



# **Day To Day Disease Activity in Multiple Sclerosis**

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No MS day is the same

We are interested in both disease progression and day to day disease activity

# Variables

## Questionnaire

How was your day?

Mood, Energy, Stress,  
Memory, Pain, Concentration

## Profile

EDSS, Type, M/F, Age

## Tests

Eye Tracking - Fatigue and eye problems, day to day

## Fitbit

Activity



2MWT - Physical disability, day to day

SDMT - Neurological disability, day to day

Heart rate



## External Data Sources

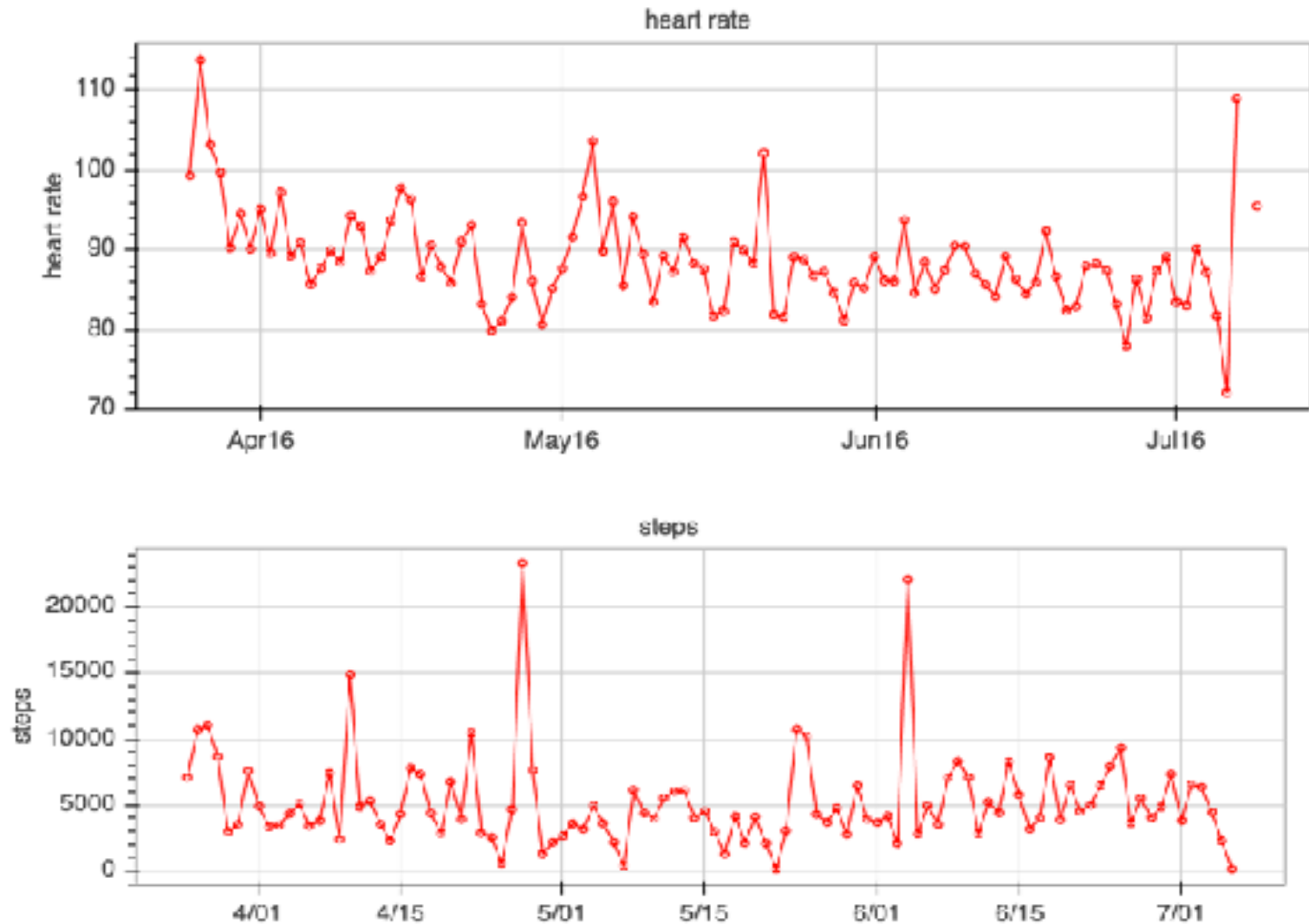
Sleeping



weather



# Wearable : pilot data



# MS sherpa Questionnaire

Day evaluation

