

DIGITAL TOOLS TO MEASURE PARKINSON DISEASE



Our perspective of a patient's illness experience remains episodic and limited to the clinic

Number of falls
throughout day

Proportion of day
spent sedentary

Heart rate
variability

Number of
words spoken

Speed of
dialing the
phone

Time spent outside

Unified Parkinson's
Disease Rating Scale

Number of sleep
interruptions

Unified Huntington's
Disease Rating Scale

Duration of
sleep

Amyotrophic Lateral
Sclerosis Functional Rating
Scale

Activity level

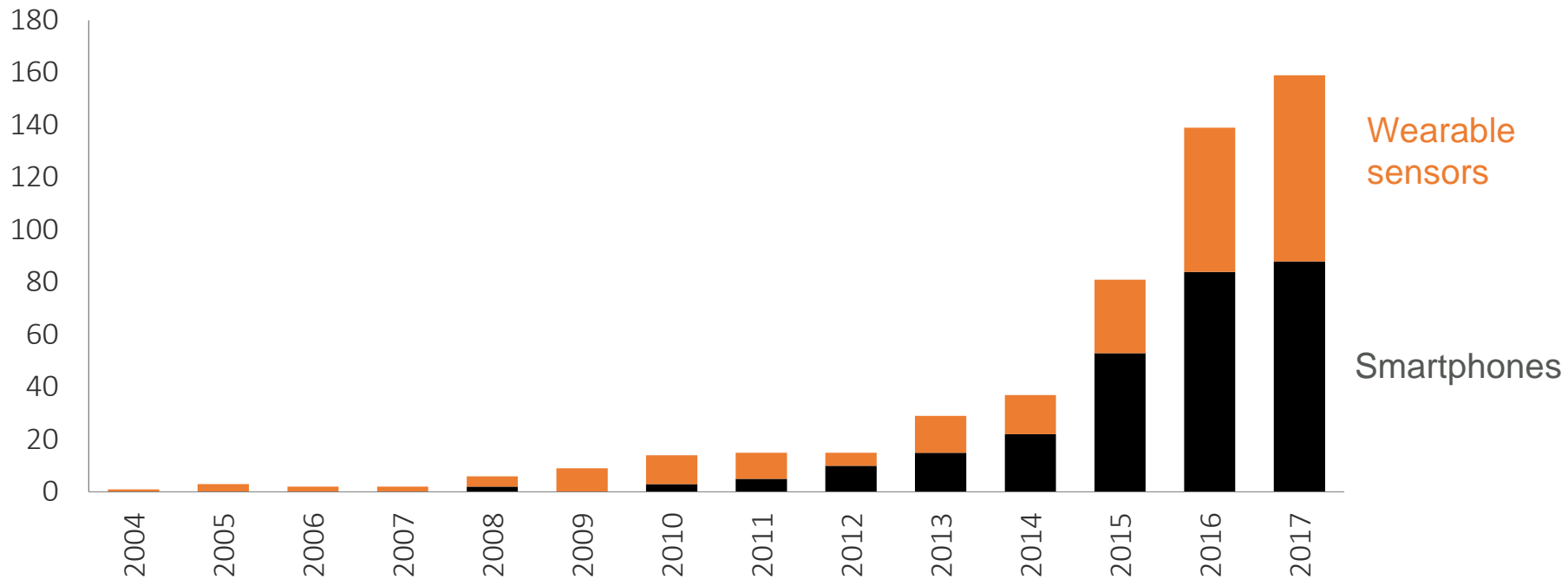
Alzheimer's
Disease

Number
of turns

Assessment Scale
Timed Up and Go

THE USE OF TECHNOLOGY TO MEASURE HEALTH IS RAPIDLY GROWING

Published studies of wearable sensors and smartphones in Neurology through Dec. 2017



