How to measure OPA using sensor technology in the field?

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Is it a need for sensor technology in the field?

What would we like to have diurnal technical measures on many participants of?

- Basic physical activity types (walking, stair climbing, running…)
- Body postures (sitting, standing, forward bending, arm elevation…)
- The physiological intensity (e.g. heart rate reserve)
- Time patterns of the exposures (e.g. EVA analyses)
- Fatigue and recovery (HRV, sleep…)
- Energy expenditure
- Manual handling
- Ambulatory blood pressure
- Temperature (environment)
- More ?

What is currently feasible to technically measure in the field over several days on many participants?

Basic physical activity types and body postures/movements

By using the Acti4 developed by NRCWE by any 3D accelerometer on thigh

Not aware of current commercial system which can do the same

Activity	Sensitivity (%)	Specificity (%)
Sitting	99.9	100.0
Standing	100.0	100.0
Walking	99.4	99.7
Running	98.7	99.9
Stairs	95.3	100.0
Cycling	99.9	100.0

Skotte et al. Detection of physical activity types using triaxial accelerometers. J Physical Activity & Health, 2014

Guideline for assessment of sedentary work

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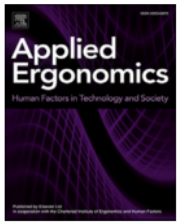

A practical guidance for assessments of sedentary behavior at work: A PEROSH initiative

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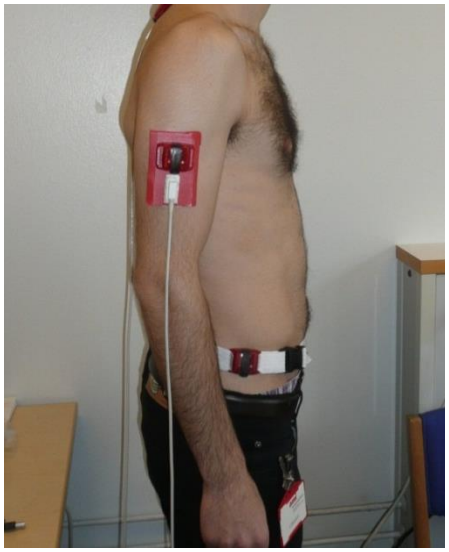
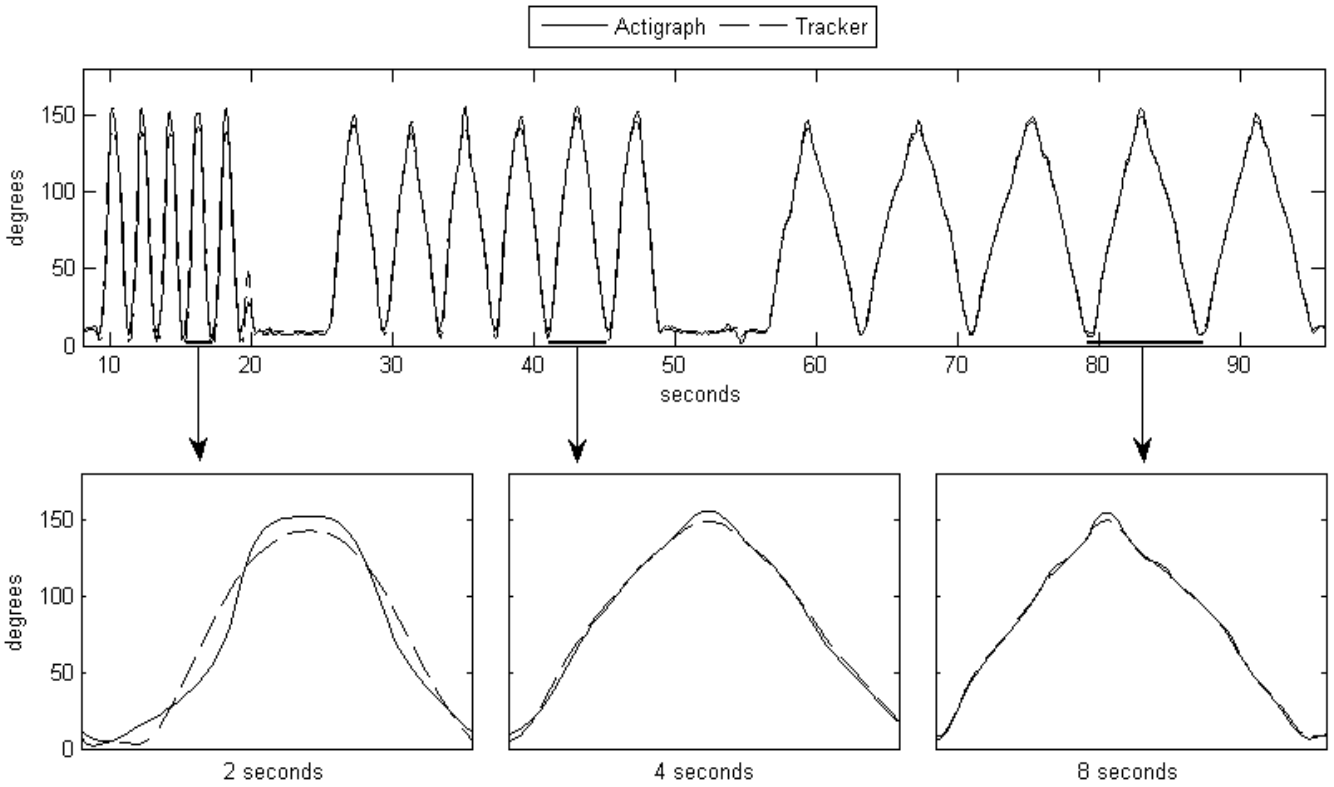
Measuring upper-arm and forward bending of back with 3D accelerometer using Acti4