A screenshot of a mobile application interface. At the top, there is a teal header with a back arrow, the text 'Vragen', and 'VOLGENDE'. Below the header, the question 'Hoe voel je je vandaag?' is displayed. In the center, there is a large blue smiley face icon. Below the icon is a horizontal slider bar with a blue dot positioned approximately one-third of the way from the left. At the bottom of the screen, there is a black navigation bar with four white icons: a triangle, a circle, a square, and a vertical bar.

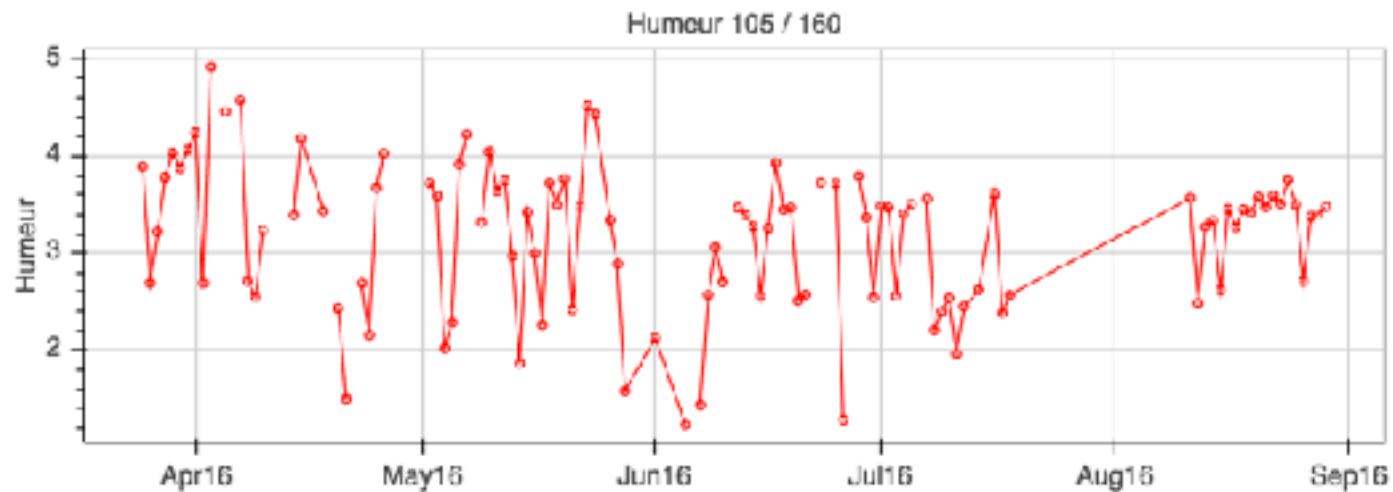
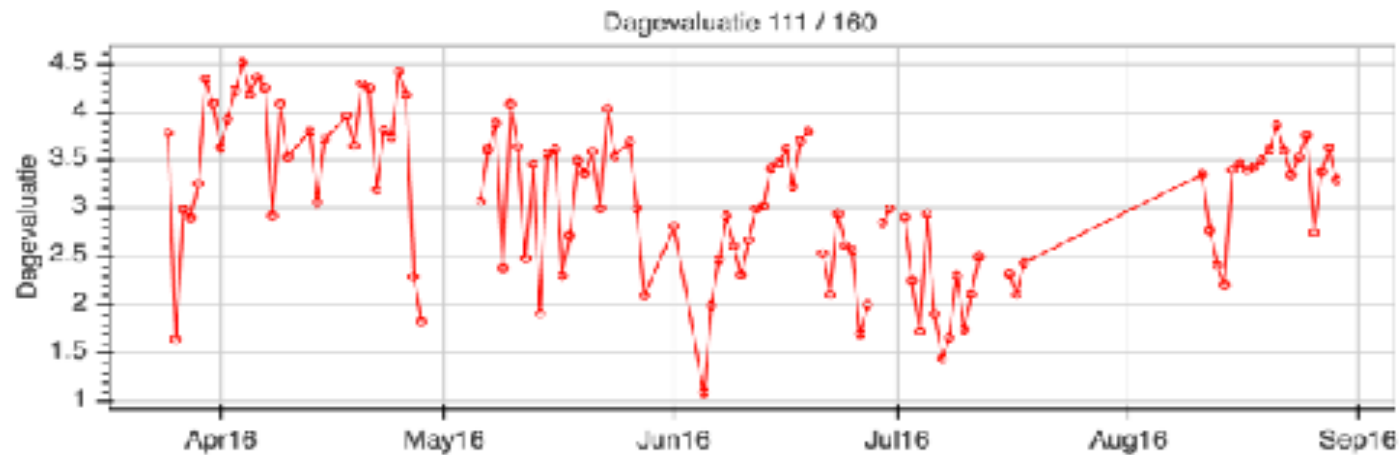
Stress, memory, concentration, pain, energy and mood