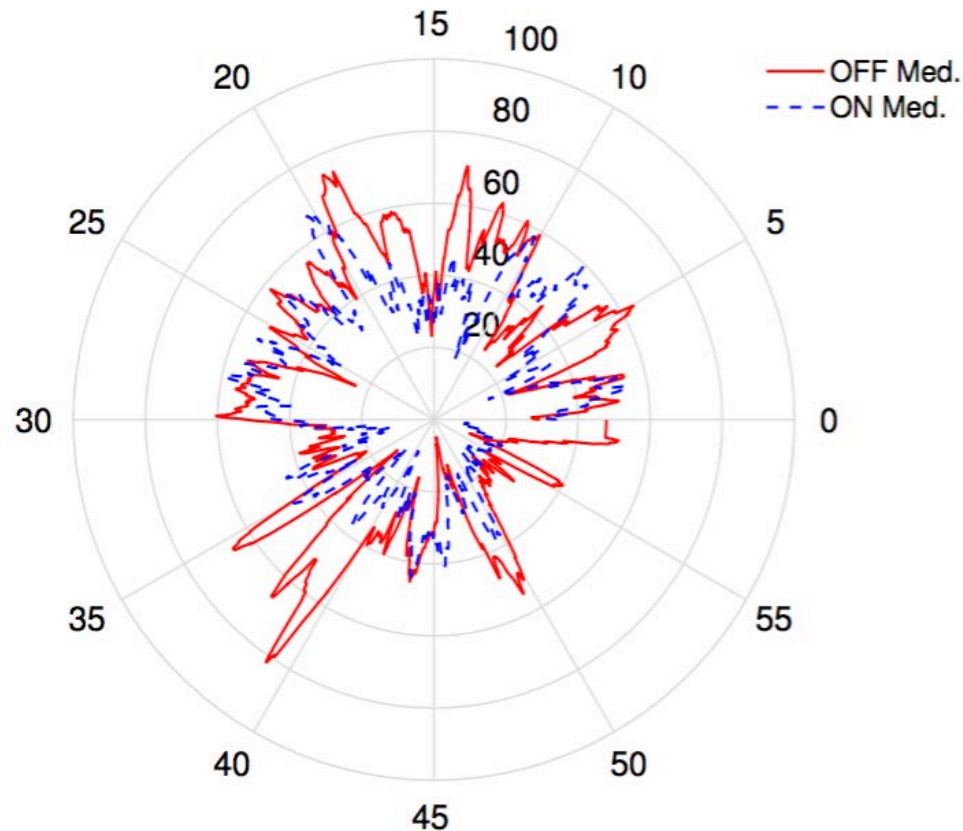
Source: PubMed searches of smartphone and wearable sensor studies for neurology and associated conditions on 12/31/2017



NOT ONLY CAN SENSORS TRACK KNOWN MOTOR SYMPTOMS OVER TIME...

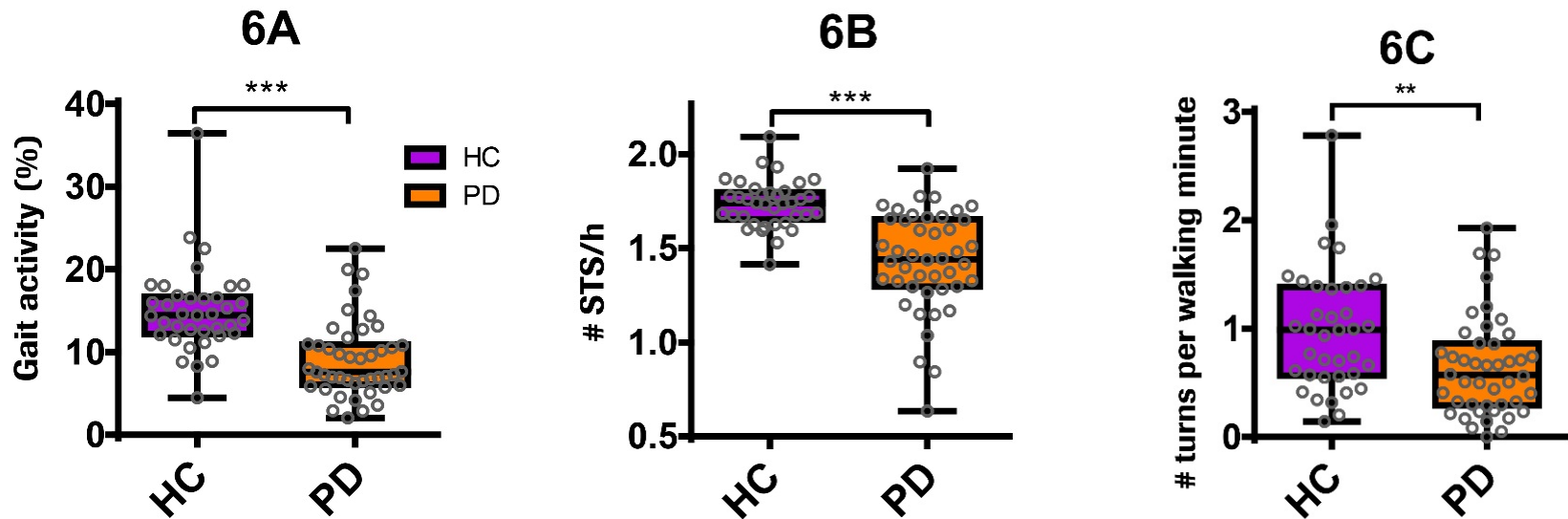
Frequency and severity of tremor detected over one hour period

