

**THE
MAASTRICHT
STUDY**



Maastricht University

Total amount and patterns of sedentary behaviour & glucose metabolism status

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THE PROBLEM

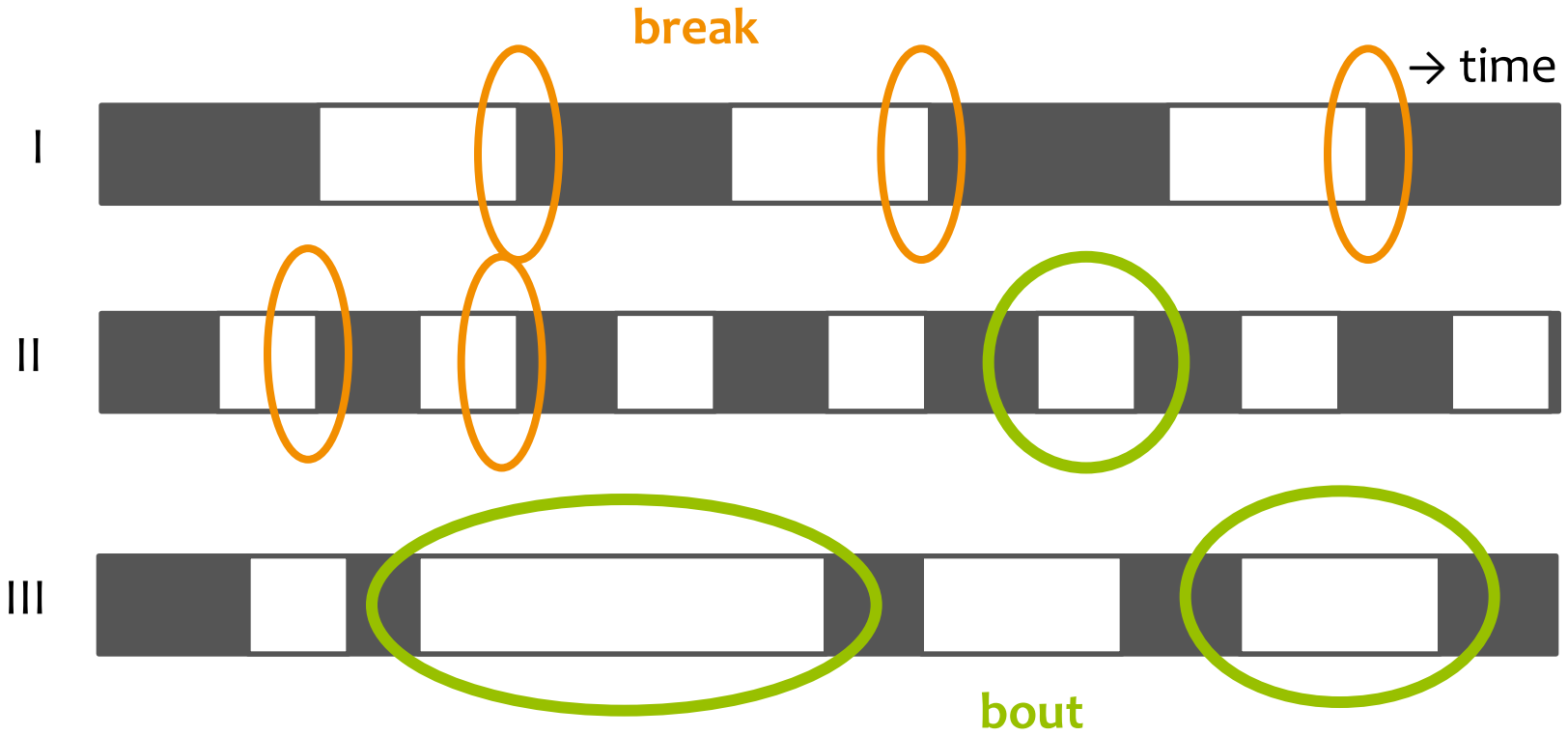
Long periods of sedentary behaviour (sitting, watching TV, using the computer) unfavourably associated with several metabolic health outcomes

