NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES
HEALTH DISPARITIES STRATEGIC PLAN
for the
NIH Comprehensive Strategic Plan and Budget
To Reduce and Ultimately Eliminate Health Disparities

IC MISSION/VISION STATEMENT

The National Institute of Environmental Health Sciences (NIEHS) mission is to reduce the burden of environmentally associated diseases by defining:

* how environmental exposures affect our health;
* how individuals differ in their susceptibility these exposures; and
* how these susceptibilities change with age and time.

OVERVIEW OF THE IC STRATEGY FOR ADDRESSING HEALTH DISPARITIES

Health disparities exist between citizens of lower socioeconomic status (including minorities and other medically underserved citizens) and those more economically advantaged. Examples where health disparities exist include: shorter life expectancy, higher cancer rates, more birth defects, greater infant mortality, and higher incidence of asthma, diabetes, and cardiovascular disease. These health discrepancies involve increased morbidity and mortality rates associated with increased incidences of disease. The ways in which poverty and other factors create these health disparities are still poorly understood. There is increasing evidence that these groups are burdened with a disproportionate share of residential and occupational exposure to hazardous substances such as lead, PCBs, wood dusts, and air pollutants. Thus, both social and physical environmental exposures represent an important area of investigation for understanding and ameliorating the health disparities suffered by the disadvantaged of this nation.

The Congress and the Administration have committed the Nation to eliminating such disparities while continuing the progress we have made in improving the overall health of the American people. As the primary Federal agency responsible for supporting research, prevention, and training efforts to reduce the adverse health impact of environmentally related diseases, the NIEHS seeks to expand its leadership role in addressing such conditions in minority and socioeconomically disadvantaged populations and in developing tools and strategies that will prove effective in eliminating health disparities. Research on the influence of poverty, racism and toxic environmental exposures is encouraged by the NIEHS and forms a cornerstone of its strategic plan on health disparities. Moreover, the training and support of researchers in this field needs to be increased. The NIEHS is committed to supporting research activities aimed at lessening the environmental health consequences associated with disadvantaged socioeconomic status.

The three areas of emphasis for the NIEHS strategic plan to reduce and ultimately eliminate health disparities are:

- to increase the knowledge base on the role of the environment in health disparities through research;
- to improve health of minority and disadvantaged groups through targeted research on environmentally-related disease prevention;
- and to expand the capacity for health disparities research through infrastructure support and research training.

The initiatives outlined in this Plan represent new or expanded activities in these areas of emphasis. They complement the overall existing portfolio of NIEHS efforts relating to minority health and health disparities.

Public Input on the NIEHS Health Disparities Program

A series of regional workshops was sponsored by the NIEHS devoted to issues examining the relationships among poverty, pollution and health status, with a view towards developing a research agenda on socioeconomic status, environmental exposures and health disparities. These workshops were intended to generate ideas and stimulate discussion on research activities intended to drive: (1) the design of action plans to lessen the adverse health impact of hazardous environmental exposures on populations of low socioeconomic status, and (2) the development of research directions to enhance our understanding of how socioeconomic status and hazardous environmental exposures interact to contribute to disparities in health.

The workshops were structured such that most of the time was spent in breakout groups. They were attended by key experts from environmental health research backgrounds; community leaders actively involved in identifying community environmental health problems; national organizations with expertise in environmental health areas and a mission of improving the public health situation for all Americans; and health care providers.

Three workshops were held: in Oakland, CA, Baltimore, MD, and Chicago, IL. The topics addressed in these meetings included the following:

Air quality health risk issues
Lead and other heavy metal exposures
Agricultural occupational exposures
Border issues and environmental health risks
Community participation in research approaches
Methodology and evaluation criteria
Risk assessment
Funding: cross-cutting, trans-agency, public/private approaches
Multiple exposures and disease relationships
Threshold vs. gradient effect of SES on exposure and disease

Environmentally induced psychosocial stress and its impact on health
Accessibility/linkage to health care professionals (HCPs), clinics, health care delivery systems

Meeting reports were developed from all three meetings, and these reports and the comments from the meetings were considered in the development of many of the initiatives in this Strategic Plan. In addition, meetings, workshops and focus groups have been held for a number of the individual programs described in this Plan, including the Sister Study, the Uterine Fibroid Growth Study, the program on the Fetal Basis of Adult Disease, and others.

