



Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Lung Distance Relationship: A Remote Monitoring Device That Tracks Pulmonary Function

Finalist's Name: Maria Sears

School and City: Monte Vista Senior High School, Monte Vista

Sponsor's Name: Loree Harvey

Category: Biomedical & Health Sciences

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

More than 35 million people in the U.S., live with chronic lung diseases such as asthma, bronchitis, bronchiectasis, cystic fibrosis, and emphysema. And 735,000 of these individuals are hospitalized yearly due to exacerbations. Remote pulmonary monitoring devices are now being utilized to track the patient's condition and share that information with their provider in the hope of decreasing the hospitalization rate. However, devices currently available are mainly used in hospitals, only track certain vitals, and have issues with transferring data to the patient's care team. I developed a device and app that tracks the user's respiratory rate and heart rate, as well as allows the user to input their FEV1 rate and send a notification to their care team when their vitals are out of the recommended range. This device uses a pulse oximeter module and a conductive knitted stretch module to gather the user's vital signs. To develop the app, I used Google Sheets to store the values sent from the modules, and I used MIT App Inventor to display the values, allow the user to input their FEV1 rate, and send a notification. The device was able to successfully measure the user's pulmonary vitals and display the information. This device could be utilized by people with chronic pulmonary diseases to track the deterioration of their condition and reduce their hospitalization rate.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**