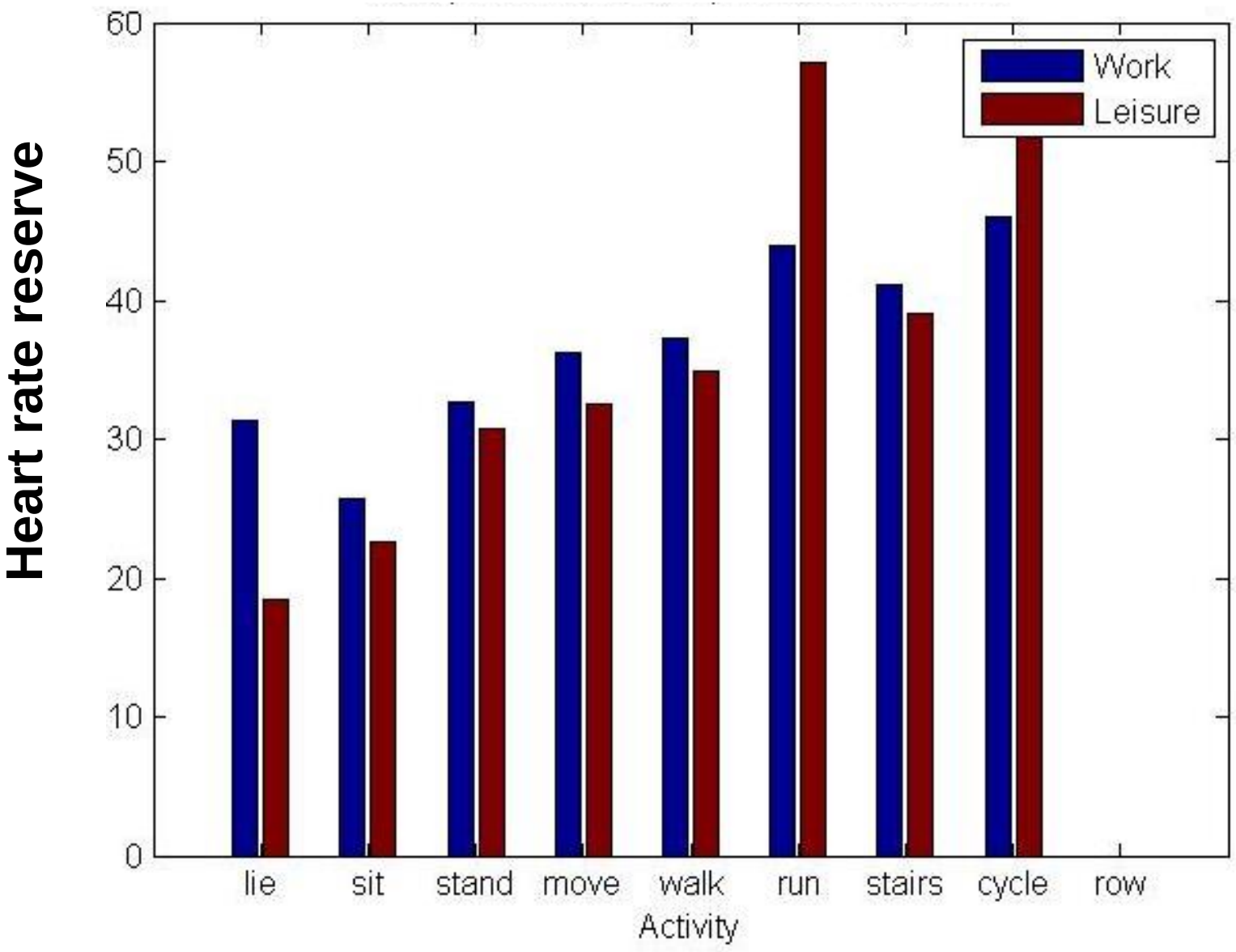
Korshøj et al. 2014, Ergonomics

The physiological intensity (e.g. heart rate reserve)

