2. Scientific Annual Report 2023 DNRF Chair Ruth Loos

2.1 Annual Highlights

During 2023, we have continued to make steady progress with the design of the Danish Precision Health Cohort, which was initiated in 2022. As such, we are on track to launch the pilot study in late Summer 2024.

2.1.1 Background

Health is influenced by many factors, and understanding how people transition from a healthy to a diseased state has been at the core of scientific endeavor for decades. A lot of progress has been made in identifying risk factors, behaviors, and environmental exposures underlying the development of cardiometabolic diseases. Nevertheless, our knowledge remains limited, particularly at the individual level as compared to the population level. Specifically, it remains challenging to accurately predict who is at risk of suffering from these conditions, how the disease will manifest and progress, who will respond to which medical or behavioral therapies, or what the likelihood of complications is. Therefore, there is **a need for comprehensive and large-scale longitudinal studies that leverage vanguard technologies to capture molecular and environmental information** to generate the knowledge for precision health in cardiometabolic disease.

To that extent, we set out to design a large-scale population-based, deep-phenotyped prevision health cohort, which we named **"The Danish Precision Health Initiative** (DELPHI)". Our ambition is to design a prospective cohort study of **10,000 individuals, aged 20-65 years**, recruited from the greater Copenhagen Area. Participants will be invited to a **4h clinical examination** for detailed phenotype measurements. Then, they will be equipped with wearables and electronic devices for **a 10-day continuous health profiling** in free-living conditions. A mobile phone application, specifically designed for the study, will be used as a study notebook to guide participants through the 10-day phase. Participants will **return to the clinical center for fasting biospecimen collection**. For the following 25 years, electronic questionnaires will be administered every year, and participants will be invited for in-clinic visits and continuous health profiling every two years (when ≥40 years of age) or every five years (<40 years of age).

Instrumental to a large undertaking like this is the pilot phase in which we test all aspects of the study, including the measurements, data collection platform, apps, wearables and equipment, return of results, participants' engagement, and more. The DNRF Chair supports all the work leading up to the pilot study and the pilot testing itself.

2.1.2 Overview of progress in 2023

We have been actively preparing for the launch of the pilot study. Activities include;
[1] ethical approval by the Regional Ethical Committee was obtained,
[2] RedCap solution for recruitment via invitation by Digital Post,
[3] Approved solution for digital consent,
[4] In-clinic data-capture app solution for precise data collection from medical devices to a secure database,
[5] digitalization and translation of validated questionnaires,
[6] building and fine-tuning of mobile app, for at-home data collection (passive/active)
[7] development, and integration of 6 minigames for assessment of cognition,
[8] GDPR approval and risk assessment of all technical solutions/devices,
[9] the Tasso device [at-home blood drawing kit] was tested to validate sample quality for omics analyses,
[10] a mixed meal tolerance test is being developed in collaboration with ARLA,
[11] building of visual identity,
[12] designing website, in collaboration with a storyteller, for recruitment and public dissemination,
[13] establishment of the scientific advisory board,
[14] drafting of data governance and management plan,
[15] establishment of a participant and public engagement group, and
[16] purchase the most sustainable, state-of-the-art equipment to perform deep-phenotyping.

2.1.2.1. Collaborations

The design of our study has been inspired by cohorts established by national and international collaborators.

2.1.2.2. Resources and personnel

We have recently recruited the required personnel to launch the pilot study. Based on the pilot study results, we will further define the profiles of positions for which we plan to hire personnel in the coming years.

2.1.2.3 Communications and awards

Karina Husted, the Clinical Study Coordinator of the project, won a prize for her poster "The Danish Precision Health Initiative - Study Protocol" at Metabolism Day 2023 hosted by CBMR on March 14, 2023.

2.1.3 Next steps

We are now ready for the pre-testing of the platform in 2024, developed by Unikk.me for the project.

2.2 Publications

There are no publications available yet, but a "Cohort Profile" paper is planned.