied dwellings contaminated with mercury as a result of its ritualistic uses in Caribbean and Latino communities? Environmental Health Perspectives later published “Assessing Elemental Mercury Vapor Exposure from Cultural and Religious Practices” (Riley et al. 109:8: August 2001 <http://www.ehponline.org/members/2001/109p779-784riley/riley.pdf>); “Subcutaneous Injection of Mercury: “Warding Off Evil” (112:13 September 2004 <http://www.ehponline.org/members/2004/6891/6891.pdf>); and “Comparison of Indoor Mercury Vapor in Common Areas of Residential Buildings with Outdoor Levels in a Community Where Mercury Is Used for Cultural Purposes.” (Garetano et al. 114:1 January 2006 <http://www.ehponline.org/members/2005/8410/8410.pdf>). However none of these papers answered the aforementioned question.

Several biomarker studies looking for elevated urinary mercury levels attributable to ritualistic exposure have been performed, but none of them made a serious attempt to correlate mercury vapor levels in dwellings with biomarker UMLs. (“Mercury Exposure in an Urban Pediatric Population” Ozuah et al Ambulatory Pediatrics 3:1 January-February 2003 <http://www.mercurypoisoningproject.org/pdf/oct2003ozuah.pdf>); “Exposure assessment of young children living in Chicago communities with historic reports of ritualistic use of mercury” Rogers et al., Clinical Toxicology, March 2007; Rogers et al “Mercury Exposure in Young Children Living in New York City” Rogers et al Journal of Urban Health: Bulletin of the New York Academy of Medicine [late] 2007. Two of the three studies found children with high UMLs, but none of the three measured mercury vapor levels in the children’s homes.

The closest that researchers have come to making these measurements was a study by the New Jersey Department of Environmental Protection, which measured mercury vapor believed likely to be from its ritualistic use, not in occupied dwellings, but in public hallways into which Caribbean-Latino-occupied apartments opened into. (“Cultural Uses of Mercury in New Jersey: Research Project Summary” Stern et al. NJDEP May 2003 <http://www.state.nj.us/dep/dsr/research/mercury-cultural.pdf>; also in Garetano Op. cit.) This inconclusive investigation, after finding highly elevated mercury vapor levels emanating from thresholds of apartments, failed to even attempt to measure the levels inside the dwellings, or to inform the occupants of the risks they incurred from the elevated levels of mercury vapor detected.

The same neuropsychological assessment battery (or elements of it) as were and are employed in the Faeroe and Seychelles Islands studies of methylmercury exposure can be applied to measuring the neuropsychological and neuro-physiological sequelae of these domestic mercury and mercury vapor exposures, in order to elucidate in- utero as well as post natal damage.

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We recommend that the PEPH Program develop an overarching framework for its proposed work that emphasizes the interface between physical and social environmental exposures and their cumulative impact on low-income communities of color that are experiencing health inequalities. Such a framework would guide the development of research partnerships aimed at gaining an increased understanding of these exposures and the mechanisms through which they impact health disparities, and addressing these exposures through evidence-based interventions and policy changes to reduce and eventually eliminate health disparities. For example, a component of this framework might include the intersection between where people

live (literally) and the impact of other aspects of their environment on health (e.g., land use, air quality, built environment), that is, putting residential neighborhoods at the hub. Using such a broad framework as the overall guide for determining specific scientific themes, exposures and health outcomes to study, we suggest the following topics as priority areas to address: 1) cumulative health outcomes (e.g., asthma, CVD, diabetes) associated with poor air quality, including diesel exhaust; 2) the reduction of the impact of lead exposure and it's implications on health; 3) impact of hazardous waste sites and abandoned industrial facilities on community health; 4) impact of abandoned/vacant housing and the demolition of these houses on community health (e.g., asbestos, lead); 5) health implications of clean up of Browns fields sites and their use for community gardening/farming; and 6) the relationship between the social environment, built environment and green way development and health.

In addition to these specific research topic areas, we recommend that the PEPH Program's funding initiatives require the dissemination and translation of research findings into programs and policy. Such a requirement would go a long way in ensuring that the research conducted has an impact on improving health status and reducing health inequalities. Related to this point, we suggest the PEPH Program build in a health literacy component into its activities. Here again, improved health literacy will contribute to positive health outcomes in the communities most effected by the negative impact of environmental exposures.

