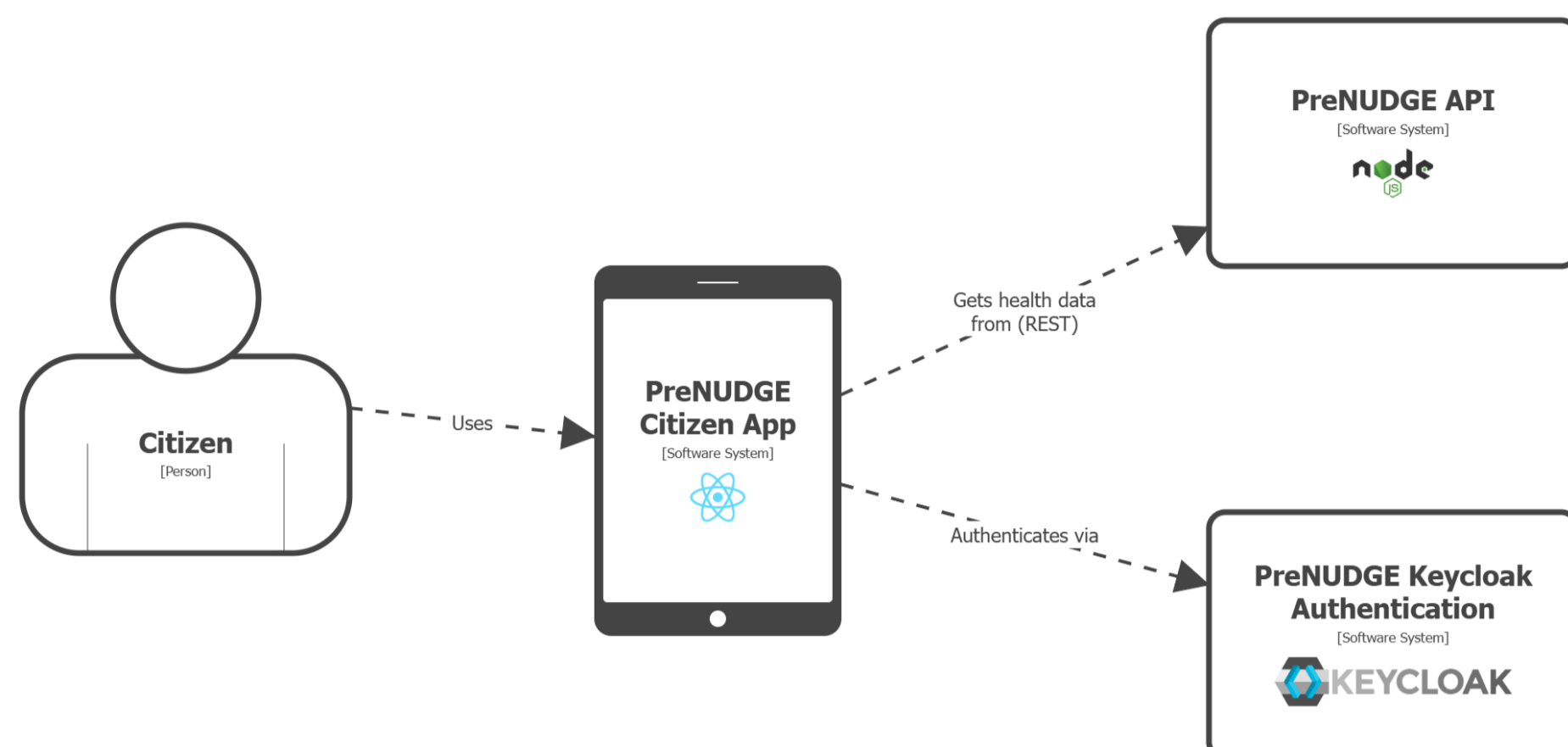
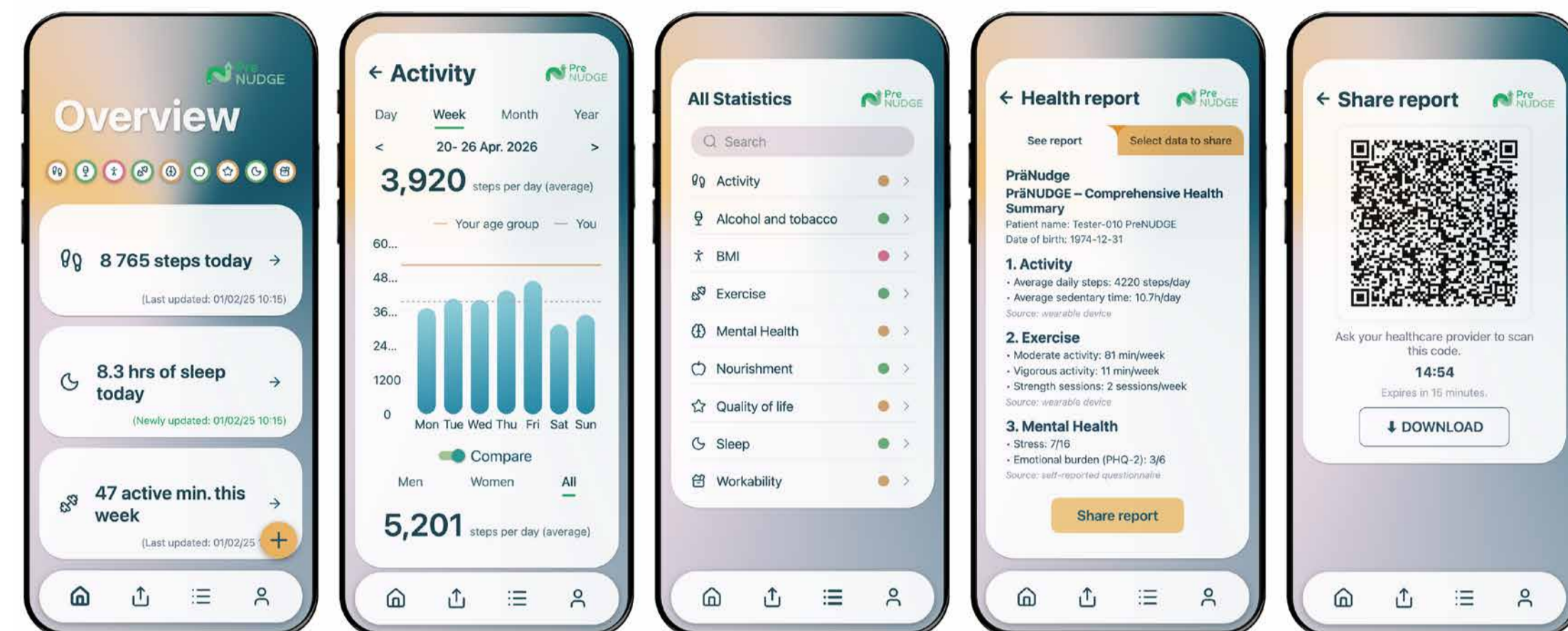