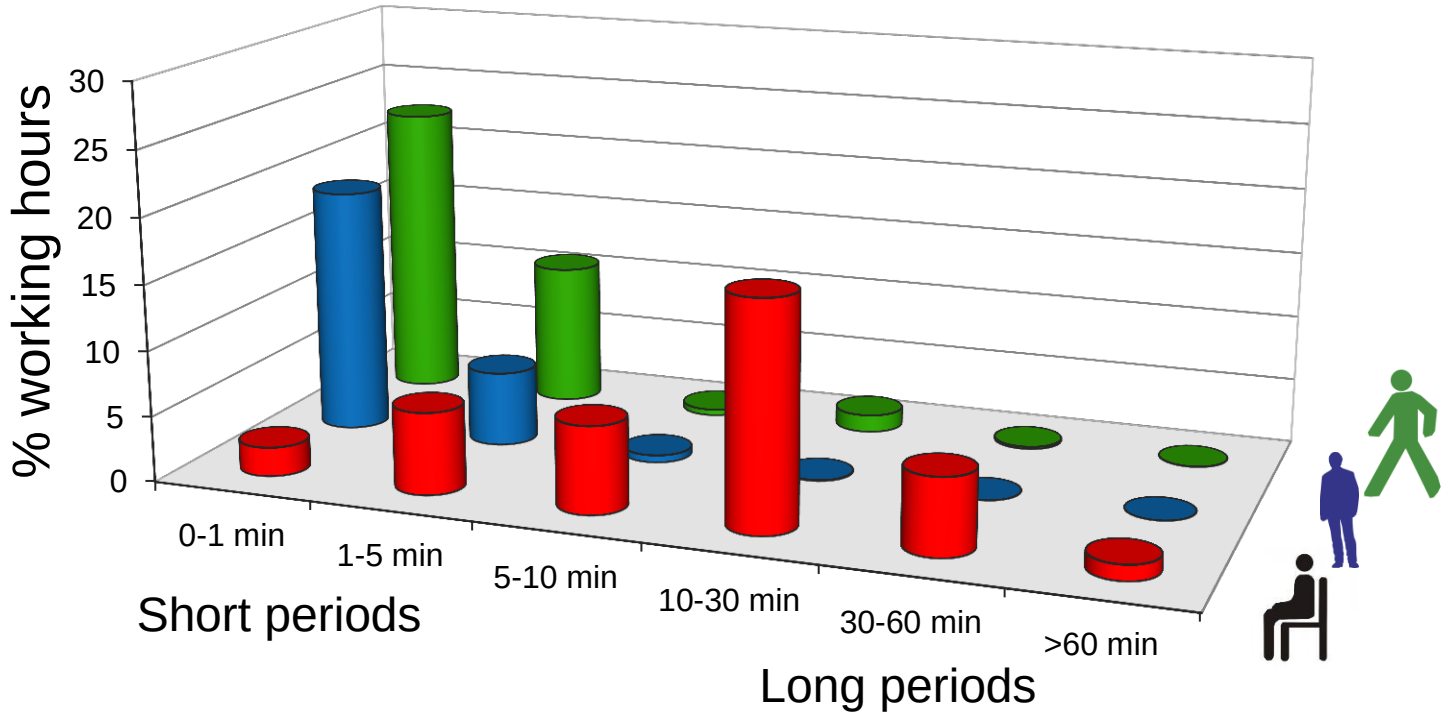
Actiheart

Road maintenance workers

n=52 work hours=1,130 leisure hours=2,433