Another area in which the PEPH Program could make a valuable contribution to the field is through supporting efforts aimed at enhancing the capacity of community, health care professional and academic/researcher partners to work together effectively to promote and advance partnerships for environmental public health. This could include the development of funding mechanisms to support training and capacity building efforts aimed at, for example, developing and maintaining successful community-based participatory research partnerships; and enhancing the competencies of community-based organizations to address environmental issues (e.g., through submission of grant proposals to NIEHS). In the latter instance, the PEPH Program might provide technical assistance to community-based organizations so that they may apply successfully for NIEHS funding.

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The most important direction to take in this program is to look at the intersections of race, gender, class, immigration, age and ability within the theme of environmental hazard exposure. It is critical that the issues addressed include addressing the root causes of the underlying inequities and does not focus exclusively on behavioral change as the mechanism to address environmental exposure. Additionally, programs should look at under-researched areas such as impacts on reproductive health and human development.

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100

An important need is the development of methods to evaluate the efficacy of programmatic interventions. Opportunities for building relationships outside of the usual paradigm for scientists and community representatives should be explored and followed. In this way the scientific community can benefit from questions and hypotheses which flow from community perception. The community partners urged focus upon people's welfare and not simply the production of scientific documents.

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101

Themes and outcomes

A. Development: Maternal-Child Interactions and Outcomes

(1) Diet and nutrition Poor diet contributes centrally to of a number of diseases (cancer, heart disease, diabetes, etc.) and surely contributes to others through interactions with toxic contaminants. For example, diet can be a source of contaminants (aflatoxins, lipid peroxides, Hg, PCBs). Diet can counteract contaminant-- dietary Ca antagonism of Pb absorption. Children in socioeconomically disadvantaged communities are disproportionately affected in many examples as described above. In some cases, research is needed; in all cases, science investigator-community communication needs to be strengthened to improve environmental health science literacy. NIEHS’s portfolio includes virtually nothing in the areas of childhood obesity and its consequences from an environmental health perspective. This may be the paramount health issue in the country. It needs a community participatory research and communication emphasis if prevention and intervention are to be successful.

(2) Neurobehavioral development The evidence is overwhelming that children develop in utero and during their early life in the midst of many neurotoxic compounds that may contribute to apparently increasing incidence of behavioral syndromes such as attention deficit disorder and autism. Particularly in brain development, it is likely that suppressed or modified development leads to later life neurological problems. Population studies need to understand the origins of neurological deficits.

B. Environment-Environmental Health

The SETAC symposium above was targeted in part to bridge the unnatural divide between research into the health of the environment and environmental health research focused on human disease. One of the speakers was the Director of Environmental Health at the Sixteenth Street Community Health Center, one of the oldest and best known community health centers in the country. His department focuses on brownfield and river restoration in the area of the clinic, on the state of Lake Michigan, and other issues that clearly fall under the generic heading of built environment. He does so because of the public health perspective that living conditions are a primary determinant of health. Two of our recent pilot projects connect clinicians who work on children’s health issues with environmental scientists who have expertise in assessing potential sources of contaminants related to these problems in aquatic systems. Public or community health has a natural interface with the health of the environment. The two areas have much to offer one another and should be encouraged to form research and communication partnerships.

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103

Health outcomes of most importance should include both exposure and early biomarkers of response. Sometimes we only focus on frank disease outcomes and yet prevention is so important for public health but require knowledge of early biomarkers of response. Our research has identified the need for risk-based models to answer the public health questions our Center receives regarding relevant endpoints concerning both fish consumption risks and

benefits. Focusing on these health outcomes will provide additional information that will help investigators pinpoint more exactly the optimal balance between fish consumption health risks and health benefits.

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104

The effect of reproductive and developmental toxicants on childhood diseases and conditions and problems that can persist into or emerge in adulthood have the greatest long-term impact. The most critical endpoints are: neurotoxic including behavioral, developmental, genotoxic, and endocrine because of their long-term and far-reaching effects on the health of current and future generations.

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105

Streamlining regulatory compliance associated with COI, IRB, and informed consent to allow these partnerships to proceed more fluidly. We are running into more and more frustration with the bureaucratic requirements that are more focused on protecting universities and funding agencies than in protecting communities and their rights. The lack of individual protection of information in the current consent process is pretty obvious to participants and we are sensing more and more backlash in terms of whether communities want to be burdened with this effort that is not truly protecting their interests. The process needs to be reevaluated, simplified, and truly just protect the rights and privacy of participants. It needs to be in terms participants can understand, and be of a length appropriate to the information asked. In other words – a 3 page consent for a 4-page survey needs to be reevaluated. Combined exposures and the role of exposure timing (in life-span), as well as modifying factors needs more assessment. A focus on rural vs. urban exposures and lifestyles and the unique characteristics associated with each. The potential protective factors that could emerge from such an assessment. Also, the unique exposures that occur in each of these populations even if the contaminants are similar. The choice of whether or not an issues is appropriate for this program is difficult to predetermine. I think it should rely on the defense of the idea by the group interested in exploring the question. A priori exclusion of particular research topics may limit the field's ability to grow. I think it is more important for the institute to ensure open-minding and creative composition on review panels to ensure the field is not limited by the basic research models.