A screenshot of a mobile application interface showing four evaluation sliders. The top header is teal with a back arrow, 'Vragen', and 'VOLGENDE'. The sliders are as follows:

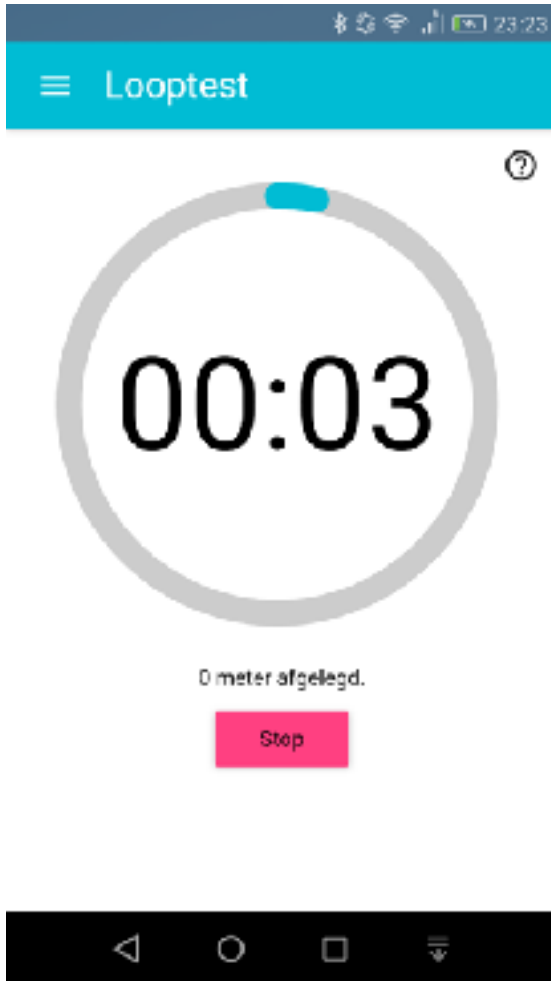
- Stress**: A horizontal slider with 'Wenig' on the left and 'veel' on the right. A blue dot is positioned in the middle.
- Geheugen**: A horizontal slider with 'Slecht' on the left and 'Geed' on the right. A blue dot is positioned near the right end.
- Concentratie**: A horizontal slider with 'Slecht' on the left and 'Geed' on the right. A blue dot is positioned near the right end.
- Pijn**: A horizontal slider with 'Wenig' on the left and 'veel' on the right. A blue dot is positioned in the middle.

At the bottom of the screen, there is a black navigation bar with four white icons: a triangle, a circle, a square, and a vertical bar.