Area of Emphasis No. 1: Increase the Health Disparities-Related Knowledge Base Through Research

Rationale: Critical gaps exist in the base of knowledge concerning the role of environment in diseases and dysfunctions that disproportionately affect minority populations and the poor. The NIEHS has developed a series of programs and studies, either new (to be funded) or ready for expansion, which target some of the most critical areas and research needs. These efforts complement the ongoing NIEHS and NTP research programs focusing on environmental risk factor identification, risk assessment, and mechanistic research aimed at understanding how disease susceptibility and environmental exposures interact to affect human health.

Uterine Fibroid Growth Study

Rationale and Priority: Uterine leiomyomas, commonly called fibroids, are a major health concern for women of reproductive age, especially African American women. These non-cancerous (benign) tumors are present in the muscular wall of the uterus in up to 70% of all women and with highest prevalence in African American women. Even though they are benign, fibroids can cause problems such as heavy bleeding, pelvic pressure, severe cramping, pain, infertility, and miscarriage. Complications due to uterine fibroids are the major cause of hysterectomy in the United States and account for the about one-fifth of emergency hospital visits related to women s reproductive health.

Objective: The purpose of this study is to learn more about why some fibroids grow to become problems while others do not cause problems. This study has four specific aims. First, fibroid growth will be evaluated over time by MRI. Second, the relationship between fibroid growth and symptoms or outcome (i.e., surgery/no surgery) will be determined. Third, we will identify markers that may be related to growth. Lastly, we will examine the hormone and lifestyle factors that may be related to fibroid growth. It is hoped that the findings from this study will help us develop strategies to prevent fibroids in women at high risk for problems, or help us develop new therapies that may reduce the need for radical surgical procedures like hysterectomy.

Action Plan: Three hundred women with large and/or multiple fibroids will be recruited for this study. These women will have up to four study-related visits to a clinic at Duke or UNC

Medical Centers over a one-year period. Those visits will include a physical exam, collection of blood and urine samples, and magnetic resonance image (MRI) scans of their uterine fibroids. Participants will also be asked to complete an initial telephone questionnaire, followed by monthly telephone updates. Questions will be asked relating to medical, family, menstrual, pregnancy, and sexual histories and lifestyle. In the natural course of treatment for fibroids, some women decide with their physician to have surgery to remove their fibroids. If a women enrolled in this study decides to have surgery, we will ask their permission to collect and examine post-operative tissues; if the woman is having a myomectomy (removal of fibroids only), we will ask permission to remove a small piece (about the size of two peas) of normal uterine tissue for comparison to the fibroid tissue.
Timeline: Patient enrollment anticipated in April 2001. Study to be completed in three years.

Performance Measures: Enrollment of full complement of subjects; publications reflecting new knowledge of causes and risk factors for uterine fibroids.

Outcome Measures: Application of new information on leiomyoma risk factors to preventive approaches.

The Sister Study

Rationale and Priority: Breast cancer is the most common form of cancer in women in the U.S. The incidence of breast cancer has been rising in the U.S. over the last few decades. The age-adjusted incidence of breast cancer is highest in white and black women versus Asian women, but the highest age-adjusted mortality due to breast cancer occurs in black women in the age groups of 30-54 years and 55-69 years.

Objective: The Sister Study is a major, new NIEHS initiative to study genetic and environmental risk factors for breast cancer in a cohort consisting of 50,000 sisters of women who had breast cancer. These cancer-free women will be followed over time with periodic health updates. Those who do develop breast remained healthy to identify factors associated with increased cancer risk. The cancer-free sisters have about twice the risk of developing breast cancer themselves, presumably because they and their affected sister share many of the same genes and early life exposures. We anticipate that after 5 years of follow-up, 1500 women in the cohort will have developed breast cancer.

The Sister Study will be large and inclusive. It will enroll high numbers of minority and high risk women (e.g. African Americans and Latinas) to allow for investigation of group-specific risk factors.

Action Plan: Focus groups have been and are being held with women to determine interest in this study and barriers to participation. Information we gain will be used as we develop formal pilot studies to evaluate strategies for recruitment and data collection. We plan to recruit volunteers through a national campaign designed to maximize the inclusion of specific minority and high-risk women. Two focus groups have been completed one with sisters and one with

breast cancer survivors. Both groups of women were very supportive, informative, and enthusiastic about the study. Separate focus groups conducted with special sub-populations, including Latina and African American sisters, and a group of low socioeconomic status sisters have been competed. Design of data collection materials is underway and initiation of feasibility studies should shortly. The pilot phase involving recruitment of women in selected regions is expected to begin in the winter of 2001 with full-scale recruitment beginning in 2002.

