3D-Printed Bluetooth Android-Based Spirometer with HIPAA-Compliant Secured Cloud Data Storage

Edge, Hannah

This project identifies a novel, inexpensive approach in the development and structure of a portable, compact spirometer; merging new technology such as 3D printing, Bluetooth, Android and Cloud for the gathering and determination of lung function. Lung conditions that are able to be tested via this device include asthma and a1-antitrypsin deficiency, but most commonly chronic obstructive pulmonary disease. The current issue with commonly-used spirometers is their cost and inability to be carried around at a facile rate, creating a crucial disadvantage. Another drawback hospital spirometers possess is that they are solely computer-connected, rather than able to connect to portable devices such as smartphones. A portable handheld spirometer able to connect to the Android system and store user information to a secured Cloud server satisfies this issue. The information gathered includes height, weight, sex, age, ethnicity, location, and the lung parameters. The error rate of the SpiroEdge prototype is 4% and has a variation of approximately .14 L. The spirometer includes a built-in Bluetooth module which communicates to the Android interface to display the respiratory data. This device allows for more accessibility for both the doctors and the user, improving the ability to analyze and track vital information.

Awards Won: