E-nose TB

An innovative technology, utilizing machine learning to screen tuberculosis cases.

Tuberculosis working group

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WHY?

- **The gap** between the number of **actual cases and detected cases** in Indonesia is **very high**.
- Screening of tuberculosis in Indonesia is usually conducted with Chest Radiography (CXR) or clinical symptoms.
- Clinical symptoms has low sensitivity and specificity.
- The sensitivity of CXR is 87%, however **CXR is not portable, has large size, expose patient to radiation, and unmanageable to carry out in remote areas**.
- **Breath tests** have several advantages: **non-invasive, easy to perform, fast, potentially point-of-care** and can be used for patient who experience the **difficulty in splitting out the sputum**.

HOW DOES IT WORK

- Electronic-nose consists of metal-oxides sensors and pre-concentrators. Participants **breathe normally through a disposable mouthpiece for 2 minutes.**

- Mouthpieces contain filters to protect electric-nose contaminated with bacteria and viruses, meanwhile valves, and carbon filters prevent interference from Volatile Organic Compounds (VOCs) in the environment that can interfere with breath test

RESEARCH METHODS

2019
Case-control:
- 100 patients TB positive
- 100 healthy controls

Location:
Respira Lung Hospital, Bantul

2020
Cross sectional:
- 1000 participants

Along with the launch of active TB case finding with portable X-ray in high-risk populations in Yogyakarta city

'17 – '18 Development of e-Nose for tuberculosis screening

2019 E-Nose Validation test in Respira Lung Hospital

2020 Test of E-Nose as a tuberculosis screening tool in endemic area in Yogyakarta Province

'21 – '25 e-Nose test as tuberculosis screening tool in wider coverage (several provinces)

2026 Dissemination of findings

Simulation of using E-nose

A product image of E-nose

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