STRATEGIC GOAL 4:
Enhance the Capacity and Productivity of the Nation's Health Science Research Enterprise

HHS recognizes the important role research plays in improving the Nation's health. As a result, many of the strategies that HHS has identified as important components in achieving its other strategic goals also incorporate a research base. This strategic goal, therefore, focuses on creating the underlying knowledge and strategies that improve and maintain the research infrastructure to produce advances in health science.

HHS is committed to advancing the understanding of the environmental factors that contribute to human disease. In order to accomplish this objective, HHS will continue to support basic, clinical, and applied biomedical and behavioral research with stringent peer review for scientific quality of research proposals. HHS will also develop and implement processes for setting research priorities that ensure that research is responsive to public health needs, scientific opportunities, and advances in technology. HHS places a high priority on improving the coordination, communication, and application of health research results.

Three programs from the National Institutes of Health (NIH) are highlighted in this strategic goal, including Culturally Appropriate Stroke Prevention Programs for Minority Communities, Evidence-based Treatment Approaches for Drug Abuse in Community Settings, and Knowledge Base on Chemical Effects in Biological Systems (CEBS).

HHS commitment to enhancing the capacity and productivity of the Nation's health science research enterprise is demonstrated in many ways. Stroke is the third leading cause of mortality in the United States and the leading cause of adult disability, but the burden of stroke is greater among racial/ethnic minority groups by virtue of its higher incidence and mortality in these populations. NIH is conducting stroke prevention research projects to include community-based interventions, epidemiology, and/or outcome measures, to ultimately lead to the identification of effective stroke prevention and intervention strategies for a variety of community settings. One important tool to treat substance abuse is behavioral intervention, which has been shown to be effective in improving drug abuse and drug addiction outcomes. NIH is working to more rapidly bring research-based treatments to communities by adapting three treatment approaches for testing in community-based settings. The development of CEBS shows the great strides being achieved in HHS. Investment in this research will provide important information for identifying toxic substances in the environment and help to treat people at the greatest risk of diseases caused by environmental pollutants or other toxicants.

Highlighted Programs

- 4a: NIH Culturally Appropriate Stroke Prevention Programs for Minority Communities
- 4b: NIH Treatment for Drug Abuse in Community Settings
- 4c: NIH Knowledge Base on Chemical Effects in Biological Systems

Significance
Stroke is the third leading cause of mortality in the United States and the leading cause of adult disability, but the burden of stroke is greater among racial/ethnic minority groups by virtue of its higher incidence and mortality in these populations. For example, African Americans have almost twice the risk of first-ever strokes compared to whites, and have higher death rates. Stroke is the fourth leading cause of death among Hispanics, and this population is particularly susceptible to hemorrhagic (or bleeding) strokes. For American Indians/Alaska Natives, the relative risk is almost 2 times higher at ages 35-44, 1.3 times higher at ages 45-54 and 1.5 times higher at ages 55-64. In fact, many minority populations have higher death rates from bleeding strokes than do whites. Both African Americans and Hispanic Americans also have a high prevalence for many comorbid health conditions that raise the risk of stroke, including high blood pressure, overweight, and diabetes. Eliminating health disparities, including stroke, is one of the Healthy People 2010 stated goals, the disease prevention agenda for the Nation.

Racial/ethnic variations in stroke-related risk factors and utilization of health care are not fully understood. Prevention programs are a preferred strategy for reducing or eliminating racial/ethnic disparities in stroke. By collecting much needed stroke-related epidemiological data in racial/ethnic minority communities and conducting stroke prevention research projects to include community-based interventions, epidemiology, and/or outcome measures, this performance goal will ultimately lead to the identification of effective stroke prevention and intervention strategies for a variety of community settings.

The success of this program will benefit society by eliminating or reducing the racial disparity between minority groups and whites in potential life-years lost. Benefits are also expected in reduced health care expenditures and lost earnings.

