



 **LUNGPASS**

“thermometer for  
lungs”

# Stethoscope for lungs with AI powered app

based on Bluetooth technology



Pneumonia

COPD

Bronchitis

Asthma

Interstitial lung diseases

Acute respiratory infections

# Functionality

(Clinical studies)



# Clinical study «Safety and Performance Assessment of the LungPass Electronic»

(for CE certification, January-March 2020)

- Multicenter study, **5 clinical sites in Belarus**
- **110 patients** (74 adults and 36 children) with different respiratory diseases (pneumonia, asthma, COPD, bronchitis, ARI)
- The **overall accuracy** of the algorithm in comparison with the concilium of pulmonologists is **81.6%** (89.1% for normal breathing, 84.1% for crackles, 95.6% for wheezes)
- **90%** of the interviewed patients noted the convenience of using the stethoscope and the **ability to make a correct records** after training
- **95%** of interviewed patients noted the convenience of the user interface and the **simplicity and clarity** of the questions in the questionnaires

# Clinical study of the electronic stethoscope LungPass

(post-registration trial, Republic of Belarus, 2020)

- Multicenter study, **3 clinical sites in Belarus**
- **406** pulmonary sound recordings
- The **average accuracy** of the algorithm in comparison with the assessment by pulmonologists is **93.7%** (93.7% for normal breathing, 92.3% for crackles, 98.5% for wheezes).
- All physicians involved in the trial noted the **good overall functionality and usability of the LungPass** electronic stethoscope for lung auscultation and recognition of main lung sounds.

# Automated lung sound analysis in patients with bacterial pneumonia (2019-2020)

(completed study)

- **148** patients with pneumonia confirmed by X-ray
- LungPass **detected crackles in 95%** of cases

# Automated lung sound analysis in patients with viral COVID-19 pneumonia (2020)

(completed study)

- **200** patients
- Data analysis in progress
- Data from a preliminary analysis of sounds obtained from **51 patients**: LungPass **reveals the crackles in 86% of cases**, while auscultation with a conventional stethoscope by pulmonologist - in 33% of cases.

# Early recognition of acute exacerbations of COPD (2019-2020 гг.)

(completed study)

- Monitoring of **30 patients with COPD**
- Specific changes in the sound picture were observed 2-3 days **before going to the doctor** for worsening COPD symptoms in **5 out of 6 detected cases of COPD** exacerbation



# Automated lung sound analysis for improving the accuracy of pneumonia diagnosis in primary care

(planned clinical trial)

- **Multicenter study** with the participation of **clinics in Belarus and Germany**
- At the stage of approval of the research protocol
- It is planned to include **150 patients** (adults and children)
- Objectives - to analyze the accuracy of **early detection of pneumonia** using the LungPass device based on the sound pattern and symptoms in comparison with the accuracy of physicians

# Early detection of exacerbations in patients with COPD

(planned clinical trial)

- Recruitment of a group of patients for **long-term monitoring** at home has started
- It is planned to recruit **30 patients** with COPD
- Objectives - to assess the **benefits of the LungPass device** in the early detection of exacerbation of COPD based on the sound picture and symptoms

# Safety

(preclinical testing)

- **Biocompatibility assessment**

Report № 0115/4976/06-02 dated 30.06.2020, issued by RUE "Scientific and Practical Center for Hygiene" Sanitary and hygienic report No. 18-12-01 / 4339 dated 12.06.2019.

- **Technical tests**

Report № 45-88/2234-2020, protocols № 45-88/2234-7-2020, № 45-88/2234-8-2020, № 45-88/2234-9-2020, № 45-88/2234-10-2020, № 45-88/2234-11-2020, № 45-88/2234-12-2020 dated 04.06.2020, issued by RUE "Belarusian State Institute of Metrology"

Article link: [APPLICATION OF THE NEURAL NETWORK TECHNOLOGY FOR DETECTION AND MONITORING OF AUSCULTATIVE PHENOMENA IN DIAGNOSIS AND TREATMENT OF DISEASES OF THE RESPIRATORY SYSTEM](#)