Timeline:
Year 1 (FY2001) a planning year in which researchers are meeting with advocates and scientists form the intramural (NIH-wide) and extramural community, culminating in design for the study.
Year 2 (FY2002) development and pilot-testing; begin recruitment
Years 3-5 Recruitment and sample collection
Years 6-10 Follow-up and re-interview of subsets of cohort, ascertainment of new cases, collection of tumor specimens, storage and management of biological specimens.

Performance Measures: Tracking of enrollment; publications (adding to knowledge of causes and risk factors for breast cancer, especially in black women ages 30-69).

Outcome Measures: Incidence and mortality rates for breast cancer; application of new information on risk factors to preventive approaches.

Fetal Basis of Adult Disease

Rationale and Priority: Premature and small for term babies are at increased risk of neonatal and postnatal morbidity and mortality. Such outcomes are of increased incidence for socioeconomically disadvantaged populations in our society and represent a major U.S. public health disparity issue. No stage of life is as exquisitely sensitive to the impact of its environment as the embryonic and fetal phases of our life span. Fetal programming that involves instructional imprinting that modifies the potential of developing tissues and organs in response to negative environmental conditions can cause an effect on human health later in life. Such effects, in some instances, appears to be passed to first generation offspring . One form of fetal programming, for example, includes the socioeconomic-based health disparity based incidence of adult cardiovascular disease in England and Wales resulting from poor maternal nutrition during the pregnancy producing the affected adult. Research has shown that Low Birth Weight (LBW) and Intrauterine Growth Retarded (IUGR) babies weighing five pounds or less at birth had a two-fold greater risk of cardiovascular disease as adults. As a result of the Dutch Hunger Winter of 1944, which was instigated by a Nazi reprisal against the Dutch resistance during World War II, people undernourished during their first two months of their gestational development are now known to be three times as likely to be obese. Such people also encounter the increased co-morbidities associated with obesity. In particular, those undernourished during their last gestational trimester are more likely to have diabetes mellitus.

During development in the womb, there are critical periods of development that are exquisitely vulnerable to sub-optimal physiological conditions. These vulnerable periods occur at different times for different tissues. Fetal programming, depending on the gestional time of occurance, involves metabolic and cellular effects that can lead to several different structural changes in important organs. The placenta plays a key role in regulating the effector exposures that cause such programming and any consequent compensatory responses among the forming tissues and organs. Compensation carries a price. In an unfavorable environment, the developing baby makes attempts to compensate for deficiencies, but the compensatory effort itself often causes other deleterious effects, some of which are permanent. Moreover, attempts made after birth to reverse the consequences of fetal programming may have their own unwanted consequences. Problems may arise when postnatal conditions prove to be other than those for which the fetus prepared its life. Fetal cellular mechanisms often differ substantially from adult processes and fetuses react differently to sub-optimal conditions than do newborn babies or adults. Most strikingly, evidence suggests that the effects of programming may pass across generations to first-generation offspring by mechanisms not clearly understood that do not involve changes in the genes as well as those that do. Also, programming has different effects in males and females.

Objective: The NIEHS is planning an initiative to support research in this promising area - the fetal basis of adult disease. There are critical roles and timing of physiologic events such as the release and levels of critical hormones and growth factors necessary for signalling events, presence or absence of unnatural chemicals, and quantity and quality of nutritional status that play critically essential role(s) in a fetus' ability to develop the phenotype (expected trait) encoded in its genotype. Based on what we know, the list of diseases, conditions, and quality of life issues most likely to be affected by fetal programming is long, and includes Type II diabetes, cardiovascular disease, cancer, polycystic ovarian syndrome, asthma, obesity, allergies, infertility, depression, bipolar disorder, and exercise intolerance. Nutrition and nutritional deficiencies, as well as the absence of endogenous or exogenous source toxicants, probably play major roles in the prevention and development of environmentally related diseases, respectively. Alterations of receptors and signalling mechanisms is a common theme that underlies many of these diseases, especially since signaling mechanisms that initiate changes in differentiation are areas that could be targets for deleterious perturbations.

Action Plan: Phase I 2-year developmental awards will be made in early FY2002 with co-funding from the American Chemistry Council. An RFA for Phase II awards is planned for early 2002 with awards to be made in late FY2002. A program announcement to move the program forward from the RFA will likely take effect in FY2005.

Performance Measures: Awards made.

Outcome Measures: Publications adding to the body of knowledge about the fetal basis of adult disease.