Also, pattern in which sedentary time is accumulated seems important for health

- sedentary breaks
- sedentary bouts



Examples of different sedentary behaviour patterns



White bars = sedentary time

Grey bars = standing or stepping time (physical activity)

STUDY AIM

Examine associations of
volume and patterns
of sedentary behaviour
with glucose metabolism status



STUDY SAMPLE

The Maastricht Study:

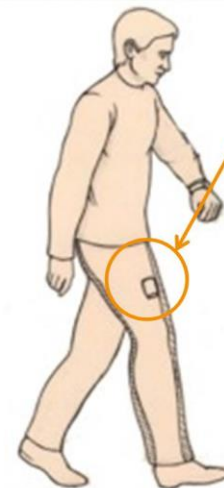
- 10,000 participants
- Type 2 diabetes oversampled
 - Aetiology
 - Pathophysiology
 - Complications
- Current study
 - 2,497 participants



SEDENTARY BEHAVIOUR

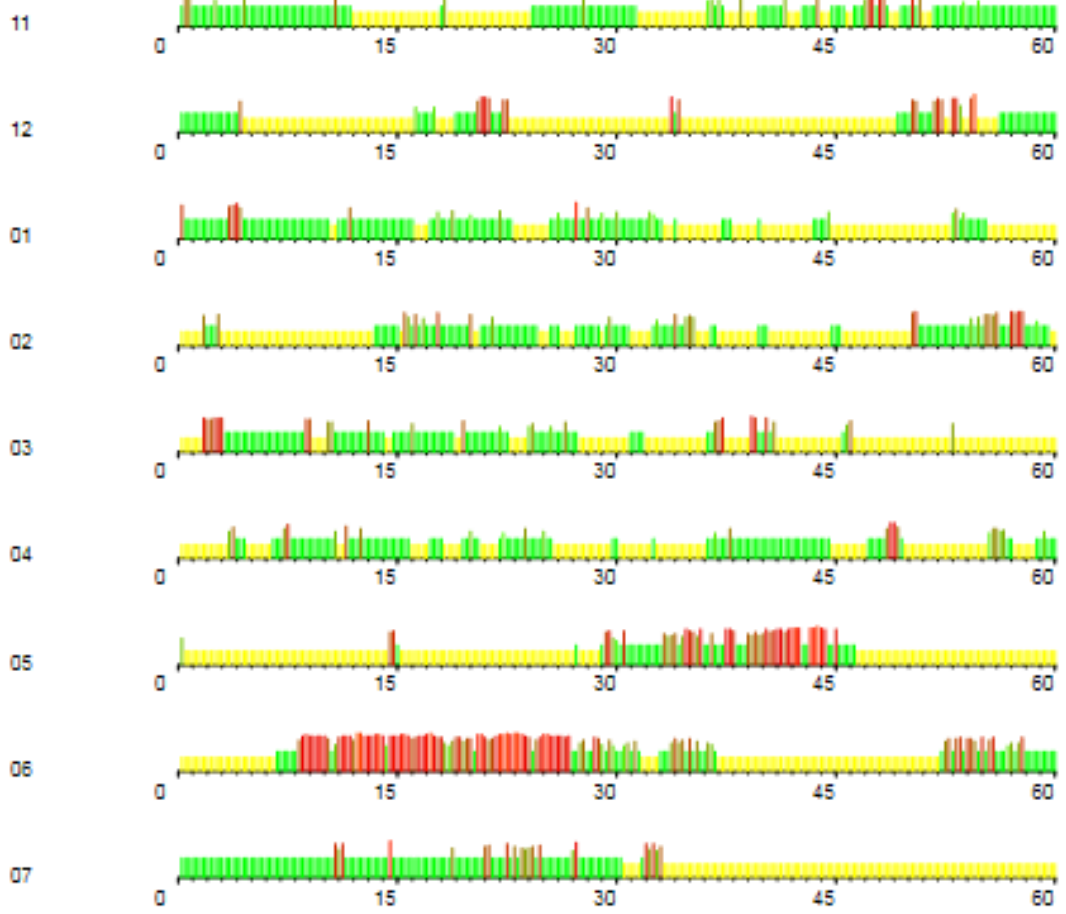
activPAL™ physical activity
monitor

- 24h/day for 7 days





Activity profile for 99999999-AP1234243 30Sep13 01-14pm for 8d 0m - Day 2



Sit/Lie	22.1min
Stand	33.1min
Step	4.8min
388 steps	
10/10 u/d transitions	
Sit/Lie	41.7min
Stand	14.0min
Step	4.3min
342 steps	
7/7 u/d transitions	
Sit/Lie	26.1min
Stand	29.5min
Step	4.4min
365 steps	
8/8 u/d transitions	
Sit/Lie	29.4min