Performance Measure	Fiscal Year 2006		
	Target	Actual	Result
By 2010, identify culturally appropriate, effective stroke prevention programs for nationwide implementation in minority communities.	Establish the infrastructure for a pilot Alaska Native Stroke registry that will facilitate identifying risk factors and strategies to improve stroke prevention and quality of stroke care provided to Alaska Natives.	Established Alaskan Native Stroke Registry, began enrolling patients	Met
Data Source: Grant number U01NS048069, "Alaska Native Stroke Registry"			

Result Analysis
The program's FY 2006 annual target was met when NIH awarded funding to the Alaska Native Medical Center for an Alaskan Native Stroke Registry in September 2005. This registry builds on the Medical Center's extensive experience with chronic disease registries and will provide critical information on the disparity in stroke mortality. A Scientific Advisory Committee for the registry project has been formed and has met five times. This committee has developed a list of data elements pertinent to Alaskan Natives that live in a rural setting, including culturally unique risk factors. A web-based data collection tool has also been created. The registry began entering patient data on October 1, 2005. As of June 2006, 71 patients had been enrolled in the registry.

Trends	Fiscal Year Actual				
Performance Measure	2002	2003	2004	2005	2006
By 2010, identify culturally appropriate, effective stroke prevention programs for nationwide implementation in minority communities.	N/A	Established seventeen Nursing Partnership Centers to reduce health disparities, including stroke, which link research-experienced nursing schools with minority-serving nursing schools across the nation.	Established acute stroke care center serving a minority community in Washington, DC metropolitan area.	Established research infrastructure and advisory committees, and hired director for Stroke Prevention and Intervention Research Program.	Established Alaskan Native Stroke Registry, began enrolling patients

Data Collection
A Scientific Advisory Committee (SAC) composed of the Principal Investigator, the Nurse Coordinator, and local experts assisting the project will meet at least quarterly to discuss the project and make sure that performance targets are met. Minutes from these meetings will be forwarded to the NIH staff and the Program Advisory Committee (PAC). The PAC is made up of national experts in stroke, epidemiological research, and NIH staff. The PAC will meet yearly to evaluate the Principal Investigator and the SAC, help set new appropriate performance targets, and assess the direction of the overall project. A yearly PAC report will be created for the Principal Investigator and Institutional Officials suggesting ways to improve the performance of the project and move the science forward. Based on the recommendations by the PAC, the Principal Investigator will create new performance targets in the form of an implementation plan that will be placed the notice of grant award for the subsequent fiscal year.

Completeness
Both active and passive case surveillance (e.g., review of hospital logs, review of hospital discharge diagnosis codes, community surveys) will be used to identify patients within the Alaska Health Care System. Patient data will be entered into a web-based registry for purposes of case management and quality improvement. Once the data are complete, patient identifiers are removed and the data is moved to a separate, pooled data set used for epidemiologic and research purposes.

Reliability
NIH program staff evaluates the performance of this program based on the quarterly SAC minutes, yearly PAC meetings, PAC recommendations, and yearly non-competing progress reviews.

4b Treatment for Drug Abuse in Community Settings
National Institutes of Health (NIH)

Significance
The total costs of drug abuse and addiction (including tobacco, alcohol, and illicit drugs) to our Nation are almost $524 billion, including health care expenditures, lost earnings, and costs associated with crime and accidents. Without alcohol, the cost is approximately $338 billion. Although research has demonstrated that drug abuse treatment can be effective in reducing drug use and addiction, few research-based interventions have been developed and tested widely within the health care field.

One important tool to treat substance abuse is behavioral intervention, which has been shown to be effective in improving drug abuse and drug addiction outcomes. This performance goal is an effort to more rapidly bring research-based treatments to communities by adapting three treatment approaches for testing in community-based settings. It also targets specialized populations that are often underrepresented in drug abuse research and underserved in treatment programs: minorities, adolescents, families, and women diagnosed with Post-Traumatic Stress Disorder. The results of these trials will generate much needed information on how to implement effective treatments in a variety of community settings and allow clinicians to improve the delivery of scientifically-based treatments to drug abuse patients.

The success of this program will improve the overall health of the Nation, lessen the negative impact drugs can inflict on individuals, families, and communities, and reduce the total costs of illicit drug abuse and addiction to society. As the treatment protocols come to completion, plans are in place for wide dissemination to researchers to continue to improve and refine the approaches, and to community providers and policymakers to ensure their implementation. Collaborative efforts with the Substance Abuse and Mental Health Services Administration and Single State Authorities (State Substance Abuse Directors) are ongoing to develop products and trainings based on research results and practitioner needs to facilitate community adoption of evidence-based practices.