Health Disparities in Exposures and Risks for Cancer and Birth Defects in the Semiconductor Manufacturing Industry

Rationale and Priority: Impoverished people and people of color in the U.S. have a greater burden of disease including increased mortality, cancer, birth defects, infant mortality, asthma, diabetes, and cardiovascular disease. Limited health care access may account for some of this disease burden, but other factors that contribute to this increased health burden are that they more often live in polluted environments and work in hazardous occupations. In "Silicon Valley", home to the semiconductor industry, 45% of the population is Latino and Asian Pacific Islander. Location of other plants are in economically depressed areas such as Burlington ,Vermont and Fishkill, NY. Although "Silicon Valley" invokes the image of "high tech", clean jobs, in fact laborers in the semiconductor industry deal with mixtures of highly toxic chemicals, many of which are known or suspected human carcinogens (including arsenic, benzene, cadmium, toluene, and trichloroethylene). Serious health consequences from such work are evident. For example, workers suffer from significantly greater numbers of illnesses and sick days than in other industry. Significantly increased rates of miscarriage, irregular menstrual cycles, and other associated reproductive problems are documented in women working in rooms where chips are fabricated and in the wives of male workers. Birth defect incidence maps show the highest rates of some major malformations in areas that house these plants. An additional growing community concern is the number of cancers in workers, family members and their children, including testicular cancer, brain cancer, breast cancer, endometrial cancer, uterine leiomyoma, and ovarian cancer. Thus, both workers and their families may be at an increased risk for disease either through primary and secondary occupational exposures or from environmental contamination from surrounding plants. Consequently, there is a critical need to determine whether these communities have an increased burden of cancers and birth defects because of their occupational or environmental exposures.

Objective: We plan to describe cancer incidence and birth defects incidence and types in these communities using retrospective case-control studies and prospective cohort studies.

Action Plan: Phase 1 of the study will focus on populations in San Jose, CA where the largest numbers of people of color are employed in this industry. Exposures will be assessed through questionnaires and biological samples of participants. Phase 2 of the study will incorporate sister communities where semiconductor manufacturing is the primary industry, and recruit workers and families in prospective studies. These studies will provide information to scientists and to the communities about exposures and risk for disease because of those exposures.

Timeline: Four years.

Performance Measures: Enrollment in Phase 1 and Phase 2.

Outcome Measures: Publications adding to the body of knowledge about health consequences due to exposures in the semiconductor industry.

Area of Emphasis No. 2: Improve Health Through Research on Disease Prevention Strategies/ Public Health and Translational Research

Rationale: Responding to the expressed desire of communities to better understand the effects and risks to human health from exposure to physical and social environmental agents, the NIEHS has assumed an increasingly important role in numerous public health issues. Communities are challenged daily to make decisions on the risk and benefits of agents that permeate their environments; however, there have been few programs designed to help prepare the public to face these tasks. Minimizing and preventing adverse health effects from environmental exposures requires some form of public outreach and education coupled with innovative research to develop solutions, train scientists and health care providers, and create new opportunities for careers in environmental health sciences. Consequently, there exists a critical need to establish sustainable mechanisms for educating the public about environmental health issues and for supporting individual and community involvement in the identification and investigation of environmental health concerns. Recognizing this gap, the NIEHS developed and supports a series of translational research programs that share the following three objectives:

1. Improve the understanding of how physical and social environmental factors affect human health.
2. Develop better means of preventing environmentally related health problems.
3. Promote partnerships among scientists, health care providers, and community members.

The NIEHS defines translational research as the conversion of findings from basic, clinical or epidemiological environmental health science research into information, resources, or tools that can be applied by health care providers and community residents to improve public health outcomes in at-risk neighborhoods. In addition, the NIEHS gives special attention to insure that the information disseminated is culturally relevant and understandable.

Treatment of Lead-Exposed Children Follow-Up

Rationale and Priority: Lead exposure and its sequelae have been and continue to be a problem that disproportionately affects urban poor minority children because of their exposure to lead paint and dust from old housing stock. Lead in the environment and its effects on human health is a matter of great societal concern. It has special importance to the health of children because it affects their development. These effects include impaired mental and physical development, decreased heme biosynthesis, elevated hearing threshold, and decreased serum levels of vitamin D. Of these effects, its neurotoxicity is of the largest concern, because evidence from a number of studies has shown that neurobehavioral outcomes, such as impaired academic performance and deficits in motor skills, may persist even after elevated blood lead (PbB) levels have returned to normal. The possible sources of lead exposure include leaded paint, gasoline, stationary sources, dust/soil, food, and water. For leaded paint, the potential number of exposed children under 7 years of age in all housing with some lead paint at toxic levels is about 12 million. An

estimated 5.6 million children under 7 years old are potentially exposed to lead from gasoline at some level. The range of children likely exposed to lead in dust and soil is estimated at 5.9 million to 11.7 million children. Some actual exposure to lead occurs for an estimated 3.8 million children whose drinking water lead level has been estimated at greater than 20 microgram/dl.