Stand	24.9min
Step	5.6min
380 steps	
12/11 u/d transitions	
Sit/Lie	32.0min
Stand	22.6min
Step	5.4min
426 steps	
10/9 u/d transitions	
Sit/Lie	28.8min
Stand	26.9min
Step	4.2min
376 steps	
12/11 u/d transitions	
Sit/Lie	41.3min
Stand	9.5min
Step	9.2min
478 steps	
3/3 u/d transitions	
Sit/Lie	23.1min
Stand	13.3min
Step	23.6min
232 steps	
3/2 u/d transitions	
Sit/Lie	28.2min
Stand	28.4min
Step	3.4min
245 steps	
1/1 u/d transitions	



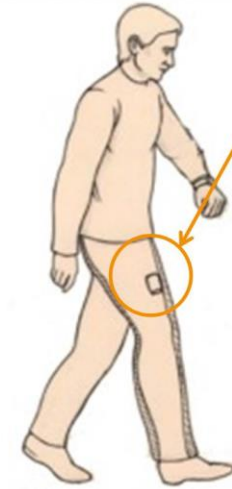
EE (MET.h): 1.4
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 EE (MET.h): 2.2
 EE (MET.h): 1.4

SEDENTARY BEHAVIOUR

activPAL™ physical activity
monitor

○ 24h/day for 7 days

- Sitting (h/day)
- Standing (h/day)
- Stepping (h/day)
- Sedentary breaks (#/day)
- Sedentary bouts ≥ 30 min (#/day)
- Average bout duration (min)



OUTCOME MEASURE

- Glucose metabolism status - OGTT
 - normal glucose metabolism (NGM)
 - impaired glucose metabolism (IGM)
 - impaired fasting glucose
 - impaired glucose tolerance
 - type 2 diabetes (T2DM)



