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The Breathe Easy Telehealth Program: A Project-Based Grant Proposal Thesis to Improve Asthma Management among Elementary and Middle School Children in Louisiana

By
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Degree to be Awarded: Master of Public Health
Program: Executive MPH Program

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An abstract of
A Thesis submitted to the Faculty of the
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Abstract

The Breathe Easy Telehealth Program: A Project-Based Grant Proposal Thesis to Improve Asthma Management among Elementary and Middle School Children in Louisiana

BY

Kia Renee Padgett

Asthma has emerged as a significant health and economic burden to patients, families, health systems, payors, and society. It is one of the most common chronic childhood conditions in the United States, affecting approximately nine million children under the age of eighteen. Researchers have identified a broad range of genetic, behavioral, and environmental triggers associated with symptoms and exacerbation. Asthma disproportionately affects low-income and minority populations with higher morbidity and mortality rates. Although the etiology of asthma is unknown and currently there is no cure, asthma can be effectively controlled through prevention activities and symptom management. Louisiana has a unique set of demographic, socioeconomic, environmental, and geographical factors that contribute to the state's childhood asthma burden. Under the application guidelines for NIH funding opportunity announcement PA-16-161, I propose a project-based thesis to create opportunities for children and families living in low-income communities to receive specialty health services in the school setting, using a telehealth care delivery model. The proposed research program entitled "The Breathe Easy Telehealth Program" aims to increase access to specialty healthcare; utilize evidence-based prevention strategies; create essential clinical, public health, academic, and community partnerships; improve population health; and demonstrate sustainability.

After obtaining IRB approval, a pilot program will be conducted in eight elementary and middle schools; across four USDA-designated, persistent poverty parishes in Louisiana. Students with signed consent forms and completed asthma impact assessment forms will be eligible for participation in the program. Using encrypted health information technology, audio-visual equipment, and telehealth medical devices, students enrolled in the program will receive HIPAA-compliant health services. Participating students will receive a respiratory focused physical examination, patient education, and individualized asthma action plan. A registered nurse will perform the physical assessment at the presenting site, the school nurse office, while virtually connected with a pediatric pulmonologist who will facilitate the visit, from a hospital setting. Quantitative and qualitative data collected from the asthma impact assessment form, and the telehealth consultations will be entered into IBM SPSS 22.0 and NVivo 11, respectively. Results of data analysis will be used to identify knowledge gaps; evaluate medication adherence; assess the impact of high trigger burden on the frequency of severe asthma exacerbations, hospitalizations, days lost at school; and the impact on overall quality of life. Proven effectiveness of the Breathe Easy Telehealth Program will allow for reproducibility of the program, as a viable healthcare delivery model, that can be expanded to other school-based telehealth specialty services including diabetes management and behavioral health consultations.

THE BREATHE EASY TELEHEALTH PROGRAM: A PROJECT BASED GRANT PROPOSAL THESIS TO IMPROVE ASTHMA MANAGEMENT AMONG ELEMENTARY AND MIDDLE SCHOOL CHILDREN IN LOUSIANA

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Thank you to my colleagues at the Georgia Department of Public Health. I am indebted to all who took time out of their busy schedules to review and provide feedback that ultimately enhanced the content of project.

I consider it an honor, a privilege, and a blessing to have learned from students and faculty alike during my academic studies at the Emory University Rollins School of Public Health – Executive MPH program. This experience has singularly made me a better nurse and equipped me with the skills to impact lives as a public health scientist.

And finally, I offer a heartfelt thank you to my family and friends who endured this process with understanding, love, prayers, and pride in this accomplishment. We did it.

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Chapter 1: Introduction

Asthma has emerged as a significant health burden to patients, families, health systems, payors, and society. It is the focal point of public health research and clinical interventions. Asthma is one of the most common chronic childhood conditions in the United States, affecting approximately nine million children under the age of 18. Researchers have identified a broad range of genetic, behavioral, and environmental triggers that are associated with asthma symptoms and exacerbation. Other nonclinical factors such as race and socioeconomic status influence asthma prevalence which disproportionately affects people of low socioeconomic status, certain ethnic minority groups, and those living in rural or inner-city communities.

Healthcare expenditures associated with asthma are substantial for the individual and the nation. Direct medical costs associated with asthma include emergency room visits, durable medical equipment, and medications. Indirect medical costs account for absenteeism from work and school, activity limitations, and premature death. The average cost of medical expenses for a child without asthma averages $618 a year; the annual cost of medical expenses for a child with asthma averages $1,042. Among children and adolescents ages 5 to 17 years old, asthma accounts for a loss of 10 million school days, annually, and costs caretakers $726.1 million per year because of work absence.

Although the etiology of asthma is unknown and currently there is no cure, asthma can be controlled through prevention activities and symptom management. Effective asthma management can prevent absenteeism for children, parents and caregivers due to illness; increase productivity in the classroom; reduce costs associated with preventable urgent doctor's visits, emergency room consultations, and hospitalizations; and improve overall health-related quality of life. Under the application guidelines for NIH funding opportunity announcement PA-16-161,

I propose a project-based thesis to create opportunities for children living in low-income communities to receive specialty asthma clinical services at their schools, utilizing telehealth capabilities. This thesis will examine the social, behavioral, and environmental determinants of childhood asthma, as a pervasive health concern in Louisiana, and analyze the clinical effectiveness of a school-based telehealth asthma program, as a model for healthcare delivery and chronic disease management.

The proposed research program entitled "The Breathe Easy Telehealth Program" is a comprehensive school-based telehealth program that aims to identify gaps in asthma knowledge and care, increase access to specialty healthcare services, promote asthma awareness, utilize evidence-based prevention strategies, encourage self-management, improve individual and population health, and demonstrate sustainability. The Breathe Easy Telehealth Program proposes a Social Ecological Model (SEM) to guide the research associated with the program, and foster collaborations among clinical, public health, academic, and community stakeholders. Using the theoretical underpinnings of the SEM, program staff can identify potential areas for effective prevention activities that will successfully address and improve asthma-related issues from the individual, interpersonal, community, organizational, and policy levels of influence.

The Breathe Easy Telehealth program will be operated within eight public elementary and middle schools, across four parishes in Louisiana. The participating schools were selected based on their designation as persistent poverty areas, high black poverty areas, and housing stress areas by the Census of Population and Housing and the U.S. Department of Agriculture (USDA). A parent or legal guardian must sign a consent form and complete an asthma impact assessment form, prior to scheduling a telehealth appointment, through the school's

administrative office. The telehealth consultation will take place in the nurse's office during normal school hours.

Using encrypted health information technology, audio-visual equipment, and telehealth medical devices, students enrolled in the program will receive HIPAA-compliant health services. The consultation involves a respiratory-focused physical examination, patient education, and an individualized asthma action plan. The program manager, a registered nurse, will perform the physical assessment at the presenting site, in the school nurse office. The co-PI, a pediatric pulmonologist will facilitate the visit from a hospital setting located over 150 miles from the presenting site. A follow-up telehealth consultation will take place nine months later to assess the appropriateness and adherence to the plan of care and provide additional care recommendations, if deemed necessary. After the follow up consultation, the student will be directed to their patient centered medical home (PCMH) for continuation of care and ongoing disease management.

Quantitative and qualitative data collected from the asthma impact assessment tool and telehealth consultation will be entered into IBM SPSS 22.0 and NVivo 11, respectively, to enable data triangulation between the qualitative and quantitative datasets. Quantitative data from the asthma impact assessment form and the telehealth consultations will be analyzed to gather information on topics of environmental exposures, lifestyle modifications, utilization of telehealth services, and adherence to the asthma action plan. The responses to the qualitative questions will be transcribed, coded, and analyzed thematically. Results of the data analysis will also be used to identify knowledge gaps, evaluate the impact of high trigger burden on the frequency of severe asthma exacerbations, hospitalizations, days lost at work/school, and impact on overall quality of life. Program results will be complied in text and table form, into a report.

The Breathe Easy Telehealth program will contract with the Tulane University School of Public Health and Tropical Medicine to initiate a school-based eco-education and environmental health project. Tulane will create a comprehensive eco-education and environmental health curriculum, with a focus on air quality at the eight participating schools. They will also provide technical assistance to the schools during the development of their school-based project. Project goals are for each school to create environmental health awareness activities using the Indoor Air Quality Tools for Schools Action Kit by the United States Environmental Protection Agency (EPA), learn about clean air policies, and a create a culminating project to be presented to the school in recognition of Asthma Awareness Month in May. Tulane University, The Breathe Easy Telehealth Program, and participating schools will work with the local Parent Teacher Association (PTA) to secure resources and sustain the project activities after the grant period.

Students have difficulty learning, meeting developmental milestones, and performing well in school if they are not healthy. A school-based telehealth asthma program can be an effective and innovative way to provide specialty care, deliver education and preventive services, and promote effective disease management. It offers comprehensive health services in a safe, convenient environment with trusted personnel who are invested in the child's overall well-being, while decreasing absenteeism due to chronic illness. Furthermore, the model outlined by the Breathe Easy Telehealth Program is reproducible and can be applied to other school-based telehealth chronic disease initiatives such as diabetes management and behavioral health services.

Definition of Terms

Allergy: a hypersensitivity caused by exposure to an antigen (allergen) resulting in a marked increase in reactivity to that antigen on subsequent exposure, sometimes resulting in harmful immunologic consequences such as rash, itching, swelling, and difficulty breathing.

Bronchoconstriction: the medical term for the narrowing of the airways that occurs in an asthma attack.

Federal Poverty Line (FPL): the set minimum amount of gross income that a family needs for food, clothing, transportation, shelter and other necessities. In the United States, this level is determined by the Department of Health and Human Services. For 2016, the Federal poverty guideline is an annual income of $24,300 for a family of four.

Health-adjusted life years (HALYs): population health measures permitting morbidity and mortality to be described in a single number. They are useful for overall estimates of burden of disease, comparisons of the relative impact of specific illnesses and conditions on communities, and in economic analyses. Quality-adjusted life years (QALYs) and disability-adjusted life years (DALYs) are types of health-adjusted life years.

Immunology: the branch of biomedicine that studies the structure and function of the immune system, passive and active acquired immunity, the bodily distinction of self from non-self, and laboratory techniques involving the interaction of antigens with specific antibodies.

Medicaid: a health care program that assists low-income families or individuals in paying for long-term medical and custodial care costs. Medicaid is a joint program, funded primarily by the federal government and run at the state level, where coverage may vary. Medicaid is available only to individuals and families that meet specified criteria.

Ozone Matter: a gas composed of three atoms of oxygen. High ozone occurs naturally above the Earth's surface where it forms a protective layer that shields people from the sun's harmful ultraviolet rays. In the Earth's lower atmosphere, ozone is formed when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react chemically in the presence of sunlight. Man-made chemicals are known to destroy this beneficial ozone and cause health problems.

Particulate Matter: a mixture of solid particles and liquid droplets found in the air. Particulate matter contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems. Particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even get into your bloodstream. Fine particles ($PM_{2.5}$) are the main cause of reduced visibility (haze) in parts of the United States.

Chapter 2: Review of Literature

Asthma is a chronic respiratory disease characterized by narrowing, swelling, and congestion of the airways in the lungs. When these airways react because of asthma, the muscles around them tighten, causing less air to flow into the lungs. Swelling and mucus-producing cells further narrow the airways. Combined, these factors make it difficult to breathe (Asthma and Allergy Foundation of America, 2016). Symptoms of asthma include coughing, wheezing, shortness of breath, increased production of mucus, and chest tightening. The frequency of asthma symptoms varies among individuals and can manifest as infrequent mild symptoms that require rest and medication, to status asthmaticus, a severe asthma episode and medical emergency (Asthma and Allergy Foundation of America, 2016).

In most children, asthma develops before the age of 5, and, in more than half of asthma diagnoses, symptoms develop before the age of three. Before puberty, the prevalence of asthma is 3 times higher in boys than in girls. During adolescence, the prevalence is equal among males and females (Asthma and Allergy Foundation of America, 2016). Factors that may put children at an increased risk of developing asthma and an increased incidence of asthma exacerbation include: premature birth; wheezing with respiratory syncytial virus (RSV) or rhinovirus; increased exposure to indoor and outdoor pollution; exposure to tobacco smoke during pregnancy and throughout childhood; a family history of asthma; and a personal history of allergies or eczema (Asthma and Allergy Foundation of America, 2016). In addition, high levels of stress and negative life events in children increase the risk of asthma exacerbations in the subsequent weeks following the initial stressor (Asthma and Allergy Foundation of America, 2016).

Many children with asthma appear and sound normal so further diagnostic tests are used to make a diagnosis. Spirometry testing measures the flow and volume of air blown out after a child takes a very deep breath and then forcefully exhales. Additional testing may be recommended to ensure that another condition is not the cause of a child's coughing or wheezing (Asthma and Allergy Foundation of America, 2016). This may include a chest x-ray, sweat chloride test (for cystic fibrosis), barium swallow (for gastroesophageal reflux or GERD), modified barium swallow (for aspiration), or skin or blood testing (for allergies or immune system disorders).

Population-based asthma severity prevalence estimate depends on whether the individual is treated or not and how well the individual responds to the treatment. Intermittent severity includes people who are well-controlled without long-term control medication. Persistent severity includes people who are on long-term control medications and people with uncontrolled asthma who are not on long-term control medication (Centers for Disease Control and Prevention, Asthma Stats, 2015). Approximately 60 percent of children, ages 5-17, with a current diagnosis of asthma have persistent asthma; and 40 percent have intermittent asthma (Centers for Disease Control and Prevention, Asthma Stats, 2015). Intermittent asthma severity among children in Louisiana, with a current diagnosis of asthma, is lower than the national average. However, the persistent asthma severity among children in Louisiana, with current diagnosis is above the national average (see Table 1).

Table 1: Asthma Severity among Children with Current Asthma by U.S. State

	Asthma Severity among Children with Current Asthma	
STATE	Intermittent Severity%	Persistent Severity%
U.S. Total**	39.7	60.3
AZ	33.0	67.0
CA	32.5	67.5
CT	40.5	59.5
DC	46.9	53.1
GA	36.4	63.6
HI	52.6	57.4
IL	46.4	53.6
IN	34.9	65.1
IA	43.5	57.5
KS	33.7	66.3
LA	36.4	63.6

Source: Centers for Disease Control and Prevention, Asthma Stats, 2015

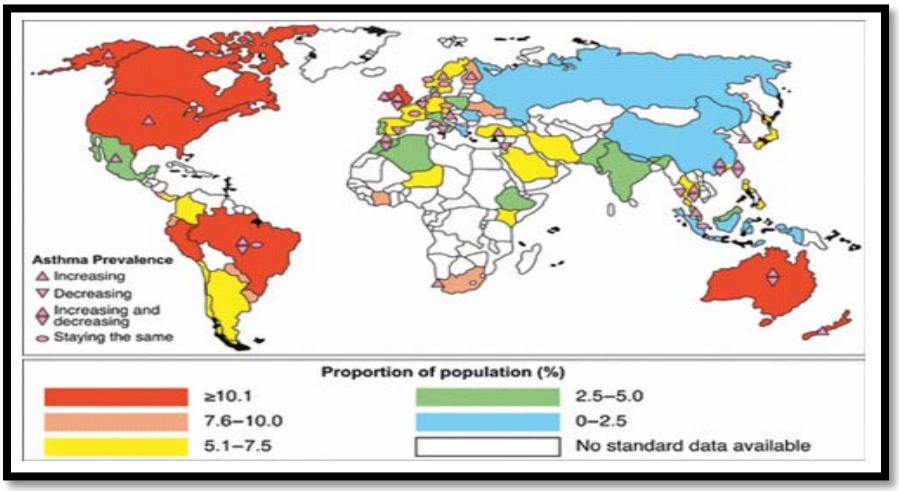
The etiology of asthma is unknown. However, researchers have identified various genetic, infectious, and environmental factors that may increase the risk of developing asthma and the risk of asthma exacerbation (Asthma and Allergy Foundation of America, 2016). Given the multifaceted nature of asthma, a definitive diagnosis in children requires a careful review of a child's current and past medical history, family history, environmental exposures, and physical examination (Asthma and Allergy Foundation of America, 2016).

Global Burden of Asthma

Approximately 300 million people worldwide have asthma, and 250,000 people per year die prematurely because of asthma-related complications. Research studies show that asthma is

under-diagnosed and under-treated, creating a substantial burden by limiting individual activity and functionality over the course of a lifetime. Over 80 percent of asthma deaths occur in low- and lower-middle income countries (World Health Organization - Asthma, 2016). With a projected increase in the world's population dwelling in urban areas, amidst adverse environmental health factors such ambient air pollution, the prevalence of asthma is expected to rise steadily. The World Health Organization estimates that there may be an additional 100 million people living with asthma by 2025 (World Health Organization - Asthma, 2016). The highest asthma prevalence rates are seen in economically developed countries. Based on available surveillance data - North America, South America, and Australia have the highest asthma rates in the world with increasing asthma prevalence. Conversely, Asia and Russia have the lowest asthma incidence and prevalence. A significant number of the countries in Africa lack epidemiologic data for asthma surveillance (see Figure 1).

Figure 1: Global Prevalence of Asthma



Source: Global Asthma Report, 2014

The International Study of Asthma and Allergies in Childhood (ISSAC) established a global epidemiological research program to investigate asthma, rhinitis, and eczema in children

due to the increase of these conditions in western and developing countries (International Study of Asthma and Allergies in Childhood, 2015). The ISAAC program became the largest global, research collaboratives, involving more than 100 countries and nearly 2 million children. The program aimed to develop environmental measures and disease monitoring for future interventions and recommendations, to reduce the burden of allergic and non-allergic diseases in children (International Study of Asthma and Allergies in Childhood, 2015). In 2012, ISAAC and the International Union Against Tuberculosis and Lung Disease formed a collaboration and established the Global Asthma Network (GAN).

Global priorities for asthma include: surveillance activities to map the magnitude of asthma, analyze the determinants of asthma and monitor trends with emphasis on low-income and disadvantaged populations; primary prevention strategies to reduce the level of exposure to common risk factors such as tobacco smoke, frequent lower respiratory infections during childhood, and air pollution (indoor pollution, outdoor pollution, and occupational exposure); the identification of cost-effective interventions for asthma; and the increasing quality and accessibility of asthma medical services at different levels of the healthcare system (Global Asthma Report, 2014).

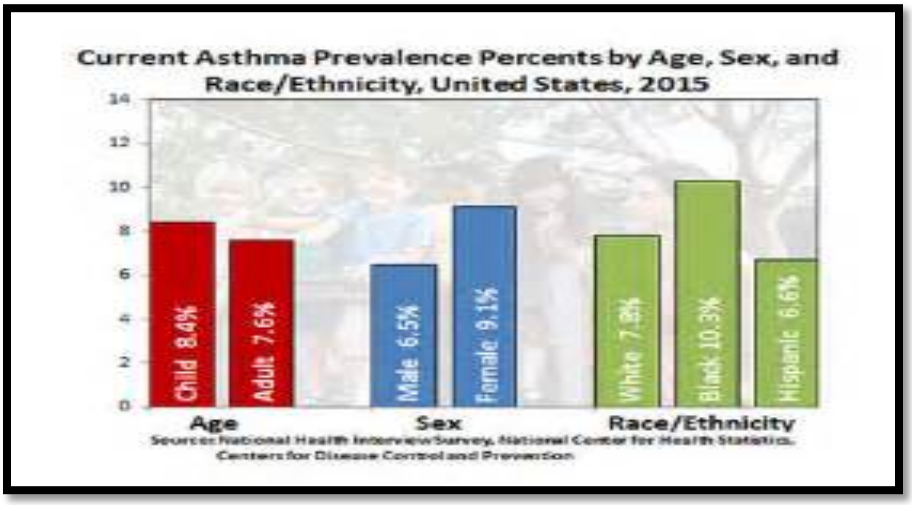
HealthyPeople 2020 - Respiratory Disease

Approximately 23 million people in the United States have asthma, including 9 million children. Although mortality rates due to asthma have decreased, the number of people in the United States affected by asthma continues to rise. The incidence of asthma grew 28 percent between 2001 and 2011. The United States Department of Health and Human Services created Healthy People 2020 as a national initiative to help people live longer with high quality and productivity; achieve health equity; eliminate disparities; create social and physical environments

that promote good health; and foster the development of healthy behaviors across the lifespan (Healthy People 2020, 2016).

The Healthy People 2020 topic area of respiratory diseases focuses on the promotion of better prevention strategies, detection, treatment modalities, education efforts (Healthy People 2020, 2016). Asthma-specific objectives aim to reduce the proportion of children ages 5 to 17 years of age with asthma who miss school days; increase the proportion of persons with current asthma who receive formal patient education; and increase the proportion of persons with current asthma who receive appropriate asthma care according to National Asthma Education and Prevention Program (NAEPP) guidelines (Healthy People 2020, 2016). Data for the Healthy People 2020 Respiratory Disease topic focuses on disparities by age, sex, income, disability, race and ethnicity, and education (see Figure 2).

Figure 2: U.S. Asthma Prevalence by Age, Sex, and Race



Source: Centers for Disease Control and Prevention, 2015

Emerging areas of research and intervention on the HealthyPeople 2020 topic of respiratory diseases, specific to asthma, involve assessing the impact of climate change on asthma causation and exacerbations; increasing the importance of indoor air quality as a cause of

work-related respiratory symptoms and asthma in a service economy; applying knowledge about gene-environment interactions and epigenetics to respiratory disease prevention; using knowledge about primary causes of asthma in developing effective prevention strategies, such as weight control and allergen avoidance; developing novel treatments to prevent onset of asthma and alter the progression of disease severity; and tailoring asthma treatment to a patient's specific phenotype, genetics, and health history (Healthy People 2020, 2016).