Objective: The goal of this research is to further evaluate cognitive function in a cohort of lead exposed (20-44 ug/dl BPb) children, some of whom received Succimer chelation when they entered the double blinded study between the ages of 18 to 33 months. In the original study they were last tested 3 years after their entry into the study. Consequently, no child was then over five years of age and some were younger. The results of this study do not indicate any enhancement in neurocognitive performance with Succimer. In the current study, these same children are being tested on their seventh birthday and when they reach 7 1/2 for cognitive, memory neurological and behavior issues because they are now capable of receiving more sophisticated testing to determine if the earlier succimer treated groups show any improvement in function over the untreated group. The results from this study will have important public health consequences for all lead-exposed children. If early chelation with Succimer mitigates the persistent effect of moderate lead-exposure, then this would be a major efficacious intervention in the treatment of moderate lead exposure. Currently, pediatricians have no clear guidelines as to whether to recommend chelation treatment for children who present with blood lead levels between 20 ug/dl and 45 ug/dl. In addition, this study is important as a response to the multi-faceted Lead Chelation and Nutrition Supplementation initiative for at least two areas of concern highlighted in Senate and House report language: increased participation of minorities in clinical research, including clinical trials, and the health and behavioral effects of lead exposure in inner-city children and on the health of minority women.

Action Plan: Children at four clinical centers who were enrolled in the original study and are currently approaching seven years of age and need to be enrolled for cognitive and neurobehavioral testing. Therefore, the clinical centers need to increase outreach and clinical efforts to support patient/family contacts and tracking. Support for the Data Coordinating is necessary so that the results generated by the clinical centers can be monitored and evaluated.

Timeline: There are two years remaining in the study.

Performance Measures: This has been a very prolific group and it is anticipated that a number of publications will be generated from the study.

Outcome Measures: The results of this study will determine whether chelation with Succimer has any validity in the treatment of children who present with blood leads between 20 ug/dl to 44 ug/dl.

Environmental Impact on Disparities in Asthma

Rationale and Priority: According to *Healthy People 2010*, rates of death, hospitalization, emergency room use, and disability from asthma occur disproportionately in certain age, gender, racial, and ethnic groups. For example, rates of self-reported asthma are higher for woman than men, for African Americans than whites, and for children and adolescents than for the general

population. Although the rate of asthma cases for nonwhites is only slightly higher than for whites, the rates for death, hospitalization, and emergency room use are more than two times the rates for whites. Emergency room use for asthma is especially high among inner-city patients with a history of severe asthma. Healthy People 2010 lists several reasons for these disparities, such as a lack of access to quality health care, a lack of financial resources and social support, and environmental exposures from tobacco smoke, allergens and other agents. Of particular interest to the National Institute of Environmental Health Sciences are exposures to indoor allergens from dust mites, cockroaches, pets, rodents, and fungi. Also of interest are exposures to bacterial endotoxin, which is a proposed asthma risk factor in certain populations. In inner-city children, it is believed that exposure to cockroach allergen is one of the most important risk factors for asthma. However, the effects of exposure to other allergens and endotoxin on asthma development and/or severity in inner-city children remains largely unknown. Effective and inexpensive methods to monitor and reduce allergen levels in homes have not been thoroughly studied. Moreover, the impact of monitoring and reducing allergen levels on the incidence of and morbidity and mortality from asthma has yet to be demonstrated. This program has extremely high priority in light of the worrisome trends in asthma prevalence, morbidity and mortality over the last decade.

Objectives: The objectives of this program are three fold. The first objective is to evaluate the relationship between exposure to indoor allergens and endotoxin, and the development of allergic sensitization and asthma in the U.S. population. Previous studies have been limited to small study populations or narrowly defined geographic areas and have not examined a nationally representative sample. The relationship between allergen/endotoxin exposure and disease will be examined in the U.S. population as a whole and according to household characteristics, such as race, ethnicity, and income. The second objective is to test the effectiveness of methods to monitor and reduce allergens and endotoxin in homes. Currently, home kits, being developed by private companies, will allow residents to test for and monitor the presence of allergens in the home. Of particular focus will be the use of these kits by low-income and inner-city residents as part of an overall strategy to lower allergens in their homes. Practical and inexpensive methods to mitigate allergens and endotoxin in low-income housing will also be developed and tested. The third objective will be to examine the impact of home monitoring and allergen reduction strategies on lowering the incidence, morbidity, and mortality of asthma.