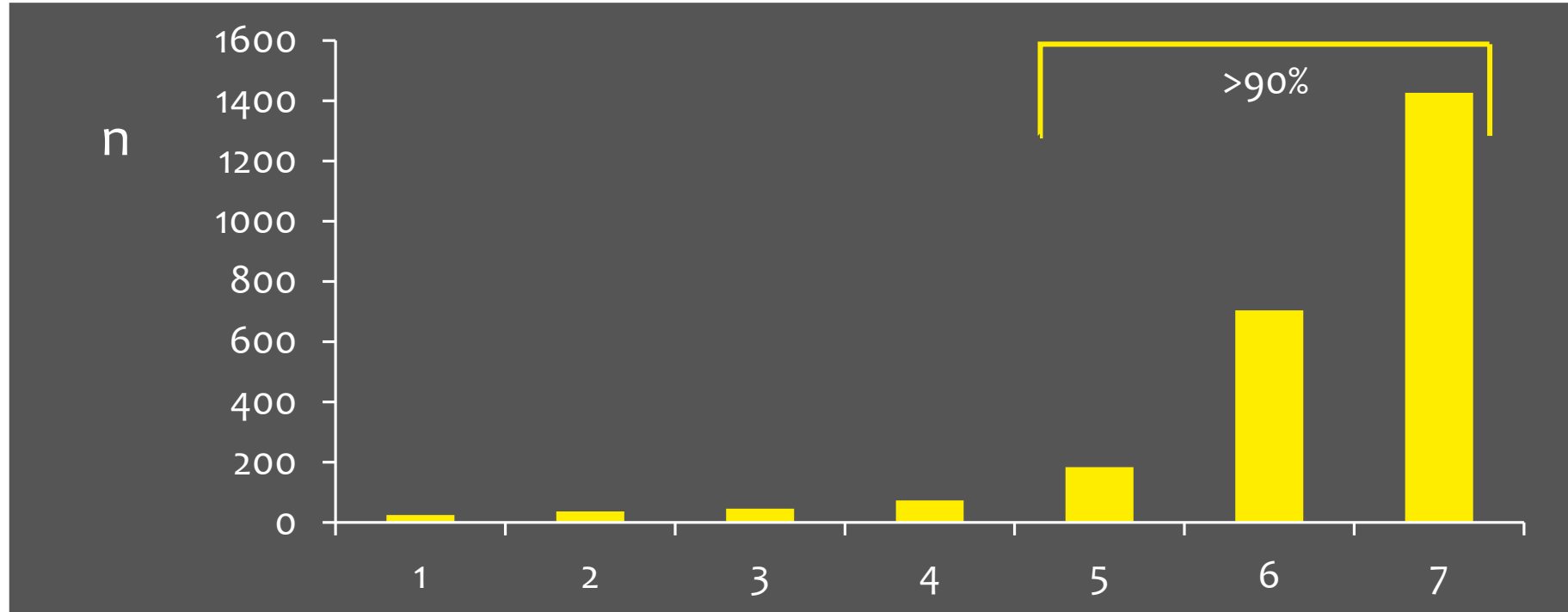
BASELINE CHARACTERISTICS

	NGM (n=1395)	IGM (n=388)	T2DM (n=714)
Sex (%men)	41.9	54.9	70.2
Age (years)	58.1 (8.1)	61.9 (7.2)	62.7 (7.7)
Low educated (%)	26.7	36.9	45.0
BMI (kg/m ²)	25.5 (3.6)	27.7 (4.3)	29.8 (4.9)
Diabetes duration (years), median (IQR)	n/a	n/a	6.0 (3.0-12.0)
HbA1c (%)	5.4 (0.3)	5.7 (0.4)	6.9 (1.0)

