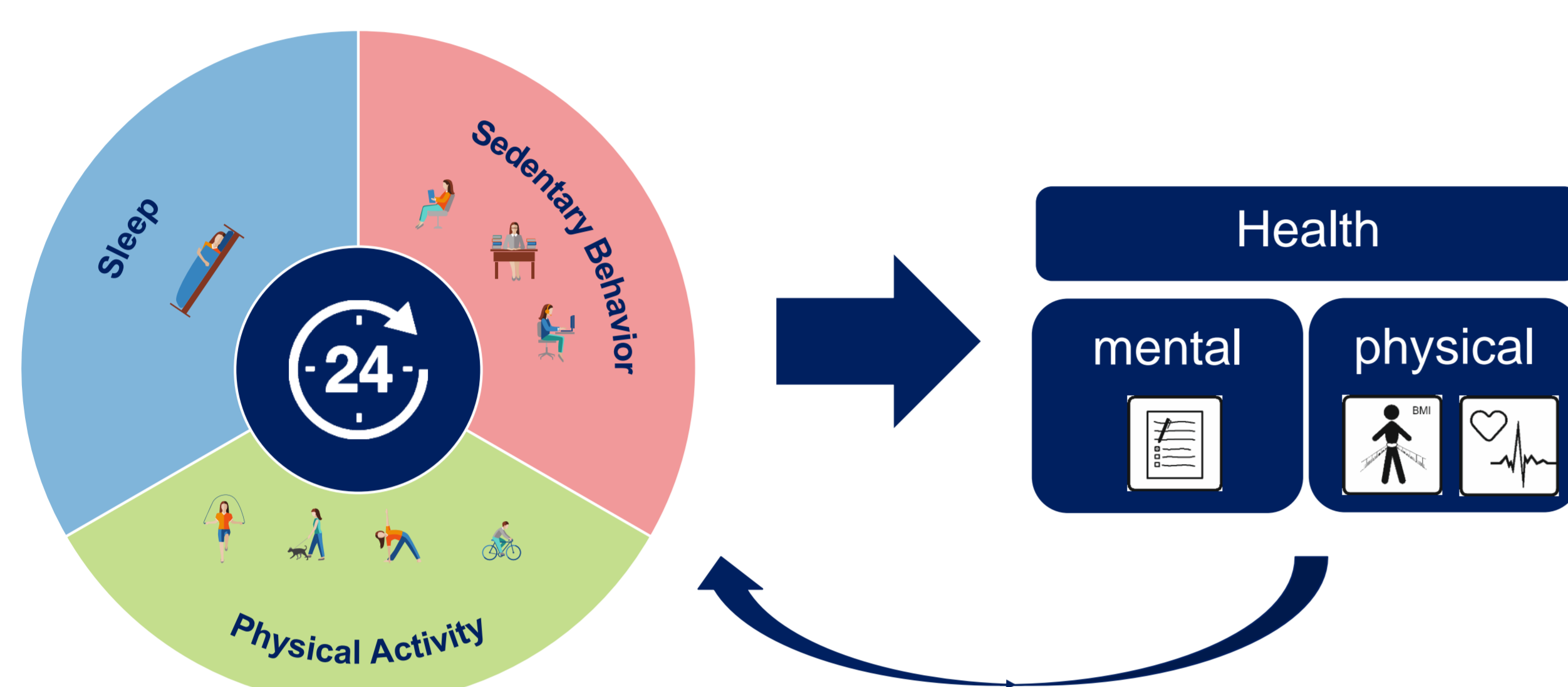


# Study protocol for the MoMo 2.0 accelerometer study to investigate 24-hour physical behaviour patterns in 4-17-year olds

