Seeing the Path to FOREVER—

Finding Ophthalmic Risk and Evaluating the Value of Eye exams and their predictive Reliability (FOREVER)

Sight is essential for the individual's self-understanding, sense of freedom, and quality of life. Visual impairment can, in many cases, be prevented by timely detection. However, screening the entire population is not cost-effective, which is why research is needed that can enable risk profiling of the population.

Project FOREVER can pave the way for such risk profiling.

OUR MISSION

We aim to build the largest clinical database of eye data in Scandinavia. With such a comprehensive database, our goals are to:

- Identify risk factors and predictors of visual disability
- Identify risk factors and predictors of systemic conditions
- Validate the current eye health check in optician shops

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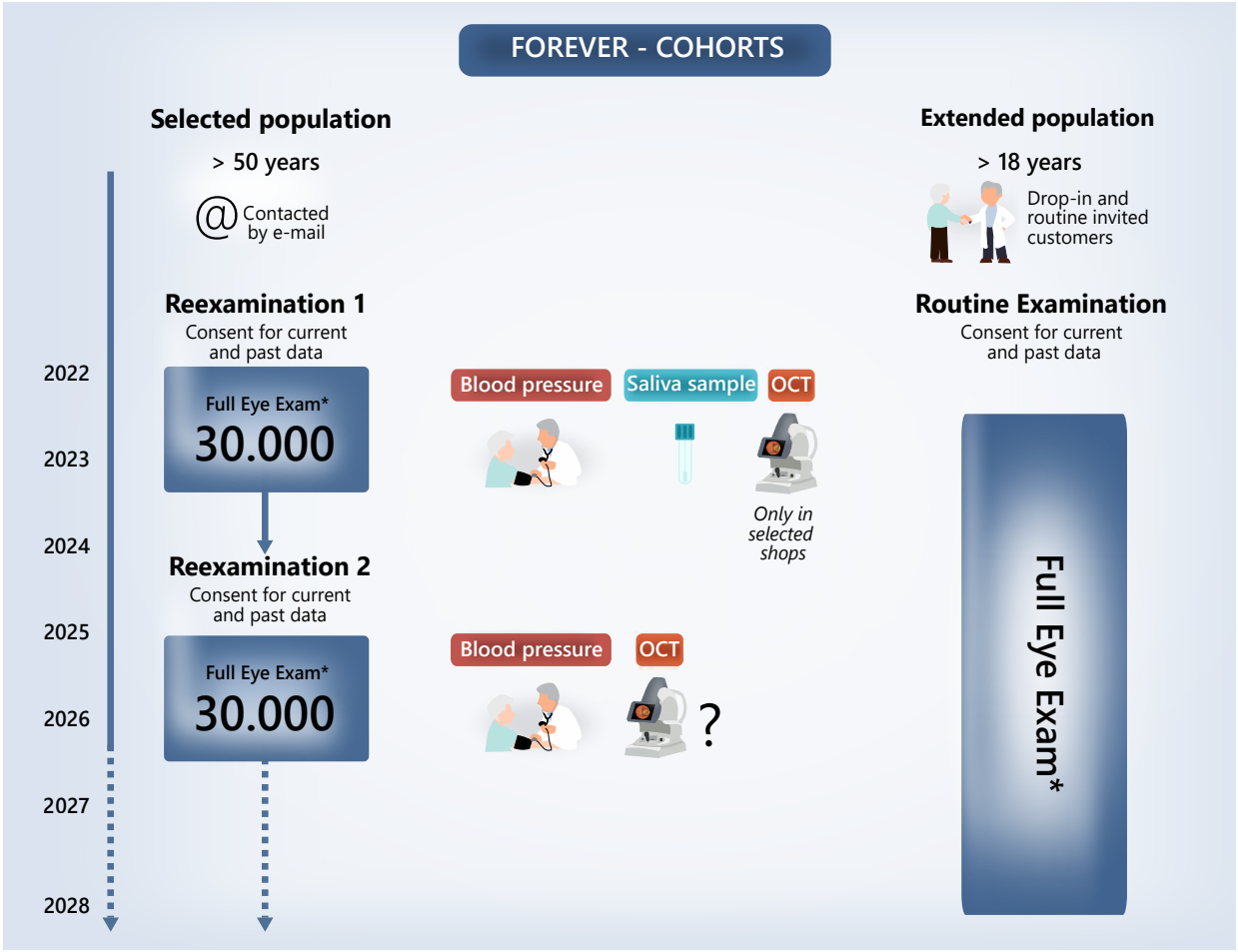

Figure 1. The FOREVER cohorts. A selected cohort of 30,000 will be invited by email. All participants in the selected cohort will be aged 50+, and the inclusion criterion is that they have had a fundus photograph taken three years before the invitation. The extended cohort will consist of a minimum of 250,000 participants who will be invited after their advanced eye exam in any Synoptik store across Denmark. The extended population will enroll participants from the age of 18 years.