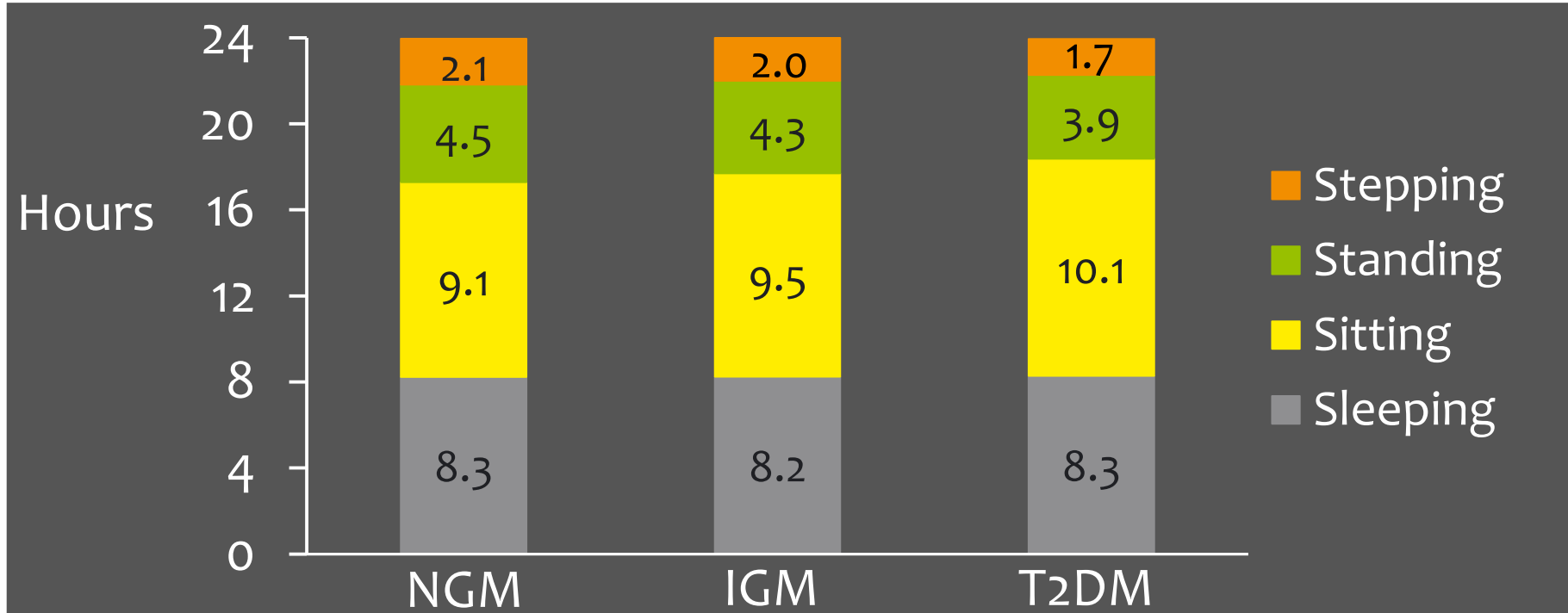
Mean (SD), unless stated otherwise



ACCELEROMETER WEAR DAYS



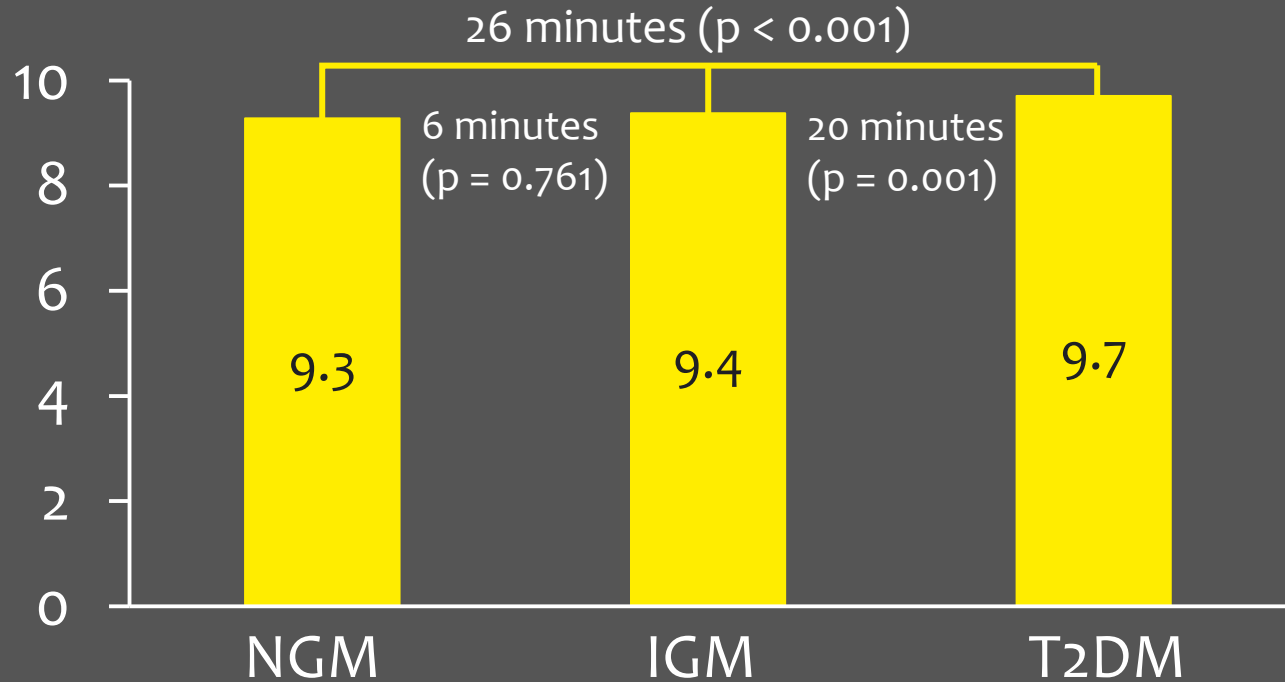
DAILY ACTIVITY BY GMS



SEDENTARY TIME BY GMS

Hours/day

