

PROJECT TEAM

Maria Artunduaga, MD, MPH, MTM
Principal Investigator

Luis Javier Peña, MD, Pulmonologist/Intensivist
Subinvestigator

Karen Martínez, MD
Clinical Operations Lead

Li Zhang, MS, PhD
Biostatistician

Cezar Morun, PhD
Hardware Engineering Lead
Douglas Baptista de Souza, PhD
DSP/ML Lead

MOTIVATION

Three months following hospitalization, up to 43% of COVID-19 patients report dyspnea. Respiratory symptoms left untreated can cause irreversible lung damage and progressive decline in lung function. Maintaining accurate post-acute COVID patient monitoring employing acoustic lung resonance for air trapping measurement can help **understand COVID-19 sequelae and new therapy development, efficacy, safety, and side effects.**

OUR PROPOSAL: SYLVEE

Today's tools are inadequate!



PLETHYSMOGRAPHY

- \$50K device
- >1 Hr duration
- Requires a technician
- Difficult to complete (blowing)
- Performed every other year



PULSE-OXIMETER

- 70% error rates
- Issues with colored skin
- Could be normal with symptoms
- Need to stay still
- Doctors don't prescribed them



CT SCANNER

- \$2M device
- >1 Hr duration
- Requires a technician
- Need to stay still
- Performed every other year



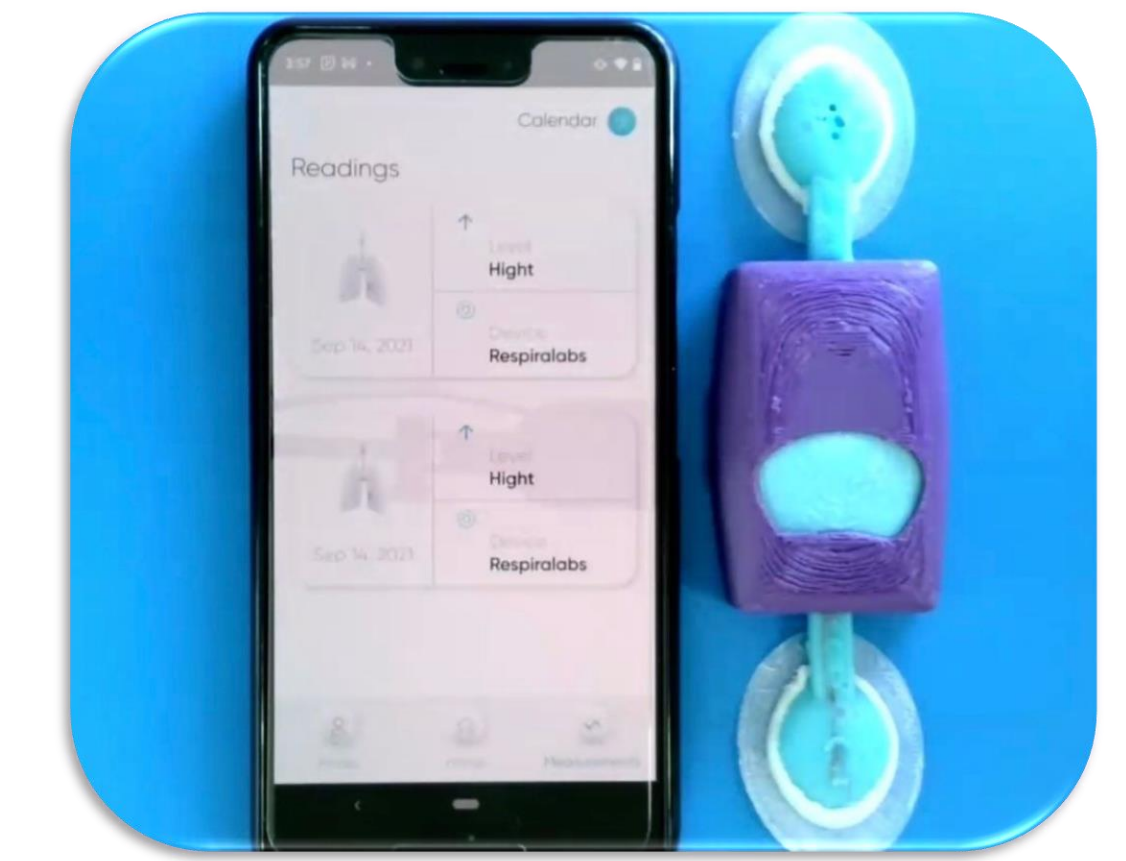
QUESTIONNAIRE

- 67% accurate
- Relies on subjective data
- Needs patients to complete it
- The **STATUS QUO** at home