Action Plan:

- Develop an NIEHS proposal and study protocol for the inclusion of allergy skin testing, indoor dust sampling, and immunological assessment in the National Health and Nutrition Examination Survey (NHANES). The NHANES, conducted by the National Center for Health Statistics, is now repeated annually on a representative sample of the U.S. population. The proposal will request that the study be conducted for at least three consecutive years. The study will allow for 1) the assessment and monitoring of allergen exposure in the U.S. population and subgroups of the population and 2) the study of the

relationship between allergen exposure and asthma in the U.S. population and subgroups of the population.

- Develop and implement studies that will evaluate the effectiveness of home kits for testing allergen levels in their own homes. The role of these kits in influencing residents to implement and comply with allergen reduction strategies will be evaluated. The effect of household characteristics, such as race, urbanicity, and income will be examined.
- Develop and implement the Environmental Intervention in Primary Prevention of Asthma in Children (EIPPAC) study that will evaluate the impact of home allergen monitoring and the implementation of allergen reduction strategies on asthma incidence, morbidity, and mortality. High risk households - households with asthmatic members and minority and low-income households - will be studied. The EIPPAC will be a six-year prospective clinical trial.

Timeline: The NIEHS protocol for NHANES will be proposed to NCHS during 2002 for inclusion into NHANES 2003-2005. Studies that evaluate the effectiveness of home monitoring and reduction of allergens will be conducted from 2002-2006. The EIPPAC study will be conducted from 2002-2008.

Performance measures: The performance measures will be the completion of protocols, implementation of NIEHS protocol into the NHANES 2003-2005, implementation of the EIPPAC study, implementation of the allergen monitoring and intervention studies, and publication of results from these studies in high quality peer-reviewed journals.

Outcome measures: The outcome measures of interest are 1) the prevalence of clinically significant levels of indoor allergens (dust mite, cockroach, cat, dog, rodent, and fungi) and endotoxin by household characteristics, and 2) asthma incidence, prevalence, morbidity and mortality.

Community-Based Participatory Research

Rationale and Priority: This initiative aims to implement culturally relevant prevention/intervention activities in economically disadvantaged and/or underserved populations adversely affected by an environmental contaminant. It is intended not only to foster refinement of scientifically valid intervention methods but also to strengthen the participation of affected communities in this effort. Community-based prevention/intervention research thus seeks to expand our knowledge and understanding of the potential causes and remedies of environmentally related disorders, while at the same time enhancing the capacity of communities to participate in the processes that shape research approaches and intervention strategies. Given the complexity and magnitude of environmental health problems, research endeavors aimed at improving our knowledge of and ability to resolve these issues can benefit from establishing collaborative relationships with the communities experiencing these problems. Such community-research partnerships have benefits for both the researcher and the community. These partnerships can, for example, facilitate the definition of important environmental health issues and concerns, the development of measurement instruments that are culturally

appropriate, and the establishment of trust that will enrich the value of data collected.

Objective: The long-range goal of this program is to improve the knowledge and behavior of disadvantaged or underserved community members regarding prevention, detection, and treatment of environmentally related diseases and health conditions, and thereby reduce incidence and mortality rates of such diseases and conditions.

Action Plan: Research projects are conducted in a manner that reinforces collaboration between community members and research institutions. Relevant results are disseminated to the community in clear, useful terms. Moreover, these studies are designed to be culturally appropriate, i.e., due consideration is given to the social, economic, and cultural conditions that influence health status. Identifying and incorporating unique cultural factors into intervention strategies may result in increased acceptability, use, and adherence. This approach seeks to maximize the potential for change in knowledge, attitudes, and behavior. Only through realization of this final leg of the NIEHS mission, i.e., communication and partnership formation, can we ensure that research findings reach and are made relevant to affected individuals and communities.

Timeline: In addition to the existing awards, reannouncement of the CBPR program is planned for FY2002 with the additional awards to be made in FY2003.

Performance Measures: Funding of new awards plus ability of program to attract and foster collaborations between researchers and communities or community-based organizations.

Outcome Measures: Publications/generation of new knowledge about environmental risks and disease prevention strategies.