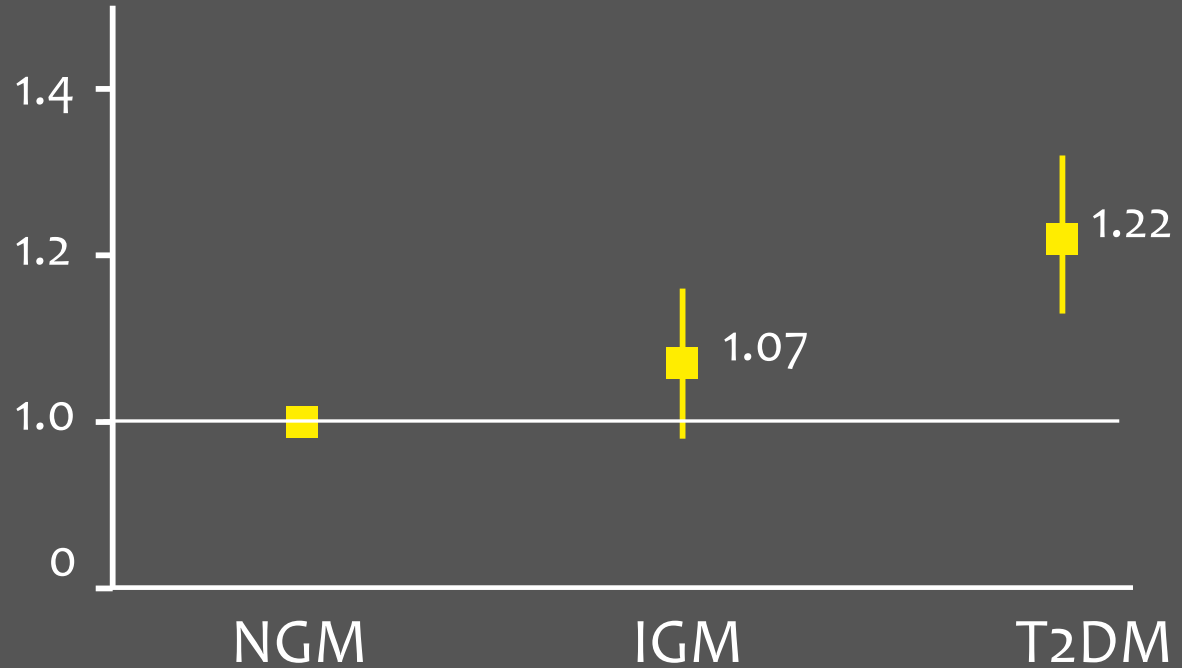
Adjusted for sex, age, level of education, waking time, smoking status, alcohol consumption, health status, mobility limitation, BMI, and high-intensity physical activity