Social Determinants of Childhood Asthma

Healthy early child development involves physical, emotional, psychosocial, language, and cognitive domains of development. These domains strongly influence overall well-being and predisposition to chronic disease and mental health disorders, competence in literacy and numeracy, criminality, and economic participation throughout life. Experiences in early life are critical predictors of a child's developmental trajectory and life course (Total Environment Assessment Model for Early Child Development, 2007). Upstream social and economic determinants such as limited access to healthy foods, residing in areas of high crime, poor living conditions, unemployment status, and limited educational attainment can influence social disadvantage, risk exposure, and social inequalities (Bharmal et al, 2015). The combination of these factors play a key role in population health outcomes.

There is a strong association between race, socioeconomic status, environmental variables, and the prevalence of asthma symptoms in children. Asthma disproportionately affects ethnic minorities. Blacks and Hispanics have higher rates of asthma emergency department visits, hospitalizations, and deaths than Whites. The prevalence of asthma among Hispanic groups in the United States is highest among Puerto Ricans. The rate of asthma among Puerto Ricans is approximately 2 times higher than Whites and 1.5 times higher than Blacks (Asthma

Facts, 2016). Researching ethnically-based differences in pharmacogenomics, and clinical trials targeting the Black and Hispanic population may help to better define optimal asthma medication regimens in ethnic groups.

The Controlling Asthma in American Cities Project (CAACP) was designed to improve the control of asthma in inner-city populations of children with a disparate burden of asthma symptoms and adverse health outcomes (Herman, Garbe, & McGeehin, 2011). The project involved seven sites in large cities across the United States to coordinate and synchronize multiple interventions (education, healthcare access, medical management, trigger reduction). The interventions were implemented at multiple levels (individual, home, school, community, and policy) through the collaboration of key stakeholders. Program results showed that effective strategies for prevention and treatment must focus on the non-clinical determinants of the incidence and prevalence of childhood asthma (Herman, Garbe, & McGeehin, 2011).

Another study of the asthma prevalence in children under the age of 18 using National Health Interview Survey data revealed that the risk is particularly high among children of a racial minority and disadvantaged socioeconomic status (Williams et al, 2008). The study results demonstrated that evidence-based asthma counseling and environmental interventions can improve asthma management and reduce environmental exposures when effectively implemented. In addition to appropriate counseling and medical management, individuals with asthma must have systematic, financial, and cultural access to environments that allow avoidance of asthma triggers and encourage good asthma management practices (Williams et al, 2008). Environments where children live and learn are an important part of their development. In recognizing the strong impact that social determinants of health have on early child development and health outcomes in adulthood; local, regional, national, and international agencies can work

with families to provide equitable access to resources. This collaboration will create safe and healthy environments that offer comprehensive, community-based, culturally sensitive support systems to promote effective asthma management.

Economic Impact of Asthma

National health expenditure data projects that total healthcare spending in the United States will reach $4.8 trillion in 2021. This number has increased from $2.6 trillion in 2010 and $75 billion in 1970. Healthcare spending is expected to account for nearly 20 percent of gross domestic product (GDP), or one-fifth of the U.S. economy, by 2021 (Aetna, 2016). The disproportionate share of costs for hospitalization, and unscheduled emergency care of children with asthma is largely responsible for the significant economic burden of childhood asthma in the United States. In Louisiana, children 10 years old and younger account for more than 50 percent of the state's asthma Medicaid recipients, and almost 50 percent of the state's asthma expenditures (Health Care Journal of Baton Rouge, 2012).

The economic impact of asthma includes components of direct and indirect healthcare costs. The annual direct healthcare cost of asthma in the U.S. which accounts for medical resource utilization is approximately $11.5 billion. Direct costs include inpatient care, emergency visits, physician visits, nursing services, ambulance use, cost of medication, cost of durable medical equipment and devices, blood and diagnostic tests, research, and health education. Prescription drugs for asthma represented the largest single direct cost, at $5 billion (Asthma Facts - CDC's National Asthma Control Program Grantees, 2013). Annual indirect costs associated with asthma are derived from the cessation or reduction of productivity, as a result of asthma morbidity and mortality. Indirect costs associated with asthma are $4.6 billion per year and accounts for absenteeism from school and work, traveling to and from medical

appointments, pain and disability, higher insurance premiums, wait time during healthcare visits or scheduled testing, and premature death. The value of lost productivity due to death represented the largest single indirect cost at $1.7 billion (Asthma Facts - CDC's National Asthma Control Program Grantees, 2013).

The Centers for Disease Control and Prevention (CDC) is partnering with health care purchasers, payers, and providers to improve health and control health care costs. The CDCs 6-18 initiative offers interventions to prevent chronic and infectious diseases by increasing coverage, access, utilization, and quality of care (Control Asthma | 6|18 Initiative | CDC, 2016). Additionally, the 6-18 initiative aligns evidence-based preventive practices with emerging value-based payment and delivery models. The initiative targets six of the most common and costly health conditions – asthma, tobacco use, high blood pressure, healthcare-associated infections, unintended pregnancies, and diabetes - with an initial focus on eighteen specific, evidence based interventions (Control Asthma | 6|18 Initiative | CDC, 2016).

Proposed payor interventions utilizing the 6-18 Control Asthma initiative promotes evidence-based medical management in alignment with the 2007 National Asthma Education and Prevention Program guidelines (NAEPP Guidelines); strategies that improve access and adherence to asthma medications and devices; expanded access to intensive self-management education for individuals whose asthma is not well-controlled; expanded access to home visits by licensed professionals or qualified lay health workers to improve self-management education; and reduction of home asthma triggers for individuals whose asthma is not well-controlled (Control Asthma | 6|18 Initiative | CDC, 2016). Strategies to effectively mitigate the substantial healthcare costs associated with childhood asthma include accurate diagnosis and assessment of asthma severity, appropriate pharmacologic intervention, follow-up with the healthcare provider,

care coordination between supportive services, and programs designed to teach patients and their families how to monitor and manage asthma (Asthma Facts - CDC's National Asthma Control Program Grantees, 2013).

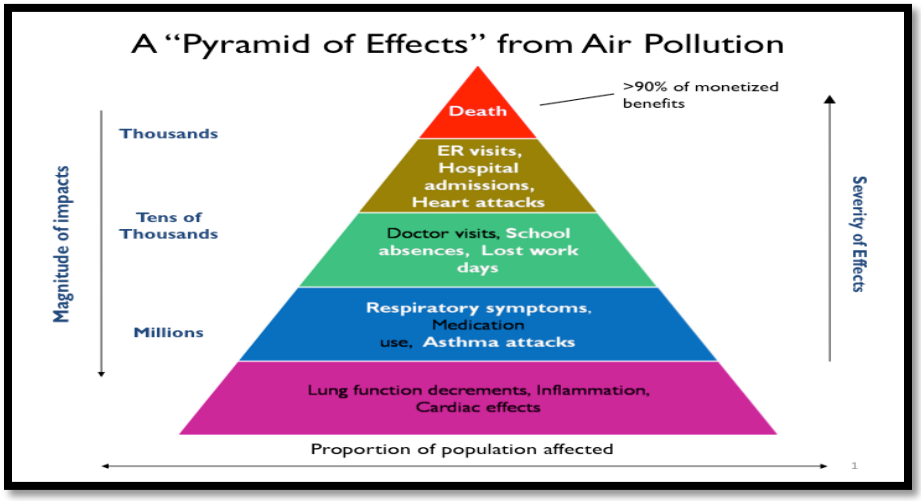
Environmental Health and Asthma

Indoor and outdoor environmental exposures are a major cause of asthma exacerbation. Allergies trigger asthma attacks in 60-90 percent of children (Kelly, III, MD & Kaliner, MD, 2016). An early allergic response occurs within a few minutes and peaks at 20 minutes, following exposure to an allergen. Children may experience bronchoconstriction, airway swelling, and mucus production. Four to ten hours later, a late allergic response may occur, causing a complex immunological and inflammatory process in the body that can result in long-term changes of the airway such as airway remodeling, fibrosis, and irreversible airway obstruction (Kelly, III, MD & Kaliner, MD, 2016).

Several studies reported associations between air pollution exposures and asthma. Researchers have found an association between increased hospital admissions for asthma and particulate matter, an outdoor air pollutant (American Lung Association, 2016). These fine microscopic particles primarily come from motor vehicle exhausts, power plants, wild fires, manufacturing processes, and the reaction of gases in the atmosphere. Indoor sources include tobacco smoke, cooking, fireplaces, and candles (American Lung Association, 2016). The American Lung Association analyzes data from official air quality monitors to compile the State of the Air report. More than two million children who suffer from asthma live in areas of the United States that received a failing grade for high ozone days and particulate matter pollution by the American Lung Association. (American Lung Association, 2016).

The Environmental Protection Agency's (EPA) Benefits Mapping and Analysis Program (BenMAP) tool estimates the economic value of health impact, resulting from changes in air quality, specifically, ground-level ozone and fine particles (BenMAP-CE | US EPA, 2016). Health impact related to inhalation of fine particles include premature death, non-fatal heart attacks, and asthma exacerbation. The health impacts from ground-level ozone include premature death, aggravated asthma, and lost days of school (see Figure 3).

Figure 3: BenMAP-CE Economic Estimates of Health Impacts related to Changes in Air Quality



Source: United States Environmental Protection Agency, 2016

Climate change is expected to affect air quality through several pathways, including production of allergens, and increased regional concentrations of ozone, fine particles, and dust. Climate change results in higher temperatures and more carbon dioxide which increases pollen production, especially for more allergenic types of pollen such as ragweed, and longer pollen seasons (American Lung Association, 2016). Increased pollen levels contribute to missed work and school days, more asthma emergency department visits, and the use of over-the-counter medication to treat allergic rhinitis.

Council of State and Territorial Epidemiologists (CSTE) and CDC collaborated to address gaps in understanding environmentally-related diseases, and identify specific areas and indicators that should be evaluated. A new initiative of the State Environmental Public Health Indicators Collaborative (CSTE/SEHIC) asthma work group is the surveillance of pollen and its relationship to respiratory conditions, such as asthma, in the United States (Council of State and Territorial Epidemiologists, 2016). The aim of this initiative is universal applicability in which every state should be able to replicate and produce environmental public health indicators (Council of State and Territorial Epidemiologists, 2016).

Environmental Health in Louisiana

Man-made and natural disasters have a significant and long-lasting impact on the lives of residents and the ecosystem of Louisiana, especially in the Gulf Coast region where environmental health hazards have developed in the air, land, and water. The Exxon Valdez oil spill in 1989, and the BP oil spill in 2010 resulted in the loss of wildlife and marine animals, negative economic impact due to decreased tourism in affected areas, and potential adverse health events in people directly exposed to the oil during the cleaning and recovery process (National Wildlife Federation, 2016).

Louisiana has experienced several tropical storms, hurricanes, and floods in succession. The largest and most devastating of these natural disasters is Hurricane Katrina which flooded 80 percent of New Orleans and displaced more than two million people in the region. Childhood asthma morbidity and mortality in New Orleans, Louisiana, were among the highest in the nation prior to Hurricane Katrina. Severe water damage, post-Katrina, created an environmental health hazard that led to high levels of mold, and other allergens and pollutants in the air and water, as

well as post-traumatic psychosocial sequalae among residents (Herman et al, 2012). Louisiana suffered from an acutely and long-term weakened health care infrastructure, post-Katrina.

Researchers and health care professionals at the local, state, and federal levels, and the private sector formed strategic alliances to support the healthcare needs of residents of Louisiana during rescue and recovery efforts. The Head-off Environmental Asthma in Louisiana (HEAL) research project was conducted in collaboration with the New Orleans Department of Health, the Merck Childhood Asthma Network, the National Institute of Environmental Health Sciences (NIEHS), National Institute of Minority Health and Health Disparities, Tulane University School of Public Health and Tropical Medicine, and Louisiana State University Health Sciences Center - School of Public Health (Herman et al., 2012).

The HEAL research project aimed to examine the effects of mold and indoor allergen exposure in children with asthma, residing in New Orleans after Hurricane Katrina; determine whether the combination of evidence-based asthma counseling and environmental interventions could be effective in a post-disaster setting; and characterize relationships between environmental exposures and childhood asthma morbidity (Herman et al., 2012). Results of the HEAL research project revealed that the combination of evidence-based asthma interventions was associated with improved asthma symptoms among children in post-Katrina New Orleans. Post-intervention changes in symptoms were consistent with previous randomized trials of National Cooperative Inner City Asthma Study (NCICAS) and ICAS (Inner-City Asthma Study) interventions (Herman et al., 2012).

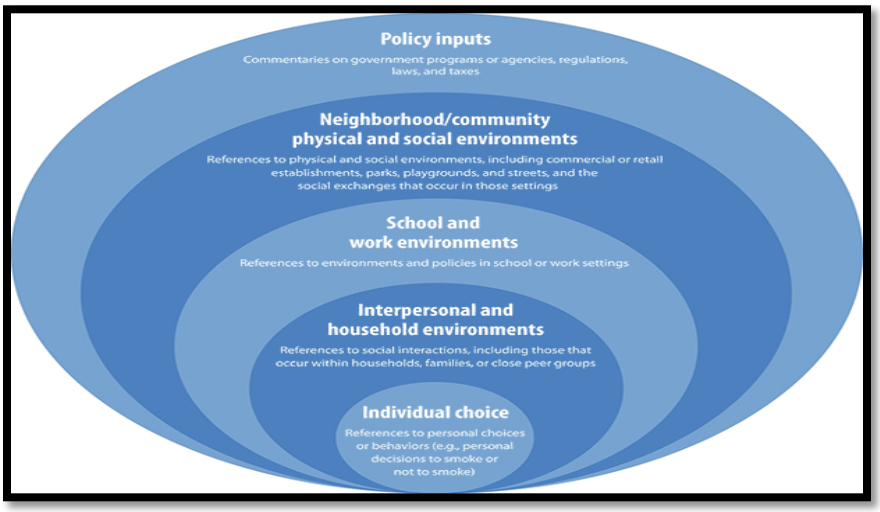
The Community Preventive Services Task Force recommends the use of home-based multi-trigger, multicomponent interventions with an environmental focus for children and adolescents with asthma based on strong evidence of effectiveness in improving overall quality

of life and productivity, improving asthma symptoms and reducing the number of school days missed due to asthma (The Community Guide, 2008). Environmental control measures of allergens should be considered first-line treatment measures for asthma. Understanding the complex relationships between environmental exposures and allergies on asthma is important in the development of effective primary and secondary prevention strategies.

Application of a Theoretical Framework to Asthma Management

The social ecological theory examines a child's development within the context of the system of relationships that form his or her environment. The theory further defines the complex levels of the environment and the effect each level has one a child's physical and psychosocial development. The social ecological model (SEM) gives a visual depiction of the complex interaction between individual, interpersonal, community, organizational, societal, and policy factors that relate to childhood asthma (see Figure 4). Changes or conflict in any one level of the social ecological model can have a profound effect throughout other levels (Agency for Toxic Substances and Disease Registry, 2015).

Figure 4: Social Ecological Model



Source: Centers for Disease Control and Prevention, 2016

The Social Ecological Model and Asthma Management

Individual - The individual level identifies biological factors and the internal determinants of behavior that increase the incidence and prevalence of childhood asthma. Prevention strategies at this level are designed to promote changes in attitudes, beliefs, and behaviors that ultimately prevent asthma exacerbation.

Interpersonal - The interpersonal level examines the close relationships that may increase the risk of asthma exacerbation. An individual's closest social network - family members, coworkers, friends - greatly influences their behavior. The activities on this level are intended to facilitate individual behavior change by affecting social and cultural norms and overcoming individual-level barriers. Prevention strategies at this level may include tobacco cessation support for parents to reduce a child's exposure to second-hand smoke in the home.

Community - The community level explores settings, such as schools and neighborhoods, in which social relationships occur and seeks to identify characteristics of the community that are associated with asthma exacerbation. Coalition building at this level is effective and involves identifying asthma champions in health systems, public health entities, and housing authorities and regulations. Community-level strategies foster positive community relationships and promote community empowerment and buy-in for healthy families, quality schools, and safe neighborhoods. Prevention strategies as this level may involve collaborating with tribal health departments to expand asthma management services.

Organizational - The organizational level explores the roles that organizations and agencies play in prevention strategies. Health care systems, employers or worksites, health care plans, local health departments, and professional organizations represent potential sources of

organizational messages and support. Activities at this level may involve school district-wide clean air programs that prevent bus idling and emitting primary pollutants from diesel engines.

Societal - The societal level assesses social and cultural norms. Societal factors include the health, economic, educational and social policies that help to maintain economic or social inequalities between groups in society. Activities at this level may involve national media campaigns including TV, radio, newspaper, and social media to promote asthma awareness and clean air quality standards.

Policy - The policy level activities involve interpreting and implementing public policy, laws, and resource allocation that support asthma prevention efforts. Federal, state, local, and tribal government agencies may support policies that promote healthy behavior. Policy level activities may involve collaborating with coalitions to communicate policy decisions to the public, such as insurance mandates for specialty clinic visits with asthma and allergy specialists.

Using the SEM framework as a guide for implementation of program activities, the Louisiana Asthma Management and Prevention Program (LAMP) implemented the Asthma-Friendly Schools Initiative in high-risk Louisiana populations in 70 state K-12 public schools, over a 2- year timeframe (Nuss et al., 2016). Program activities included a needs assessment, identification of students with asthma, individualized asthma action plans (AAP), staff trainings, environmental quality improvement, and school system policy changes to address the asthma burden. Results of the Louisiana Asthma Management and Prevention Program revealed 522 new or existing asthma cases, and improved asthma knowledge and awareness among students, parents, and school personnel. Participating schools adopted policies that improved asthma action plan collection, increased compliance with bus-idling restrictions, improved adherence

with asthma medication self-carry, and improved school indoor air quality across all locations (Nuss et al., 2016).

The success of the Louisiana Asthma Management and Prevention Program showed that the social ecological framework can be used successfully for school-based programs to address and improve asthma-related issues from the individual, interpersonal, community, organizational, societal, and policy levels (Nuss et al., 2016). The social ecological framework is a sound theoretical framework to guide strategic collaborations, an effective care coordination process in the healthcare setting, and consideration of the care of entire family as a critical component to successful asthma management. The social ecological framework is more likely to sustain prevention efforts over time than the implementation of a single intervention.

Patient Centered Medical Home and Telehealth

The concept of patient centered medical home (PCMH) was introduced by the American Academy of Pediatrics Council on Pediatric Practice. The medical home concept originally referred to one central source of medical records for children with special health care needs (Patient-Centered Primary Care Collaborative, 2016). The concept has evolved beyond data entry, to a sound methodology for delivering quality of care for all children. Presently, the PCMH model has been endorsed by patient care and advocacy organizations including American Academy of Pediatrics, the American Academy of Family Physicians, the American College of Physicians, and the American Osteopathic Association (Patient-Centered Primary Care Collaborative, 2016).

The Agency for Healthcare Research and Quality (AHRQ) defines the PCMH as an approach to the delivery of primary care that is: a partnership among practitioners, patients, and

their families to provide education that supports informed decision making; a comprehensive team based approach that is accountable for a patient's comprehensive care to promote physical and mental wellness; coordinated care organized across all divisions health care system; accessible to patients with shorter wait times, after hours care flexibility, committed to high quality and safety; ensures that clinicians and staff enhance the quality of care for patients and families; and strong communication through health information technology (IT) innovations (Patient-Centered Primary Care Collaborative, 2016). One of the most prolific health IT innovations in the delivery of medical care is the telehealth model of care delivery.

The Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services defines telehealth as the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health and health administration (HRSA, 2016). Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications. Telehealth is viewed as a cost-effective alternative to the more traditional face-to-face way of providing medical care. Telehealth seeks to improve a patient's health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site (Telemedicine - Medicaid, 2016).

As evidence of telehealth's potential to improve population outcomes and reduce costs continues to grow, legislative action and efforts to further expand access to telehealth and its related technologies is being enacted (Kendall & Rawal, 2015). The Medicaid and CHIP Reauthorization Act of 2015 (MACRA) law includes initial steps to remove barriers to telehealth use for providers participating in alternative payment models (APMs). Medical coverage for

telehealth varies by state. Should a state decide to cover telehealth but does not cover certain practitioners or providers, or its telehealth coverage is limited to certain parts of the state, the state is responsible for assuring access and coverage for physical examinations by designated practitioners or providers in areas where telehealth is not available (Telemedicine - Medicaid, 2016).

Eliminating restrictive state policies could significantly increase the use of telehealth, especially at a time when providers are seeking high-value ways to coordinate care for patients across various settings. Research suggests that Medicare and Medicaid should update and streamline payment policy for telehealth and leverage APMs to expedite the adoption of technologies that engage patients in their care and avoid the use of more intensive and costly therapies (Kendall & Rawal, 2015). Based on a phased-in approach to expanding access to telehealth services in Medicare, the ten-year federal savings from 2017-2026 are projected to be $1.8 billion (see Table 2).