Environmental Justice: Partnerships for Communication

Rationale and Priority: Prominent among the goals of NIEHS is support of research aimed at achieving environmental justice for all populations. Assays of the health effects of environmental pollution, as well as regulations based on such assays, are often performed with little or no input from affected communities. Hence, the purpose of this program, "Environmental Justice: Partnerships for Communication," is to institute mechanisms to bridge this crucial communication gap so that the communities involved have a demonstrable role in identifying and defining problems and risks related to environmental health and in shaping future research approaches to such problems.

Objective: The primary objective of this program is to establish methods for linking members of a community, who are directly affected by adverse environmental conditions, with researchers and health care providers. Development of community-based strategies to address environmental

health problems requires approaches that are not typically familiar to the research and medical communities. The distinctive needs of individual communities and their inhabitants are rarely considered in identifying environmental health problems and devising appropriate medical intervention tactics. This program is designed to develop new modes of communication and to ensure that the community actively participates with researchers and health care providers in developing responses and setting priorities for intervention strategies.

Action Plan and Timeline: A new round of awards was recently made for this program. Within the next five-year period, additional awards are planned.

Performance Measures: Ability of program to attract and foster collaborations between researchers and communities or community-based organizations.

Outcome Measures: Outcomes will be tracked based on local issues and concerns.

Centers of Excellence for Health Disparities Research

Rationale and Priority: Disparate environmental exposures contribute to disparate health outcomes in socioeconomically disadvantaged and/or minority populations in the United States. Exposures to airborne toxics, chemical pollutants, heavy metals, radiation and pesticides can be occupational or residential as well as in recreational areas, schools and day care centers. Additionally, exposures can be social, cultural or behavioral in nature and have profound and additive effects on adverse health outcomes in combination with one or more of the listed physical exposures. Thus, physical and social environmental exposures represent an important area of investigation for understanding the health disparities suffered by the disadvantaged of this nation.

Objective: The NIEHS plans to support establishment of Centers for Health Disparity Research and Intervention. These Centers will focus on specific exposures that lead to disparate adverse health outcomes in low socioeconomic and/or domestic minority populations. Additionally, they can focus on specific disparate health outcomes and the exposures that influence them. Adverse health outcomes may include reproductive disorders, low birth weight and infant mortality, cognitive and/or neurodevelopmental disorders, autoimmune diseases, or any number of a broad range of health outcomes that have disparate incidence, severity and associated mortality. Projects at these Centers will be thematic and multidisciplinary in nature. It is envisioned that Centers would support one or two biomedical research projects, a behavioral or social science research project, and a community-based research (CBR) project. The CBR project could address prevention/intervention, etiology, or exposure/risk assessment. These Centers will thus elucidate roles, contributions, and interactions of SES, social, and physical exposures to disparities in health outcomes and enable implementation of interventions to alleviate such disparities. NIEHS will actively engage other ICs and HHS agencies in the planning and

implementation of this initiative to make it a trans-NIH and -HHS activity.

Action Plan: Establishment of the first Centers in FY2003.

Performance Measures: Ability to attract applications and make awards to teams of multidisciplinary researchers with community-based collaborative partners and outreach efforts.

Outcome Measures: Publications/generation of new knowledge of disease causation and disease prevention strategies. Specific disease/exposure areas will be dependent on the research focus of the individual Centers.

Area of Emphasis No. 3: Expand Capacity for Health Disparities Research

Rationale: An important part of the effort to understand and reduce health disparities is the ability of minority-serving institutions and minority investigators to conduct state-of-the-art research. This ability depends both on the establishment and enhancement of biomedical research capacity at minority-serving institutions as well as the development of talent in science, engineering and mathematics among minority and disadvantaged youth to serve as a pipeline for future investigators. The NIEHS is supporting several key initiatives in this area of emphasis.

Advanced Research Cooperation in Environmental Health

Rationale and Priority: The National Institutes of Health (NIH) has initiated many programs over the past twenty years to assist minority-serving institutions to develop the scientific resources necessary to participate in the NIH research mission. Although there have been successes, investigators at minority institutions have not in general been able to compete as well as all would like for funding from mainstream NIH research programs. These investigators represent a pool of scientific talent that will be a critical part of the effort to understand and reduce health disparities. NIEHS therefore believes there is a critical need for a focused program to increase participation of minority schools and investigators in the health research mission of the Institute.