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## BACKGROUND



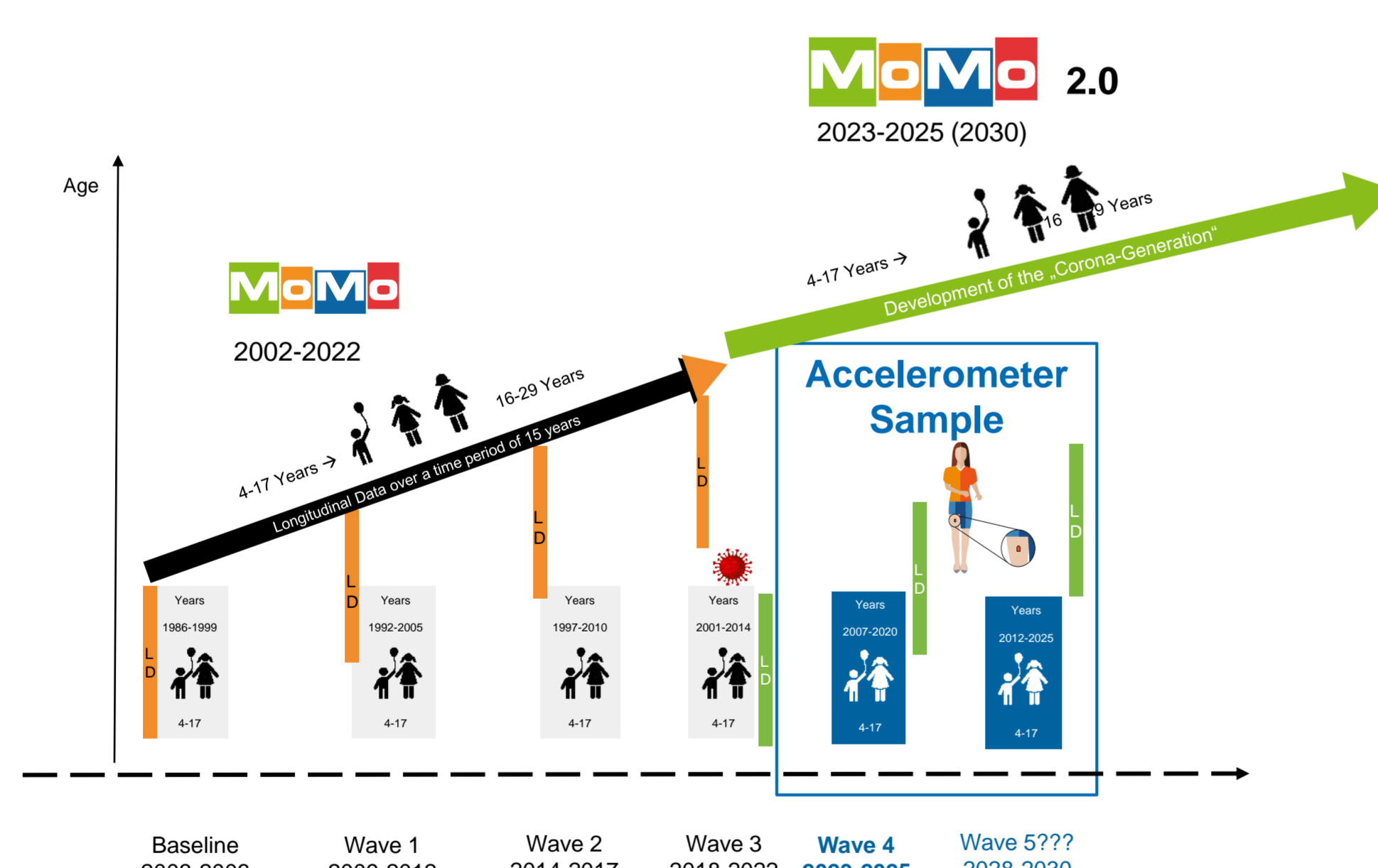
### Research Question

How are 24-hour physical behaviour patterns in 4-17 year olds associated with physical and mental health?

## METHODS

### Study Design

This accelerometer study is part of the MoMo 2.0 longitudinal nationwide cohort study that originated in 2003. It is a joint project of four universities.



