

## Consumer-based activity trackers as a tool for physical activity monitoring *The Tromsø Study, Tromsø 8, 2024-25*

André Henriksen *UiT The Arctic University of Norway, Department of Computer Science Mandre.henriksen@uit.no* 



@andrejhenriksen

## The Tromsø Study research laboratory 77 544 inhabitants

https://uit.no/research/tromsostudy



114 397 participants

	1974	1979-80	1986-87	1994-95	2001	2007-08	2015-16
	Tromsø 1	Tromsø 2	Tromsø 3	Tromsø 4	Tromsø 5	Tromsø 6	Tromsø 7
Participants	6595	16 621	21 826	27 158	8 130	12 984	21 083
Age range	20-49	20-54	12-67	25-97	30-89	30-87	40+
Attendance	74%	78%	75%	72%	79%	66%	65%









## Aim for Tromsø 8 (2024)

To implement a system for automatic and continuous physical activity monitoring using consumer-based activity trackers, and to examine the usability of this system as a tool for long-term physical activity recording in epidemiological studies



## Measuring physical activity





## How does it work?





# Testing the system 1: One year recording using a Polar M430 The RESTART pilot study 2017–18



# Method

#### The RESTART pilot study 2017–18



L. A. Hopstock, T. S. Deraas, A. Henriksen, T. Martiny-Huenger, and S. Grimsgaard, "Changes in adiposity, physical activity, cardiometabolic risk factors, diet, physical capacity and well-being in inactive women and men aged 57-74 years with obesity and cardiovascular risk - A 6-month complex lifestyle intervention with 6-month follow-up," *PloS one*, vol. 16, no. 8, p. e0256631, 2021, doi: 10.1371/journal.pone.0256631.



Testing the system 2: Detecting change in population activity due to COVID-19









A. Henriksen, E. Johannessen, G. Hartvigsen, S. Grimsgaard, and L. A. Hopstock, "Consumer-Based Activity Trackers as a Tool for Physical Activity Monitoring in Epidemiological Studies During the COVID-19 Pandemic: Development and Usability Study," *JMIR Public Health Surveill*, vol. 7, no. 4, p. e23806, Apr 23 2021, doi: 10.2196/23806.

## Steps





https://www.statista.com/statistics/1107874/access-to-smartwatch-in-households-worldwide/

## Creating variables





## Benefits and drawbacks

- Long term objective recording
- Relatively low participant burden

- Validity not well known
- Activity tracker ownership
  - Penetration (24% in Norway, in 2020)
  - Socio-economic status

## Take home message

- Consumer based activity trackers **can** assist in closing the gap between existing methods for PA collection.
- Best suited to estimate change over time.
- An additional tool, not necessarily a replacement.
- Potential bias in who owns a smart watch



#### **UiT** The Arctic University of Norway

### Thank you for listening

André Henriksen UiT The Arctic University of Norway, Department of Computer Science andre.henriksen@uit.no  $\succ$ 



@andrejhenriksen