# Questionnaire : Pilot data



# Mijn Kwik: MS Tests



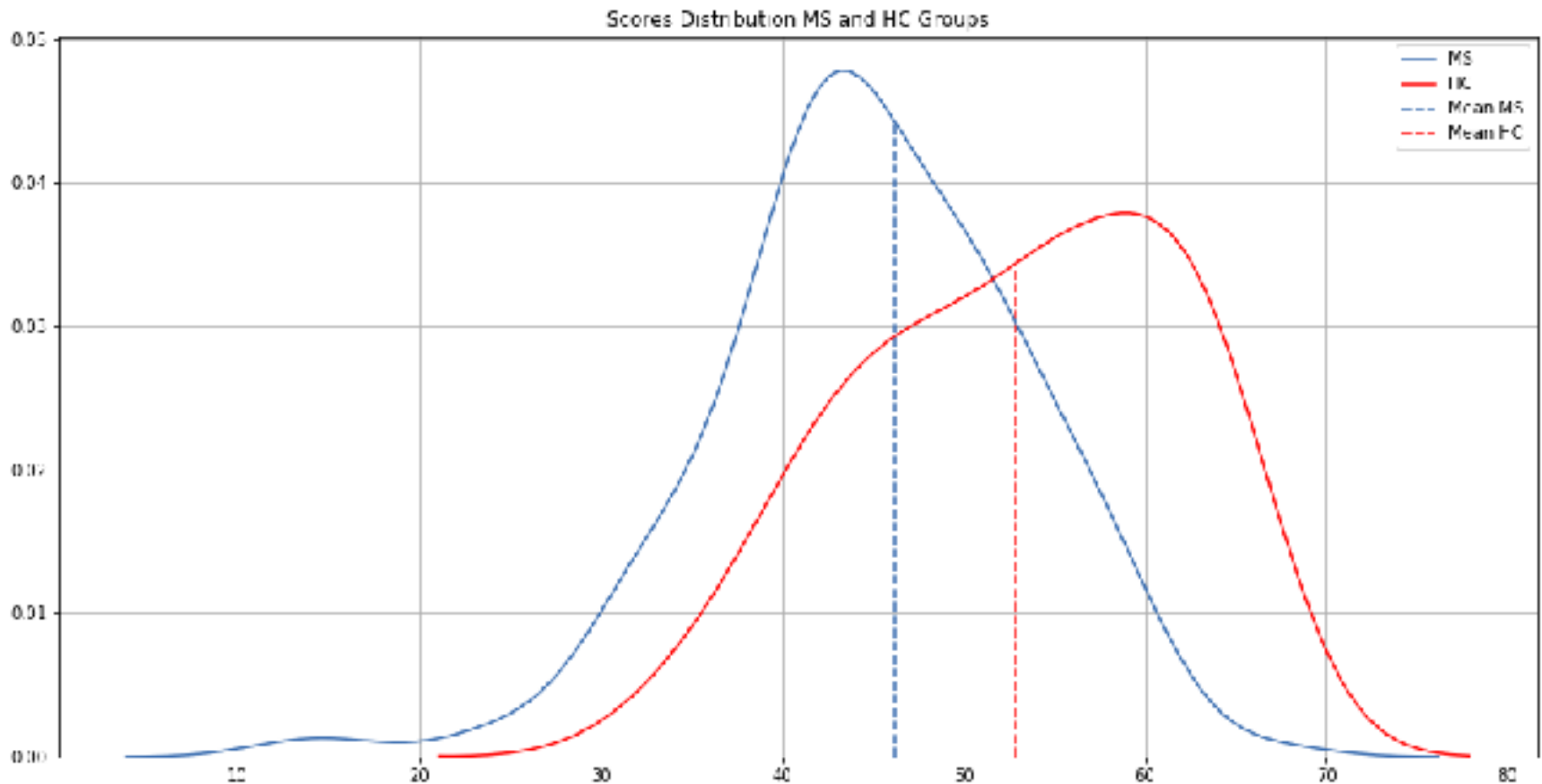
# Symbol Digit Modalities Test (SDMT)

- Measures cognitive impairment: 43-65% of Multiple Sclerosis (MS) patients (Homann, 2007)
- Fast: SDMT takes only 90 seconds
- Practical and effective: sensitivity 0.7-0.9 specificity 0.6-0.9

Study	Patients	Healthy	Patient Score (SD)	Healthy Score (SD)	Sensitivity	Specificity
Schependom (2014)	359		40		0.91	0.60
Gongora (2015)	237	57	54.30 (13.40)	63.70 (8.6)	0.80	0.64
Akbar (2011)	119	38			0.71	0.84
Lapshin (2013)	99	98	35.40		0.67	0.88
Ruet(2013)	101	415	44.70 (13.37)			
Sandroff (2014)	82		56.60 (12.78)			
Moccia (2016)	155		45.20 (12.8)			
Sonder (2014)	485		53.30 (14.3)			