SEDENTARY TIME BY GMS

OR

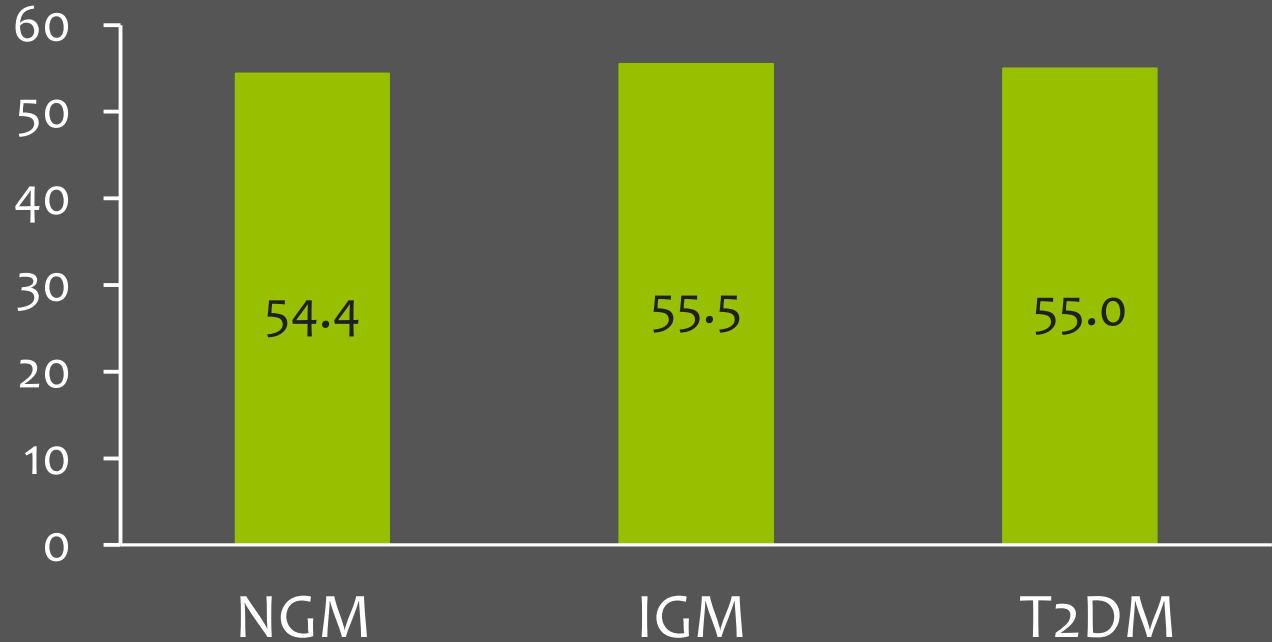
Adjusted for sex, age, level of education, waking time, smoking status, alcohol consumption, health status, mobility limitation, BMI, and high-intensity physical activity



SEDENTARY BREAKS BY GMS

#sedentary
breaks/day

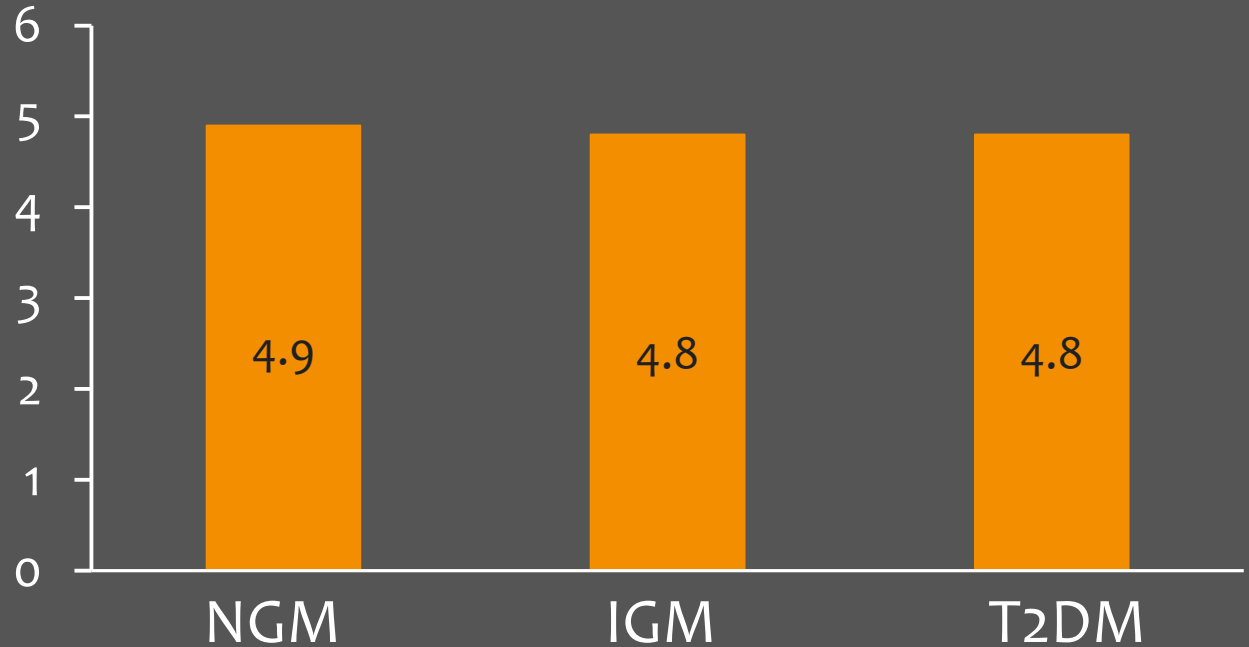
Adjusted for sex, age, level
of education, waking time,
smoking status, alcohol
consumption, health
status, mobility limitation,
BMI, sedentary time, and
high-intensity physical
activity



