I. IDENTIFICATION & DEFINITION OF PRIORITY RESEARCH AREAS

A. Identify the campus’s top priority research areas aligned with Core Industry S&T Sector and High Growth Target Industry elements of FIRST Louisiana.

The Louisiana State University Health Sciences Center at New Orleans (LSUHSC-NO) has identified four priority research areas aligned with Core Industry S&T Sector and High Growth Target Industry elements of FIRST Louisiana. These four research areas are:

1. Alcohol and Drug Abuse,
2. Neuroscience,
3. Cancer
4. Infectious Diseases.

Each of these research areas is based in a Center approved by the Board of Regents. These research areas also manifest strengths across stages of the FIRST Louisiana Framework. The Blue Ocean Target Industry is Specialty Healthcare. The High Growth Target Industry is Biomedical. Core Industry S&T Sectors are Healthcare and Bio Products. Biomedical represents the Translational Research Domain. Core Enabling S&T Research areas are Bioscience and Biotechnology.

B. Provide a brief justification narrative for each priority.

**ALCOHOL AND DRUG ABUSE:**

Alcohol and drug abuse has been a strong research focus of LSUHSC-NO for more than two decades. A hallmark of this research is the Comprehensive Alcohol Research Center (CARC), which has received nearly $2 million per year since 1993. Dr. Steve Nelson, Dean of the School of Medicine, is the Director of the Center titled, “Alcohol, HIV Disease and Host Defense.”

The Alcohol and Drug Abuse Center stimulates interdisciplinary collaborative efforts for research and teaching and the dissemination of pertinent information in the area of alcohol and drug abuse. This Center enhances the research capabilities of scientists, stimulates collaborative research efforts, and strengthens educational activities in the biomedical aspects of alcohol and substance abuse throughout the Health Sciences Center. The Center is directed toward building upon existing strength, expanding and elevating our reputation in substance-abuse research, treatment, and prevention. A strong focus of the center is to promote discovery in the field of alcohol and drugs of abuse and their impact on HIV disease prevention, progression and treatment. While major components of the program’s activities are focused on biomedical research, continued growth has now involved community based intervention programs.

While LSUHSC-NO researchers have addressed biomedical consequences using cutting-edge basic science approaches, the Center has also formed collaborative efforts to translate fundamental findings to those at risk of acquiring HIV infection and those already infected. Center goals for the future will direct resources to develop effective prevention and treatment
strategies that will have a more direct impact on Louisiana citizens. These efforts have already started with the initiation of collaborations between clinician scientists who care for HIV-infected patients that also abuse alcohol and other drugs, with scientists in LSUHSC-NO’s growing School of Public Health and with behavioral scientists that are attempting to understand neurological mechanisms that alter drinking and drug-seeking behaviors.

**NEUROSCIENCE:**
The Neuroscience Center of Excellence is dedicated to the study of the fundamental principles of brain, retina and nerve function, and to contribute to understanding and conquering diseases of the nervous system. The Neuroscience Center is comprised of 15 teams led by independent faculty members who focus their research on cellular and molecular neuroscience, including the neurobiology of disease and translational neuroscience. All faculty members have joint appointments in clinical and basic science departments. The Center also hosts fellows, residents and faculty from several clinical departments, fostering effective interdisciplinary research.

Projects are directed toward discovering novel mechanisms for stroke, brain injury, blinding eye diseases, Alzheimer’s and Parkinson’s Disease, epilepsy, traumatic brain injury and other disorders of the nervous system. Specific faculty research interests include: cellular and molecular mechanisms of corneal inflammation, nerve regeneration and wound healing, dry eye; retinal pigment epithelium/photoreceptor interactions, neuroprotection, neurobehavior and histopathology; nonlinear dynamics of single neurons and networks; neuroinflammation, hippocampal synaptic plasticity, and neurodegeneration; mediator lipidomics; proteomics and biochemical approaches for understanding mechanisms of memory and neural disorders.

In addition, the Neuroscience Center participates in translational research programs, such as those sponsored by the LSUHSC Translational Research Initiative, to bring the innovative research conducted here in the lab to the clinic, providing new therapies and treatments for nervous system injuries and diseases. To date, the innovative research conducted has resulted in more than 20 patents or patent applications.

The Neuroscience Center plays a pivotal role in developing innovative approaches to understanding the mechanisms of disease and advancing treatment for disorders of the brain and retina.

**CANCER:**
In 1995, the Cancer Center was awarded a National Cancer Institute Planning Grant, the first step in receiving designation as a Comprehensive Cancer Center. Since that time, the Center has grown into a multidisciplinary matrix organization, drawing membership and expertise from virtually every department within LSUHSC-NO’s Schools of Medicine, Nursing, and Dentistry.