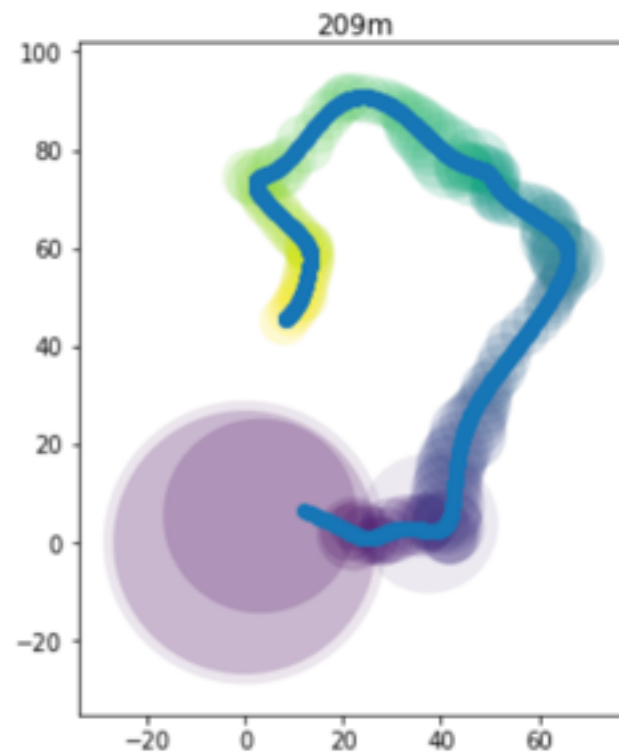
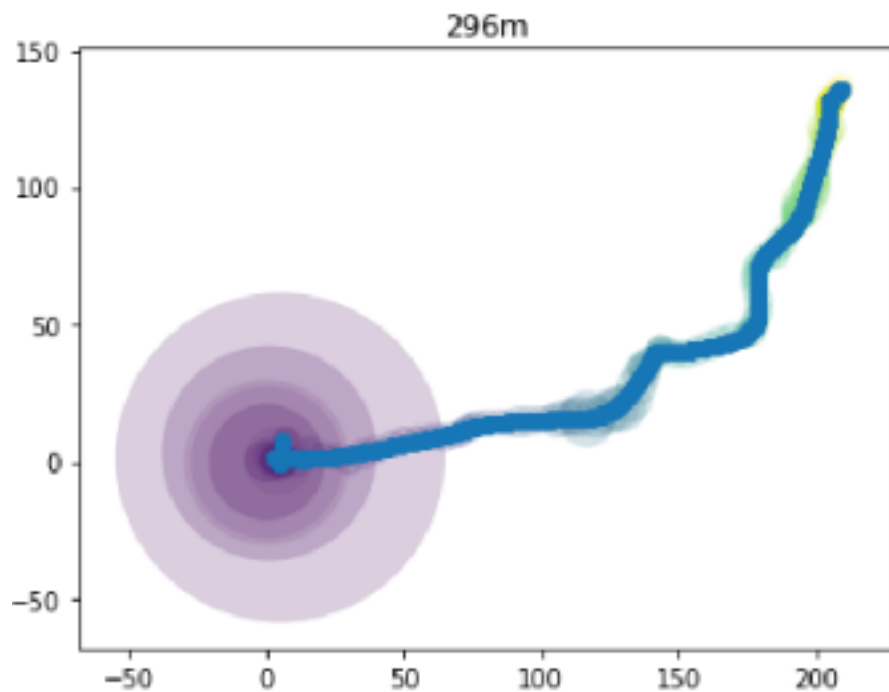
# Cognition in MS sherpa (healthy vs MS)



