

VOLABIOS

First Issue
2026

Year 1 Progress in

VOLABIOS - Validation and Comparative Multi-Omics Benchmarking of Fluid-Derived Volatilomics Biomarkers for the Prevention and Early detection of Schizophrenia

Multi-omics, volatilomics, AI, and digital health for early detection.

COORDINATOR'S EDITORIAL

Technion

As we complete our first year, we are pleased to share how the project is developing a new approach to understanding schizophrenia. This condition is complex and influenced by many biological and environmental factors. VOLABIOS brings together experts across Europe to study these different aspects using complementary technologies.

During 2025, our partners focused on building the project's core tools and infrastructure. This includes advanced genetic and molecular analysis, innovative breath and skin-sensing technologies, and a secure digital platform that enables researchers to combine and analyze different types of health data.

In the coming year, the project will transition from planning to active research. Clinical studies and stakeholder engagement activities will start across several sites, helping ensure that the knowledge generated by VOLABIOS can ultimately support earlier detection and better care for people affected by schizophrenia.

In this issue:

Key areas of progress across the VOLABIOS consortium.

- Multi-Omics Technology — FIRALIS
- VOCs Analysis — SmartNanoSense
- Data Infrastructure — EXUS AI Labs
- Biobank — FIRALIS
- Machine Learning Models — CERTH
- Legal Framework — TIMELEX
- Living Labs — LSMU
- Social Labs — ZSI



THE MULTI-OMICS TECHNOLOGY

FIRALIS

Schizophrenia is influenced by many factors. These include a person's genetic makeup, how genes are switched on and off, and other changes in the body that happen as a result. In the first year of VOLABIOS, the FIRALIS team focused on building the tools and methods needed to study these different layers together. This groundwork is important because it will support the next stages of the project and help researchers better understand how these factors are connected.

One of the main achievements of the first year was the creation of a custom genetic test panel for schizophrenia and related mental health conditions. This panel focuses on selected genetic differences that have been linked to disease risk in large research studies. By concentrating on a carefully chosen set of markers, the project can study them in greater detail while still working with large groups of samples. This panel now provides a strong basis for the genetic part of VOLABIOS and will help researchers compare risk patterns across participants.

To better understand how genetic differences may affect the body, VOLABIOS also added a new method to study RNA, the molecule that carries instructions from genes. During the first year, the team set up a pipeline based on PacBio Revio sequencing, a technology that can read full RNA molecules more completely than standard methods. This is especially useful because many genes linked to schizophrenia can produce different RNA forms, each with a different role in brain cells. Studying these forms in detail may help researchers see how genetic risk affects gene activity.

Another important part of the project is the study of proteins, which carry out many of the body's key functions. In its first year, VOLABIOS selected the Olink high-throughput platform to measure many proteins at the same time, using only small sample volumes. This makes it suitable for large studies. The platform will help the project look for protein patterns linked to processes such as immune responses, communication between cells, and brain function, all of which may play a role in schizophrenia.

Key Milestone

Together, these steps mark an important milestone for VOLABIOS. By the end of the first year, the project had put in place a connected system to study genetics, RNA, and proteins side by side. This gives researchers a clearer path to follow, from DNA changes to their effects in the body. With this foundation now ready, VOLABIOS can move on to combining results, interpreting what they mean, and searching for new biological markers in the years ahead.

THE VOCs ANALYSIS TECHNOLOGY

SNSI

In the first year of the VOLABIOS project, SmartNanoSense (SNSI) made a significant contribution by setting up reliable methods for collecting and analyzing volatile organic compounds (VOCs) related to schizophrenia. These compounds can be found in body fluids like breath, skin, blood, and urine, and studying them helps identify patterns that may be linked to the condition. One of the main achievements was the development of new tools based on ion mobility spectrometry (IMS), which were customized for each type of body fluid. These tools were fine-tuned to detect and compare VOC patterns across different fluids, helping to identify specific chemical markers that could be connected to schizophrenia and psychosis.

To ensure the accuracy of the measurements, IMS systems were successfully set up and tested at three clinical sites, with plans to expand to three more. This multi-site approach ensures that the data gathered will be consistent and comparable across different locations. With these systems now in place, the project is ready to increase the scale of its measurements, improve consistency between sites, and use this data to develop future diagnostic tools for psychiatry.