### Sample

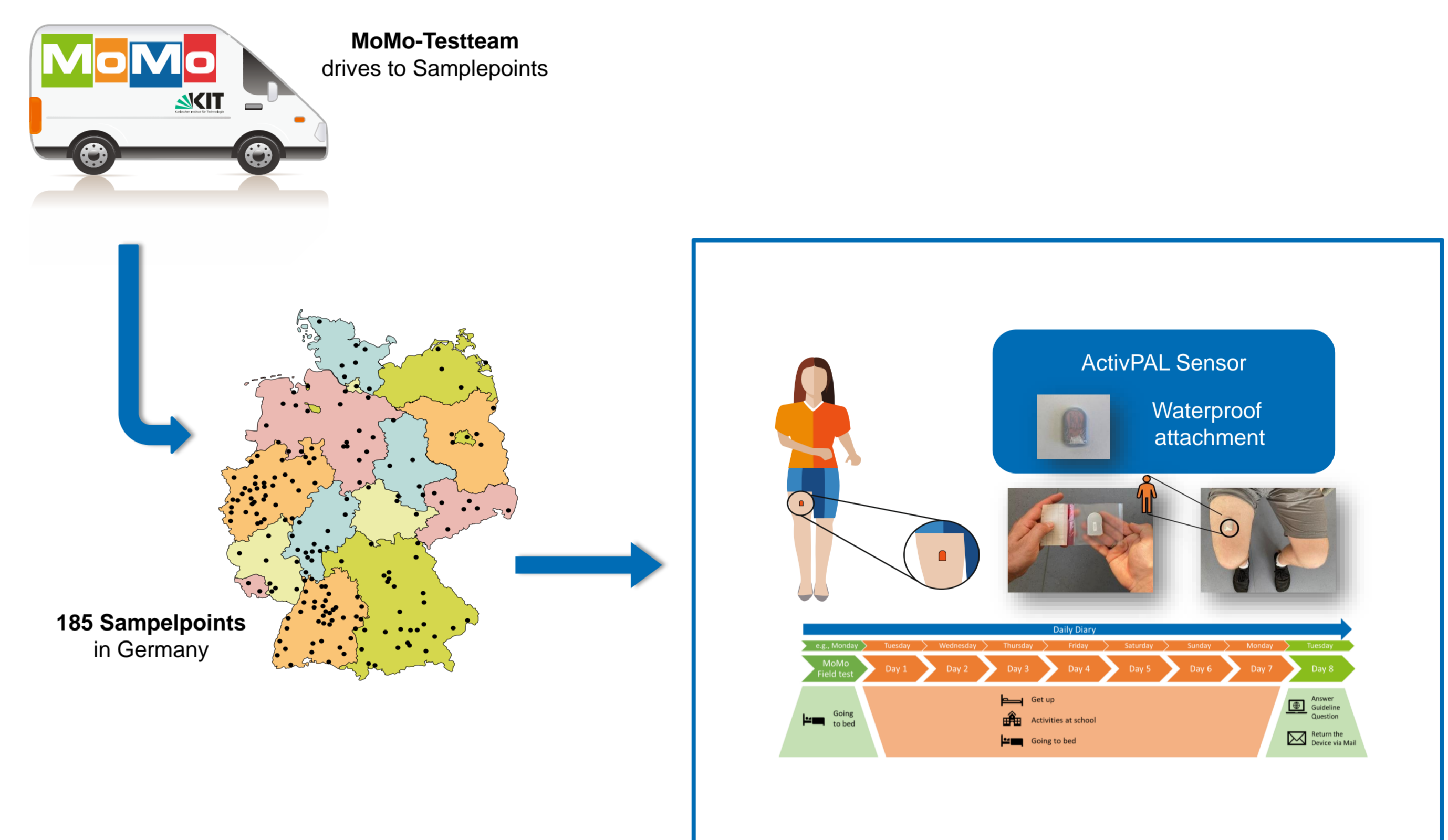
A target sample of 4500 children and adolescents aged 4-17 in Germany was randomly selected in two steps: residents' registration offices selected municipality first and participants afterwards.

### References

Edwardson, C. L., Winkler, E. A. H., Bodicoat, D. H., Yates, T., Davies, M. J., Dunstan, D. W., & Healy, G. N. (2017). Considerations when using the activPAL monitor in field-based research with adult populations. *Journal of sport and health science*, 6(2), 162–178. <https://doi.org/10.1016/j.jshs.2016.02.002>  
 von Rosen, P. (2023). Analysing time-use composition as dependent variables in physical activity and sedentary behaviour research: different compositional data analysis approaches. *Journal of Activity, Sedentary and Sleep Behaviors*, 2(1), 23.

### Procedure

Participants receive the ActivPAL 4 sensor after completion of fitness tests, questionnaires, health measurements and an interview (e.g., stress, chronic diseases) at test locations nearby their homes.



### Statistical Analysis

To analyse how physical behaviour patterns are related to health, we will conduct compositional data analyses by using participants' daily time-use of each behaviour as compositions (von Rosen, 2023).

Table 1

Accelerometer specifications (Edwardson et al., 2017)

Criteria	MoMo 2.0 study
Monitor version	ActivPAL 4, PAL Technologies Ltd. (Glasgow, GB-SCT)
Rationale for selecting activPAL	To assess 24-hour physical behaviour (PA, sedentary behaviour and sleep)
Behavioral characteristics of primary interest	Time spent in sleep, sedentary behaviour, physical activity (LPA, MVPA)
Wear period and number of days	24 hours for 7 consecutive full days
Study design	Cross-sectional
Sampling frequency	40 Hz
Diary data collected and details collected	Time go to bed and get up, school times (including physical education), dropping sensor (and reasons for dropping) in an online questionnaire (SoSci Survey) every evening
Type of file used for data processing	Raw data, Events files, X, Y, Z version, steps
Goal for the sampling periods observed	24 hours; 4 days of data
What quality control checks were implemented	Use of heat maps of included and excluded data (Edwardson et al., 2017)
Sample	4-17-year-old children and adolescents in Germany
Data processing package used and methods used to generate key summary variables	R-Statistical Package GGIR, ActiPASS
Definition of a day	Person-oriented day approach from one wake time to next day wake time

### Contact

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