Preliminary



... ..THEY CAN ALSO CAPTURE NOVEL DATA OBJECTIVELY AND CONTINUOUSLY IN CLINIC

Roche app measures Parkinson's disease fluctuations



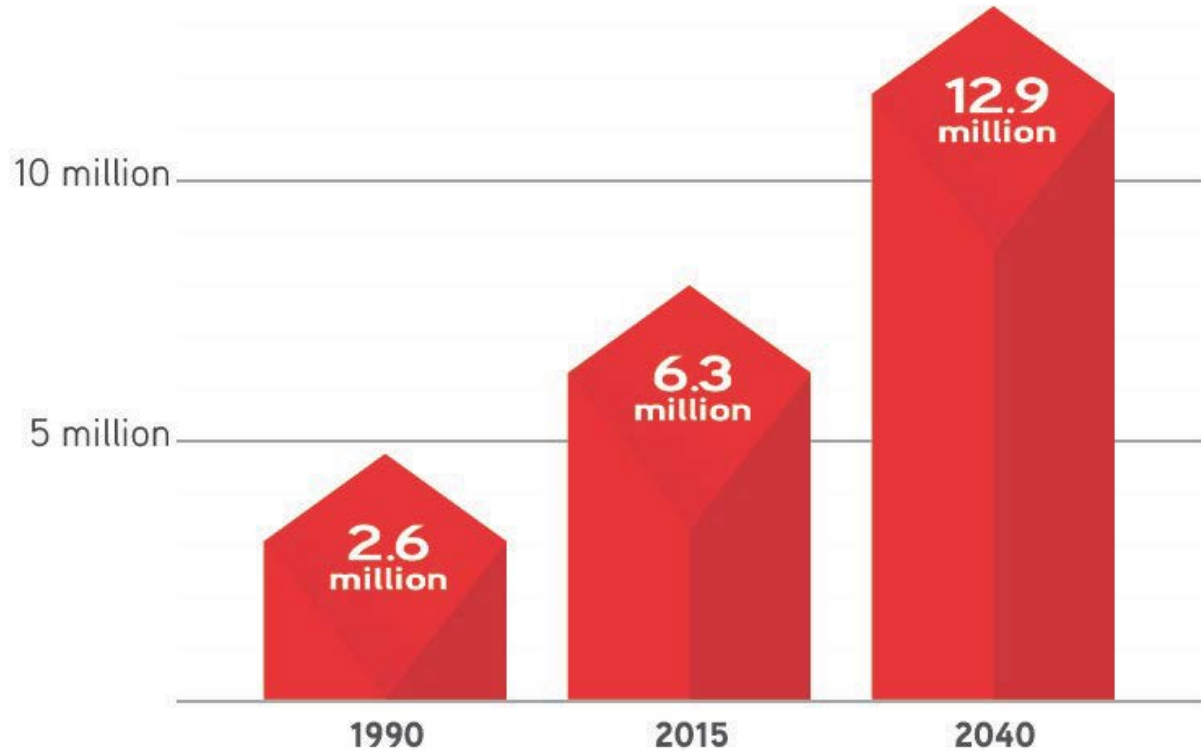
“This could be the first time that such an app has been used to measure disease and symptom severity in a medicine development program in Parkinson’s disease.”

Source: Lindemann et al., 2017



WE ARE IN THE MIDST OF A PARKINSON PANDEMIC

Estimated and projected number of individuals with
PARKINSON DISEASE, 1990 – 2040



Source: The Parkinson Pandemic: a call to action. *JAMA Neurology* 2017



PARKINSON'S PROGRESSION MARKERS INITIATIVE