From left to right, top to bottom: urine sampling, breath sampling, the IMS device, skin sampling

THE DIGITAL ASSETS

DATA INFRASTRUCTURE

EXUS

During the first year of VOLABIOS, EXUS AI LABS focused on building the shared digital foundation that supports the project's research. We set up a secure and scalable environment where project data can be collected, stored, organized, and explored, and where machine learning models can be developed to study multimodal data related to schizophrenia. This work is essential for all partners, as it creates a common space for collaboration across technical, clinical, and research teams. The infrastructure was designed to protect sensitive information, allowing access only to authorized users and ensuring that data is handled in line with European data protection rules. It also supports the smooth flow of anonymized or pseudonymized data coming from different sources, helping the consortium work with information in a more consistent and reliable way. In practice, this means that VOLABIOS now has the core digital environment needed to support data analysis, model development, and future tools that will assist researchers and healthcare professionals as the project moves forward.

BIOBANK

FIRALIS

One of the major achievements in the first year was setting up a strong system for managing biological samples and clinical data. Firalis was chosen to lead this work because its facility is ISO 20387 certified, meaning it meets international standards for biobanking. This certification ensures that all aspects of sample collection, processing, storage, and tracking follow strict quality rules. Firalis also uses a Laboratory Information Management System (LIMS), which helps keep track of samples throughout the project, ensuring full traceability. At the same time, Firalis created an electronic case report form (eCRF) on the dotter.science platform, designed specifically for the VOLABIOS clinical study. This form helps capture clinical data in a standardized and organized way. Together, these systems make sure that both biological samples and clinical information are managed carefully, providing a solid foundation for the project's future work.

THE ML MODELS

CERTH

In the first year of the project, CERTH has focused on developing machine learning (ML) models to predict the risk of schizophrenia using non-invasive electronic health records. To make sure the results were reliable, we designed and tested these models to find meaningful patterns in the clinical data. The data was carefully cleaned and organized to provide clear inputs for the analysis. Early results suggest that existing information can already help in the goal of identifying schizophrenia earlier and more easily. Based on these findings, our next steps will involve testing more advanced algorithms and adding new types of information, like omics data, environmental factors, and volatile organic compounds. This will improve the accuracy of the models and strengthen their ability to support early detection and decision-making in the future.

LEGAL ASPECTS

TIMELEX

During the first phase of the project, TLX led the work on legal, ethical, and societal issues. They prepared and submitted a report on these topics at the end of the first year, with input from several partners, including UKA, SAS, ZSI, and LSMU. The report provided a detailed review of the EU laws that apply to the project.

DATA COLLECTION

TLX helped the team understand how current and upcoming regulations affect the project, especially in relation to clinical studies and data use. A key focus was making sure the rights of study participants were protected. This included reviewing and creating patient consent forms and information notices. TLX also led the development of an agreement that clearly defines the roles and responsibilities of all partners in managing the data collected during the project.

LIVING LABS

LSMU

In 2026, LSMU will move into the active preparation phase for launching the clinical study. Our team will focus on getting the clinical site ready — setting up clear procedures, training staff, organizing how data will be collected, and making sure all activities meet the highest safety and quality standards. Starting in May 2026, we hope to begin the active sample collection process. We will help apply the clinical study plan in practice, including collecting questionnaires about patients' experiences and well-being, and introducing new diagnostic and data collection tools. This work ensures that the study is not only scientifically strong, but also safe, well-organized, and meaningful for participants.

LIVING LAB AND IMPACT ACTIVITIES

At the same time, LSMU will continue leading Living Lab and impact activities. We will expand stakeholder mapping by actively involving external experts, policymakers, healthcare professionals, and community representatives to raise important questions about early detection of schizophrenia and future policy strategies. Another hackathon is planned for next autumn, where we will once again bring together students, researchers, clinicians, and innovators to develop practical, people-centered ideas that can improve understanding, early recognition, and support for those affected. Through these efforts, LSMU helps connect science, practice, and society — turning research into real-world impact.

SOCIAL LABS

ZSI

In the first project year, VOLABIOS laid the groundwork for meaningful stakeholder engagement by defining the Social Lab concept, launching the virtual Living Lab, and facilitating a dedicated workshop at Open Living Lab Days 2025 in Andorra titled “Making Mental Health Science Matter: Engaging Through Living Labs and Real Data”. These activities kicked-off the building of a Europe-wide community around AI- and VOC-based diagnostics for schizophrenia and helped to test participatory formats.

In the coming year, we will translate this foundation into on-site Social Labs: ZSI will finalise implementation guidelines and deliver a train-the-trainer module in May 2026, after which each clinical site will host the first of three pop-up Social Labs bringing together clinicians, people with lived experience, carers, policymakers, insurers, industry and civil society to co-shape socially robust diagnostic solutions.

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