Performance Measure	Fiscal Year 2006		
	Target	Actual	Result
By 2008, develop and test two new evidence-based treatment approaches for drug abuse in community settings.	Recruitment will be completed of approximately 1000 patients from specialized populations to test the efficacy of community-based treatments.	02/2007	Deferred
Data Sources: 1. Trial progress reports prepared by Data Statistics Center. 2. http://www.nida.nih.gov/CTN/protocol/brochure/2005_ctn_brochure%2010_17_05.pdf			

Result Analysis
The program met and exceeded its FY 2005 annual target. A total of 184 treatment providers, 94 more than the original target of 90, were trained in the three treatment protocols. All 184 treatment providers participated in the trials. Training is an ongoing priority to ensure the continuity of treatment in the delivery of care. Extra treatment providers were trained for two important reasons: to accommodate the requirements of shift work/service provision and in anticipation of the different turnover rates of providers at different sites.

Final and annual progress is typically due 30-90 days at the end of the fiscal year. Most findings are available on October 31 for NIH's review. The 2006 data are available between November and January and reported in the FY 2008 Congressional Justification published in February 2007.

Trends	Fiscal Year Actual				
Performance Measure	2002	2003	2004	2005	2006
By 2008, develop and test two new evidence-based treatment approaches for drug abuse in community settings.	N/A	N/A	Three treatments have been adapted for community-based settings.	The Clinical Trials Network has trained 184 providers (94 more than planned) in Brief Strategy Family Therapy, Motivational Enhancement Treatment, and Seeking Safety, which are being tested in community settings.	02/2007

Data Collection
NIH established a Data and Statistics Coordinating Center for the Clinical Trials Network program (CTN). The Data and Statistics Coordinating Center is a system for data collection, management, and quality assurance. For each trial, it collects data from Case Report Forms that are received directly from practitioners and kept at the DSC. The data must conform to predetermined parameters described in the written protocols. Queries are generated centrally by the Data and Statistics Coordinating Center for any data that are outside these parameters, and sent to both the sites and the Principal Investigator for resolution. Data on Case Report Forms are matched to patient records by local site monitors and by national monitors sent from the CTN's Clinical Coordinating Center. The Clinical Coordinating Center was established as an independent contract institution to provide resources and regulatory support with review and quality assurance monitoring. On-site monitoring by the Clinical Coordinating Center usually occurs every three months or more often as needed for the particular trial. At the completion of the trials, all data are verified by the Clinical Coordinating Center and the Data and Statistics Coordinating Center before data lock.

Completeness
Final data sets are audited by on-site monitors matching Case Report Forms with the electronic data base. Data are also reviewed by monitors from the independent Clinical Coordinating Center that conducts quality assurance monitoring for the program nationally. An in-person site visit is scheduled for close-out of the site. In addition, the data are released after they are used in scientific publications, so accuracy and completeness are assured.

Reliability
The reliability of this program's performance data is ensured by the Data and Statistics Coordinating Center and the Clinical Coordinating Center. The Data and Statistics Coordinating Center ensures that the data conform to the predetermined parameters and that non-conformance is tracked and submitted to the site for resolution. The conduct and compliance of the treatment protocols is ensured by the Clinical Coordinating Center site-monitoring.

4c Knowledge Base on Chemical Effects in Biological Systems (CEBS)
National Institutes of Health (NIH)

Significance
The problems of identifying environmental factors involved in the etiology of human disease and performing safety and risk assessments of drugs and chemicals have long been formidable issues. A new scientific field, toxicogenomics, is evolving to examine how chemical exposures disrupt biological processes at the molecular level. Toxicogenomics involves the collection, interpretation, and storage of information about gene and protein expression in order to identify toxic substances in the environment and to help treat people at the greatest risk of diseases caused by environmental pollutants or toxicants. Because the pattern of regulation of various genes is diverse for different chemicals, scientists expect that these characteristic "signatures" of exposure and effects will be useful in classifying these chemicals and other stressors by their biological activity. This information will provide a means of potentially predicting effects on human health from chemicals about which little is known. To enable this predictive capability, a knowledge base on Chemical Effects in Biological Systems (CEBS) is being established. CEBS will contain data on global gene expression, protein expression, metabolite profiles, and associated chemical/stressor-induced effects in multiple species.