Objective: To address the need for increased minority participation, the NIEHS has developed the Advanced Research Cooperation in Environmental Health (ARCH) program, which focuses on establishing research partnerships between investigators at Research Intensive Universities (RIUs) with significant environmental health sciences research and investigators at Minority-Serving Institutions (MSIs) with a strong interest in such research.

The ARCH grant is a mechanism for support of a broadly-based research program involving investigators at Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs) or Tribal Colleges, with established investigators at RIUs. It is intended to facilitate sharing of knowledge and common resources. The goal of the ARCH grant is to establish a group of investigators at an MSI that can successfully compete for NIH/NIEHS

Research Project Grant (RPG) support, typically R01 grants. To achieve this goal, ARCH grants provide support for a broadly based multi-disciplinary research program that has a well-defined central research focus or objective. The NIEHS envisions the support received from the ARCH grant as the foundation necessary for achieving the above stated goal. It is anticipated that MSI scientists will compete for other types of NIH/NIEHS grants during the period of ARCH funding as part of the overall strategy for this effort.

Action Plan: In addition to the existing programs and new awards being made in FY2001, an expansion of the program is planned for FY2003.

Performance Measures: Ability of program to attract and foster collaborations between minority institutions and research intensive institutions.

Outcome Measures: Tracking success of researchers from minority institutions in competing for overall NIH research funding.

Meyerhoff Scholars Program

Rationale and Priority: The Meyerhoff Scholars program is a partnership based at the University of Maryland/Baltimore County and designed to increase the number of underrepresented minorities who pursue graduate and professional degrees in science and engineering. The Meyerhoff students have achieved higher grade point averages, graduate in science and engineering at higher rates, and gained admittance to graduate schools at higher rates than multiple current and historical comparison samples. Student survey and interview data revealed that a number of program components were viewed as especially important contributors to students' academic success: Program Community, Study Groups, Summer Bridge Program, Financial Support, Program Staff, and Research Internships and Mentors.

Objective: The objective of the program is to incorporate multiple components to address the broad range of factors linked to minority student success: academic and social integration, knowledge and skill development, support and motivation, and advising and monitoring. The immediate goal of the program was to effect substantial increases in the performance of qualified Black students in science, engineering and mathematics courses, in completion of majors, and in entrance into science and engineering graduate programs.

Action Plan: The program incorporates many different components: financial aid, recruitment, a pre-freshman year Summer Bridge program, establishment of study groups, program values, program community, personal advising and counseling, tutoring (both by and for Meyerhoff students), summer research internships, mentoring, involvement of students= families, and community service. Currently, between 40 and 60 Meyerhoff students are selected each year from over 1,400 nominations and applications from across the nation.

Timeline: The program is in its second 5-year agreement with NIEHS, slated to end in FY2004.

Funds for FY2000 and 2001 included $100,000 per year from NCMHD plus $500,000 per year from NIEHS.

Performance Measures: Surveys and interviews with Meyerhoff students to determine which components of the program are most important; interviews to ascertain faculty perceptions of program impact on their departments and on the university.

Outcome Measures: Assessment of academic outcomes for cohorts of Meyerhoff students, including bachelor-level retention and graduation rates in science and engineering majors; science and engineering GPA; overall GPA; and science and engineering graduate and professional school admission rates for Meyerhoff and comparison students.

Model of Institutional Excellence: The Ana G. Mendez University System, Puerto Rico

Objective: The goal of Ana G. Mendez University System (AGMUS) in Puerto Rico has been to prepare under-represented, low-income minority students for further doctoral-level training and careers in the biomedical sciences.

Action Plan: The support for this program will be used to strengthen biomedical sciences training at the AGMUS Universidad Metropolitana (UMET) in the following areas: student scholarships; undergraduate research; curriculum and faculty development in the Biology, Cellular and Molecular Biology, and Chemistry Programs; laboratory equipment; and student support (mentoring and tutoring services for sciences students). This support is managed as a supplement to the existing NSF Model Institutions for Excellence (MIE) Project at UMET.

Timeline: Year-to-year support for students and student research capacity. Support for this program began in FY2001.

Performance measures: Numbers of students supported by scholarships; number of undergraduate research projects supported.

Outcome measures: Assessment of academic outcomes for UMET students, including retention and graduation rates, GPA, and admissions rates into science and engineering graduate and professional programs.

NIEHS Health Disparities Budget
(Dollars in Millions)

Institute/Center	FY 2002			FY 2003		
	Research	Infrastructure	Outreach	Research	Infrastructure	Outreach
NIEHS	$25.50	$8.50	$0.00	$30.80	$10.30	$0.00