Table 2: Projected Medicare Savings from Telehealth

Savings from Telehealth

(in $billions)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10 years
Medicare	-0.5	-0.5	-0.1	0.1	0.2	0.3	0.4	0.5	0.7	0.8	1.8
Medicaid-federal	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.5
Total federal	**-0.5**	**-0.5**	**-0.1**	**0.1**	**0.2**	**0.4**	**0.5**	**0.6**	**0.8**	**0.9**	**2.4**
Medicaid-state	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4
Private health insurance	-0.1	-0.1	0.0	0.1	0.2	0.4	0.5	0.6	0.8	0.9	3.4
Out of pocket spending	-0.2	-0.2	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	1.3
Total- Medicare, Medicaid, PHI + OOP	**-0.8**	**-0.8**	**-0.1**	**0.3**	**0.6**	**0.9**	**1.2**	**1.5**	**2.1**	**2.4**	**7.5**

Source: Third Way Report, 2016

Evaluation of School-Based Telehealth Asthma Programs

School-based telehealth programs have been shown to improve attendance and reduce barriers to learning. It is a valuable care delivery model to complement and expand the capacity of schools to meet the health care needs of children, and work obligations of parents. The innovation of school-based telehealth programs provides a forum for discussion, and opportunities for clinical, research, policy, and educational collaboration. Exploration of the telehealth programs can generate interest in outreach, research and the reporting of outcomes, and to identify and remove any barriers to the fullest implementation of school-based telehealth health programs. Successful implementation of a telehealth program requires a careful planning process that is respectful of community-specific considerations. Implementation involves assessing local and regional needs, securing community support and establishing goals, evaluating resources, configuring logistics, training staff, informing parents, and launching the clinic. Proper planning is crucial to the establishment of a rural school-based telehealth clinic.

In a study of three elementary schools in an inner-city neighborhood in San Francisco, researchers developed a school-based program that identified children with asthma and used telehealth technology to consult with an asthma specialist for recommendations. Results of the telehealth visit were communicated to the patient's parent and primary care physician (Bergman et al. 2008). Study results demonstrated the feasibility of bringing subspecialty care to children with asthma in the context of their school. The study revealed that 24 percent of the students who screened positive for asthma symptoms were unaware that they had asthma. By utilizing telehealth technology, the researchers were able to increase the efficiency of the specialist time

and ensure that 100 percent of the study children, 92 percent of whom used California's Medicaid program, Medi-Cal, had access to specialty care (Bergman et al. 2008).

Pediatricians and staff at the University of Rochester Medical Center created a pilot project in Rochester, NY called Health-E-Access. The project utilized telehealth capabilities to treat inner-city preschool and elementary school-aged students. The project was part of the Robert Wood Johnson Foundation (RWJF) Local Funding Partnerships (LFP) national program. Health-E-Access involved 10 child-care centers and 11 elementary schools, covering more than 2,000 children (Robert Wood Johnson Foundation, 2007). The project logged 4,555 telemedicine visits, facilitated by over forty Rochester clinicians who used telemedicine to treat child patients in child-care centers and schools. Project researchers reported a reduction in the number of child-care days these children missed due to illness by 63 percent when compared to a control group without telemedicine and adjusting for other variables.

Research results also revealed that 91.2 percent of the telemedicine visits allowed parents to stay at work, and that 93.8 percent of the child illnesses handled by telemedicine would have otherwise resulted in a visit to a doctor's office or emergency room (Robert Wood Johnson Foundation, 2007). Researchers also studied the before-and-after impacts of telemedicine on children's absences due to illness (ADI), at five inner city child-care centers. After adjusting for other variables, telemedicine remained the strongest predictor of ADI with a 63 percent reduction in ADI attributable to telemedicine. In the 940 telemedicine encounters, the telehealth clinicians recommended that 2.8 percent required an in-person visit to a physician (Robert Wood Johnson Foundation, 2007).

Secure telehealth technology allows patient centered medical homes to provide care coordination, follow-up visits, referrals, and specialist visits for patients. Telehealth is a viable

service delivery model to mitigate the persistent health care provider shortage by utilizing real-time access to specialists from a laptop or desktop computer, with audio-visual connectivity, over a secured, internet connection. The result is HIPAA-compliant health care service delivery, equal to the quality of an in-person consultation with a health-care provider, using high-quality video conferencing without the cost of expensive video conferencing equipment or travel to a distant provider. School-based telehealth programs can improve access to healthcare for school-aged children in medically underserved areas and health professional shortage areas, particularly inner city and rural populations. Telehealth programs across the nation are making a significant impact in keeping children healthier and reducing the number of absences due to acute and chronic illness, from the safe and familiar setting of their school building.

Chapter 3: Methodology

Several federal, private, and non-profit agencies address the genetic, environmental, behavioral, and socioeconomic factors associated with asthma through research, funding opportunities, education and training, advocacy, and innovation. The American Academy of Allergy, Asthma & Immunology (AAAAI) is committed to the advancement in the knowledge of allergy, asthma, and immunology for optimal patient care. The AAAI is committed to publishing current research, funding research and training, presenting results of current advancements in treatment and research, and creating effective and visible platforms for advocacy (History | AAAAI, 2017). The AAAAI and the AAAAI Foundation granted almost $1 million in awards for allergy/immunology research projects in 2017 (Grants & Awards | AAAAI, 2017).

The Centers for Disease Control and Prevention (CDC) National Asthma Control Program funds states, school programs, and non-government organizations to help them improve surveillance of asthma, train health professionals, educate individuals with asthma and their families, and explain asthma to the public (CDC - Asthma, 2016). In 2015, the CDC awarded 23 state health departments a funding opportunity over a 5-year period (CDC Awards Funding for Comprehensive Asthma Control, 2017). The award aimed to maximize the reach, impact, efficiency and sustainability of comprehensive asthma control services in the following components: evidence based guidelines for medical management, asthma self-management education, and home-based multicomponent, multi-trigger reductions services—as well as connections and coordination between these components (CDC Awards Funding for Comprehensive Asthma Control, 2017).

The National Institutes of Health (NIH), a division of the U.S. Department of Health and Human Services, is a biomedical and health-related research agency. The NIH conducts interagency scientific research through its Intramural Research Program (IRP), and provides major biomedical research funding to non-NIH research facilities through its Extramural Research Program. National Institute of Allergy and Infectious Diseases (NIAID) has supported targeted research to understand the causes of and develop preventions and treatments for asthma. NIAID research focuses on understanding how the environment, allergens, and genetics interact with the body's immune system to cause the disease and aggravate the symptoms. NIAID-supported investigators are working to prevent asthma prevention and better treatments modalities for those who are currently affected (Asthma | NIH: National Institute of Allergy and Infectious Diseases, 2016).

The United States Environmental Protection Agency (EPA) is dedicated to national efforts to reduce environmental risk, based on the best available scientific information. The EPA's strategic environmental protection plan involves U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and environmental policy (Our Mission and What We Do | About EPA | US EPA, 2017). The EPA also ensures that the United States plays an integral leadership role in collaborating with other nations to protect the global environment. Approximately one-half of the EPA's budget is allocated for grants to state environmental programs, non-profits, educational institutions, and other organizations. The EPA awards over $4 billion in funding, annually. The EPA's work in Louisiana involves water quality, air quality, environmental cleanups, compliance and enforcement, and tribal programs. These environmental initiatives are

managed from the EPA Region 6 office in Dallas, Texas (Our Mission and What We Do | About EPA | US EPA, 2017).

Summary of the Request for Proposal

The National Institute of Health (NIH) Exploratory/Developmental Research Grant Program (Parent R21) seeks to introduce novel scientific ideas, model systems, tools, agents, targets, and technologies that have the potential to advance biomedical, behavioral, and clinical research. It is intended to encourage new exploratory and developmental research projects. Exploratory/Developmental Research Grant Program may involve considerable risk that can lead to a scientific breakthrough, or to the development of innovative techniques, agents, methodologies, models, or applications that could have a major impact on a field of biomedical, behavioral, or clinical research.

Eligible organizations include higher education institutions; nonprofits other than institutions of higher education; for profit organizations; county, city, state, and tribal governments agencies; independent school districts; public housing authorities; nongovernmental tribal organizations (other than Federally recognized tribal governments); faith-based organizations, and community-based organizations. The combined budget for the Exploratory/Developmental Research Grant Program for direct costs, for the two-year project period, may not exceed $275,000.00 and no more than $200,000.00 may requested in any single year. The total project period for this funding opportunity should not exceed two years.

Exploratory/Developmental Research Grant Program reviewers focus their evaluation on the conceptual framework, the level of innovation, and the potential to significantly advance our knowledge or understanding. Appropriate justification for the proposed work can be provided

through literature citations, data from other sources, or investigator-generated data, although preliminary data are not required for R21 applications. Reviewers provide an overall impact score to reflect their assessment of the likelihood for the project to exert a sustained, powerful influence on the research field(s) involved, in consideration of the stipulated review criteria and additional review criteria.

Rationale for Choosing a National Institute of Health (NIH) Funding Source

The rationale for choosing (National Institutes of Health) NIH as a funding source is its commitment to enhancing lives and reducing the burdens of illness and disability, specifically around asthma research. The NIH spent $241 million on asthma research in 2014. NIH-sponsored research and clinical trials in the National Institute of Allergy and Infectious Diseases (NIAID) and the National Institute of Environmental Health Sciences (NIEHS) include initiatives to reduce the public health burden that asthma presents in inner-city populations; longitudinal studies to evaluate the effects of mold exposure in early life; and large genome-wide association study (GWAS) carried out by a consortium of nine research organizations that also identified other genes that were common across multiple ethnic groups. The National Heart, Lung, and Blood Institute (NHLBI) supports studies that explore how new technologies can improve asthma care, how certain medicines and other therapies can help treat asthma and improve quality of life, and what factors cause asthma to develop.

Program Aims and Objectives

Specific Aim 1: To determine, during the course of a one-year school-based asthma telehealth pilot program, whether students will experience decreased absenteeism and presentism, adhere to individualized plan of care, and improved health quality-of-life.

Objective 1.1: Utilize remote, bi-directional audiovisual technology to perform a real-time medical consultation with a pediatric pulmonologist for a respiratory-focused clinical assessment; develop an individualized asthma action plan; provide health education; offer supportive services; and refer students to their patient center medical care for care coordination.

Objective 1.2: Improve the knowledge, attitudes, and skills of students and families regarding the detection and management of asthma, particularly in high-risk populations.

Specific Aim 2: To create, during the course of a one-year school-based telehealth pilot program, a sustainable eco-education and environmental health project with a focus on air quality.

Objective 2.1: Contract with Tulane University School of Public Health and Tropical Medicine to develop a comprehensive eco-education and environmental health curriculum for faculty, staff, students in the eight participating schools.

Objective 2.2: Utilize the United States Environmental Protection Agency (EPA) Indoor Air Quality Tools for Schools Action Kit to create environmental health education materials and communications, draft school policies around air quality, engage in environmental health activities, and promote asthma awareness activities.

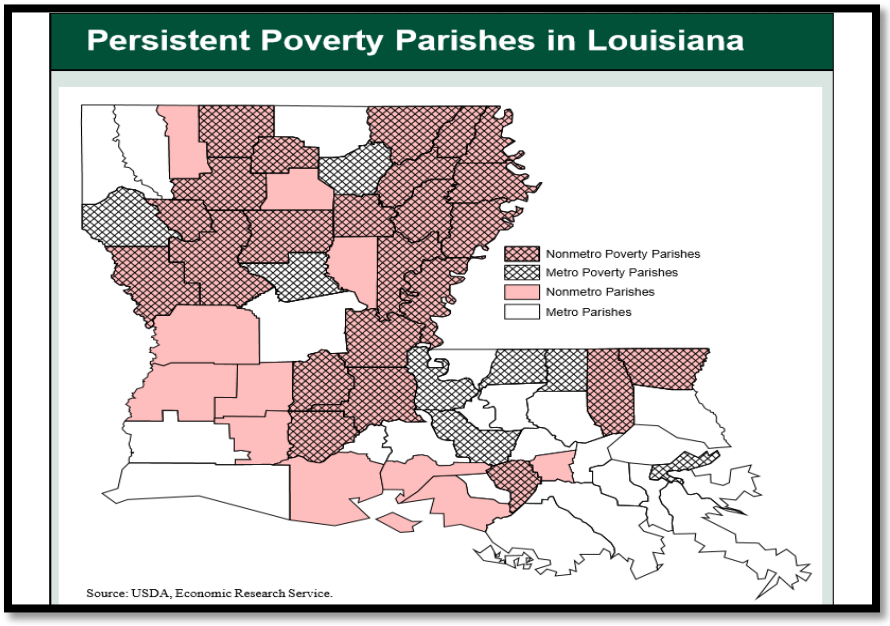
Objective 2.3: Assist participating schools in the development of a strategic partnership with local Parent Teacher Association (PTA) organizations in securing resources, that will sustain the activities associated with the school based eco-education and environmental health project, after the funding period.

Target population

The poverty rate in Louisiana is 19.8 percent, in comparison to the national poverty rate of 13.5 percent. The poverty rate in rural Louisiana is approximately 24.2 percent, almost twice

the national average. There are 64 parishes in Louisiana, of which 35 are rural parishes. Twenty-four rural parishes are defined by the United States Department of Agriculture (USDA) as persistent poverty areas, where 20 percent or more of the population fell below the poverty line as measured by the Census of Population and Housing (see Figure 5). Thirty-two of the 35 rural parishes in Louisiana are defined by USDA as Black high poverty parishes. Black high poverty areas are identified in two ways: over half of the poor population in the county is Black, or over half of the poor population is non-Hispanic White (USDA, Economic Research Service, 2015). The USDA describes eight parishes in Louisiana as housing stress parishes. Seven of these eight parishes are rural. The USDA defines these areas as having housing that lacks complete plumbing, lacks complete kitchen facilities, the rent or owner costs over 30 percent of household income, or there is more than one person per room (United States Department of Agriculture Economic Research Service, 2016).

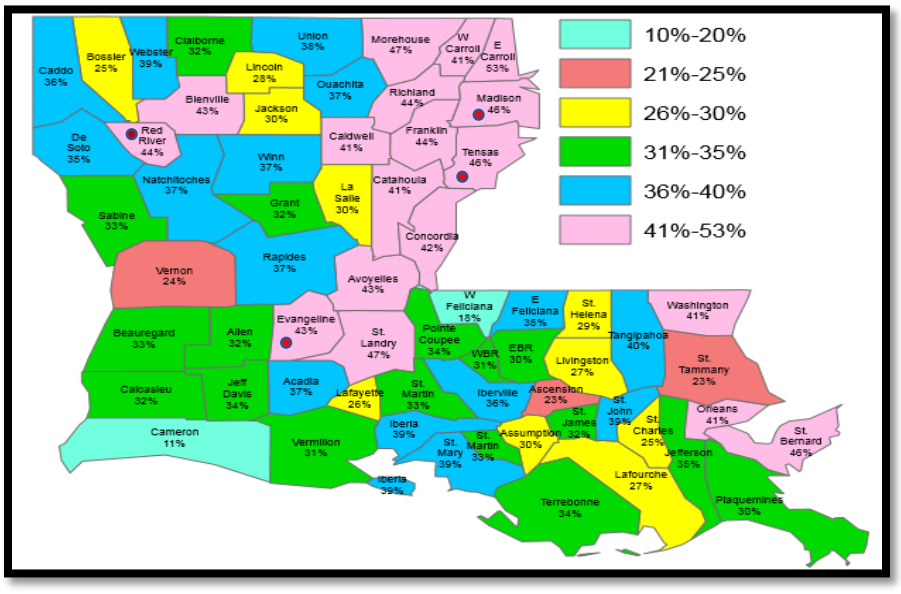
Figure 5: Persistent Poverty Parishes in Louisiana



Source: USDA, Economic Research Service, 2015

A significant portion of the persistent poverty parishes in Louisiana have a percentage population enrolled in Medicaid of 41 percent or greater (see Figure 6). Medicaid services for children in Louisiana are offered through KIDMED which provides preventive health care for Medicaid-covered children under the age of 21. Low-income families make slightly more than the amount that qualifies them for government-sponsored health care coverage and may have difficulty obtaining private insurance (Louisiana Department of Health Medicaid Report, 2014-2015). In recognition of the gap in medical coverage between being Medicaid-eligible and being able to afford private insurance, the federal government and Louisiana established a child health insurance program called LaCHIP, which uses higher income standards than traditional Medicaid. LaCHIP, Louisiana's version of the national Children's Health Insurance Program, is designed to give uninsured children quality health care until 19 years of age (Louisiana Department of Health Medicaid Report, 2014-2015).

Figure 6: Percentage of Population Enrolled in Medicaid by Parish

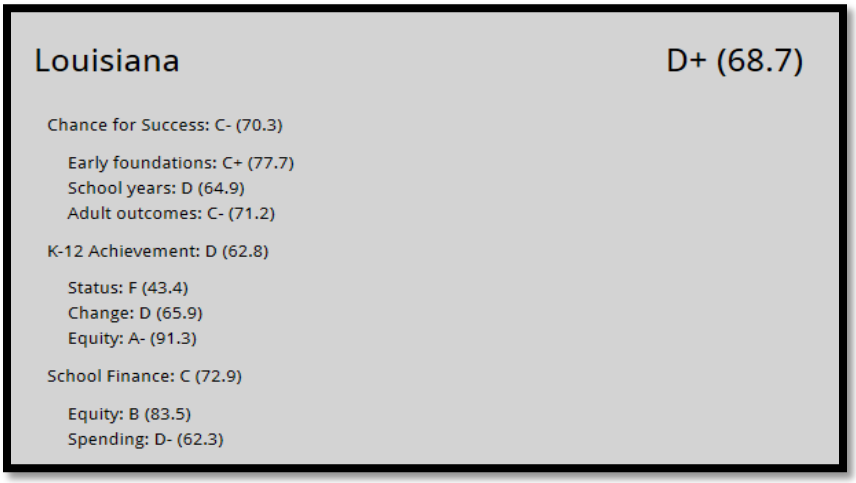


Source: Louisiana Department of Health Medicaid Report, 2014-2015

The Education Week Research Center developed state and national grades on three indices in public education, grades K-12. The Chance-for-Success Index consists of 13 indicators that records early opportunities, progress through the K-12 system, educational and workforce outcomes in adulthood, and a subjective perspective on the role that education plays in promoting positive outcomes throughout a person's life (Education Week, 2016). The K-12 Achievement Index consists of 18 indicators that report current academic performance, gains over time, high school graduation rates, and equity as measured by poverty-based disparities. The school finance index outlines a comprehensive analysis on per-student spending patterns and equity (Education Week, 2016).

The Louisiana public education system ranks 44th in the nation on key predictive indicators of success in the classroom, with scores below the national average (see Figure 7). Implementation of a school-based telehealth program will allow students to receive health services during the school day, in the school setting, which will increase opportunities for classroom learning; decrease absenteeism for urgent medical visits; and reduce prolonged travel for specialty medicine consultations.

Figure 7: Quality Counts 2016: State of Louisiana Report Card



Source: Education Week, 2016

The Breathe Easy Telehealth program will operate a pilot program at one public elementary school and one public middle school in each of the following parishes: Evangeline Parish, Madison Parish, Red River Parish, and Tensas Parish. The program anticipates that 3,686 school-aged may be eligible to participate in the project, which is based on current student enrollment (Education Bug, 2016). We chose to focus on elementary and middle schools in Evangeline Parish, Madison Parish, Red River Parish, and Tensas Parish as our targeted populations because they have been identified as persistent poverty areas, high black poverty areas, and housing stress areas by the Census of Population and Housing and the USDA. Currently, there are no active pediatric pulmonary providers or allergy providers, in the Louisiana Medicaid program, in Evangeline, Madison, Red River, or Tensas parishes (Louisiana Medicaid Provider Locator, 2016).

Evangeline Parish:

- Mamou Lower Elementary School, Mamou, LA - Total school population - 509
- James Stephens Elementary School, Ville Platte, LA - Total school population - 604

Evangeline Parish has a total population of 33,984. Based on U.S. Census Bureau data, Evangeline parish is 69 percent White, 28.3 percent Black or African American, 0.3 percent Asian, 0.3 percent Native American, 1.0 percent of some other race and 1.1 percent of two or more races, 2.3 percent Hispanic or Latino (of any race), 40 percent French, French Canadian or Cajun. The median income for a household in Evangeline parish is $20,532, and the median income for a family is $27,243. Approximately 29.6 percent of the parish is under the age of 18; 27.2 percent of families and 32.2 percent of the population live below the poverty line, including 39.1 percent of residents under the age of 18.

Madison Parish:

- Tallulah Junior High School, Tallulah, LA - Total school population - 202
- Wright Elementary School, Tallulah, LA - Total school population - 727

Madison Parish has a total population of 11,514. Based on U.S. Census Bureau data, Madison Parish is 37.2 percent White, 61.0 percent Black, 0.2 percent Native American, and 0.2 percent Asian. The population is spread out with 32.6 percent under the age of 18. The median income for a household in Madison parish is $20,509, and the median income for a family was $23,589. The per capita income for the parish is $10,114. Approximately 29.7 percent of families and 36.7 percent of the population lives below the poverty line, including 51.6 percent of those under the age of 18.

Red River Parish

- Red River Elementary School, Coushatta, LA - Total school population: 943
- Red River Junior High School, Coushatta, LA - Total school population: 195

Red River Parish has a total population of 9,091. Based on U.S. Census Bureau data, Red River parish is 59.0 percent White, 39.5 percent Black or African American, 0.4 percent Native American, 0.1 percent Asian, 0.3 percent of some other race, 0.6 percent of two or more races, and 1.1 percent Hispanic or Latino. Approximately 30.1percent of residents are under the age of 18. The per capita income for Red River parish was $12,119. Approximately 26 percent of families and 29 percent of the population live below the poverty line, including 40.1 percent of residents under the age of 18.

Tensas Parish

- Lisbon Elementary and Junior High School, Waterproof, LA- Total school population: 122
- Newellton Elementary and Junior High School, Newellton, LA - Total school population: 384

Tensas Parish has a total population of 5,252. Based on U.S. Census Bureau data, Tensas Parish is 56.5 percent Black or African-American; 41.9 percent White; 0.2 percent Asian, 0.1 percent Native American; 0.5 percent of unidentified race; 0.8 percent of two or more races; and

1.2 percent Hispanic or Latino. Approximately 26.5 percent Tensas parish resident are under the age of 18. The median income for a household in Tensas parish is $19,799, and the median income for a family was $25,739. The per capita income for the parish was $12,622. Approximately 30 percent of families and 36.3 percent of the population were below the poverty line, including 48.20 percent of residents under the age 18.