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106

The NIEHS should take a lead in research and communication on the key environmental issue of our times: Energy, Climate Change and Greenhouse Emissions. In particular, NIEHS should focus on measuring and proposing controls for greenhouse emissions from urban, suburban, exurban and rural areas of the U.S. These would include baseline measurements of toxic air pollution in our cities. For example, after 9/11 when existing lead and other metal dust levels in New York City were measured (Caravanos, Weiss et al, Env. Res., 100/2, 159-172, 2006), the researchers found that baseline levels for the toxics did not exist for New York City; consequently, they were not able to assess whether the dust levels observed were typical of an urban environment or



were high due to emissions from the 9/11 event. Other assessments would include greenhouse emissions from hospitals and other incinerators and rural methane emissions. This research needs to first be conducted and databases established and shared with relevant constituencies in order to inform critical policy decisions needed to reduce U.S. greenhouse emissions. The NIEHS-WETP should be commended on the wide range of training subject matter it enables its grantees to cover in the current training programs, while keeping to the core mission of 1910.120 education and training.

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107

Too often major government agency and university databases under-estimate and under-value death, suffering, and solutions in local communities that have been determined to be low-income, minority, Native American, or environmental justice. Focus data collection, data analysis, and information dissemination to local impacted communities and high-risk residents. There is a pressing need for more research models aimed at local solutions rather loading local data into mega data-bases with emphasis on national research trends that support academic funding and publication for tenure tracks.

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109

- o Routinely include pregnancy outcomes in exposure and policy analyses.
- o Routinely include children/youth with special health needs as a population sector when investigating the impact of exposures.

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110

- a.) The needs of the affected population related to the health risk in their community.
- b.) Exposure to radon gases, contaminated ground water and contaminated cistern water caused by air releases.
- c.) Water quality.
- d.) Health education relevant to environmental exposures and medical monitoring results.
- e.) Improved health & environmental literacy among residents and local health care providers.

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112

In addition to Superfund hazards, weapons of mass destruction and pandemic flu, more attention should be focused on the effects of exposure to carbon emission, greenhouse gas,

and other related issues in keeping with the current trend on climate control and the effects of global warming.

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115

Air pollution and Respiratory diseases such as asthma, Noise and education, micro and chemical water quality issues, and occupational exposure.

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116

• Issues to address: Community Stressors, Causes of Poor Air Quality, Connecting the Environment to Our Health.

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118

Extent of exposure of various Superfund chemicals and health effects.

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119

There is a real lack of research and outreach and education that a) demonstrates the HUMAN HEALTH EFFECTS/IMPACTS (short and long term) effects of Global Change b) informs individuals what they can DO to deal with the incredible uncertainty associated with Global Change. Other areas of interest are: Oceans and Human Health, Water, mixed exposures (anthropogenic chemicals, natural toxins, microbes), and interactions between the physical and biologic environment.

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120

The scientific theme is to ascertain the impacts, composition, possible health related implications as a result of our activities as it specifically relates to water quality. TRES is designed to operate in this capacity at this time.

Water exposure and usage can have broad based implications. It would be up to the discretion of other concerned professionals on how to apply the information provided. There are certain indicators that water quality and its complex variables can and does have a negative affect on organic and biological organisms.

However, this all begins with creating awareness to reach the hopeful and positive objectives of our endeavors.

This, we hope, will be of interest to the NIEHS, and we will be able to utilize its support and resources.

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121

To measure changes in behaviors and also measure reductions in environmental exposures.

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122

Two of the schemes that are important to developing positive outcomes are 1) develop methods of communication for dissemination of the information to policy makers, 2) to develop a strategic plan with policy makers for addressing the public health concerns. Utilizing the effective leadership and research of all of the partners and collaborators is essential. For example, promoting the need to addressing cumulative risk assessments prior to allowing air quality permits, conducting a community risk assessment prior to approval of a new development, or defining the criteria for a "vulnerable Community" are regulations which can be modeled after current regulations or laws in other states.

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123

Asthmas, air and water pollution, lead, children's vulnerability to EH risks, and pesticides would be good topics to cover.

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124

- Awareness of how global trade impacts local environmental health (e.g. lead in candies and in toys, food safety- inappropriate fish-farming techniques).
- Climate variability, environmental change and security

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