Award Abstract #1738560

STTR Phase II: User-Friendly Spirometer and Mobile App for Self-Management and Home Monitoring of Asthma Patients

NSF Org:	**IIP** **Div Of Industrial Innovation & Partnersh**
Initial Amendment Date:	September 14, 2017
Latest Amendment Date:	August 26, 2019
Award Number:	1738560
Award Instrument:	Standard Grant
Program Manager:	Henry Ahn IIP Div Of Industrial Innovation & Partnersh ENG Directorate For Engineering
Start Date:	September 15, 2017
End Date:	August 31, 2022 (Estimated)
Awarded Amount to Date:	$1,109,999.00
Investigator(s):	Charvi Shetty charvi@aluna.io (Principal Investigator) Ngoc Ly (Co-Principal Investigator)
Sponsor:	KNOX Medical Diagnostics Inc. 175 Bluxome Street Unit 234 San Francisco, CA 94107-1552 (415)320-0690
NSF Program(s):	STTR Phase II
Program Reference Code(s):	1591, 165E, 8018, 8038, 8042, 8240
Program Element Code(s):	1591

ABSTRACT

The broader impact/commercial potential of this Small Business Technology Transfer (STTR) Phase II project is the development of a user-friendly asthma management solution. The asthma management tool consists of a portable medical device and mobile app combination that measures lung function with the consistency and accuracy of a trained lab technician, displaying current asthma status, and providing health insights to act upon. During the 2-year duration of this proposal, the applicant will further develop a machine-learning algorithm that obtains the same level of consistency and accuracy as if a trained lab technician were coaching and correcting the asthmatic patient on proper usage. Steps will be taken to establish the efficacy of such technology through verification of classification by pulmonologists. In order to engage users to continue using the product over several months, gamification elements will be implemented into the mobile app. By expanding on the machine-model through a longitudinal study, earlier detection of asthma exacerbations may be identified. Early detection leads to improved self-management as measured by the reduction of severe asthma attacks, the use of systemic corticosteroids, hospitalizations, emergency department or urgent care visits related to asthma.

The proposed project aims to develop an asthma management tool that provides parents a simple way to reliably monitor their child's lung health, eliminating the guesswork associated with relying on symptoms alone. The rate of asthma continues to rise, with an increasing amount of healthcare utilization among asthmatic individuals. Effective technologies for proper management remain trapped within the hospital due to high costs and requirement of a skilled lab technician for proper measurement collection. This proposal aims to develop an algorithm alongside UCSF pediatric pulmonologists to gain consistent and accurate spirometry measurements, so that only proper measurements are acted upon. Our machine-learning algorithm will determine the cause of failure and prompt the user on corrective action to achieve a good quality measurement on a subsequent effort. By the end of this proposal period, the applicant will have a mobile app algorithm that is able to achieve the consistency of a trained lab technician, provide effective corrective feedback, engage users over the span of months for consistent lung monitoring, and potentially predict the onset of an asthma attack.

Please report errors in award information by writing to: awardsearch@nsf.gov.