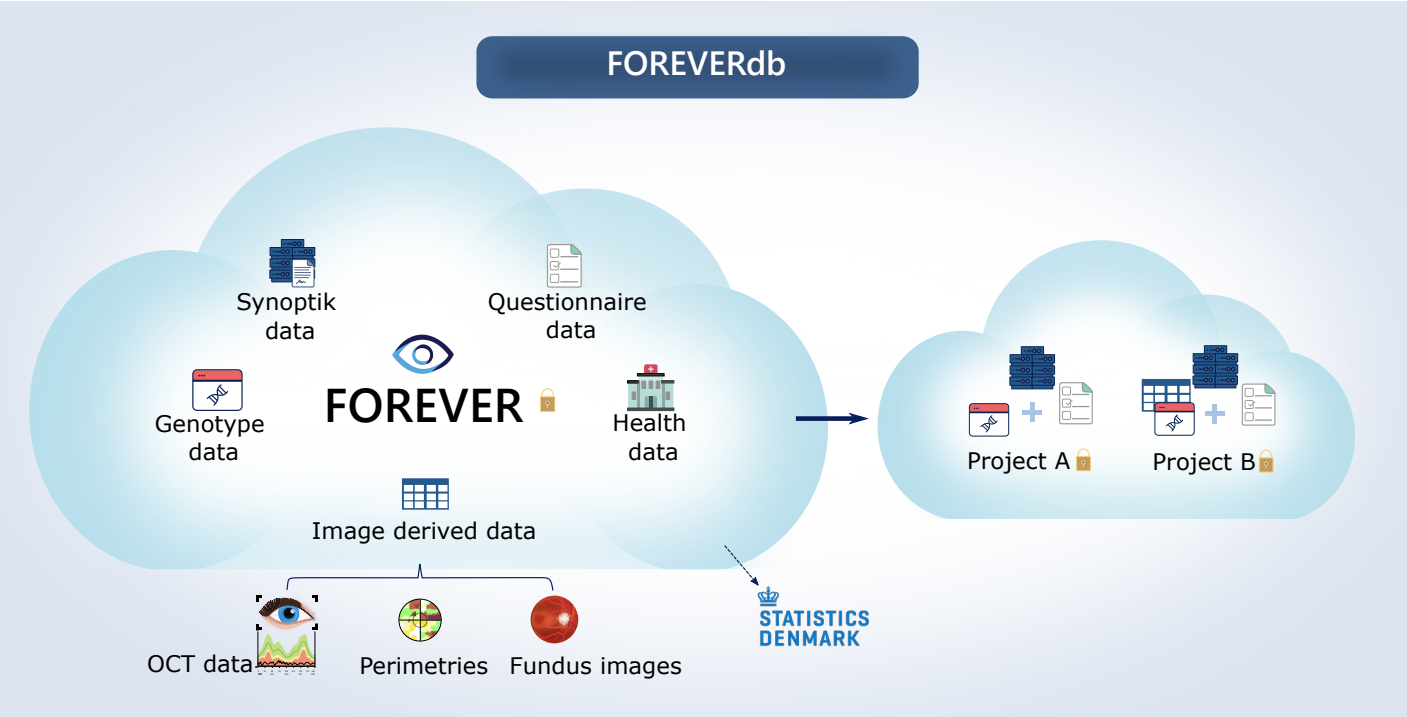

Figure 2. The FOREVER database (FOREBERdb). Data will be stored securely, and no data will leave the FOREVERdb except for transfer to Statistics Denmark (Danmarks Statistik). Within the FOREVERdb, an evaluation interface has been developed for the evaluation and validation of all participants in the selected population. Once the evaluation has been performed, the data are locked and cannot be changed again. Image data will be stored in a remote cloud and only made available when needed to minimize the costs of data storage. When a project has been submitted to and approved by the FOREVER steering group, the researcher will gain access to relevant data in a separate cloud as depicted as "project A" and "project B."

WHY

With the growing elderly population, the number of patients with sight-threatening diseases is expected to increase. However, the limited number of ophthalmologists makes identifying high-risk populations and directing resources toward them crucial. Optometrists perform dilated eye examinations, but a need exists to validate the comprehensive clinical case-finding examinations to prevent unnecessary referrals of healthy individuals and promptly detect visual impairment. Project FOREVER can enable us to classify people at risk of developing a sight-threatening eye disease and those who do not need to be concerned. In addition, Project FOREVER can help with the validation and optimization of the collaboration between optometrists and ophthalmologists. Overall, the knowledge created by Project FOREVER can hopefully pave the way for better eye health.

WHAT

Project FOREVER is collecting comprehensive data on eye health from a minimum of 250,000 participants visiting 100 Danish high-street optician shops. This is referred to as the 'extended population,' and we are also collecting data from a subpopulation of 30,000 individuals over 50 years old, known as the 'selected population' (**Figure 1**). In addition to the eye examinations, the selected population will have their blood pressure measured and be asked to provide a saliva sample for DNA purification and later genetic analyses. All participants from the selected population will have their eye examination viewed by ophthalmologists for disease case-finding.

WHO

Project FOREVER is an interdisciplinary research project where renowned researchers collaborate with one of the leading optical companies in Denmark, Synoptik A/S. More than 400 employees from 100 Synoptik stores across Denmark are collecting data and images from extensive eye examinations, questionnaires, blood pressure measurements, and saliva samples for DNA purification and genetic profiling following strict quality-controlled operating protocols.

HOW

We will create the FOREVER database using the extensive vision-related clinical dataset and answers from the FOREVER questionnaire. The FOREVER database will be combined with national health data from Statistics Denmark, thereby creating a world-recognized resource for significant contributions to eye health (**Figure 2**).

WHEN

Data collection was initiated in June 2022 for the extended population and in August 2022 for the selected population. To date, 46,126 participants have been enrolled in the extended population and 3,042 enrolled in the selected population. The recruitment strategy for the extended population is fully digitalized, and we are currently optimizing the recruitment strategy for the selected population.

CONCLUSION

The combination of extensive clinical data from eye examinations and a questionnaire with substantial self-reported information on health in the FOREVER database with genetic profiles, the national registry data, and the longitudinal study design enables us to achieve a decisive understanding of the relationships between genetics, retinal vascular changes, age, blood pressure, medication use, lifestyle, and the development of sight-threatening eye diseases. This can create ground-breaking new knowledge and a better understanding of who is at risk of developing eye diseases and who does not need to be concerned.

Follow project FOREVER at: https://forever.ku.dk/

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