Concept Clearance

Concept Title: Superfund Hazardous Substance Research and Training Program

Strategic Plan Goals:

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Introduction

As part the NIEHS, the Superfund Hazardous Substance Research and Training Program [the Superfund Research Program (SRP)] was created under the Superfund Amendments and Reauthorization Act (SARA) in 1986. Under SARA, Congress authorized the NIEHS to develop a university-based program of basic research and training grants to address the wide array of scientific uncertainties facing the national Superfund Program. The SRP was also designed to complement existing activities related to hazardous substances and human health and the environment within the U.S. Environmental Protection Agency (USEPA) and the Agency for Toxic Substances and Disease Registry (ATSDR). The scientific parameters under which the SRP operates were included in the SARA legislation, which mandates that the research funded by the SRP should include development of (1) advanced techniques for the detection, assessment, and evaluation of the effect on human health of hazardous substances; (2) methods to assess the risks to human health presented by hazardous substances; (3) methods and technologies to detect hazardous substances in the environment; and (4) basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances. To accomplish these mandates, P42 Centers consist of interdisciplinary research teams with expertise in biomedical science as well as environmental science and engineering to advance knowledge using innovative and integrated approaches. Centers are also expected to facilitate transfer of research findings through coordinated data management and analysis; engage communities with prevention/intervention strategies; share findings to broader audiences; and train the future generation of scientists.

Since the first Centers were funded in 1987, the SRP has continued to evolve, both structurally and scientifically, introducing key components that are now required and in place to help enhance the impact of the science emerging from the program. These components include a Community Engagement Core (CEC), Research Translation (RT) activities, a Research Experience and Training Coordination Core (RETCC), and most recently, Data management and Analysis Core (DMAC). In addition to these required cores, each center consists of at least two biomedical research (BMR) and two environmental science and engineering projects (ESE). In the last iteration of this RFA, Centers were limited to 11 components and could request a budget up to $1.75M.

Research Goals and Scope

To achieve the mandates described above, the SRP uses the P42 mechanism for multi-disciplinary Centers that integrate biomedical research (BMR) with related environmental science and engineering (ESE) research with unique scientific themes developed by the research team. The biomedical projects address human health-related implications of hazardous substances (e.g., toxicology, epidemiology, mechanistic studies, genetic susceptibility, computational toxicology, biomedical engineering, preclinical/clinical intervention, or efficacy of prevention studies). The ESE projects address questions concerning hazardous substances (e.g., remediation, geochemical, ecological, civil/environmental engineering, geology, microbiology, fate and transport studies, hydrogeology, and detection sciences). In addition, recent iterations of the RFA require that at least one of the environmental science and engineering projects supports the fourth mandate.

To maximize the impact of the research projects, the SRP requires various Cores within a Center. For instance, the Center's Administrative Core, which contains a research translation function, fosters collaborative communication to Center stakeholders and coordination with each project to connect with and identify potential end- users. The CEC builds capacity within communities through bi-directional partnerships to develop best practices and engagement activities for prevention and intervention consistent with SRP's fourth mandate "basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances." The Data Management and Analysis Core (DMAC) supports the management and integration of data assets across the Center. The Research Experience and Training Coordination Core promotes training and mentoring of the next generation of multi-disciplinary researchers. These cores are considered an asset to multi-project Centers in achieving a longstanding impact on awareness of environmental risks and methods of prevention. The SRP expects that each Center will foster integration between projects and cores while addressing a Superfund-relevant environmental health problem; therefore, specific emphasis is placed on interactions between the BMR and ESE research projects.

In line with the NIEHS and SRP Strategic Plans, SRP Centers are also expected to tackle complex biomedical and environmental science and engineering issues identified by stakeholders, bringing a mechanistic understanding to solve some of the vexing problems associated with Superfund. As problem-solving research seeks to find answers to inform real-life exposures – both in terms of understanding health implications as well as developing remedies for these exposures - interdisciplinary teams are expected to work together to identify research that addresses relevant exposure pathways. The SRP firmly supports trans-disciplinary research, through the synthesis and extension of disciplinary boundaries that adapt technologies and approaches from one field and apply them to other fields to solve challenging environmental health problems. As such, forward-looking or ‘‘anticipatory’’ research is critical to identify and address future stakeholder needs and centers are expected to integrate between projects and cores, striving for a systems approach, where sustainable solutions that consider environmental, social, and economic issues are considered in problem-solving.

Mechanism and Justification
We are proposing that the Superfund Hazardous Substance Research and Training Program, referred to as Superfund Research Program Centers, continue using the NIH P42 Grant mechanism described by the NIH Mechanisms Table as follows: *"This mechanism supports basic research directed towards understanding and attenuating the public health effects resulting from exposure to hazardous substances, including 1) advanced techniques for detection, assessment and evaluation of the effects on human health of hazardous substances; 2) methods to assess risks to human health presented by hazardous substances; 3) methods and technologies to detect hazardous substances in the environment and 4) basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances. This special program, authorized under Superfund legislation, is for a broadly based, multi-disciplinary research effort which must include biomedical research components and which may include research components related to engineering, hydrogeology, ecology and epidemiology so long as they are linked to basic biomedical science. Each research project is generally under the leadership of an established investigator. The grant can provide support for certain basic resources used by the groups in the program (cores), including an administrative structure for effective coordination."* The intent is for the continuation of Research Experience and Training Coordination, Community Engagement and Data Management and Analysis Cores, and activities structured around research translation.