Research Design

In collaboration with the Louisiana Health Department; Children's Hospital, New Orleans, Louisiana; the school districts of Evangeline, Madison, Red River, and Tensas parishes; and the Tulane School of Public Health and Tropical Medicine, the Breathe Easy Telehealth Program will conduct a rigorous family-focused, asthma intervention telehealth program in eight schools across Louisiana. This pilot program is designed as a bridge between specialty asthma care, primary care providers, school nurses and staff, regional and state-level stakeholders, children living with asthma, their families and caregivers.

The core components of the program involve identifying children with current or undiagnosed asthma, providing evidence-based asthma education, case management and referrals using skilled clinical examinations, a validated asthma impact assessment tool, and the innovation of telehealth technology and medical devices. We will employ a nonexperimental study design that utilizes elementary and middle schools to obtain demographic, behavioral, environmental, and clinical data related to asthma management; and provide specialty telehealth services. Generalizability is not a primary goal of this project. The major purpose of this program is to determine whether a specific telehealth program could improve population health outcomes in an accessible context.

A comprehensive literature review, needs assessment, and stakeholder meeting will be conducted to set priorities for the program activities, final proposal, and strategic plan. The Breathe Easy Telehealth Program will receive institutional review board (IRB) approval prior to initiating program activities. The program manager and health IT specialist will perform preparatory school-site visits to ensure all measures of privacy are maintained during clinical presentation; and the site has the appropriate medical equipment, telephone and internet connections required to facilitate a telehealth consultation.

Protection of Human Subjects and Vulnerable Populations

According to federal regulations regarding human research, the principal investigator holds the ultimate responsibility for protecting the safety, rights and welfare of research subjects. It is important to obtain informed consent according to strict regulatory and ethical requirements. Vulnerable populations such as children may have limited capacity to make voluntary and informed decisions. To this end, the Breathe Easy Telehealth Program will adopt additional safeguards for research involving children.

Regulations define children as persons "who have not attained the legal age for treatments or procedures involved in the research under the applicable law of the jurisdiction in which the research is being conducted." The age of consent is determined by the state of residency. Louisiana does not have a specific age regarding medical decisions. Regulations charge the principal investigator with responsibilities for seeking parental permission for the child to participate in the research and securing the child's assent to participate in the research. Demographic and medical data will be collected from all children who participate in the program, by a parent or a legal guardian. Demographic data will include age, sex, and race which will be used for data analysis. Medical data will include the presence or absence of inflammatory

conditions (infections, autoimmune disorders, etc.), atopic conditions (asthma, allergic rhinoconjunctivitis, etc.), exposures that can modify inflammatory/atopic conditions (tobacco smoke, pets, etc.), and immunization history.

Information will be stored in an encrypted (meeting mandated IT security standards) password-protected database and will contain subject identifiers such as name, address, date of birth, and medical record numbers. This information is necessary to maintain contact with the children during the full year of the program. Only the Breathe Easy Telehealth program staff will have access to personal health information. Asthma impact assessment information, and results from the telehealth physical assessment and pulmonary function tests will not have any subject identifiers and will be linked to subjects with a number generated specifically for this program.

Inclusion of women and minorities:

This program has a prospective component in that it will recruit children from four elementary schools and four middle schools, across four parishes in Louisiana. The children will be assessed at the beginning of the program during the telehealth consultation, and re-evaluated nine months after the initial telehealth consultation. It is anticipated that the number of female and male participants recruited will be approximately the same. There are no inclusion or exclusion criteria based on sex or race. Program enrollment will occur at selected schools that have a population reflective of the diversity of the general population of their respective city/parish, and are demonstrated in our expected enrollment table.

Potential Risks:

Confidentiality: Certain aspects of the subjects' medical history and demographics will be collected for this study. Loss of privacy may lead to problems with insurability or social

stigmatization. Also, some of the results from the physical assessment and pulmonary function test being performed may potentially indicate other health conditions. Loss of privacy, in regards to this information, may also lead to problems with insurability.

Adequacy of protection against risks:

Recruitment and Informed Consent: Children will be recruited from the participating elementary and middle schools. Pre-registration in the program by the parent is required. Families who participated in this study were first screened for eligibility. Consent and assent forms will be signed and returned to the designated school-based telehealth site. Children will then be scheduled for an appointment through the school nurse and administrative offices. Parents and guardians will be asked by the school nurse/school administrative staff if they would like to speak with a member of the Breathe Easy staff regarding this program. If they agree, the program manager will be available to discuss the details of the program.

All information will be explained in a nontechnical fashion. Ample time will be available for the child's parent/guardian to ask any specific questions or discuss any specific concerns about the program. Parents will be informed of the risks associated with the loss of confidentiality of collected information. Since there may be Spanish-monolingual children who attend one of the participating schools, the program staff will contact the AT&T language line during the consent process and schedule a Spanish-interpreter to be present during the telehealth visits. Consent forms will be translated into Spanish (and approved by the LHD Committee on Human Research) to be used if subjects are Spanish-monolingual, or indicate that this is their preference. Interpreter services will be engaged to translate for other non-English or non-Spanish speaking patients who indicate interest in participating.

Data Collection and Procedures

Children ages 5-12 with a past or current diagnosis of asthma; or signs and symptoms of asthma including - frequent coughing, wheezing, chest tightness, and difficulty breathing - will be the initial, primary target population. Given there is usually a low consent and assessment form completion rate, the recruitment goal is 40 children from each school, for a total of 320 participants. The pilot program will run for one school year, Fall 2018 to Spring 2019. The assent and consent form will contain information about the program purpose, procedures, benefits and risks of voluntary participation, contact information for the program manager, and information about the Health Insurance Portability and Accountability Act (HIPPA) [see Appendix: Consent Form]. The forms will be distributed by administrative staff and the school nurse at participating schools.

The asthma impact assessment form will include the following information: (1) sociodemographic information, (2) current symptoms and health concerns (3) pertinent past medical and surgical history, (4) basic screening survey indicators, (5) medication adherence and reconciliation - prescription and over the counter medications will be brought in during the consultation to be recorded, (6) a summary of services delivered by the program, (7) control of environmental factors and comorbid conditions that affect asthma such as tobacco and mold exposures, and (8) indicators of efficiency (e.g., education for a partnership in asthma care, knowledge and/or ability to access information about pollen counts; knowledge of preventive measures) [see Appendix: Asthma Impact Assessment Form].

All consent forms and asthma impact assessment forms will be returned in-person, mail, or email, to the student's school administrative office. School administrative staff will collect all forms and send them to the program manager. If any forms are returned to the program manager with incomplete fields, the program manager will contact the parent or guardian to obtain the

missing information. All signed and completed forms will be uploaded onto a Sharedrive with restricted access and minimal necessary use by the program staff, only. All student personal health information (PHI) will be stored on a computer or storage device; using passwords that change every 30 days, anti-virus software, data backups, and encryption. After the forms have been uploaded to the Sharedrive, they will be stored and locked in a file cabinet at the Louisiana Health Department.

Initial Telehealth Consultation

All telehealth appointments will be scheduled with the school administrative staff and the school nurse. The consultations will take place during school hours. Twenty minutes will be allotted for each telehealth consultation. Prior to the initial consultation, the Breathe Easy Telehealth program Co-PI, a pediatric pulmonologist, will access the telehealth schedule and the student's asthma impact assessment forms from the Sharedrive. The pulmonologist will use this form to document the clinical data collected during the telehealth consultation and care recommendations at the conclusion of the visit. The Breathe Easy Telehealth program manager, a registered nurse, will be the patient presenter and clinical evaluator at the school. The Breathe Easy Health IT specialist will also be present at the presenting site to provide technical assistance.

The telehealth consultation will take place in the school nurse office, at each participating school. The child's blood pressure, heart rate, temperature, and pulse oximetry will be measured and recorded. The height and weight will be taken on a standard medical-grade balance beam scale. Next, the nurse will connect with the pediatric pulmonologist using the telehealth network. The nurse will utilize a telemedicine stethoscope to perform a respiratory- focused physical assessment. Then the nurse will perform a pulmonary function test (PFT) using

spirometry. The student will be coached in appropriate blowing techniques, and 6-8 trials will be done to obtain a laboratory best FEV1, in accordance with American Thoracic Society guidelines.

Key spirometry measurements will be recorded:

- Forced Vital Capacity (FVC) - the largest amount of air that you can forcefully exhale after breathing in as deeply as you can. A lower than normal FVC reading indicates restricted breathing. Normal value is 80 percent to 120 percent (95 percent confidence interval).
- Forced expiratory volume (FEV-1) – assess how much air can be forced from the lungs in one second and assess the severity of your breathing problems. Lower FEV-1 readings indicate more significant obstruction. Normal value is 80 percent to 120 percent (95 percent confidence interval).

The pediatric pulmonologist will discuss the results of the physical examination and pulmonary function test, and develop a plan of care, using age and developmentally appropriate communication strategies and visual aides. An after-visit summary packet will be sent home with the student containing a detailed report of the telehealth visit, the individualized asthma action plan (see Appendix: Asthma Action Plan), health education materials, Louisiana Tobacco Quitline information – based on the tobacco asthma impact assessment form indicator, and referrals as deemed appropriate by pediatric pulmonologist. If needed, electronic prescriptions will be sent to the child's preferred pharmacy. A detailed after visit summary and individualized asthma action plan will be mailed to the student's primary care provider to establish care coordination with the patient centered medical home.

KIDMED and LA Medicaid information and the location of the nearest Federally Qualified Health Center (FQHC) will be provided to children who do not have primary health care coverage. An evaluation form will be sent to the parent/guardian after the telehealth visit. Participants who can read and understand the evaluation form (i.e. the participants in middle school) can complete the form with the guidance of the parent or guardian. If this is not feasible, the students' parents/guardian will complete the form on their behalf (see Appendix: Telehealth Evaluation Form). The school nurse at each participating school will contact each parent or legal guardian to confirm receipt of the after-visit summary packet. All clinical questions related to the telehealth consultation will be directed to the program manager and co-PI.

Follow Up Telehealth Consultation

Students who complete the initial consultation will be re-evaluated in nine months using the same clinical workflow as the initial telehealth consultation. The pulmonologist will review the asthma impact assessment form prior to the follow up consultation. The pulmonologist will use the information collected during the follow-up telehealth consultation to evaluate the student's current health status. This information will also determine if the previous health education, asthma action plan, prescribed lifestyle changes, and medication regimen have been implemented effectively and resulted in a reduction in absenteeism, illness, and exposure to environmental triggers.

An after-visit summary packet will be sent home with the student containing a detailed report of the telehealth visit, health education materials, and referrals as deemed appropriate by the pulmonologist. The school nurse will contact the students parent or legal guardian to confirm receipt of the packet. The school nurse at each participating school will contact each parent or legal guardian to confirm receipt of the after-visit summary packet. All clinical questions related

to the telehealth consultation will be directed to the program manager and co-PI. Final recommendations and all components of the after-visit summary packet will be provided in the same manner as the initial telehealth visit. If needed, electronic prescriptions will be sent to the child's preferred pharmacy. An evaluation form will be sent the parent/guardian after the telehealth visit. Participants who can read and understand the evaluation form (i.e. the participants in middle school) can complete the form themselves. If this is not feasible, the student's parents or legal guardian will complete the form on their behalf. The student will complete the program at the end of follow-up telehealth consultation, and be directed to the school nurse and patient centered medical home for continued disease management and primary care services.

Budget

Funding from the grant will be utilized for program operations in terms of the personnel, equipment, and materials that will be essential in starting the Breathe Easy Telehealth Program (see Appendix: Modular Budget).

Organizational DUNS	874-913-256
Enter name of Organization	Breathe Easy Telehealth Program
Budget Type	Project
Start Date	Jan-18
End Date	Dec-19

Personnel Direct Cost Justifications:
Sharon Freeman, PhD (PI, effort = 2.0 calendar months): Dr. Freeman is the associate director of the Chronic Disease Division at the Louisiana Health Department. Dr. Freeman performed research in reactive airway disease and cystic fibrosis at Yale University while completing her doctoral degree. She will coordinate and provide ongoing review of all program activities. Dr. Freeman will also be responsible for facilitating partner and stakeholder meetings, and

overseeing program implementation; data analysis; data reporting; evaluation; and publication of the program results.

Dr. Cynthia A. Beauvilleux, M.D (Co-PI, effort = 2.0 calendar months): Dr. Beauvilleux is a part-time pediatric pulmonologist in The Allergy and Immunology Department at Children's Hospital Main Campus in New Orleans, Louisiana. Dr. Beauvilleux travels to sub-Saharan Africa as a consulting physician for Doctors Without Borders. She has 10 years of experience in the full evaluation of adult and pediatric patients with recurrent or unusual infections and a family history of immunodeficiency disorders. Dr. Beauvilleux's clinical management expertise includes, but is not limited to, allergic rhinitis; asthma; and atopic dermatitis/allergic skin disorders. She is fluent in French and Spanish. Dr. Beauvilleux will facilitate the consultation from the distant provider site (Children's Hospital, New Orleans, LA) and oversee all clinical aspects of the program.

Kia R. Padgett, BSN, RN (Program Manager, effort = 6.0 calendar months): Ms. Padgett earned her B.S.N from the Villanova School of Nursing and has 15 years of experience in the healthcare industry. Her clinical expertise is in pediatric and adult critical care, chronic disease management, telephonic lifestyle modification coaching, and medical triage. She is currently the chronic disease nurse consultant for the Louisiana Health Department – Chronic Disease Division. Ms. Padgett will be the clinician at the presenting site (the school). She will perform signs, the respiratory focused assessment and pulmonary function test at the presenting site while Dr. Beauvilleux facilitates the consultation from the distant provider site at Children's Hospital in New Orleans. Ms. Padgett will also be responsible for participant communications (e.g. call parents or legal guardian regarding incomplete fields on the consent or assessment forms).

Reginald Daniels, M.P.H.c (Graduate student, effort = 6.0 calendar months): Reginald Daniels is a second-year graduate student enrolled in the Epidemiology Program at Louisiana State University Health Center – School of Public Health. Reginald Daniel's thesis is focused on chronic disease epidemiology with a focus on hypertension management in African American men over the age of 50. His work for this program will be overseen by Dr. Freeman data collection and statistical analysis. Mr. Daniels work will enhance understanding about the determinants of asthma in the target population and how to intervene most effectively to reduce morbidity and mortality associated with childhood asthma in Louisiana. He will be responsible for data entry, data analysis, and interpretation of results from the asthma impact assessment forms, telehealth consultations, and the patient telehealth evaluation forms.

Jeffrey Hasselbrand, M.S. (Information Technology Professional, effort = 6.0 calendar months): Jeffrey Hasselbrand is a health technology specialist level III at the Louisiana Health Department (LHD). He will be responsible for overseeing software approval, installation of equipment, training and implementation of the telehealth component of this initiative. Mr. Hasselbrand received his Bachelors and Masters of Science in Information Technology with a concentration in health information systems and software management, from the Georgia Institute of Technology. Mr. Hasselbrand will serve as a health IT liaison for LHD, the participating schools, and Children's Hospital of New Orleans. He will travel with the program manager to all preparatory site visits and telehealth consultations.

Frederick Johnston, M.B.A (Telehealth Consultant): Frederick Johnston is a telehealth consultant from Avizia Consulting Services. He has 10 years of experience in facilitating the development of an organization's telehealth strategy, expanding existing telehealth services into new specialties, establishing patient monitoring programs. Mr. Johnston will work with the PI, co-PI, and program manager to develop the Breathe Easy Program strategic plan, program promotion and communication, and develop a sustainability plan. He will also train all program personnel on the best methods to efficiently and correctly administer telehealth services.

NOTE: Two calendar months of salary is requested for the Principal Investigator and co-Principal Investigator in each year of the project and are calculated on the current rate. The PI will be responsible for the overall coordination of the project and the supervision of the program staff, graduate students, and other project personnel. The NIH salary cap as of February 1, 2017, is $ 185,100 and can be found at http://grants.nih.gov/grants/policy/salcap_summary.htm.

Table 3: Equipment Direct Cost Justifications

Telehealth Equipment for School site (Presenting location)

Equipment	Amount	Number Requested	Final Amount
Targus-17' Groove Backpack	$44.78	2	$89.56
Horus-Scope +3 bundle (General Exam, Oto, Derm camera)	$5,728.13	2	$11,456.26
Horus-Scope +3 bundle (1-year Maintenance)	$641.88	2	$1,283.76
Littman Bluetooth stethoscope	$1695.00	2	$3,390.00
Littman Bluetooth stethoscope (1year license fee)	$650.00	2	$1,300.00
Digital USB Spirometer	$1665.00	2	$3,330.00
Portable Speaker	$113.71	2	$227.42
Headsets	$45.00	2	$90.00
Movi/Jabber client licensing (per completed backpack)	$10,583.50	2	$21,167.00

HP ProBook 450G3 15.6 Core 4GB Ram with embedded laptop	$653.35	2	$1306.70
Spirometer (with 2-year warranty)	$2,500.00	1	$2,500.00
Telehealth Equipment for Hospital (Distant Provider site)			
HP ProBook 450G3 15.6 Core 4GB Ram with embedded laptop	$635.35	1	$635.35

NOTE: All prices are based on LDH state contract quotes with Telemedicine vendor (CISCO) and Durable Medical Equipment Vendor (Welch Allyn).

Travel: Travel funds are required for travel by the program manager and the technology liaison relating to site visits, prior to program activities, and implementation of the program activities. The Louisiana Health Department will provide the PI, program manager, and health IT professional each with a LHD-company vehicle for all program activities that require travel 50 miles or more from the LHD state office - including site visits, partner meetings, and telehealth program visits.

Table 4: Travel Direct Cost Justifications

Reason for Travel	Year 1	Year 2
Telehealth Site Visits: • Local mileage for program director and health IT specialist (2 people) • 40 total travel days • $150.00/night - hotel accommodations • $50.00/day – per diem • 300 miles/month @ $0.517/mile x 4 months	$12,900.00	$10,000.00
Total		**$22,900.00**

Additional Materials: All educational materials including information on state programs, list of Medicaid providers and Federally Qualified Health Centers (FQHC), LAQuitline resources, and asthma educational pamphlets will be purchased and provided by the Louisiana Health Department.

Costs associated with first class postage, and related paper products for mailers will be assumed by the Louisiana Health Department. The program manager will send a detailed after-visit summary and individualized asthma action plan to primary care providers and unable to reach letters to students, as needed.

Publication Costs: We are requesting funds for the publishing costs associated with disseminating findings from the proposed program.

Indirect Costs: Fringe benefits and graduate student tuition remission are charged at the currently approved and anticipated rates and can be found at Office of Sponsored Projects at http://www.lsu.edu/osp/proposals/policies-procedures/current-rates.php. Graduate student support is based on the current University rate for graduate students.

Consultant: The PI and Co-PI secured a commitment from a telehealth consultant to provide four days of specialized in-person and web-based telehealth program training, at a discounted rate of $1,250.00 per 8-hour session. The trainings will take place during two days in the Spring 2018, preceding implementation of the program activities, and Fall 2019, after the program activities are concluded. The consultant has agreed to provide technical assistance during the program activities, at no additional cost.

Additional Narrative Justification: The first-year budget is higher than the second-year budget as this includes the majority of the telehealth and technology equipment purchases. Budget items excluded from the F&A base calculations cover the prorated graduate student tuition fee of $6,000 in year one, and $6,000 in year two.

Evaluation

The evaluation framework for the proposed program involves a two-part evaluation plan: a process evaluation and an impact evaluation. The evaluation plan for the Breathe Easy Telehealth program will focus on the process of providing health education and asthma specialty clinical services using a telehealth care delivery model. It will also focus on eventual outcomes, in terms of increased knowledge of asthma and asthma-related triggers; adherence to the prescribed medication regimen and individualized asthma action plan; decreased absenteeism; decreased urgent care, emergency room visits or hospitalization due to asthma exacerbation; tobacco reduction or cessation; and overall improved asthma-related quality of life.

Process evaluation activities for the Breathe Easy Telehealth program will examine the environment and setting in which the telehealth services will be provided, and understanding the strengths and weaknesses of the collaborating organizations, target population and community environment, and community interaction. The focus of the process evaluation, early in the Breathe Easy Telehealth Program, is to determine if changes need to be made in internal

processes, staffing, program operations, communications, marketing, and fund development to successfully meet the aims and objectives of the program.

An impact evaluation will generate information to measure the overall worth and utility of the Breathe Easy Telehealth program, beyond the granting period; and examine the overall value of the program at the community level and program sustainability. Regional and national agreements for targeted school-based telehealth interventions and outcomes can promote large-scale program replication and promote work across multiple spectrums, including the following:

- Community mobilization efforts - e.g., organizing community health workers to perform home visits for high risk children to ensure environmental precautions in the home for asthma management;
- Research initiatives - e.g., an effort to find out whether inequities in health outcomes based on socioeconomic status can be reduced by using a telehealth care model;
- Surveillance systems - e.g., whether early detection of school readiness improves educational outcomes;
- Advocacy work - e.g., a campaign to influence the state legislature to pass legislation regarding tobacco control, environmental safety concerns such as no school buses or cars sitting idle with engines running;
- Social marketing campaigns - e.g., a campaign in the inner City and rural areas encouraging indoor mold removal and tobacco cessation to reduce incidence and prevalence of asthma;
- Infrastructure building projects - e.g., a program to build the capacity of state agencies to support community development initiatives and environmental safety policies;
- Training programs - e.g., community health worker trainings to complete home evaluations for mold job training program to reduce levels of mold exposure and other asthma triggers in the home; and
- Administrative systems - e.g., an incentive programs to improve efficiency of asthma health services.