# Design and Development of a Health and Lifestyle Data App to Empower Citizens

Theresa WEITLANER<sup>1</sup>, Stefan HOCHWARTER<sup>1</sup>, Tone-Lill AARSHEIM<sup>2</sup>, Mari GJUL<sup>2</sup>, Lana Dalåmo LACKEN<sup>2</sup>, Andrej LAZIC<sup>2</sup>, Birk Fjeldsgård STEINSHOLT<sup>2</sup>, Mari Jin Sjøvold SUNDAL<sup>2</sup>, Emma Felicia WEIBY<sup>2</sup> and Franz FEICHTNER<sup>1</sup>



C4 system context architectural view of the PreNUDGE ecosystem, illustrating the citizen app, API layer, and authentication component.



Exemplary screenshots of the developed citizen app, showing a personalized overview, detailed health indicator view, data exploration interface, and a preview of a shareable health report.

## Introduction

Citizens increasingly collect health and lifestyle data through mobile applications and wearable devices [1]. However, these data remain scattered across platforms, providing only a fragmented view of an individual's overall health and remains inaccessible for research or secondary use. The PreNUDGE research project addresses this challenge by establishing an ecosystem of qualified applications that collect evidence-based health indicators to support the creation of health profiles for Austrian citizens [2]. These applications transmit domain-specific health indicators to the web-based PreNUDGE platform, which serves as a central repository for citizens' health profiles. The platform is designed to enable both primary use (citizens themselves, health care providers) and secondary use in research and public health contexts, while maintaining appropriate governance and data protection mechanisms. This work presents the development of a minimum viable product (MVP): an intuitive, cross-platform mobile application that connects to the PreNUDGE platform via APIs to visualize personal health data and profiles, promote preventive health behaviors, and enhance health literacy.

## Methods

Development began with a design sprint, following the Google Design Sprint Kit methodology, to explore solutions and identify application features. Requirements and user stories were then compiled to guide development. Key user requirements include the ability to access a clear overview of personal health indicator trends, review a consent audit trail, and export or share health profiles. Based on these, a component-based software architecture was derived using the C4 model. This architecture informed the selection of the technology stack. The mobile application was developed as a cross-platform React Native app using Expo Router, TypeScript, and Tailwind CSS for the user interface. PreNUDGE platform integration was achieved through RESTful API services connected to a HAPI FHIR server for standardized health data exchange.

## Results

The developed GDPR-compliant PreNUDGE mobile application enables citizens to explore their individual health data and profiles holistically. The main logical components correspond to core user functionalities, including authentication, health data visualization, and user profile management. Furthermore, the application enables users to securely share their data with third parties through standardized reports and interoperable export mechanisms (e.g., QR-codes). In addition, consent and data sharing permissions for both primary and secondary use can be managed transparently within the application. The interface integrates interactive visualizations and structured summaries to support intuitive exploration of longitudinal health and lifestyle information.

## Discussion

Future work includes integrating personalized benchmarks and peer-group comparisons (e.g., age- and gender-specific reference values) to enable evidence-based nudging strategies. Additionally, technical interfaces to health information services (e.g., gesundheit.gv.at) require further exploration before inclusion in future app releases. The prototype demonstrates how health and lifestyle data can be made more accessible and understandable for citizens, potentially supporting preventive health behaviors and strengthening autonomy, data sovereignty, and improved (digital) health literacy.

## References

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## CONTACT

<sup>1</sup> JOANNEUM RESEARCH  
Forschungsgesellschaft mbH

HEALTH –  
Institute for Biomedical Research  
and Technologies

DI Dr. Franz Feichtner

Neue Stiftingtalstraße 2  
8010 Graz, Austria

Phone +43 316 876-4000  
franz.feichtner@joanneum.at  
www.joanneum.at/health

## Partner



<sup>2</sup> Department of Computer  
Science, Norwegian University  
of Science and Technology,  
Trondheim, Norway



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