The primary mission of the Cancer Center is to conduct basic and clinical research with a focus on the prevention, treatment, and eventual eradication of cancer, particularly among underserved populations. The knowledge obtained will lead to providing cutting-edge clinical care for cancer patients and an opportunity to educate professionals and laymen alike.

Research is conducted in such areas as Molecular Signaling; Population Studies; Molecular Genetics; Immunology, Infection and Inflammation; and the clinical sciences. Support to researchers is provided in many forms, including several core facilities, such as Genomics,
Proteomics, Immunology, Imaging, and Biostatistics/Bioinformatics. In addition, faculty benefit from a dedicated clinical trials office and a grants and development office that assists with strategic development of proposals as well as with the application processing and award management. The Center is actively enhancing its translational and clinical research programs to complement its strong basic science component. This progress is being achieved through an in-house expansion of our clinical activities and the development of strategic partnerships.

**INFECTIOUS DISEASES:**
Investigators at LSUHSC-NO have justly earned an international reputation for research achievement and training in infectious disease, particularly in the related areas of microbial pathogenesis, host immunity, and vaccine development. LSUHSC-NO has a long-standing history of successful interaction and external funding in these areas, which collectively represent one of the most significant local and regional research strengths. This was recognized by the Louisiana Board of Regents by the establishment of the Louisiana Vaccine Center (LVC) through the post-Katrina Support Fund Initiative in 2007. The goal of the Center, headquartered at LSUHSC-NO, is to develop and focus local interdisciplinary strengths to foster the development of novel approaches to infectious disease research and vaccine development, with appropriate infrastructure to support future growth and the commercialization of new discoveries, and the education of local students in these areas. Strong partnership in the Center with LSU-BR, Tulane and Xavier facilitates access to critical core research equipment and services, and enriches the training environment for graduate students, postdoctoral trainees, and physician scientists across each of these campuses. LVC scientists, with primary appointments in a variety of basic science and clinical departments at LSUHSC-NO, have also trained over 100 interns and summer students since 2008, with the primary aims of promoting education of high school, undergraduate and medical school students in vaccine development and related biosciences, and facilitating the development of a technologically savvy local research support workforce. The summer internship program plays an important role in making students aware of graduate training opportunities here in Louisiana and in cultivating their interest in careers in the biosciences.

LSUHSC-NO investigators affiliated with the LVC currently hold over $21 million in federal funding from the NIH for translational research in HIV/AIDS; sexually-transmitted diseases; tuberculosis; bacterial, parasitic and fungal infections; antifungal and antiviral drug development; and infections caused by herpesviruses and respiratory syncitial virus (RSV), a precipitating factor for asthma in children and babies. Multidisciplinary research foci in two of these areas of particular institutional strength have been recognized by the award of over $25 million from the NIH since 2006, leading to the establishment of major collaborative programs in HIV/AIDS and sexually-transmitted disease, involving researchers from multiple basic science and clinical departments and the Research Institute for Children. These programs directly address public health problems for which Southeast Louisiana has among the highest infection rates in the country.
RESEARCH PRODUCTIVITY:

<table>
<thead>
<tr>
<th>ALCOHOL/DRUG</th>
<th>CANCER</th>
<th>CANCER-EPI</th>
<th>INFECTIOUS DISEASES</th>
<th>NEUROSCIENCE</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of PIs/Co-PIs w/ Active Research Projects</td>
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<td>15</td>
<td>4</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Number of Active Awards</td>
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<td>7</td>
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<td>$602,112.00</td>
<td>$5,500,000.00</td>
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<tr>
<td>Amount of Extramural Funding - Private</td>
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<td>$3,976,222.00</td>
<td>$26,507,842.00</td>
<td>$7,433,854.50</td>
</tr>
</tbody>
</table>

C. Success Stories: Provide a minimum of two success stories (discoveries, inventions, industrial partnerships, spin-off companies, etc.) for each priority research area that significantly impacts or promises to impact the Louisiana economy.

ALCOHOL AND DRUG ABUSE:
[1] The Alcohol Research Center is the only Comprehensive Research Center (P60) in the state of Louisiana and has been continuously funded for 21 years, netting over $35 million in research dollars.

[2] The Alcohol Research Center has developed a nationally acclaimed and highly successful training program for graduate students and postdoctoral fellows. The NIH-funded “Biomedical Alcohol Research Training Program” has successfully trained nine PhD students, with six earning a MD as part of LSUHSC’s combined MD-PhD program. The program has also trained twenty-five postdoctoral fellows, of which nine were physician-scientists. Funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) as part of the National Research Service Award program, this initiative currently relies on fifteen faculty members at the LSU Health Sciences Center. In addition, program faculty includes mentoring scientists at the Tulane National Primate Research Center in Covington, LA, and LSU in Baton Rouge, LA, as well as other scientists that enrich the research training environment at all three campuses.