Analysis and results from the evaluations will include an assessment of self-reported asthma symptoms, healthcare utilization, asthma triggers and environmental exposures, health quality of life indicators, and asthma-related events. We will also offer lessons learned from the project and direct service interventions - e.g. a program that provides access to health education, preventive services, and specialty providers for high risk asthma patients. A logic model has been created as a six-column graphical representation of the relationship between the different components of

the Breathe Easy Program – inputs, activities, outputs, short term, outcomes and long-term outcomes - as an initiative to improve asthma management in elementary and middle school children using a telehealth care delivery model (see Appendix: Logic Model).

Milestones of the program's progress will include performance measures set by the funders, program staff, and partners. This systematic process is used to determine what proportion of the students, who would benefit most from the services provided by the Breathe Easy Telehealth Program, actually accessed the program; what were the demographic and clinical characteristics of students and families who utilized the services provided by the Breathe Easy Telehealth Program; and were the recommended plan of care, health education, and individualized asthma action plan appropriate and consistent with the results of asthma impact assessment form. The evaluation plan reflects various stages of the project with an accompanying timeline to track the program activities against time (see Appendix: GANTT Chart).

Sustainability Plan

The Breathe Easy program manager will work with the PI to compile a subaward request packet, which consists of the Subaward Request Form and applicable documents in accordance with the SRF instructions (see Appendix: Letter of Commitment). Stipulations of the subaward are outlined in the subaward agreement between the Louisiana Health Department and Tulane University School of Public Health and Tropical Medicine, to include the following (see Appendix: Subaward Agreement):

- Objective, aims and purpose;
- Period of performance;
- General description of the activities to be performed by the subcontractor;
- Expected results;
- A list of detailed work requirements, tasks, and what is expected;
- Provide technical and performance specifications;

- Performance, quality and timeliness requirements;
- Workload requirements;
- Personnel requirements, qualifications, and skill levels expectations; and
- Reporting requirements to be submitted by the contractor to monitor progress.

The project will include a comprehensive program on environmental health, climate change, and air quality. The participating schools will develop their projects design. Tulane University will assist the participating schools in the development of a strategic partnership with the local Parent Teacher Association (PTA) organizations to secure resources to sustain the activities associated with the eco-education and environmental health project, after the funding period.

Statistical Analysis and Reporting of Results

Approval from the research ethics committee will be obtained for data analysis and publication following informed consent for the respective telehealth services and as part of a school-based clinical database for students attending the participating schools. Quantitative and qualitative data collected from the asthma impact assessment form and the telehealth visits will be entered into IBM SPSS 22.0 and NVivo 11, respectively, to enable data triangulation between the quantitative and qualitative datasets. Research from the program is descriptive in nature. Descriptive statistics will be performed as appropriate, including frequencies for variables.

Data from the asthma impact assessment form and telehealth consultation notes will be entered and analysis analyzed by the graduate student epidemiologist-evaluator. For the comparison of categorical variables, Chi-squared test will be performed. A p-value of <0.05 will be taken as significant for all the analysis done in the program. Results of data analysis will be used to identify knowledge gaps; evaluate medication adherence; assess the impact of high trigger burden on the frequency of severe asthma exacerbations, hospitalizations, and days lost at school; and the impact on overall quality of life. Program results will be complied in graph, text, and table form, into a formal report.

Public Health Implications

Continuous improvement is the most critical mandate in both public health and health care today. Improving the health status of families, communities, and society requires a broader approach to addressing the vast array of factors affecting health status. To effectively design, implement, and sustain a comprehensive approach to health promotion, better collaboration across local; state; federal government; academic institutions; and acute and primary care settings is paramount. Telehealth technology can help achieve the "triple aim" initiative, developed by the Institute for Healthcare Improvement, to improve patient outcomes; access to care; and cost savings to the health care system. School-based telehealth programs reduce absenteeism, improve convenience of provider appointments, through the provision of primary and secondary prevention strategies, and cost effective, quality healthcare services.

Implementation of the Breathe Easy Telehealth program as a research translation project will be effective in the improvement of asthma awareness and self-management skills among elementary and middle school children, their families, and the community. The implementation of school-based telehealth programs is essential to improve population health, specifically for childhood chronic disease. Cultural competence and considerations are the hallmark of best-quality public health systems, programs, and research in addressing health inequalities; innovative strategies for health promotion; and successful translation of evidence-based interventions to improve the behaviors, knowledge, and overall health outcomes of the residents of Louisiana.

Chapter 4: Grant Proposal Review Process

I would like to take this opportunity to thank my distinguished thesis committee - Dr. Caudle, Suleima Salgado, Dr. Blais, Professor Rutz, and Dr. Westfall. I had the privilege of being a student, in your respective courses throughout the Executive MPH program. I also had the privilege of being a presenting site clinician during a pilot teledermatology program with the Georgia Department of Health and Emory University Hospital. Your expertise and desire to see this project be the best it can be, helped me to reach this culminating point of my graduate studies at the Rollins School of Public Health.

Description of the Methodology of the Grant Review Process

The thesis committee consists of faculty from the Rollins School of Public Health's Executive Masters of Public Health program, Department of Behavioral Science and Health Education Department, Department of Environmental Health Department; and the director of telehealth and telemedicine services at the Georgia Department of Public Health. The grant reviewers received the grant proposal and standardized rubric as an email attachment. The reviewers were allotted two weeks to review and score the grant proposal. Reviewers provided feedback on the content and quality of the grant proposal to the author, individually. After reviewing feedback from the committee, and assessing for common themes and areas of improvement, I edited the proposal and made corresponding changes to the thesis document, as deemed appropriate.

Grant Reviewer Comments on Request for Proposal

Reviewer 1: Linelle Blais, PhD comments:

Comment 1: More discussion about telehealth and how this is a novel or adds to the field of health and technology; whether novel approach in LA. Given multiple sites, some discussion about possible analyses across site even if qualitative, especially if site selection characteristics.

Response to comment 1: Added information about two telehealth studies in San Francisco, CA and Rochester, NY, respectively. Updated the thesis document and proposal with the results of previous school-based telehealth programs and public health implications of telehealth as a care delivery model.

Comment 2: Socio-ecological models mentioned as theoretical structure. Link of variables studied to model could be stronger or just linked more clearly. Very nice logic model. Ambitious.

Response to comment 2: Included more information about the SEM variable studies aligning with the SEM framework under the research strategy.

Comment 3: Discuss more on proven value of telehealth in schools. Are there similar telehealth programs in place in LA, other similar schools nationwide that lead one to believe this could work? More specific discussion of travel costs and site visits to justify costs.

Response to comment 3: Added information about two telehealth studies in San Francisco, CA and Rochester, NY. Updated results of telehealth programs and public health implications of telehealth as a care delivery model to the thesis document and the proposal.

Comment 4: Concern that without a check on parent receipt of information from student about, won't know if program challenges or failure to meet certain outcomes were because parent did not get info for follow through from child. Could look like program failed when was successful up to the point of follow through at the home. Good if direct physician access to information will help.

Response to comment 4: Added an additional step in the workflow. The school nurse working with the proposed program staff will contact the patient or legal guardian of the students to verify receipt and review of the after-visit summary packet. All missing and incomplete packages will be resent through the school administrative staff and school nurse, to the parent or legal guardian. If the parent or guardian has specific clinical questions after the telehealth consultations, they will be directed to the program manager, co-PI, or PCMH.

Comment 5: Not clear if novel to field; appears like novel to schools at least with Asthma. No discussion about telehealth more generally and how adds to novel use of technology for health generally.

Response to comment 5: Clarified language in the abstract and innovation sections of the proposal to emphasis novelty of a school-based asthma telehealth program in Louisiana.

Reviewer 2: Daniel C. Rutz, MPH comments:

Comment 1: Improve conciseness and clarity of content in the cover letter and research strategy.

Response to comment 1: Revised and edited all areas of ambiguity throughout the proposal document.

Reviewer 3: David N. Westfall, MD comments:

Comment 1: Feedback revealed agreement and strong agreement with the questions and topics outlined in the rubric.

Response to comment 1: Not applicable.

Chapter 5: Grant Proposal

Presented is the final version of the Breathe Easy Telehealth Program grant proposal, under the application guidelines for NIH funding opportunity announcement PA-16-161. The content of the proposal incorporates the suggested edits by the thesis committee chair; thesis field advisor; and three thesis committee members.

March 29, 2017

Center for Scientific Review
National Institutes of Health
Suite 1040-6701
Bethesda, MD 20817

Dear Project Officer,

It is a privilege to submit a grant proposal, entitled "The Breathe Easy Telehealth Program" for consideration under the application guidelines as noted by our chosen grant, PA-16-161: NIH Exploratory/Developmental Research Grant Program. Since our proposal deals primarily with the provision of primary prevention strategies, of specialty asthma health care services, environmental health, and, we request that this proposal be reviewed by the following:

Institute
National Institute of Environmental Health Sciences (NIEHS)
Study Section
Healthcare Delivery and Methodologies IRG [HDM]

The Breathe Easy Telehealth program will align and contribute to the Healthy People 2020's Respiratory Disease targeted objectives to reduce the proportion of children ages 5 to 17 years with asthma who miss school days, increase the proportion of persons with current asthma who receive formal patient education, and increase the proportion of persons with current asthma who receive appropriate asthma care according to National Asthma Education and Prevention Program (NAEPP) guidelines. In Louisiana, children 10 years old and younger account for more than 50 percent of the state's asthma Medicaid recipients and close to 50 percent of the state's asthma expenditures. Intermittent asthma severity among children in Louisiana, with a current diagnosis of asthma, is lower than the national average. However, the persistent asthma severity among children in Louisiana, with current diagnosis is above the national average. The Breathe Easy Telehealth program will allow for the delivery of health care services through a strong consortium of clinical, public health, academic, and community partners. Every consortium organization will be actively involved in the planning and delivery of program activities. Increasing formalized patient education, preventive services, community health resources, and specialty health care services in vulnerable and underserved populations, especially children, is not likely until research, evidence-based programs, and diffusion of innovation confront the barriers to health care access and disease management, systematically.

Enclosed are the components of the RFP which include the project summary, project narrative, description of the program's objectives, research strategy, budget and budget justifications, and all supplemental materials as appropriate. Thank you for your consideration.

Sincerely,
Sharon Freeman, PhD
Associate Director, Chronic Disease Division
Louisiana Health Department

Project Summary

Asthma has emerged as a significant health and economic burden to patients, families, health systems, payors, and society. It is one of the most common chronic childhood conditions in the United States, affecting approximately nine million children under the age of eighteen. Researchers have identified a broad range of genetic, behavioral, and environmental triggers associated with symptoms and exacerbation. Asthma disproportionately affects low-income and minority populations with higher morbidity and mortality rates. Although the etiology of asthma is unknown and currently there is no cure, asthma can be effectively controlled through prevention activities and symptom management.

Louisiana has a unique set of demographics, socioeconomic, environmental, and geographical factors that contribute to the state's childhood asthma burden. We propose a research program that will create opportunities for children and families living in low-income communities to access specialty health care services using a comprehensive, healthcare delivery model. The proposed research program entitled "The Breathe Easy Telehealth Program" aims to increase access to healthcare; utilize evidence-based prevention strategies; create essential clinical, public health, academic, and community partnerships; improve population health; and demonstrate sustainability. The program will examine the social, behavioral, and environmental determinants of childhood asthma, as pervasive health concern in Louisiana; and analyze the clinical effectiveness of telehealth as a model for school-based healthcare delivery.

A pilot program will be conducted in eight elementary and middle schools; across four USDA-designated, persistent poverty parishes in Louisiana. Students with signed consent forms and completed asthma impact assessment forms will be eligible for participation in program. Using encrypted health information technology, audio-visual equipment, and telehealth medical devices, students will receive HIPAA-compliant health services including a physical examination, patient education, and an individualized asthma action plan. A registered nurse will perform the physical assessment at the presenting site, the school nurse office, while virtually connected with a pediatric pulmonologist who will facilitate the visit from a hospital setting. The post-visit summary will be given to the student's parent/legal guardian and primary care provider, to establish care coordination with the patient centered medical home.

Quantitative and qualitative data collected from the asthma impact assessment form and the telehealth visits will be entered into IBM SPSS 22.0 and NVivo 11, respectively, to enable data triangulation between the quantitative and qualitative datasets. Results of data analysis will be used to identify knowledge gaps; evaluate medication adherence; assess the impact of high trigger burden on the frequency of severe asthma exacerbations, hospitalizations, and days lost at school; and the impact on overall quality of life.

Project Narrative

Asthma is a chronic respiratory disease characterized by narrowing, swelling, and congestion of the airways in the lungs. Studies show that asthma is under-diagnosed and under-treated, creating a substantial burden by limiting individual activity and functionality over the course of a lifetime. Proven effectiveness of the proposed program will allow for reproducibility of the program, as a viable healthcare delivery model, that can be expanded to other school-based telehealth specialty services, including diabetes management and behavioral health consultations.

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Facilities

Presenting Site (Participating Schools in Evangeline, Madison, Red River, and Tensas Parishes): Each participating elementary and middle school has a nurse's office that consists of a minimum of 500-sq feet of space with a functional set up for clinical services and telehealth capabilities. The space includes a desk to set up the telehealth equipment and durable medication detailed in the Equipment Section. The program staff will have access to an examination table, gloves, tongue depressors, medical goose neck lamp, digital thermometer with disposable sleeves, wall sphygmomanometer, and medical disinfectant wipes. The nurse's office is equipped with wireless and DSL internet networks to allow audio-visual connectivity to the distant provider site, during the telehealth consultations. Administrative and clinical support is provided by the participating schools administrative staff and the school nurse, who will be present at the presenting sites during the telehealth consultations. The program manager and health IT specialist will perform preparatory school-site visits to ensure all measures of privacy are maintained during clinical presentation; and the site has the appropriate medical equipment, telephone and internet connections required to facilitate a telehealth consultation.

Distant Provider Site (Children's Hospital, New Orleans, LA): The Co-PI, Dr. Beauvilleux, has a 150-sq. ft. office at Children's Hospital – Main Campus, in New Orleans, LA. The office is equipped with wireless and DSL Internet networks that allows for audio-visual connectivity to the presenting site, during the telehealth consultations. Dr. Beauvilleux's office is not a shared space, thereby assuring doctor-patient confidentiality.

Equipment

Telehealth Equipment: The presenting and distant provider site contains instrumentation for respiratory-focused physical assessments using telemedicine durable medical equipment and audio-visual telehealth connectivity. Of direct relevance to this proposal is specialized equipment including: Targus-17' Groove Backpack, Horus-Scope +3 bundle (General Exam, Oto, Derm camera), Horus-Scope +3 bundle (1-year Maintenance), Littman bluetooth stethoscope, Littman Bluetooth stethoscope (1year license fee), digital USB Spirometer, portable speakers, headsets, Movi/Jabber client licensing (per completed backpack), HP ProBook 450G3 15.6 Core 4GB Ram with embedded laptop, and spirometer (with 2- year warranty).

Computers: HP ProBook 450G3 15.6 Core 4GB RAM with embedded laptops are available at the presenting and distant provider sites for data entry and telehealth connectivity, to facilitate bi-directional communication. The computers at both sites are connected to black/white and color laser printers to produce after-visit summaries, individualized asthma action plans, patient education, and prescriptions.

Physical, technical and administrative safeguards will be in put in place to protect the privacy, security, and integrity of recorded patient information, while allowing appropriate access to program staff for care management. Physical safeguards include device isolation, allowing direct physical access only to authorized personnel; data backup and maintaining copies, and proper device disposal. Technical safeguards include firewalls and secure transmission modes for communication such as virtual private networks (VPN) or secure sockets layer (SSL), and encryption techniques. Administrative safeguards include requirements for documenting departmental security policies, training staff about these policies, enforcing policies for storage

and retention of electronic data and backup of all systems, adhering to specific methods for incident reporting and resolution of security issues, and clearly documenting accountability sanctions and disciplinary actions for violation of policies and procedures.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Kia Renee Padgett

eRA COMMONS USER NAME (credential, e.g., agency login): Nurse Consultant – Chronic Disease Prevention Section – Louisiana Health Department

POSITION TITLE: Program Manager

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Villanova University	B.S.N.	09/2002	Nursing
Emory University	MPH Candidate	05/2017	Public Health

A. Personal Statement

The goal of the proposed project is to create opportunities for children and families living in low-income communities to receive health education and specialty clinical services, utilizing innovative technology-telehealth, a proven model to effect positive health outcomes. Specifically, we aim to increase access to healthcare services, increase asthma awareness, promote evidence-based prevention strategies, encourage self-management, improve population health, and demonstrate sustainability through the collaboration of academic, clinical, public health, and community stakeholders. I have the expertise, leadership, and motivation necessary to successfully carry out the proposed work. I have a broad background in nursing, with specific training and expertise in the clinical areas for this application and proposed project. As a Masters of Public Heath student at Emory University, I carried out survey design and secondary data analysis. As a nurse consultant, I've worked with principal investigators on several state and (Centers for Disease Control and Prevention) CDC-funded grants. I assisted the cardiovascular program manager and the diabetes and vision program manager with activities and reporting of performance measures for Cooperative Agreement 1305: State Public Health Actions to Prevent and Control Diabetes, Heart Disease, Obesity and Associated Risk Factors and Promote School Health, CDC-RFA-DP13-1305. I created and delivered in-person and webinar presentations to a variety of audiences on chronic disease management. As a result of these previous experiences, I am aware of the importance of frequent communication among project members and of constructing a realistic research plan, timeline, and budget. The current application builds logically on my prior work, as a triage nurse in a teledermatology project in Valdosta, GA. Not only was I trained in how to present patients via telehealth, I was able to see firsthand the benefits of bringing specialty care services to local communities where

access may be limited or unavailable. This experience increased my knowledge and skillset in telemedicine and mobile health. In summary, I have a demonstrated record of success with clinical and research projects in an area of high relevance to the pediatric and adult chronic disease population.

B. Positions and Honors

Positions and Employment

Feb 2016 - present	Chronic Disease Nurse Consultant, Louisiana Department of Health
Jun 2012 - Oct 2015	Telephonic Nurse Case Manager, Kaiser Permanente Georgia
Mar 2010 - Jun 2012	Senior Staff Nurse, Grady Memorial Hospital, Atlanta, Georgia
June 2009 - Sep 2010	Medical Advice Registered Nurse, Anthem BCBS-Wellpoint Atlanta, GA
Mar 2007 - Mar 2008	Chronic Disease Management Nurse, Blue Cross Blue Shield Illinois
Jun 2005 - Aug 2009	Clinical Staff Nurse, J.H. Stroger Hospital of Cook County, Chicago, IL
Sep 2002 – May 2005	Clinical Staff Nurse Hospital of the University of Pennsylvania

Other Experience and Professional Memberships

American Association of Diabetes Educators

American Nurses Association

American Public Health Association

C. Contributions to Science

My contribution to science involves research papers, clinical workflows, policies, and webinar and live presentations for interdisciplinary groups of clinicians, health care professionals, and public health scientists. The papers and presentations focus on clinical processes, practice and protocols, and quality improvement around chronic disease, using team-based care, to improve individual and population health. The papers and presentations also outline reporting of national quality measures; adoption of systems change practices; and encouraging education on the prevention of chronic diseases**.**

Padgett, K., Smith, A. (June 2016). *Type 1 Diabetes*. Children Medical Services. Division of Maternal Child Health. Georgia Department of Public Health

Padgett, K. (April 2016). *Teachings and Tools for Correct Blood Pressure Management - Webinar*. Georgia Clinical Transformation Team.

Padgett, K. (February 2016). *Undiagnosed Hypertension - Webinar*. Georgia Clinical Transformation Team.

D. Additional Information: Research Support and/or Scholastic Performance

Padgett, K. (March 2016 - December 2016). *Practicum Experience and Poster Presentation: Evaluation of Early Child Care Center Policies in Fulton County, Georgia.* Practicum Site: HealthMPowers and the Fulton County Department of Health and Wellness Partnerships to Improve Community Health (PICH) Program. Practicum Advisor: Beth Stevenson, MPH - HealthMPowers.

Ayantunji, R., Gitukui, S., Lyles, F., **Padgett, K.** Williams, D. (November 2016) *Public Health Communications Campaign: Colorectal Cancer Screening (CRC) of African-American Men (Ages 50 or Older).* Emory University - Rollins School of Public Health. PRS538D: Community Needs Assessment.

Padgett, K., Odama, U., Satar, S. (April 2016). *Eagle Ranch Evaluation Report*. Emory University - Rollins School of Public Health. PRS541D: Planning and Performance Measures.

Battles, N.; Bell-Banks, C.; Gitukui, S.; Knight, T.; Meyers, S.; **Padgett, K.**; Taawab, N. (November 2015). *Community Needs Assessment - Shelby County, Tennessee*. Emory University - Rollins School of Public Health. PRS538D: Community Needs Assessment.

Ayantunji, R., Gitukui, S., Greenlea-Taylor, J., Illieva-Hughes, E., **Padgett, K.**, (July 2015). *Evaluation Plan Proposal for the North Georgia Integrated Health Network*. Emory University - Rollins School of Public Health. PRS 540D: Conduct of Evaluation Research.

Padgett, K. (May 2015). *A Podcast for HPV Vaccination Education*. Emory University - Rollins School of Public Health. PRS 501D: Technology Tools for Public Health.

Budget:
Funding from the grant will be utilized for program operations in terms of the personnel, equipment, and materials that will be essential in starting the Breathe Easy Telehealth Program (see Appendix: Modular Budget).