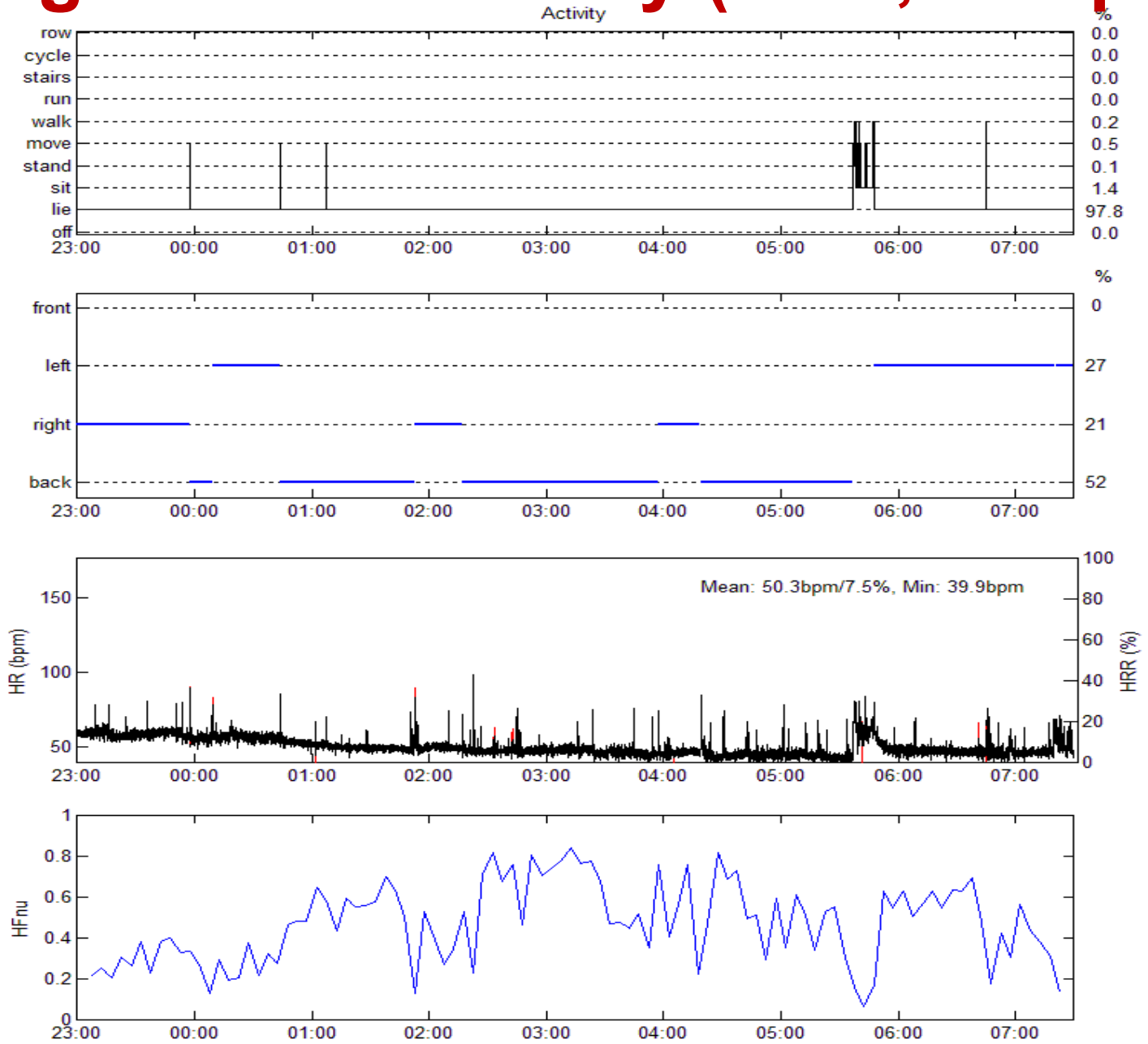


Time patterns of the exposures within and between days (e.g. EVA analyses)

