Nopneu Executive Summary

Clinical Problem

Pneumonia is an infection of the lungs that is caused by bacterial, viral or environmental transmission. The onset of the disease causes the walls of the lungs to become thickened and obstructed with excess fluid and blood that cause labored breathing, fever and chills, among other symptoms. Late diagnosis with current technology can cause a delay in receiving critical treatment. This delay can cause disease progression, severe infection and even death.

Background

In 2013, there were a reported **1.1 million individuals hospitalized and 53,282 deaths related to pneumonia**, according to the Center for Disease Control in America alone. The most vulnerable populations to infection are **children under five and individuals 65 and older** (CDC).

The effects of this epidemic are even more evident internationally in children under five. In 2011 pneumonia claimed **1.3 million lives of children under five globally**. (Bill and Melinda Gates Foundation). In 2013, the average mortality rate of children from pneumonia equated to **one child dying every 35 seconds** (Institute of Health Metrics and Evaluation). Affordable antibiotics are available to treat pneumonia, but only a reported third of children receive needed antibiotics because of lack of timely diagnosis. Many die before they reach the recommended age for vaccinations (Bill and Melinda Gates Foundation). It is the leading cause of death of children under five internationally (World Health Organization). Additionally, it is the **leading cause of death of**

diseases preventable by vaccine and kills more individuals than all vaccine preventable diseases in the U.S. (Immunization Action Coalition). Moreover, significant disparities exist between families of middle class and financially challenged families with **4.4 times more incidence in lower income, American families** (Burton, et al). Internationally, **pneumonia kills more individuals than AIDS, malaria and measles combined each year** (UNICEF).

Moreover, pneumonia related illness composes a significant amount of annual health expenditures in the United States. In 2013, more than **$16.2 billion** were spent on direct healthcare of pneumonia (American Lung Association). Internationally, as the awareness of this epidemic has increased **the expenditures on pneumonia diagnosis and prevention has more than doubled from 2008 to 2013**.

Current Approaches

Current diagnostic tools pose major limitations in the early diagnosis of the disease. These tools include invasive methods such as blood sampling, chest x- rays and lung fluid tests, which analyze the samples for the presence of biological agents responsible for pneumonia. These diagnostic tests are time consuming in producing a clear diagnosis, and cause discomfort to the tested person. These tests are especially invasive to neonates. Additionally, members of under resourced communities often lack access to these tools, as they are normally found in healthcare facilities. Moreover, a tremendous lack of awareness of symptoms exist among individuals. As a result of these current limitations, the pandemic of this preventable disease persists and adds significantly to the infant mortality rate.

Solution

In order to address these deficiencies in current diagnostic tools, Nopneu was created. Nopneu is **is a single use, saliva- based diagnostic tool that is under continued development. It is engineered to detect the presence of the primary agents of pneumonia in saliva, in a shorter period of time, for minimal discomfort that will also allow earlier medical intervention. It works through mechanisms of synthetically engineered biomaterials that fluoresce in the presence of key biomarkers of pneumonia. Nopneu is also able to detect the primary agents of pneumonia in a fraction of the time and cost of conventional methods.**

The primary, international target audience is children under five in under resourced communities because of large number of targets on the global scale. The primary domestic target audience is senior citizens. NOPNEU will empower parents and caregivers, in under resourced communities, to take an active role in combating infant mortality and say **no to pneumonia.**

Highlights

Objectives

1. Partner with international and domestic non- governmental organizations to have the widest possible distribution of NOPNEU products.
2. Increase public awareness of pneumonia symptoms and prevention strategies.

3. Make NOPNEU products accessible and affordable to people from a cross section of socio- economic backgrounds.
4. Decrease infant mortality in children under five by 30% in 2030 by focusing on areas of highest mortality rates in under -resourced communities.