The achievement of this performance goal will build the capacity for public electronic sharing of toxicogenomics data and information, making this data fully searchable and downloadable. Also, it will include traditional toxicology/pathology data. This capability provides a way to use these very different types of data to estimate animal toxicity as well as to determine safe exposure levels in people. The information generated by CEBS can be used by research scientists, regulatory agencies (e.g., Food and Drug Administration), pharmaceutical companies and the chemical industry. The success of the CEBS will greatly improve scientists' ability to identify environmental factors involved in the etiology of human disease and perform safety and risk assessments of drugs and chemicals.

Once CEBS is complete, there will be a number of benefits to society. Among these potential benefits is the ability to better assess the safety of drugs, evaluate the hazards and risks of exposures to environmental agents, and better treat disease caused by environmental exposures. Furthermore, scientists will be able to improve their prediction of human health effects from chemicals and, thereby, help to increase public health by recommending how to remove or diminish these causes of disease.

Performance Measure	Fiscal Year 2006		
	Target	Actual	Result
By 2012, develop a knowledge base on chemical effects in biological systems using a systems toxicology or toxicogenomics approach.	Enhance the CEBS to allow the capture and integration of transcriptomics, proteomics, and toxicologic data for the same compound.	CEBS version 2.0.7 was released and is the first public repository designed to capture, and fully integrate with 'omics data, toxicological, histopathological and other biological measures.	Met
Data Source: CEBS website at http://cebs.niehs.nih.gov/			

Result Analysis
The program's FY 2006 annual target was met. CEBS version 2.0.7 was released on September 6, 2006 and is the first public repository designed to capture, and fully integrate with 'omics data, toxicological, histopathological and other biological measures. The scope of data captured from toxicogenomics studies includes observations made of the subject throughout the study timeline, both before and after the specimen was taken for toxicological, histopathological or other biological analysis. CEBS also captures descriptions of the protocols used in the study, in-life observations of subjects, and all associated biochemical measurements and histopathological analyses. These protocols, temporal events, and analytical measurements, are useful in integrating microarray or proteomics data with a defined patho-

physiological phenotype. Acetaminophen is an example compound for which all mentioned datatypes have been integrated within CEBS.

Trends	Fiscal Year Actual				
Performance Measure	2002	2003	2004	2005	2006
By 2012, develop a knowledge base on chemical effects in biological systems using a systems toxicology or toxicogenomics approach.	N/A	ProtoCEBS launched.	CEBS now has a data portal that loads toxicology data. CEBS can import, export, and link molecular expression data to toxicology/ pathology fields.	CEBS versions 1.5 and 1.6 have been made available to the public. These programs provide simple query download capability of global molecular expression and toxicology/pathology data on a select number of studies of chemicals found in the environment and drugs that have an effect on biological systems.	CEBS version 2.0.7 was released and is the first public repository designed to capture, and fully integrate with 'omics data, toxicological, histopathological and other biological measures.

Data Collection
Data is currently solicited from government, commercial, or academic sources. Most are reference datasets that have been peer-reviewed and published. Papers and submitted data are reviewed by the CEBS curator who abstracts essential metadata to accompany the data; files are compared with publications and additional metadata are collected from the submitters to meet all CEBS data documentation standards.

Completeness
Data and metadata are entered by the curator as a series of CEBS standard files into the CEBS loader which performs automated checks of data integrity and completeness. The curator responds to any automated error messages that are generated in the loading process. The dataset is then visualized in the CEBS load by the curator. Once the dataset has been visually verified, a standard set of files is uploaded into pre-production CEBS. There are additional automated data-integrity and completeness checks at this stage. Finally, the depositor of the data performs the final data check for completeness and validity, as well as conformance with intended data presentation objectives. Any issues identified in pre-production are corrected before the dataset is deployed. CEBS business-rules that are applied throughout the curation and data loading process tend to minimize any limitations in the data. If the data is not complete, computationally-intact, and well-documented, it does not get deployed in production CEBS.

Reliability
Microarray data pass through a series of automated integrity checks, as well as manual verification if the data fails the test. The study design and toxicity data are checked for format validity, and spot-checked for integrity prior to upload into CEBS. A final check for data integrity is performed by the depositors of the data within the "private" mode of CEBS before the data are released to the public.