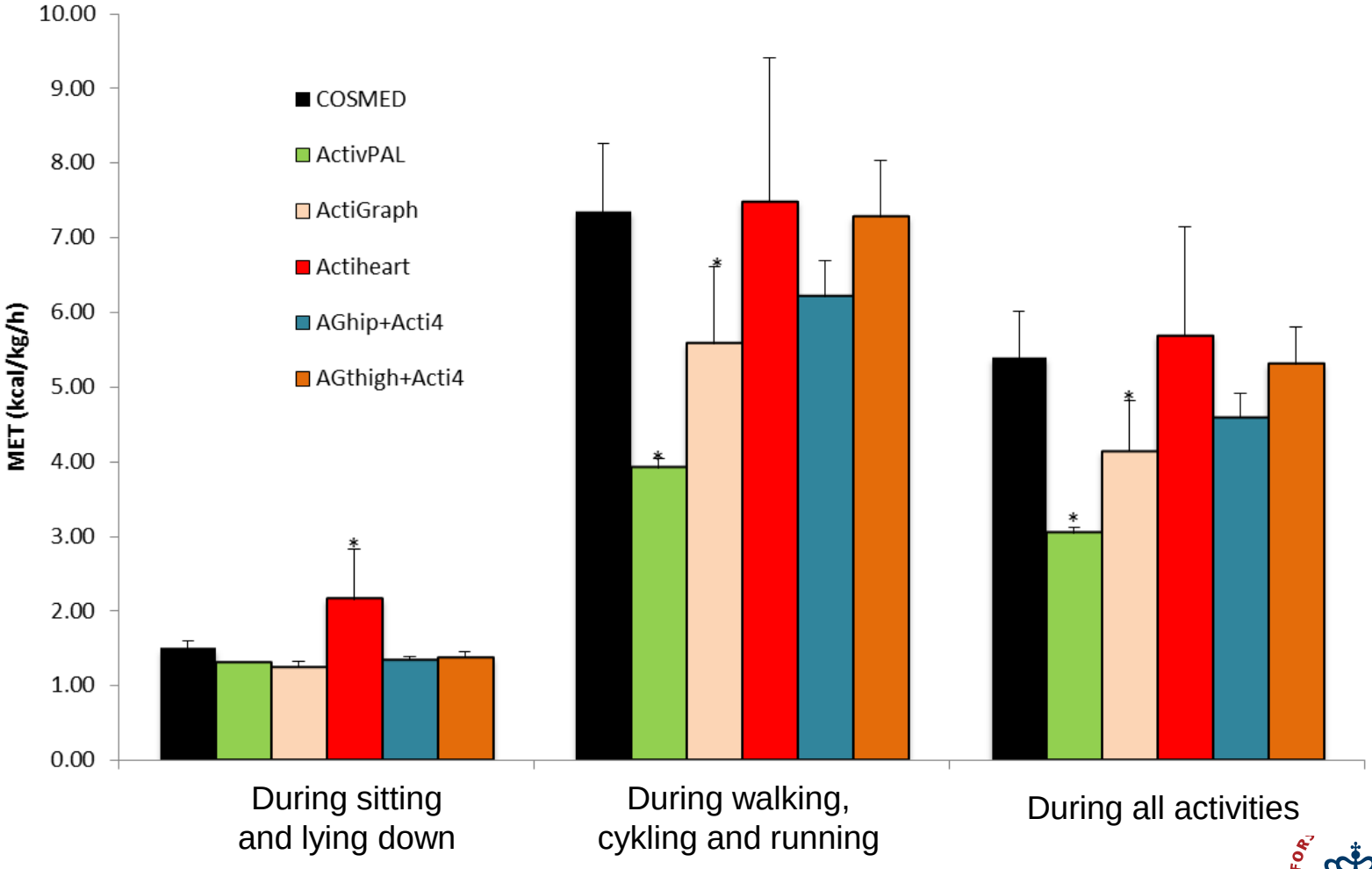


Hallman et al 2015

Fatigue and recovery (HRV, sleep…)



Energy expenditure



Schneller mfl 2015, Sensors

Manual handling

- Options exists – but still challenging to apply in the field for long time on many participants

Surface EMG

MEDILOGIC SOLE

- 125-255 sensorer
- 8 timers måling
- Summerer kraft i påvirkede område

Ambulatory blood pressure

- Several systems exist
- Considerable advances
- Important to integrate with synchronized measures of body position and physical activity

Temperature (environment)

- Most 3D accelerometers measure temperature
- However, not provided by commercial software
- Not aware of validation studies (e.g. testing for drift, specific placement on body, range of temperatures etc)

Currently feasible to have diurnal technical measures on many participants of?

- Basic physical activity types (walking, stair climbing, running…) √
- Body postures (sitting, standing, forward bending, arm elevation…) √
- The physiological intensity (e.g. heart rate reserve) √
- Time patterns of the exposures (e.g. EVA analyses) √
- Fatigue and recovery (HRV, sleep…) √
- Energy expenditure √
- Manual handling ÷
- Ambulatory blood pressure ÷
- Temperature (environment) ÷

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