# 2 Minutes Walking Test

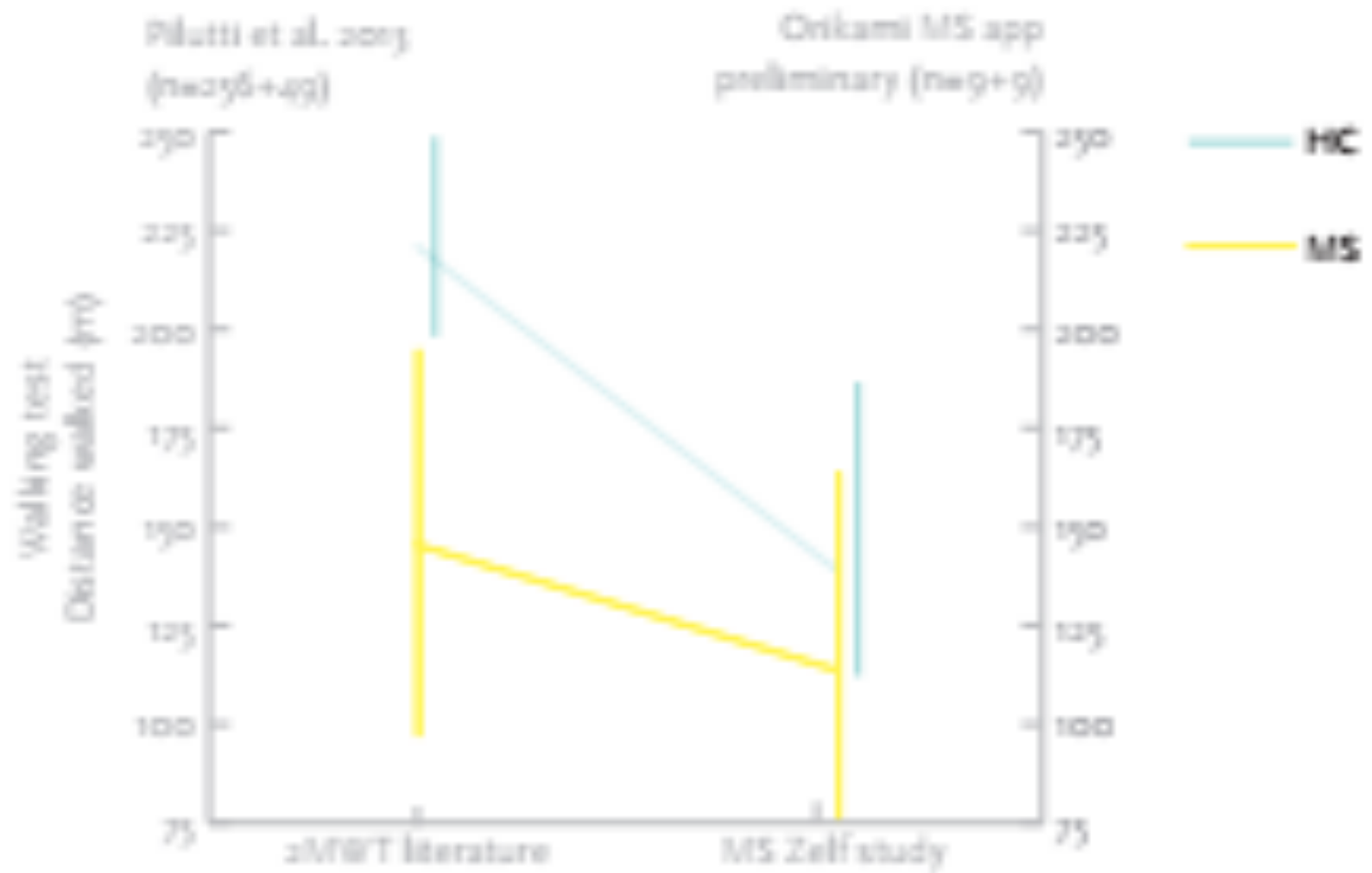
- Physical disability (exercise capacity)
- 2 minutes walking test gives similar results as 6MWT (Gijbels, 2011; Bohannon, 2014)
- Practically feasible for MS patients (Gijbels, 2011; Bohannon, 2014)

# 2MWT in mijn kwik



A feasible method for day to day measurement of physical movement of patients.

# 2MWT



# Usage

***“Using the app in combination with the wearable contributes to my health. I’m more active because it gets more fun.” - MS patient co-creation group, 43 years***