NEUROSCIENCE:
[1] Dr. Nicolas Bazan contributed to the discovery of Neuroprotectin D1 in 2003-2004 and has several patents, patent applications and new intellectual property disclosures that open a new avenue to slow down/cure Alzheimer’s disease, Parkinson’s, Huntington, stroke, epilepsy and other neurological and psychiatric diseases that currently have only partial symptomatic treatment.

His discovery has provided an answer to a central unsolved question on a specific mechanism to turn neuroinflammation beneficial, enhance survival of neurons and modulate proteostasis during protein misfolding and protein aggregation. Perturbations to proteostasis and neuroinflammation are critical elements in early stages of most neurodegenerative diseases; therefore, the key bioactivity of Neuroprotectin D1 sets the foundation of discriminating loss of
the neurons at risk. This new knowledge forms the basis of new platform technologies for at least 3 startup companies and will further create a dialogue with large pharmaceutical companies to establish branches in Louisiana.

[2] Dr. Nicolas Bazan and his colleagues have discovered that Neuroprotectin D1 plays a critical, decisive role in age-related macular degeneration and in inherited retinal degenerative diseases. Dr. Haydee Bazan and her colleagues have discovered a new therapeutic approach to regenerate corneal nerves after refractive surgery, aging and in several diseases. The technologies developed have formed the basis for VisMol Pharmaceuticals (founded by Nicolas Bazan, July 2012). This nascent company will develop novel therapies and concepts for several unmet conditions that have a major market potential.

[3] Dr. Nicolas Bazan continues to develop fundamental underpinnings of the non-toxic, non-addictive analgesics that he developed and which lay the foundation for St. Charles Pharmaceuticals. This startup company was negatively impacted by Hurricane Katrina, frustrating the conclusion of the Phase I clinical trial of one of the analgesics. A very recent paper from Dr. Bazan further demonstrates the effectiveness of these novel pain killers for neuropathic pain. The plans are to continue this and/or a related startup company.

**CANCER:**
[1] Chosen Diagnostics is a personalized medicine diagnostics provider developing a novel platform capable of predicting drug resistance and regimens for targeted treatments, especially in the oncology field. The Chosen Diagnostics technology will be marketed as a clinical diagnostic assay to simply and rapidly assess whether an individual patient is likely to respond to a specific drug or drug candidates. The company was founded by Dr. Sunyoung Kim, a Professor of Biochemistry at LSU Health Sciences Center—New Orleans.

[2] A major achievement of faculty members at the Stanley S. Scott Cancer Center has been continued success in obtaining grants (federal and other sources) supporting cancer research endeavors. LSUHSC-NO leads the state in funding for cancer research activities, and the Stanley S. Scott Cancer Center continues to maintain its level of funding despite the ongoing decrease in federal funds supporting research in general.

The major grants obtained by faculty at the Stanley S. Scott Cancer Center are:

**1. COBRE (Centers of Biomedical Research Excellence) Grant: “Mentoring Translational Researchers in Louisiana”**
The Centers of Biomedical Research Excellence (COBRE) program trains new faculty to successfully obtain independent funding that supports the translation of laboratory research into the clinical care of patients (translational research). The specific goals are to 1) establish multidisciplinary biomedical research centers in IDeA states, 2) enhance the competitiveness of young research scientists, and 3) strengthen the infrastructure of participating institutions. The COBRE grant “Mentoring Translational Researchers in Louisiana” was initially funded in 2005 and has brought a total of 34.5 M in funding to support the development of critical research and technology infrastructure needed to conduct cutting edge biomedical research in Louisiana. Faculty from the Stanley S. Scott Cancer Center of LSU, funded by this COBRE grant have established a multidisciplinary, inter-institutional partnership to study the role of inflammation in diseases such as cancer in southern Louisiana. They have obtained an additional $13.3M in grants to support research in the state.
2. Clinical Trials Program: “Minority Based Community Clinical Oncology Program (MB-CCOP)”

The LSUHSC MB-CCOP is a clinical trials program funded by the National Cancer Institute (NCI) that provides cutting edge treatment trials (clinical trials) to cancer patients in southern Louisiana through oncologists at LSU and partnerships with community oncologists in southern Louisiana. The LSUHSC MB-CCOP central location is the Interim LSU Hospital (previous University Hospital), but has established partnerships with Children’s Hospital of New Orleans, Mary Bird Perkins Cancer Center, Gulfport Memorial Hospital, and Chabert Medical Center. This program has been in existence at LSUHSC since 1994 and was renewed in 2009 for an additional 5 years. It has also received multiple funding supplements to expand and create new programs that address new health challenges in cancer. These expansion programs include:

- Addition of clinical trials sites at Chabert Medical Center and Gulfport Memorial Hospital (MS)
- Creation of a new program for the specialized treatment of cancer in HIV-AIDS patients
- Development of a Navigators program to provide guidance and support to cancer patients in the public hospitals
- Develop a program to train Clinical Research nurses in Louisiana in association with Dillard University

3. The Center for Minority Health and Health Disparities Center (a partnership with Dillard University)

The Center for Minority Health and Health Disparities (CMHHD) was established between Dillard University and the Stanley S. Scott Cancer Center to address the following goals:

- Train minority Clinical Research Associate (Research nurses) to increase the participation of minority patients in clinical trials. The lack of inclusion of minorities on trials decreases their access to cutting edge treatments of cancer and other diseases.
- Provide development and research training for Dillard University faculty in collaboration with established LSU investigators. The training occurs through the development of specific scientific projects aimed at studying the molecular basis for health disparities in Louisiana. These are:
  a. Preventing HPV-related Cervical Cancer: A Model for Reducing Health Disparities
  b. Obesity and Asthma: Determinants of Inflammation and Effect of Intervention
  c. Prosaposin: A Novel Marker of PCa Aggressiveness in African Americans

INFECTIONIOUS DISEASES:

[1] The Louisiana Vaccine Center (LVC) has consolidated and strengthened world-class local research in the areas of vaccines, infectious diseases and immunology with excellent facilities and support services. Center researchers have generated over $50 million in federal funding since inception in 2007, while the Center has also attracted and retained first class researchers and trainees to the region, and established new biotechnology ventures in Louisiana. The Center facilitates training and education to develop and focus local and regional research innovation in infectious disease and vaccine development. LVC pilot grant awards have already facilitated the award of ten new federal grants to our pilot grantees, primarily junior faculty at LSUHSC-NO and LVC partner institutions (Tulane and Xavier). Other training opportunities include: (i) graduate fellowships, (ii) summer research fellowships for promising local high school students or undergraduate students from Louisiana who are studying out-of-State but who wish to return for the summer, or (iii) entrepreneurial internships in partnership with the New Orleans BioInnovation Center.
II. INSTITUTIONAL & EXTERNAL SUPPORT FOR PRIORITY RESEARCH AREAS

A. How do identified priority areas reflect the mission and vision of the campus, as well as national focuses?
   All priority areas reflect the mission of the Health Sciences Center in terms of education, research, and patient care. The areas also are pertinent to our vision as outlined in our strategic plan. Finally, these areas are focused on nationally as major research objectives of the National Institutes of Health and numerous research foundations.

B. How do/will the institution’s internal funding structures (e.g., cluster hiring, strategic investments, infrastructure development, graduate fellowships/fellowship supplements, etc.) reflect and manifest these priorities?
   These research priority areas are reflected in the Health Sciences Center’s internal funding structure through cluster hiring (e.g., alcohol research faculty in the Department of Physiology), infrastructure development (e.g. the funding of various core labs) to support each research area, and the internal funding of various seed and bridge grants to support research.

C. How does existing and/or potential external funding relate to these priorities?
   A majority of our external funding (NIH) is related to these four priority areas of research. Our Office of Technology Management also focuses on these areas in terms of intellectual property development and translational research. Each of these activities can result in significant economic development for the state.

[2] Major Federal Program and Center funding for translational research in HIV/AIDS and sexually-transmitted diseases have been won by LSUHSC-NO researchers in national competition. The P01 (Program-Project) award: Host Defense against HIV-related Pulmonary Infections ($17 million over 10 years) and the Gulf South Sexually-Transmitted Infections Cooperative Research Center ($8 million over 5 years) directly address major areas of public health concern in Louisiana.

[3] MiniVax is an LSUHSC-NO spinoff company focused on the development of therapeutic and preventive vaccines for HIV/AIDS-related lung diseases, eg. Pneumocystis carinii, a fungal pathogen that can cause severe, often fatal, lung infections in patients with compromised immune systems. MiniVax was recently awarded a $600,000 advanced technologies STTR research and development grant by the National Institute of Allergy and Infectious Diseases at the National Institutes of Health (NIH).

[4] Full patents have recently been awarded to LSUHSC-NO researchers to protect their development of novel therapies for human disease caused by herpesvirus infection and fungal infection. In both cases, the enabling basic research work at LSUHSC-NO was facilitated by LVC and federal research grants.
## III. RESEARCH & ECONOMIC DEVELOPMENT DATA

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<thead>
<tr>
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<td>A. a. All R&amp;D Expenditures (NSF-reported)</td>
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