Organizational DUNS	874-913-256
Enter name of Organization	Breathe Easy Telehealth Program
Budget Type	Project
Start Date	Jan-18
End Date	Dec-19

Personnel Direct Cost Justifications:
Sharon Freeman, PhD (PI, effort = 2.0 calendar months): Dr. Freeman is the associate director of the Chronic Disease Division at the Louisiana Health Department. Dr. Freeman performed research in the reactive airway disease and cystic fibrosis at Yale University while completing her doctoral degree. She will coordinate and provide ongoing review of all program activities. Dr. Freeman will also be responsible for facilitating partner and stakeholder meetings, and overseeing program implementation; data analysis; data reporting; evaluation; and publication of the program results.

Cynthia A. Beauvilleux, M.D (Co-PI, effort = 2.0 calendar months): Dr. Beauvilleux is a part-time pediatric pulmonologist in The Allergy and Immunology Department at Children's Hospital Main Campus – in New Orleans, Louisiana. Dr. Beauvilleux also travels to sub-Saharan Africa as a consulting physician for Doctors Without Borders. She has 10 years of experience in the full evaluation of adult and pediatric patients with recurrent or unusual infections and a family history of immunodeficiency disorders. Dr. Beauvilleux's clinical management expertise includes, but is not limited to, allergic rhinitis; asthma; and atopic dermatitis/allergic skin disorders. She is fluent in French and Spanish. Dr. Beauvilleux will facilitate the consultation from the distant provider site (Children's Hospital, New Orleans, LA) and oversee all clinical aspects of the program.

Kia R. Padgett, BSN, RN (Program Manager, effort = 6.0 calendar months): Ms. Padgett earned her B.S.N from the Villanova School of Nursing and has 15 years of experience in the healthcare industry. Her clinical expertise is in pediatric and adult critical care, chronic disease management, telephonic lifestyle modification coaching, and medical triage. She is currently the chronic disease nurse consultant for the Louisiana Health Department – Chronic Disease Division. Ms. Padgett will be the clinician at the presenting site (the school). She will perform vital signs, the respiratory-focused physical assessment, and pulmonary function test at the presenting site while Dr. Beauvilleux facilitates the consultation from the distant provider site at Children's Hospital in New Orleans. Ms. Padgett will also be responsible for participant

communications (i.e. calling parents or legal guardians regarding incomplete fields on the consent or assessment forms).

Reginald Daniels, B.S., M.P.H.c (Graduate student, Epidemiology-Evaluator, effort = 4.0 calendar months): Reginald Daniels is a second-year graduate student enrolled in the Epidemiology Program at Louisiana State University Health Center – School of Public Health. Reginald Daniel's thesis is focused on chronic disease epidemiology with a focus on hypertension management in African American men over the age of 50. His work for this program will be overseen by Dr. Freeman, and involve data collection and statistical analysis. Mr. Daniels work will enhance understanding about the determinants of asthma in the target population and how to intervene most effectively to reduce morbidity and mortality associated with childhood asthma in Louisiana. He will be responsible for data entry, data analysis, and interpretation of results from the asthma impact assessment forms, telehealth consultations, and the patient telehealth evaluation forms.

Jeffrey Hasselbrand, M.S. (Health Information Technology Specialist, effort = 6.0 calendar months): Jeffrey Hasselbrand is a lead health information technology specialist Level III at the Louisiana Health Department (LHD). He will be responsible for overseeing software approval, installation of equipment, training and implementation of the telehealth component of this initiative. Mr. Hasselbrand received his Bachelors and Masters of Science in Information Technology with a concentration in health information systems and software management, from the Georgia Institute of Technology. Mr. Hasselbrand will serve as a health IT liaison for LHD, the participating schools, and Children's Hospital of New Orleans. He will travel with the program manager to all preparatory site visits and telehealth consultations.

Frederick Johnston, M.B.A (Telehealth Consultant): Frederick Johnston is a senior-level telehealth consultant from Avizia Consulting Services. He has 10 years of experience in facilitating the development of an organization's telehealth strategy, expanding existing telehealth services into new specialties, establishing patient monitoring programs. Mr. Johnston will work with the PI, co-PI, and program manager to develop the Breathe Easy Program strategic plan, program promotion and communication, and develop a sustainability plan. He will also train all program personnel on the best methods to efficiently and correctly administer telehealth services.

NOTE: Two calendar months of salary is requested for the Principal Investigator and co-Principal Investigator in each year of the project and are calculated at the current rate. The PI will be responsible for the overall coordination of the project and the supervision of the program staff, graduate students, and other project personnel. The NIH salary cap as of February 1, 2017, is $ 185,100 and can be found at http://grants.nih.gov/grants/policy/salcap_summary.htm.

Telehealth Equipment for School site (Presenting location)

Equipment	Amount	Number Requested	Final Amount
Targus-17' Groove Backpack	$44.78	2	$89.56

Horus-Scope +3 bundle (General Exam, Oto, Derm camera)	$5,728.13	2	$11,456.26
Horus-Scope +3 bundle (1-year Maintenance)	$641.88	2	$1,283.76
Littman Bluetooth stethoscope	$1695.00	2	$3,390.00
Littman Bluetooth stethoscope (1year license fee)	$650.00	2	$1,300.00
Digital USB Spirometer	$1665.00	2	$3,330.00
Portable Speaker	$113.71	2	$227.42
Headsets	$45.00	2	$90.00
Movi/Jabber client licensing (per completed backpack)	$10,583.50	2	$21,167.00
HP ProBook 450G3 15.6 Core 4GB Ram with embedded laptop	$653.35	2	$1306.70
Spirometer (with 2-year warranty)	$2,500.00	1	$2,500.00
Telehealth Equipment for Hospital (Distant Provider site)			
HP ProBook 450G3 15.6 Core 4GB Ram with embedded laptop	$635.35	1	$635.35

NOTE: All prices are based on LDH state contract quotes with Telemedicine vendor (CISCO) and Durable Medical Equipment Vendor (Welch Allyn).

Travel:
Travel funds are also required for travel required by the telehealth program manager and the technology liaison relating to site visits, prior to program activities, and implementation of the program activities. The Louisiana Health Department (LHD) will provide the PI, program manager, and health information technology specialist each with a LHD-company vehicle for all program activities that require travel 50 miles or more from the LHD state office - including site visits, partner meetings, and telehealth program visits.

Reason for Travel	Year 1	Year 2
Telehealth Site Visits: • Local mileage for program manager and health IT specialist (2 people) • 40 total travel days • $150.00/night - hotel accommodations • $50.00/day – per diem • 300 miles/month @ $0.517/mile x 4 months	$12,900.00	$10,000.00
Total		**$22,900.00**

Additional materials: All educational materials including information on state programs, list of Medicaid providers and Federally Qualified Health Centers (FQHC), LAQuitline resources, and asthma educational pamphlets will be purchased and provided by the Louisiana Health Department.

Costs associated with first class postage, and related paper products for mailers will be assumed by the Louisiana Health Department. The program manager will send the after-visit summary to primary care providers and unable to reach letters to students, as needed.

Publication costs: We are requesting funds for the publishing costs associated with disseminating findings from the proposed program.

Indirect Costs: Fringe benefits and graduate student tuition remission are charged at the currently approved and anticipated rates and can be found at Office of Sponsored Projects at http://www.lsu.edu/osp/proposals/policies-procedures/current-rates.php. Graduate student support is based on the current University rate for graduate students.

Consultant: The PI and Co-PI secured a commitment from a telehealth consultant to provide four days of specialized in-person and web-based telehealth program training, at a discounted rate of $1,250.00 per 8-hour session. The trainings will take place during two days in the Spring 2018, preceding implementation of the program activities, and Fall 2019, after the program activities are concluded. The consultant has agreed to provide technical assistance during the program activities, at no additional cost.

Additional Narrative Justification: The first-year budget is higher than the second-year budget as this includes the majority of the telehealth and technology equipment purchases. Budget items excluded from the F&A base calculations cover the prorated graduate student tuition fee of $6,000 in year one, and $6,000 in year two.

Specific Aims

Asthma is one of the most common chronic childhood diseases. Indoor and outdoor environmental exposures are a major cause of asthma exacerbation. Allergies trigger asthma attacks in 60-90 percent of children. The use of a telehealth program, as a school-based care delivery model, can reduce asthma exacerbation, absenteeism on the part of student and parent, and reduce the number of emergency rooms visits and hospitalizations. These factors combined can lead to improved health quality of life for the child, better health outcomes from a population health perspective, and enhance academic performance in the school setting. In this pilot program, we aim to the implement effective, evidenced-based primary and secondary asthma prevention strategies. The specific aims and objectives of the proposed program include the following:

Specific Aim 1: To determine, during the course of a one-year school-based telehealth pilot asthma program, whether students will experience decreased absenteeism, adhere to individualized plan of care, and improved health quality-of-life.

Objective 1.1: Utilize remote, bi-directional audiovisual technology to perform a real-time medical consultation with a pediatric pulmonologist for a respiratory-focused clinical assessment; develop an individualized asthma action plan; provide health education; offer supportive services; and refer students to their patient center medical care for care coordination.
Objective 1.2: Improve the knowledge, attitudes, and skills of students and families regarding the detection and management of asthma, particularly in high-risk populations.

Specific Aim 2: To create, during the course of a one year, school-based telehealth pilot asthma program, a sustainable eco-education and environmental health curriculum at the eight participating schools.

Objective 2.1: Contract with Tulane University School of Public Health and Tropical Medicine to develop a comprehensive eco-education and environmental health curriculum for faculty, staff, students in the eight participating schools.
Objective 2.2: Utilize the United States Environmental Protection Agency (EPA) Indoor Air Quality Tools for Schools Action Kit to create environmental health education materials and communications, draft school policies around air quality, engage in environmental health activities, and promote asthma awareness activities.
Objective 2.3: Assist participating schools in the development of a strategic partnership with local Parent Teacher Association (PTA) organizations in securing resources, that will sustain the activities associated with the school based eco-education and environmental health project, after the funding period.

Overall Impact: Effective asthma management can reduce absenteeism for children, families, and caregivers; reduce costs associated with preventable urgent doctor's visits, emergency room consultations, and hospitalizations; enhance learning and school performance; and improve health-related quality of life.

Research Strategy

A. Significance

Schools play an important role in the health and development of children. The school nurse functions as a leader and coordinator of healthcare provided to students. For many children, the school nurse is the only healthcare provider they see on a consistent basis, despite the need for consistent medical care. Many schools lack the required medical equipment, technology, and personnel resources necessary to meet the health needs of their students The proposed research pilot program, The Breathe Easy Telehealth Program, is highly significant because it will allow students to receive health services during the school day, and increase opportunities for classroom learning; decrease absenteeism due to asthma exacerbation and urgent medical visits; and reduce prolonged travel for specialty medicine consultations. The information provided to the students and families will align children with the patient centered medical home (PCMH) for preventive and maintenance medical care. This is an exploratory proposal in that the data collected during the program can provide information on the benefits, barriers, feasibility, and limitations of telehealth in terms of implications for future practice and program expansion.

B. Innovation

The proposed pilot program is innovative both technically and conceptually. The program would be the first school-based telehealth asthma program in the state of Louisiana. The technical innovation of this proposal is built on utilizing specialized medical equipment connected to audio-video technology at the presenting site (school) and the distant provider site (the hospital). The student and registered nurse at the school will be able to see, hear, and speak to the pediatric pulmonologist facilitating the telehealth consultation, over a 150-mile distance. The conceptual innovation of this proposal is that it offers a comprehensive approach to providing preventive asthma care, counseling and health education, and specialty clinical services to students and their families, at a convenient and easily accessible location, their school. The program will also align students and their families with state and district level programs and clinical services to increase access to healthcare. This aspect of the program enhances continuity of care, past the funding period, by establishing contact with the patient centered medication home.

C. Research Design and Methods

Specific Aim 1: To determine, during a one-year school-based telehealth pilot asthma program, whether students will experience decreased absenteeism, adhere to individualized plan of care, and experience an improved health quality-of-life.

Target Population

Evangeline Parish:

- Mamou Lower Elementary School, Mamou, LA - Total school population - 509
- James Stephens Elementary School, Ville Platte, LA - Total school population - 604

Evangeline Parish has a total population of 33,984. Based on U.S. Census Bureau data, Evangeline parish is 69 percent white, 28.3 percent black, 0.3 percent Asian, 0.3 percent Native American, 1.0 percent of some other race and 1.1 percent of two or more races, 2.3 percent Hispanic or Latino (of any race), 40 percent French, French Canadian or Cajun. The median income for a household in Evangeline parish is $20,532, and the median income for a family is $27,243. Approximately 29.6 percent of the parish is under the age of 18; 27.2 percent of

families and 32.2 percent of the population live below the poverty line, including 39.1percent of residents under the age of 18.

Madison Parish:

- Tallulah Junior High School, Tallulah, LA - Total school population - 202
- Wright Elementary School, Tallulah, LA - Total school population - 727

Madison Parish has a total population of 11,514. Based on U.S. Census Bureau data, Madison Parish is 37.2 percent White, 61.0 percent Black, 0.2 percent Native American, and 0.2 percent Asian. The population is spread out with 32.6 percent under the age of 18. The median income for a household in Madison parish is $20,509, and the median income for a family was $23,589. The per capita income for the parish is $10,114. Approximately 29.7 percent of families and 36.7 percent of the population lives below the poverty line, including 51.6 percent of those under the age of 18.

Red River Parish

- Red River Elementary School, Coushatta, LA - Total school population: 943
- Red River Junior High School, Coushatta, LA - Total school population: 195

Red River Parish has a total population of 9,091. Based on U.S. Census Bureau data, Red River parish is 59.0 percent White, 39.5 percent Black or African American, 0.4 percent Native American, 0.1 percent Asian, 0.3 percent of some other race, 0.6 percent of two or more races, and 1.1 percent Hispanic or Latino. Approximately 30.1 percent of residents are under the age of 18. The per capita income for Red River parish was $12,119. Approximately 26 percent of families and 29 percent of the population live below the poverty line, including 40.1 percent of residents under the age of 18.

Tensas Parish

- Lisbon Elementary and Junior High School, Waterproof, LA- Total school population: 122
- Newellton Elementary and Junior High School, Newellton, LA - Total school population: 384

Tensas Parish has a total population of 5,252. Based on U.S. Census Bureau data, Tensas Parish is 56.5percent Black or African-American; 41.9 percent White; 0.2 percent Asian, 0.1 percent Native American; 0.5 percent of unidentified race; 0.8 percent of two or more races; and 1.2 percent Hispanic or Latino. Approximately 26.5percent Tensas parish resident are under the age of 18. The median income for a household in Tensas parish is $19,799, and the median income for a family was $25,739. The per capita income for the parish was $12,622. Approximately 30 percent of families and 36.3 percent of the population were below the poverty line, including 48.2 percent of residents under the age 18.

Approach: In collaboration with the Louisiana Health Department; Children's Hospital, New Orleans, Louisiana; the school districts of Evangeline, Madison, Red River, and Tensas parishes; and the Tulane School of Public Health and Tropical Medicine, the Breathe Easy Telehealth Program will conduct a rigorous family-focused, asthma intervention telehealth program in eight schools across Louisiana. This pilot program is designed as a bridge between specialty asthma care, primary care providers, school nurses and staff, regional and state-level stakeholders, children living with asthma, their families and caregivers.

The core components of the program involve identifying children with current or undiagnosed asthma, providing evidence-based asthma education, case management and referrals using skilled clinical examinations, a validated asthma impact assessment tool, and the innovation of telehealth technology and medical devices. We will employ a nonexperimental study design that utilizes elementary and middle schools to obtain demographic, behavioral, environmental, and clinical data related to asthma management; and provide specialty telehealth services. Generalizability is not a primary goal of this project. The major purpose of this program is to determine whether a specific telehealth program could improve population health outcomes.

The program proposes a Social Ecological Model (SEM) to guide the research associated with the program and foster collaborations among clinical, public health, academic, and community stakeholders. Using the theoretical underpinnings of the Social Ecological Model (SEM), program staff can identify potential areas for effective prevention activities that will successfully address and improve asthma-related issues from the individual, interpersonal, community, organizational, and policy levels of influence.

Registration:
Children ages 5-12 with a past or current diagnosis of asthma; or signs and symptoms of asthma including - frequent coughing, wheezing, chest tightness, and difficulty breathing - will be the initial, primary target population. Given there is usually a low consent and assessment form completion rate, the recruitment goal is 40 children from each school, for a total of 320 participants. The pilot program will run for one school year, Fall 2018 to Spring 2019. The assent and consent form will contain information about the program purpose, procedures, benefits and risks of voluntary participation, contact information for the program manager, and information about the Health Insurance Portability and Accountability Act (HIPPA) [see Appendix: Consent Form]. The forms will be distributed by administrative staff and the school nurse at participating schools.

The asthma impact assessment form will include the following information: (1) sociodemographic information, (2) current symptoms and health concerns (3) pertinent past medical and surgical history, (4) basic screening survey indicators, (5) medication adherence and reconciliation - prescription and over the counter medications will be brought in during the consultation to be recorded, (6) a summary of services delivered by the program, (7) control of environmental factors and comorbid conditions that affect asthma such as tobacco and mold exposures, and (8) indicators of efficiency (e.g., education for a partnership in asthma care, knowledge and/or ability to access information about pollen counts; knowledge of preventive measures) [see Appendix: Asthma Impact Assessment Form].

All consent forms and asthma impact assessment forms will be returned in-person, mail, or email, to the student's school administrative office. School administrative staff will collect all forms and send them to the program manager. If any forms are returned with incomplete fields, the program manager will contact the parent or guardian to obtain the missing information. All signed and completed forms will be uploaded onto a Sharedrive with restricted access and minimal necessary use by the program staff, only. All student personal health information (PHI) will be stored on a computer or storage device; using passwords that change every 30 days, anti-

virus software, data backups, and encryption. After the forms have been uploaded to the Sharedrive, they will be stored and locked in a file cabinet at the Louisiana Health Department.

Initial Telehealth Consultation:

All telehealth appointments will be scheduled and organized by the school administrative staff and the school nurse. The program manager and health IT specialist will perform preparatory school-site visits to ensure all measures of privacy are maintained during clinical presentation; and the site has the appropriate medical equipment, telephone and internet connections required to facilitate a telehealth consultation. The consultations will take place during school hours. Twenty minutes will be allotted for each telehealth consultation. Prior to the initial consultation, the Breathe Easy Telehealth program Co-PI, a pediatric pulmonologist, will access the telehealth schedule and the student's asthma impact assessment forms from the Sharedrive.

The pulmonologist will use this form to document the clinical data collected during the telehealth consultation and care recommendations after the visit. The program manager, a registered nurse, will be the patient presenter and evaluating clinician at the school. The health IT specialist will be present at the presenting site to provide technical assistance.

The telehealth consultation will take place in the school nurse office, at each participating school. The child's blood pressure, heart rate, temperature, and pulse oximetry will be measured and recorded. The height and weight will be taken on a standard medical-grade balance beam scale. Next, the nurse will connect with the pediatric pulmonologist using telehealth connectivity. The nurse will utilize a telemedicine stethoscope to perform a respiratory- focused physical assessment. Then the nurse will perform a pulmonary function test (PFT) using spirometry. The student will be coached in appropriate blowing techniques, and 6-8 trials will be done to obtain a laboratory best FEV1, in accordance with American Thoracic Society guidelines. The following key spirometry measurements will be recorded:

- Forced Vital Capacity (FVC) - the largest amount of air that you can forcefully exhale after breathing in as deeply as you can. A lower than normal FVC reading indicates restricted breathing. Normal value is 80 percent to 120 percent (95 percent confidence interval).
- Forced expiratory volume (FEV-1) – assess how much air can be forced from the lungs in one second and assess the severity of your breathing problems. Lower FEV-1 readings indicate more significant obstruction. Normal value is 80 percent to 120 percent (95 percent confidence interval).

The pediatric pulmonologist will discuss the results of the physical examination and pulmonary function test, and develop a plan of care, using age and developmentally appropriate communication strategies and visual aides. An after-visit summary packet will be sent home with the student containing a detailed report of the telehealth visit, the individualized asthma action plan (see Appendix: Asthma Action Plan), health education materials, Louisiana Tobacco Quitline information – based on the asthma impact assessment form tobacco-use indicator, and referrals as deemed appropriate by pediatric pulmonologist. If needed, electronic prescriptions will be sent to the child's preferred pharmacy. A detailed after visit summary and individualized asthma action plan will be mailed to the student's primary care provider to establish care coordination with the patient centered medical home.

KIDMED and LA Medicaid information, and the location of the nearest Federally Qualified Health Center (FQHC) will be provided to students who do not have primary health care coverage. An evaluation form will be sent to the parent/guardian after the telehealth visit. Students who can read and understand the evaluation form (i.e. the students in middle school) can complete the form themselves (see Appendix: Telehealth Evaluation Form). Completed evaluation forms will be returned the school administrative staff or the school nurse.

Follow Up Telehealth Consultation:

Students who complete the initial consultation will be re-evaluated in nine months using the same clinical workflow as the initial telehealth consultation. The pulmonologist will review the asthma impact assessment form prior to the follow up consultation. The pulmonologist will use the information collected during the follow-up telehealth consultation to evaluate the student's current health status. This information will also determine if the previous health education, asthma action plan, prescribed lifestyle changes, and medication regimen have been implemented effectively and resulted in a reduction in absenteeism, illness, and exposure to environmental triggers.

An after-visit summary packet will be sent home with the student containing a detailed report of the telehealth visit, health education materials, and referrals as deemed appropriate by the pulmonologist. Final recommendations and all components of the after-visit summary packet will be provided in the same manner as the initial telehealth visit. If needed, electronic prescriptions will be sent to the child's preferred pharmacy. An evaluation form will be sent to the parent/guardian after the telehealth visit. Students who can read and understand the evaluation form (i.e. the students in middle school) can complete the form themselves (see Appendix: Telehealth Evaluation Form). Completed evaluation forms will be returned the school administrative staff or the school nurse. The student will complete the program at the end of follow-up telehealth consultation, and be directed to the school nurse and patient centered medical home for continued disease management and primary care services.

