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How is the LUCIA Project Study Conducted in Latvia?

The main goal of the LUCIA project is to develop a toolkit to identify and understand new risk factors contributing to lung cancer (LC) development. The toolkit includes an analysis of three interrelated aspects:

1. **Personal risk factors** (i.e., individual exposure to chemical pollutants, as well as behavioral and lifestyle factors).
2. **External risk factors** (i.e., urban, built, and transport environments, social aspects, and climate).
3. **Cellular processes** (i.e., changes in genetics, epigenetics, metabolism, and aging).

In Latvia, this project is implemented by scientists from the Institute of Clinical and Preventive Medicine at the University of Latvia (UL ICPM) under the scientific leadership of Prof. Alvils Krams, a leading researcher and chief pulmonology specialist at Riga East University Hospital.

Researchers from UL ICPM and physicians from Riga East University Hospital, in collaboration with international partners, have agreed on the development of the clinical protocol and standard procedure for the project. Participant questionnaires have been prepared, and work is underway on the participant inclusion algorithm, which will guide the involvement of study participants—individuals from multiple healthcare institutions, including general practitioners' offices.

At the beginning of 2024, the study received approval from the Central Medical Ethics Committee, which confirmed that the study complies with bioethical standards.

The LUCIA project aims to include approximately 3,000 adults aged 40–80, both smokers and non-smokers. Around 400 participants from Latvia will be included in the study.

Study Process

Upon joining the study, participants are first introduced to the planned study procedures, sample collection, and analysis methodology. The study consists of three phases:

1. **General population screening**
2. **Precision screening**
3. **Diagnostics**

The study involves four visits to the researcher/doctor:

- **Initial visit**
- **Second visit** at 6 months (which can be conducted remotely)
- **Third visit** at 12 months
- **Fourth visit** at 24 months

During these visits, the participant's general health status is assessed through objective examinations, surveys on medication use and clinical symptoms, updates on

sociodemographic data, and quality-of-life-related questions (e.g., dietary habits, harmful factors, etc.).

Following the survey, blood samples are taken, and a breath test is conducted. The analyzers used in the study measure volatile organic compounds in breath samples, blood samples, and sweat. Some participants (based on specific medical indications) will undergo chest computed tomography (CT) scans.

Participants are informed of the study process as follows:

- After the initial assessment and based on obtained results, those with low or moderate lung cancer risk will continue in Phase 1.
- Those identified with a higher risk of lung cancer, according to the developed risk assessment models, will proceed to Phase 2.
- Participants in whom lung lesions or lung cancer are detected during screening phases will continue to Phase 3.

If new information about a participant's health condition emerges during the study, the responsible researcher will address the situation in accordance with standard clinical practice in collaboration with the treating physician.

In Latvia, biological sample collection for the study takes place at two centers of Riga East University Hospital: the **Latvian Oncology Center** and the **Tuberculosis and Lung Disease Center**, located about 15 km outside Latvia's capital in Stopiņi Parish, Ropaži Municipality.

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