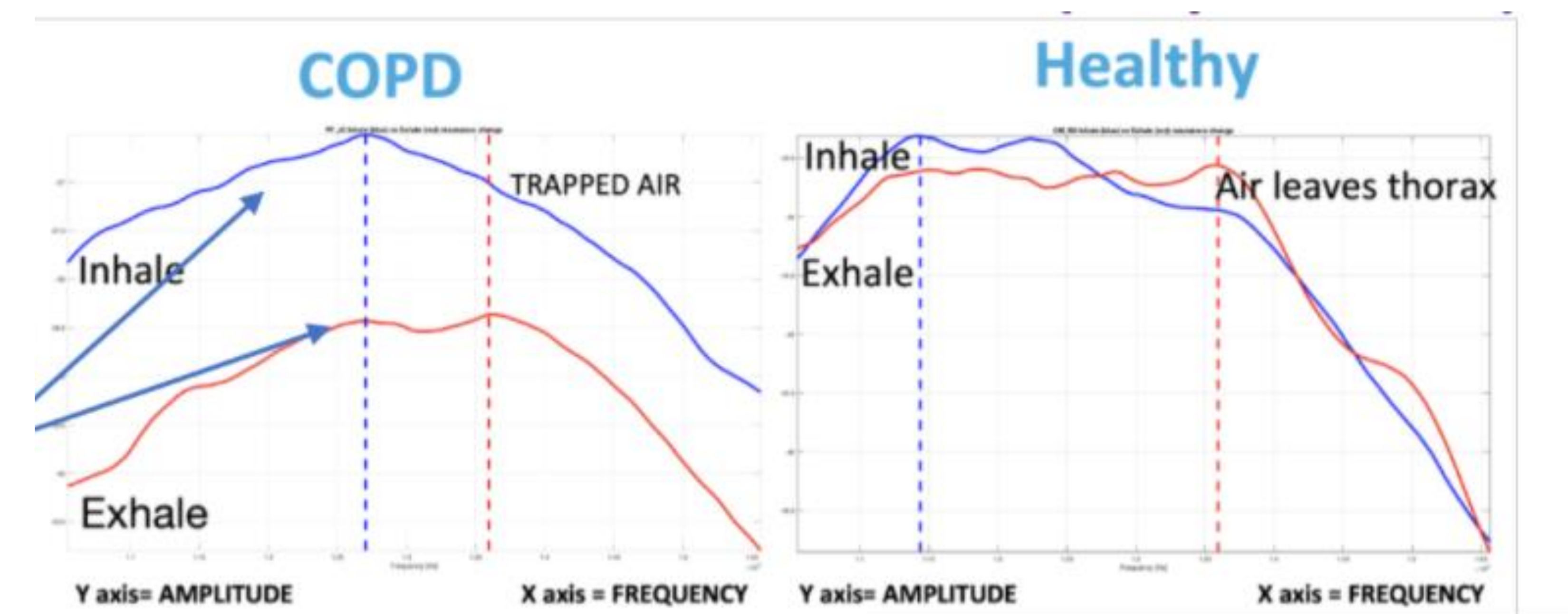
Preliminary results:

- Accuracy of >90% to detect respiratory rate when moving.
- Sylvee can consistently identify changes in lung resonance in COPD patients during exercise.
- The acoustic resonances and frequency shifts of patients with and without COPD differed.

Our device uses next-generation technology to **quantify air trapping**, a well-known biomarker of lung function decline. It monitors and analyzes acoustic resonance properties in real time or stores them for later processing.



Current prototype



DELIVERABLES

1) Clinical: Perform a semi-remote feasibility trial (n=25 COVID-19 survivors; n=25 healthy controls) to track changes in acoustic resonance properties using PFTs, metronome breathing, and the 6MWT. Also compare Sylvee's efficacy to chest CT scan imaging, standardized questionnaires, and other clinical parameters.

2) Academic: Publish in a respected peer-reviewed journal like American Journal of Respiratory and Critical Care Medicine, European Respiratory Journal or The Lancet Respiratory Medicine

3) Regulatory: Submit a pre-EUA package to the FDA for review before submitting an EUA.

4) Business: Conduct over 50 interviews with patients, healthcare providers and administrative staff to learn how to understand how our device fits into workflows and what economic data they need to see value (e.g., safety, savings, new revenue).

5) Fundraising: Secure 5 letters to support raising \$4M from institutional investors.