Evaluation:

The evaluation framework for the proposed program involves a two-part evaluation plan: a process evaluation and an impact evaluation. Process and impact are important to funders, program administrators, and fiscal managers who place more emphasis on evaluations to justify program expenditures. The evaluation for the Breathe Easy Telehealth program will focus on the process of providing health education and asthma specialty clinical services using a tele health care delivery model. It will also focus on eventual outcomes, in terms of increased knowledge of asthma and asthma-related triggers; adherence to the prescribed medication regimen and individualized asthma action plan; decreased absenteeism; decreased urgent care, emergency room visits or hospitalization due to asthma exacerbation; tobacco reduction or cessation; and overall improved health-related quality of life.

Process evaluation activities for the Breathe Easy Telehealth program will examine the environment and setting in which the telehealth service will be provided, and understanding the strengths and weaknesses of the collaborating organizations, target population and community environment, and community interaction. The focus of the process evaluation early in the

Breathe Easy Telehealth Program is to determine if changes need to be made in internal processes, staffing, program operations, communications, marketing, and fund development to successfully meet the aims and objectives of the program.

An impact evaluation will generate information to measure the overall worth and utility of the Breathe Easy Telehealth program beyond the granting period. Impact evaluations examine the overall value of the program at the community level and sustainability. Regional and national agreements for targeted school-based telehealth interventions and outcomes can promote large-scale program replication and promote work across multiple spectrums:

- Community mobilization efforts - e.g., organizing community health workers to perform home visits for high risk children to ensure environmental precautions in the home for asthma management.
- Research initiatives - e.g., an effort to find out whether inequities in health outcomes based on socioeconomic status can be reduced by using a telehealth care model.
- Surveillance systems - e.g., whether early detection of school readiness improves educational outcomes.
- Advocacy work - e.g., a campaign to influence the state legislature to pass legislation regarding tobacco control, environmental safety concerns such as no school buses or cars sitting idle with engines running.
- Social marketing campaigns - e.g., a campaign in the inner City and rural areas encouraging indoor mold removal and tobacco cessation to reduce incidence and prevalence of asthma.
- Infrastructure building projects - e.g., a program to build the capacity of state agencies to support community development initiatives and environmental safety policies.
- Training programs - e.g., community health worker trainings to complete home evaluations for mold job training program to reduce levels of mold exposure and other asthma triggers in the home.
- Administrative systems - e.g., an incentive programs to improve efficiency of asthma health services.

Analysis and results from the evaluations will include an assessment of self-reported asthma symptoms, healthcare utilization, asthma triggers and environmental exposures, health quality of life indicators, and asthma-related events. We will also offer lessons learned from the project and direct service interventions - e.g., a program that provides access to health education, preventive services, and specialty providers for high risk asthma patients. A logic model has been created as a six-column graphical representation of the relationship between the different components of the Breathe Easy Program – inputs, activities, outputs, short term, outcomes and long-term outcomes - as an initiative to improve asthma management in elementary and middle school children using a telehealth care delivery model (see Appendix: Logic Model).

Milestones of the program's progress will include performance measures set by the funders, program staff, and partners. This systematic process is used to determine what proportion of the students, who would benefit most from the services provided by the Breathe Easy Telehealth Program, actually accessed the program; what were the demographic and clinical characteristics of students and families who utilized the services provided by the Breathe Easy Telehealth Program; and were the recommended plan of care, health education, and individualized asthma

action plan appropriate and consistent with the results of asthma impact assessment form. The evaluation plan reflects various stages of the project with an accompanying timeline to track the program activities against time (see Appendix: GANTT Chart).

Specific Aim 2: To create, during a one-year school-based telehealth pilot program, a sustainable eco-education and environmental health project with a focus on air quality.

Sustainability Plan: The Breathe Easy program manager will work with the PI to compile a subaward request packet, which consists of the Subaward Request Form and applicable documents in accordance with the SRF instructions (see Appendix: Letter of Commitment). Stipulations of the subaward are outlined in the subaward agreement between the Louisiana Health Department and Tulane University School of Public Health and Tropical Medicine, to include the following (see Appendix: Subaward Agreement):

- Objectives, aims, and purpose;
- Period of performance;
- General description of the activities to be performed by the subcontractor
- A list of detailed work requirements, tasks, and what is expected;
- Provide technical and performance specifications;
- Performance, quality and timeliness requirements;
- Workload requirements;
- Personnel requirements, qualifications, and skill levels expectations; and
- Reporting requirements to be submitted by the contractor to monitor progress.

The project will include a comprehensive eco-education program on climate change and air quality. The participating schools will develop their projects design. Tulane University will assist the participating schools in the development of a strategic partnership will be formed with local Parent Teacher Association (PTA) organizations to secure resources to sustain the activities associated with the eco-education and environmental health project, after the funding period.

Reporting of Results and Dissemination of Finding:
Statistical Analysis: Approval from the research ethics committee will be obtained for data analysis and publication following informed consent for the respective telehealth services and as part of a school-based clinical database for students attending the participating schools. Quantitative and qualitative data collected from the asthma impact assessment form and the telehealth visits will be entered into IBM SPSS 22.0 and NVivo 11, respectively, to enable data triangulation between the quantitative and qualitative datasets.

The research from the program is descriptive in nature. Descriptive statistics will be performed as appropriate, including frequencies for variables. Data from the asthma impact assessment form and telehealth consultation notes will be entered and analysis analyzed by the graduate student epidemiologist-evaluator. For the comparison of categorical variables, Chi-squared test will be performed. A p-value of <0.05 will be taken as significant for all the analysis done in the program. Results of data analysis will be used to identify knowledge gaps; evaluate medication adherence; assess the impact of high trigger burden on the frequency of severe asthma exacerbations, hospitalizations, and days lost at school; and the effects on overall quality of life. Program results will be complied in text and table form, into a report.

Public Health Implications:
Continuous improvement is the most critical mandate in both public health and health care today. Improving the health status of individuals, families, communities, and society requires a broader approach to addressing the vast array of factors affecting health status. To effectively design, implement, and sustain a comprehensive approach to health promotion, better collaboration across local; state; federal government; academic institutions; and acute and primary care settings is paramount. Telehealth technology can help achieve the "triple aim" initiative, developed by the Institute for Healthcare Improvement, to improve patient outcomes; access to care; and cost savings to the health care system.

Implementation of the Breathe Easy Telehealth program as a research translation project will be effective in the improvement of asthma awareness and self-management skills among elementary and middle school children, their families, and the community. The implementation of school-based telehealth programs is essential to improve population health, specifically for childhood chronic disease. Cultural competence and considerations are the hallmark of best-quality public health systems, programs, and research in addressing health inequalities; innovative strategies for health promotion; and successful translation of evidence-based interventions to improve the behaviors, knowledge, and overall health outcomes of the residents of Louisiana.

Protection of Human Subjects

According to federal regulations governing human research, the principal investigator holds the ultimate responsibility for protecting the safety, rights and welfare of research subjects. It is important to obtain informed consent. Vulnerable populations such as children may have limited capacity to make voluntary and informed decisions. To this end, the Breathe Easy Telehealth Program will adopt additional safeguards for research involving children. Regulations define children as persons "who have not attained the legal age for treatments or procedures involved in the research under the applicable law of the jurisdiction in which the research is being conducted." The age of consent is determined by the state of residency. Louisiana does not have a specific age regarding medical decisions. Regulations charge the principal investigator with responsibilities for seeking parental permission for the child to participate in the research and securing the child's assent to participate in the research.

Demographic and medical data will be collected from all children who participate in the program, by a parent or a legal guardian. Demographic data will include age, sex, and race which will be used for data analysis. Medical data will include the presence or absence of inflammatory conditions (infections, autoimmune disorders, etc.), atopic conditions (asthma, allergic rhinoconjunctivitis, etc.), exposures that can modify inflammatory/atopic conditions (tobacco smoke, pets, etc.), and immunization history. Information will be stored in an encrypted (meeting mandated IT security standards) password-protected database and will contain subject identifiers such as name, address, date of birth, and medical record numbers. This information is necessary to maintain contact with the children during the full year of the program. Only the Breathe Easy Telehealth program staff will have access to personal health information. Asthma impact assessment information, and results from the telehealth physical assessment and pulmonary function tests will not have any subject identifiers and will be linked to subjects with a number generated specifically for this program.

Inclusion of women and minorities:

This program has a prospective component in that it will recruit children from four elementary schools and four middle schools, across four parishes in Louisiana. The children will be assessed at the beginning of the program during the telehealth consultation, and re-evaluated nine months after the initial telehealth consultation. It is anticipated that the number of female and male participants recruited will be approximately the same. There are no inclusion or exclusion criteria based on sex or race. Program enrollment will occur at selected schools that have a population reflective of the diversity of the general population of their respective city/parish, and are demonstrated in our expected enrollment table.

Potential Risks:

Confidentiality:

Certain aspects of the subjects' medical history and demographics will be collected for this study. Loss of privacy may lead to problems with insurability or social stigmatization. Also, some of the results from the physical assessment and pulmonary function test being performed may potentially indicate other health conditions. Loss of privacy, in regard to this information, may also lead to problems with insurability.

Adequacy of protection against risks:
Children will be recruited from the participating elementary and middle schools. Pre-registration in the program by the parent is required. Families who participated in this study were first screened for eligibility. Consent and assent forms will be signed and returned to the designated school-based telehealth site. Children will then be scheduled for an appointment through the school nurse and administrative offices. Parents and guardians will be asked by the school nurse/school administrative staff if they would like to speak with a member of the Breathe Easy staff regarding this program. If they agree, the program manager will be available to discuss the details of the program.

All information will be explained in a nontechnical fashion. Ample time will be available for the child's parent/guardian to ask any specific questions or discuss any specific concerns about the program. Parents will be informed of the risks associated with the loss of confidentiality of collected information. Since there may be Spanish-monolingual children who attend one of the participating schools, the program staff will contact the AT&T language line during the consent process and schedule a Spanish-interpreter to be present during the telehealth visits. Consent forms will be translated into Spanish (and approved by the LHD Committee on Human Research) to be used if subjects are Spanish-monolingual, or indicate that this is their preference. Interpreter services will be engaged to translate for other non-English or non-Spanish speaking patients who indicate interest in participating.

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Appendix A: Assent and Consent Form

What is The Breathe Easy Telehealth Program?

The Breathe Easy Telehealth Program (BETP) is a new and innovative approach to providing preventive asthma care, counseling, health education, and specialty services to children and their families at a convenient, easily accessible location - their school. The child will receive a physical examination by a registered nurse at the school while connected with an asthma specialist from Children's Hospitals in New Orleans, LA. Using audio-video equipment, your child, the registered nurse, and the specialist will be able to see, hear, and speak with each other during the telehealth visit. To participate in the program – a parent or guardian must sign a consent form and complete the asthma assessment form. The information in the assessment form will help the BETP staff to better understand and effectively treat the child's asthma. The consent and asthma assessment forms should be returned to the school nurse or school administration.

Hours & Coverage: BETP appointments will be conducted twice for each child: at to the beginning of the school year and at the end of the school year. These appointments will occur during the school day, between 8am - 4pm and scheduled with the school nurse and school administration.

Staffing: Program staff for the BETP are highly qualified and experienced in providing health care to children with asthma. The BETP staff work with, but are not intended to replace, your medical home (for example: family doctor or school nurse).

Billing & Costs: All services provided by the BETP are free of cost. There is no out of pocket expense for participation in this pilot program. No student will be denied access to health care services due to inability to pay or if they do not have a doctor/primary care provider. Students eligible for the free/reduced lunch program may qualify for CHIPS or Medicaid. Information about various programs and how to apply will be provided by program staff.

Confidentiality: Confidentiality between the student, parents and the health center is assured. The staff will encourage every student to involve his/her parent/guardian in health care decisions. Since one purpose of healthcare is to reduce high-risk behaviors of some youth, it is important for the students to feel they can have a confidential relationship with their health care provider. By law, some information requires the student's signed consent prior to disclosure to anyone, including parents/guardians. This also assures development of trust between students, the school, and the program staff.

The Breathe Easy Telehealth Program
Louisiana Department of Health | P.O. Box 629 | Baton Rouge, LA 70821-0629
Phone: 225-342-9500 | **Fax:** 225-342-5568
Medicaid Customer Service: 1-888-342-6207 | **Healthy Louisiana:** 1-855-229-6848
Email: Kia Padgett, BSN, RN at BEtelehealth@dhh.louisiana.gov

STUDENT INFORMATION

Student Name: _____
Student SS #: _____
Address: _____
City/Parish/State/Zip: _____
Email Address: _____
Date of Birth: _____
Age: _____
Name of School: _____
Grade: _____

**** The Breathe Easy Telehealth Program may need additional information as required by federal funding sources and regulations.***

PARENT / GUARDIAN INFORMATION

Father's Name: _____
Phone: (H)_____ (W)_____ (C) _____ E-mail_____

Mother's Name: _____
Phone: (H)_____ (W)_____ (C) _____ E-mail_____

Guardian: _____
Phone: (H)_____ (W)_____ (C) _____ E-mail_____

Alternate Contact:_____
Phone: (H)_____ (W)_____ (C) _____ E-mail_____

Consent for The Breathe Easy Telehealth Program Services

I, the parent/guardian of said student, give consent for my child to receive services from *The Breathe Easy Telehealth Program*. I understand that this consent form will be good until my child leaves/ graduates school or until I provide the school staff with written directions otherwise.

My healthcare provider has explained to me how the video conferencing technology will be used during my consultation. I understand this consultation will not be the same as a direct patient care visit due to the fact that I will not be in the same room as the healthcare provider. During a telemedicine consult, I understand that the responsibility of the telemedicine consulting specialist is to advise and that his/her responsibility will conclude upon the termination of the video conference connection.

I had the alternatives to a telemedicine consultation explained to me, and in choosing to participate in the telemedicine visit; I understand that some parts of the exam may involve physical tests conducted by the individual at my location at the direction of the telemedicine consulting health care provider.

I understand that there are potential risks to this technology, including interruptions, unauthorized access and technical difficulties. I understand that I can discontinue my telemedicine visit if I feel that the video conferencing connections are not adequate for this situation.

All healthcare information is confidential. By signing the consent form I am giving *The Breathe Easy Telehealth Program* staff, the school nurse, and your child's primary doctor (if applicable) permission to communicate and share medical information regarding my child's medical condition on an as needed basis with the understanding that this information will continue to be treated in a confidential manner. By law, some information requires the student's signed consent prior to disclosure to anyone, including parents/guardians. The staff will encourage every student to involve his/her parent or legal guardian in health care decisions.

I am the legal guardian of the above-named child. I understand that if guardianship changes a new consent must be signed by the legal guardian. I understand that a parent or guardian must accompany the child to *The Breathe Easy Telehealth Program* appointment. I also understand that by providing an alternative contact, if I cannot be reached, medical information regarding the above-named child will be shared between the medical provider and the alternative contact.

_____ _____

Signature of Parent / Legal Guardian **Date**

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT OF 1996

The Health Insurance Portability and Accountability Act (HIPAA) of 1996 requires all physicians and health care facilities to provide patients with a notice describing how an individual's medical information may be used and disclosed, and how a patient may obtain access to their personal health information.

Please note that there is an attached copy of HIPAA to this consent form, for the parent/guardian of the student receiving medical or mental health counseling services at BETP. You must sign below, indicating that you have received a copy of our HIPAA policies, prior to the student receiving services.

I certify that a copy of the Health Insurance Portability and Accountability Act of 1996 was provided with the BETP's consent form, to the parent/guardian of _____ on this date.

Student Name

_____ _____

Signature of Parent/Guardian Date

_____ _____

Signature of the Breathe Easy Telehealth Staff Date

Appendix B: Asthma Impact Assessment Form

The Breathe Easy Telehealth Program Asthma Impact Assessment

Name: _____

Date of Birth: _____/_____/_____ **Male/Female**: _____
MM/DD/YYYY

Accompanied by (e.g. *parent/relative/siblings/caregiver*):

_____

_____

Name of Primary Care Provider (e.g. doctor, Nurse practitioner, physician assistant):

_____

Type of Health Insurance: _____

Address: _____ **Phone Number**: _____

Name of Pharmacy to send Prescriptions: _____

Address: _____ **Phone Number**: _____

Height: _____ (cm/feet) **Weight (Actual/Self-Reported):** _____ (lbs./kg)

Blood Pressure: _____ mmHg (right arm/left arm/other: _____)

Heart Rate: _____ bpm **Pulse Oximetry**: _____ percent

Temperature (oral, tympanic, temporal): _____ Fahrenheit

General Appearance (*e.g. well-groomed, anxious, pallor*)

_____

_____

_____

The following questions will help us better understand and effectively treat your child's asthma. Thank you for your patience.

1. Ethnic Background:
□ American Indian
□ Asian/Hawaiian/Pacific Islands
□ Black/African American
□ Caucasian
□ Hispanic/Latino
□ Other: _____

2. Does your child have a primary care provider/pediatrician? □ Yes □ No

If yes, what is the date of last well child examination? _____

3. Has your child ever been diagnosed with asthma by any doctor they have seen in the past?
□ Yes □ No
If Yes, at what age? _____

4. Has your child been diagnosed with or complained of the following in the past 12 months:
Nasal Congestion □ Yes □ No Increased Burping □ Yes □ No
Nosebleeds □ Yes □ No Upset Stomach/Heartburn/GERD □ Yes □ No
Earaches □ Yes □ No Sleep apnea □ Yes □ No
Imbalance when walking □ Yes □ No Chest Pain/Tightness □ Yes □ No
Enlarged tonsils/adenoids □ Yes □ No Diabetes □ Yes □ No
Other Medical Conditions: _____

5. Does your child have an asthma action plan? □ Yes □ No
If yes, what date was the action plan created or updated? _____

6. Does anyone in the family have a history of asthma or allergies?
□ Mother
□ Maternal Grandmother – mom's side
□ Father
□ Maternal Grandfather – mom's side
□ Brother
□ Paternal Grandmother – dad's side
□ Sister
□ Paternal Grandfather – dad's side
Other: _____

7. Please list all medications at home that your child is currently taking (Include over the counter medications, herbal medications, prescribed medications, topical creams, inhalers, nasal sprays):

_____

_____

8. Which type of device(s) is currently used to administer your child's medications? (Select all that apply)

__ Nebulizer: __ With a facemask __ With the mouthpiece Is the child cooperative? __ Yes __ No

__ Spacer: __ With a facemask __ Without a facemask Is the child cooperative? __ Yes __ No

__ Inhaler alone, we do not use a spacer or valve-holding chamber.

9. Select ALL the triggers that cause your child to have difficulty breathing, coughing, wheezing, chest tightness?

□ Respiratory Infections
□ Sinus Infection
□ Casual Activity
□ Vigorous Activity
□ Emotional Excitement (crying, laughing, anger)
□ Exercise
□ Strong Smells or Perfumes
□ Tobacco Smoke
□ Weather Changes
□ Mold
□ Cold Air
□ I don't know

10. Allergens - Please list all known allergens (*e.g. medication, pollen, dust, ragweed, mold, animal dander, bees, milk, latex, metals*) and reactions:

_____

_____

_____

□ Specific locations?

_____

11. How do you cool your home?

□ Air conditioning □ Fan □ Open windows

Other: _____

12. How do you heat your home?

□ Central Air Unit □ Fireplace □ Oven

□ Kerosene space heater □ Electric space heater

Other: _____

13. What type of flooring is in the home? (Select all that apply)

□ Throw/Area rug (small removal rug) □ Carpet

□ Tile

□ Wood

14. What type of flooring is in the child's room? (Select all the apply)

□ Throw/Area rug (small removal rug) □ Carpet

□ Tile □ Wood

15. What is the child's level of smoke exposure? (Select all that apply)

□ None □ Family/caregivers smoke inside home

□ Family/caregivers smoke in vehicle □ Family/caregivers smoke outside only

16. During which time of the year does your child have the most difficulty breathing, coughing, wheezing, chest tightness?

□ Fall □ Winter □ Spring □ Summer □ All Year Round

******* Initial Telehealth Consultation - Evaluating Providers Use Only *******

Respiratory Assessment:

Chest Expansion/Spinal Alignment:
□ Symmetrical □ Asymmetrical □ Scoliosis □ Kyphosis

Respirations:
□ No distress □ Shortness of Breath □ Shallow □ Labored

Breath Sounds:
□ Clear □ Diminished □ Wheezing □ Rhonchi □ Crackles □ Rales

Cough:
□ Absent □ Productive □ Non-productive □ Weak □ Moderate □ Strong

Sputum/Secretions:
□ Clear □ Color _____

□ Thin □ Thick □ Amount _____

Cyanosis: _____ Nail clubbing: _____ Pallor: _____

Spirometry Test/PFT Results:

_____
_____
_____

FEV1 greater 80 percent of predicted= normal
FEV1 60 percent to 79 percent of predicted = Mild obstruction
FEV1 40 percent to 59 percent of predicted = Moderate obstruction
FEV1 less than 40 percent of predicted = Severe obstruction

Assessment Notes:

_____
_____
_____

Asthma Severity Classification noted in the chart for this visit?

□ Mild Intermittent
□ Mild Persistent
□ Moderate Persistent
□ Severe Persistent

Diagnosis:

_____

_____

_____

Follow Up Instruction/Care Recommendations:

_____

_____

Medication Reconciliation:

_____

_____

_____

Referrals:

____ Tobacco Quit Line ____ Pulmonologist

____ Primary Care Provider ____ Otolaryngologist (ENT)

____ Allergist/Immunologist ____ Social Services/Case management

General comments:

_____

_____

_____

Staff/Provider Signature: _____ Date: _____

Staff/Provider Signature: _____ Date: _____

Staff/Provider Signature: _____ Date: _____

******* Follow Up Telehealth Consultation - Evaluating Providers Use Only *******

Respiratory Assessment:

Chest Expansion/Spinal Alignment:
□ Symmetrical □ Asymmetrical □ Scoliosis □ Kyphosis

Respirations:
□ No distress □ Shortness of Breath □ Shallow □ Labored

Breath Sounds:
□ Clear □ Diminished □ Wheezing □ Rhonchi □ Crackles □ Rales

Cough:
□ Absent □ Productive □ Non-productive □ Weak □ Moderate □ Strong

Sputum/Secretions:
□ Clear □ Color _____

□ Thin □ Thick □ Amount _____

Cyanosis: _____ Nail clubbing: _____ Pallor: _____

Spirometry Test/PFT Results:

_____
_____
_____

FEV1 greater 80 percent of predicted= normal
FEV1 60 percent to 79 percent of predicted = Mild obstruction
FEV1 40 percent to 59 percent of predicted = Moderate obstruction
FEV1 less than 40 percent of predicted = Severe obstruction

Assessment Notes:

_____
_____
_____

Asthma Severity Classification noted in the chart for this visit?

□ Mild Intermittent
□ Mild Persistent
□ Moderate Persistent
□ Severe Persistent

Diagnosis:

_____

_____

Follow Up Instruction/Care Recommendations:

_____

_____

Medication Reconciliation:

_____

_____

Referrals:

____ Tobacco Quit Line ____ Pulmonologist

____ Primary Care Provider ____ Otolaryngologist (ENT)

____ Allergist/Immunologist ____ Social Services/Case management

General comments:

_____

_____

_____

_____

_____

_____

_____

Staff/Provider Signature: _____ Date: _____

Staff/Provider Signature: _____ Date: _____

Staff/Provider Signature: _____ Date: _____

Appendix C: Asthma Action Plan Template

Asthma Action Plan

Asthma and Allergy Foundation of America www.aafa.org

Name	Date
Doctor	Medical Record #
Doctor's Office Phone #: Day	Night/Weekend
Emergency Contact	
Doctor's Signature	

The Colors of a traffic light will help you use your asthma medicines.

Green means **Go Zone!**
Use preventive medicine.

Yellow Means **Caution Zone!**
Add quick-relief medicine.

Red means **Danger Zone!**
Get help from a doctor.

Personal Best Peak Flow _____

GO

You have *all* of these:
- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can work and play

Peak flow from _____ to _____

CAUTION

You have *any* of these:
- First signs of a cold
- Exposure to known trigger
- Cough
- Mild wheeze
- Tight chest
- Coughing at night

Peak flow from _____ to _____

DANGER

Your asthma is getting worse fast:
- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well

Peak flow reading below _____

Use these daily preventive anti-inflammatory medicines:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

For asthma with exercise, take:

Continue with green zone medicine and add:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

CALL YOUR PRIMARY CARE PROVIDER.

Take these medicines and call your doctor now.

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

GET HELP FROM A DOCTOR NOW! Do not be afraid of causing a fuss. Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room. DO NOT WAIT.

Make an appointment with your primary care provider within two days of an ER visit or hospitalization.

Appendix D: Telehealth Evaluation Form

The Breathe Easy Telehealth Program Telehealth Evaluation Form

Thank you for participating in the Breathe Easy Telehealth Program. The information you provide to us will better assist our program and its success, as well as, help us in identifying ways to improve the existing system.

Date of Service: ___/___/_____

Gender: ___Male ___Female

Location (school site) of Services: _____

Age Range of Patient Receiving Services: 5-7: ____ 8-10: ____ 11-12: ____ Other: ____

1. Is this your first visit to a health care provider (e.g. doctor, nurse, etc.) using a telehealth network connection?
   - Yes
   - No

2. How many hours did you and/or your family miss from work or school, including drive time, to get to the telehealth clinic? _____

3. How many hours would you and/or your family travelled if you had to go to an asthma specialist's physical office?

4. Would you have preferred to drive to see the doctor at their office?
   - Yes
   - No

5. Do you feel as though you have a better understanding of asthma and how to manage symptoms because of the telehealth program?
   - Yes
   - No

6. How satisfied are you with the nursing staff and their knowledge during today's telehealth consultation?
   - Highly Satisfied
   - Satisfied
   - Neutral
   - Not Satisfied
   - Highly Dissatisfied

7. How satisfied were you with knowledge and services provided to you by the asthma and allergy specialist (pediatric pulmonologist) at Children's Hospital, New Orleans, LA?

- Highly Satisfied
- Satisfied
- Neutral
- Not Satisfied
- Highly Dissatisfied

	Poor	Fair	Good	Excellent
The length of time waiting in the office for the telehealth appointment?				
The voice quality of equipment (could you hear the provider clearly)?				
The visual quality of the equipment (could you see the provider clearly)?				
The courtesy, respect, sensitivity and friendliness of the specialist you saw?				
How well the telehealth staff respected your privacy?				
Your overall treatment experience with Telehealth?				

Please provide any general thoughts on the telehealth visit you had today:

_____

_____

_____

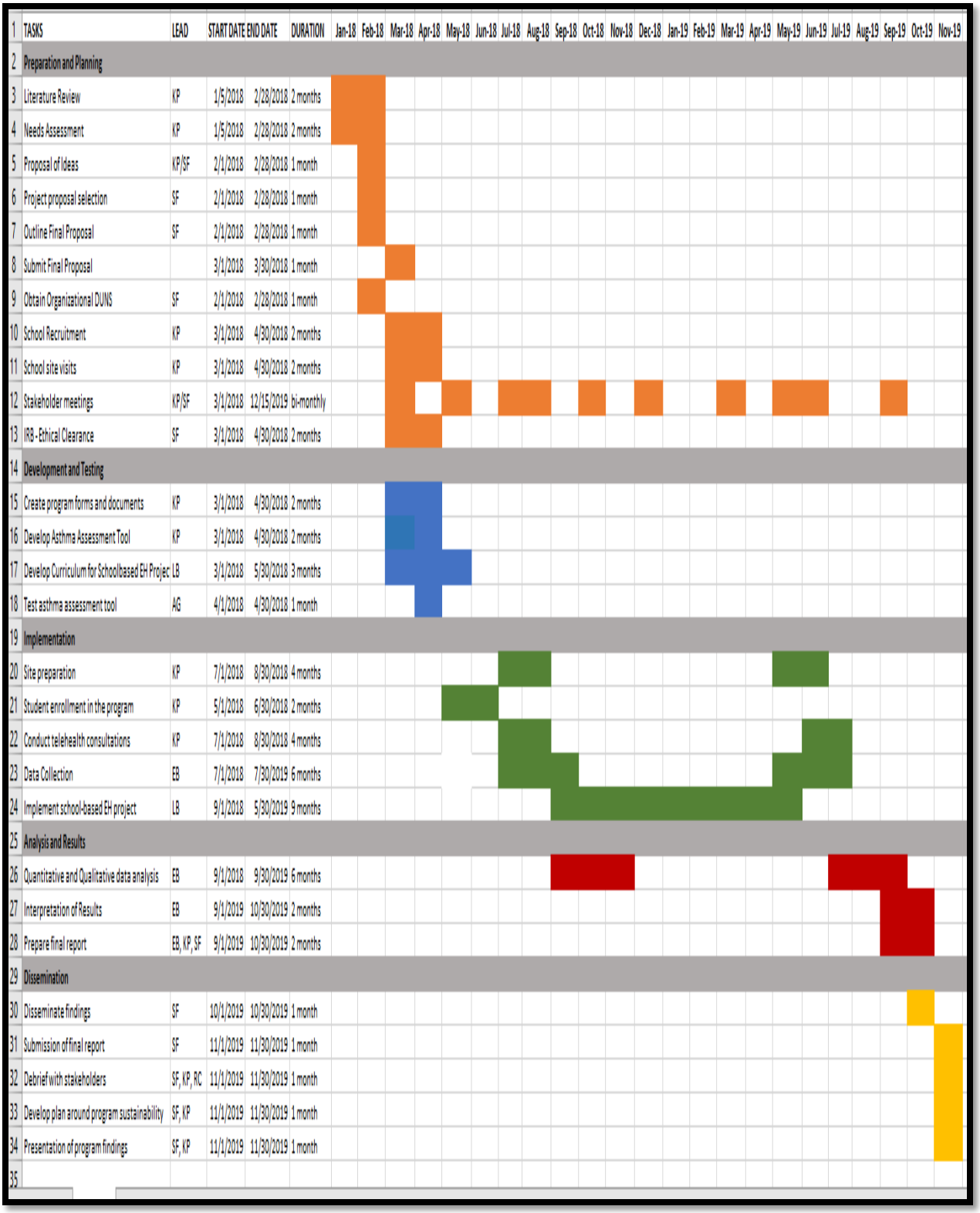
_____

Appendix E: Modular Budget

Project Title: The Breathe Easy Telehealth Program			
Budget for full Project Period	**Year 1**	**Year 2**	**Total**
Salaries *			
Principal Investigator	$ 10,000	$ 10,000	$ 20,000
co-Principal Investigator	$ 15,000	$ 15,000	$ 35,000
Program Director	$ 12,500	$ 12,500	$ 25,000
Health IT Professional	$ 12,500	$ 12,500	$ 25,000
Graduate Student - Epidemiologist/Program Evaluator	$ 6,000	$ 6,000	$ 12,000
Total Salaries	**$ 56,000**	**$ 56,000**	**$117,000**
Fringe Benefits * (estimated using percentage of salary)			
Principal Investigator	$ 2,500	$ 2,500	$ 5,000
co-Principal Investigator	$ 3,750	$ 3,750	$ 7,500
Program Director	$ 3,125	$ 3,125	$ 6,250
Health IT Professional	$ 3,125	$ 3,125	$ 6,250
Graduate Student/Epidemiologist	$ 1,500	$ 1,500	$ 3,000
Total Fringe Benefits	**$ 14,000**	**$ 14,000**	**$ 28,000**
Domestic Travel *	$ 11,500		
Total Travel	**$ 11,500**	**$ 11,500**	**$ 23,000**
Conference or Workshop*			
Equipment			
Telehealth equipment	$ 46,776		$ 46,776
Total Equipment	**$ 46,776**	**$ -**	**$ 46,776**
Other Direct Costs			
Materials & Supplies			
Consulting or Contracted Services	$ 2,500	$ 2,500	$ 5,000
Subawards	$ 12,500	$ 12,500	$ 25,000
Graduate Student Tuition			
Publication Cost/Documentation	$ -	$2,000	$ 2,000
Internal Reimbursable Service Centers			
Miscellaneous			
Total Other Direct Costs	**$ 15,000**	**$ 17,000**	**$ 32,000**
Total Direct Costs			
Base			
Facilities and Administrative Costs Rate: 65% of appropriate Base	$10,000	$10,000	$ 20,000
Total Project Costs			**$266,000**

Appendix F: Logic Model

Appendix G: GANTT Chart



	TASKS	LEAD	START DATE	END DATE	DURATION
2	Preparation and Planning				
3	Literature Review	KP	1/5/2018	2/28/2018	2 months
4	Needs Assessment	KP	1/5/2018	2/28/2018	2 months
5	Proposal of Ideas	KP/SF	2/1/2018	2/28/2018	1 month
6	Project proposal selection	SF	2/1/2018	2/28/2018	1 month
7	Outline Final Proposal	SF	2/1/2018	2/28/2018	1 month
8	Submit Final Proposal		3/1/2018	3/30/2018	1 month
9	Obtain Organizational DUNS	SF	2/1/2018	2/28/2018	1 month
10	School Recruitment	KP	3/1/2018	4/30/2018	2 months
11	School site visits	KP	3/1/2018	4/30/2018	2 months
12	Stakeholder meetings	KP/SF	3/1/2018	12/15/2019	bi-monthly
13	IRB - Ethical Clearance	SF	3/1/2018	4/30/2018	2 months
14	Development and Testing				
15	Create program forms and documents	KP	3/1/2018	4/30/2018	2 months
16	Develop Asthma Assessment Tool	KP	3/1/2018	4/30/2018	2 months
17	Develop Curriculum for Schoolbased EH Projec	LB	3/1/2018	5/30/2018	3 months
18	Test asthma assessment tool	AG	4/1/2018	4/30/2018	1 month
19	Implementation				
20	Site preparation	KP	7/1/2018	8/30/2018	4 months
21	Student enrollment in the program	KP	5/1/2018	6/30/2018	2 months
22	Conduct telehealth consultations	KP	7/1/2018	8/30/2018	4 months
23	Data Collection	EB	7/1/2018	7/30/2019	6 months
24	Implement school-based EH project	LB	9/1/2018	5/30/2019	9 months
25	Analysis and Results				
26	Quantitative and Qualitative data analysis	EB	9/1/2018	9/30/2019	6 months
27	Interpretation of Results	EB	9/1/2019	10/30/2019	2 months
28	Prepare final report	EB, KP, SF	9/1/2019	10/30/2019	2 months
29	Dissemination				
30	Disseminate findings	SF	10/1/2019	10/30/2019	1 month
31	Submission of final report	SF	11/1/2019	11/30/2019	1 month
32	Debrief with stakeholders	SF, KP, RC	11/1/2019	11/30/2019	1 month
33	Develop plan around program sustainability	SF, KP	11/1/2019	11/30/2019	1 month
34	Presentation of program findings	SF, KP	11/1/2019	11/30/2019	1 month
35					

Appendix H: Letter of Commitment

Sharon Freeman, PhD
Associate Director
Office of Chronic Disease Prevention
Louisiana Health Department
4th Street
Baton Rouge, LA 70802

Dear Dr. Freeman,

I am writing this letter of commitment that the Tulane University School of Public Health and Tropical Medicine will partner with you, in your grant proposal activities. Childhood asthma is an issue that clinicians and public health professionals alike have identified as a significant health burden.

Research at Tulane University School of Public Health and Tropical Medicine focuses on the issues of greatest relevance to our population, which includes but is not limited to, studies of the Gulf Oil Spill, post Hurricane Katrina-related exposures, tobacco use, health disparities and vulnerable populations, and quality of life issues. Our distinguished faculty are widely published including book chapters, peer reviewed journal publications, and abstracts. They also act as reviewers for the *Journal of the American Medical Association*, *Prevention Science*, the *American Journal of Public Health*. I have been the principal investigator of five RO1 grants representing about $7 million in funding support – with a total career research funding exceeds $12 million. My colleague Michelle Harrington, PhD, will be assisting in the project. Her research interests are primarily in air pollution and exposure assessment.

We are dedicated in partnering in this project by:

1) Developing a comprehensive curriculum for a school based environmental health and clean air project, in alignment with the United States Environmental Protection Agency Indoor Air Quality Tools for Schools Action Kit. The curriculum includes, but is not limited, to drafting school policies, systems change activities, and asthma awareness activities.
2) Facilitating a one-day program at each of the participating schools to meet with students, school faulty, and administration develop a plan for the school-based environmental health project and tools for tracking the progress of the school's project activities in a report.
3) Performing one site visit per school at the completion of the project, in May 2018, in recognition of asthma awareness month.
4) Assisting the participating schools in the development of a strategic partnership will be formed with local Parent Teacher Association (PTA) organizations to secure resources to sustain the activities associated with the eco-education and environmental health project, after the funding period

We look forward to working with all partners in this program and believe that the school-based asthma telehealth project is a much-needed and innovative initiative.

Best Regards,

Lewis Brunson

Lewis Brunson, MD, MPH
Associate Professor
Global Environmental Health Sciences (GEHS)
Tulane University School of Public Health and Tropical Medicine

Appendix I: Subaward Contract

SUBAWARD AGREEMENT
BETWEEN
THE LOUSIANA DEPARTMENT OF HEALTH AND
THE TULANE UNIVERITY SCHOOL OF PUBLIC HEALTH AND TROPCIAL MEDICINE

This cost reimbursable subaward agreement is entered into, on the subscribed date by the Louisiana Health Department (LHD) and Tulane University School of Public Health and Tropical Medicine.

1. This PURPOSE OF SUBAWARD: The NIH Exploratory/Developmental Research Grant Program (Parent R21) PA-16-161 was awarded to the Louisiana Health Department by the National Institutes of Health. The award provides financial assistance for the Breathe Easy Telehealth Program, a collaborative initiative. This is a cost reimbursable subaward agreement under the NIH Exploratory/Developmental Research Grant Program (Parent R21) PA-16-161 award.

2. TERM OF SUBAWARD: The term of this subaward will be from January 1, 2018 through July 1, 2019.

3. PROGRAM ACTIVITIES: Subrecipient will participate in the Breathe Easy Telehealth Program by carrying out the following program activities
Scope of Work:

- Develop a comprehensive curriculum for a school based environmental health and clean air project in alignment with the United States Environmental Protection Agency Indoor Air Quality Tools for Schools Action Kit.
- Facilitate a one-day program at each of the participating schools present the project curriculum and instruct the participating schools a standardized to reporting tool to track the progress of the school's project activities.
- Provide technical assistance to the participating schools on the project activities, and project activity reporting during the project period.
- Perform one site visit per school in May 2018, to culminating project activities, in recognition of asthma awareness month.
- Provide LDH with a detailed report of project activities.

4. PAYMENT: Subject to availability of funding, The Louisiana Health Department will reimburse the subrecipient on a quarterly basis, in arrears, for allowable costs (as defined in Article 6.0 of this subaward) incurred in the performance of the program activities described in the Scope of Work and in accordance with Modular Budget. The maximum amount payable under this subaward is $25,000 for project period included in the term of the subaward. Subrecipient shall submit its final invoice no later than 60 days after the date expiration of the term or termination of this subaward. LHD may approve an extension of this deadline if requested by Subrecipient. LHD shall have no obligation to pay invoices received more than 60 days after the expiration of the term or termination of this subaward.

5. INVOICES: Invoices will be submitted on a form acceptable to the Louisiana Health Department with supporting documentation to include but not limited to the following: name and address of Subrecipient, Agreement number, current period of performance, budget, expenditures for current period, cumulative expenditures and remaining balance by line item. Detailed documentation must accompany the face page of the invoice with actual cost accounting listing personnel, fringe benefit, and other categorical costs as reflected in the budget, both direct and indirect costs. Original Signature of Subrecipient's authorized representative. Upon review, Louisiana Health Department may request further documentation such as time sheets or actual receipts. The signature of Subrecipient's authorized representative certifies that proper financial management controls and accounting systems to include personnel policies and procedures have been established to adequately administer Federal awards and funds invoiced are being used in accordance with applicable federal cost principles, regulations and Budget.

6. ALLOWABLE COSTS: The allowability of Sub-recipient’s costs will be determined in accordance with OMB Circular A-87 Cost Principles for State, Local and Indian Tribal Governments (2 CFR part 225). Amounts paid to Subrecipient that are determined by audit or otherwise to be unallowable will be deducted from subsequent payments due Subrecipient, or Subrecipient will refund such amounts to LHD on demand.

7. TERMINATION AND SUSPENSION. LHD may suspend or terminate this subaward at any time by giving 30 days written notice of suspension or termination to Subrecipient if the prime grant is suspended or terminated in whole or in relevant part, or if Subrecipient materially fails to comply with any of the terms and conditions of this subaward. Either party may terminate this subaward without cause upon 30 days written notice to the other party. If Subrecipient sends or receives a notice of suspension or termination, Subrecipient will cancel as many outstanding obligations as possible. On the date of suspension or termination Subrecipient will stop work and Subrecipient will not incur any new obligations. In the case of termination without cause or termination resulting from suspension or termination of the prime grant, LHD will pay Subrecipient for costs incurred prior to the date of suspension or termination, including un-cancellable obligations.

8. The terms and conditions that are included within or incorporated by reference into the CA4HEALTH Notice of Award (attached as Exhibit C), including without limitation the grant program legislation and program regulations cited in the Notice of Awards, the restrictions on the expenditure of federal funds in appropriations acts to the extent those restrictions are pertinent as applicable, the NIH Grants Policy Statement including addenda in effect as of the beginning date of the budget period, and the terms and conditions in section IV of the NIH Exploratory/Developmental Research Grant Program (Parent R21) PA-16-161 Notice of Award, are hereby incorporated by reference into this subaward. Subrecipient will be subject to, and will comply with the requirements of, the terms and conditions of the Notice of Award, Exhibit C.

9. AUDIT AND INSPECTION: Subrecipient will preserve and retain all of its financial records, statistical records, supporting documentation, and all other books, records, documents, papers and other materials pertinent to this subaward for the record retention periods specified in the NIH Exploratory/Developmental Research Grant Program (Parent R21) PA-16-161 Notice of Award. Subrecipient will make the foregoing financial and other records and materials available

to LHD and its independent auditor, the funding agency, the funding agency Inspector General, the U.S. Comptroller General and any of their duly authorized representatives for the purpose of audit, examination, excerpt, copying, and transcription in accordance with 45 CFR part 92.

10. NOTICES: Notices and other communications hereunder are deemed given three business days after the date of mailing by certified mail to the address set forth at the beginning of this agreement.

11. ASSURANCE OF COMPLIANCE: Subrecipient will comply with all applicable federal statutes, regulations, and policies (including income tax regulations), and all applicable state and local laws and ordinances. Subrecipient certifies that it has an Assurance of Compliance with the following statutes on file with the HHS Office of Civil Rights: Title VI of the Civil Rights Act of 1964; Section 504 of the Rehabilitation Act of 1973; Title IX of the Education Amendments of 1972; and the Age Discrimination Act of 1975.

12. GOVERNING LAW: If any provision of this subaward is held in conflict with law, the validity of the remaining provisions will not be affected. The validity, construction, and effect of this subaward will be governed by the laws of the United States of America and the State of California.

_____	_____	_____
Print Name	Sign Name	Date
_____	_____	_____
Print Name	Sign Name	Date
_____	_____	_____
Print Name	Sign Name	Date