SEDENTARY BOUTS ≥ 30 min BY GMS

#sedentary
bouts
 ≥ 30 min/day

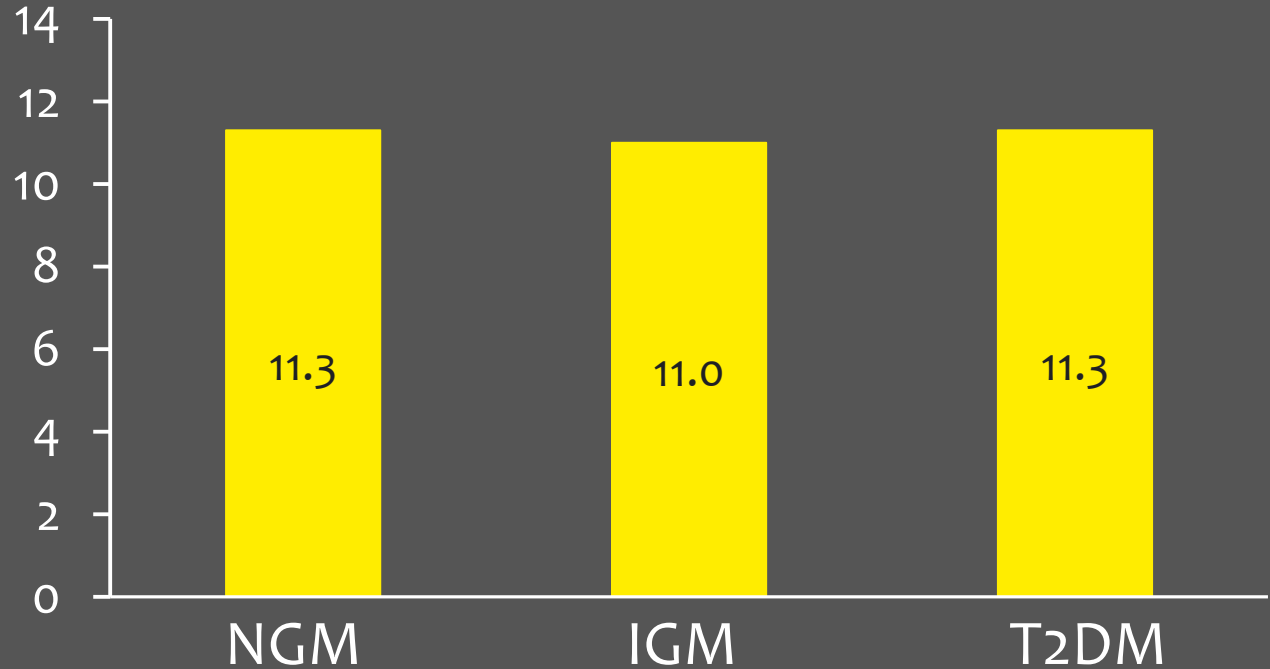
Adjusted for sex, age, level of education, waking time, smoking status, alcohol consumption, health status, mobility limitation, BMI, sedentary time, and high-intensity physical activity



SEDENTARY BOUT DURATION BY GMS

average bout duration (min)

Adjusted for sex, age, level of education, waking time, smoking status, alcohol consumption, health status, mobility limitation, BMI, sedentary time, and high-intensity physical activity



TO CONCLUDE

- Participants with type 2 diabetes ~25 minutes more sedentary time per day than participants without diabetes
- Each extra hour of sedentary time was associated with a 22% increased odds for type 2 diabetes
- No difference in sedentary breaks, long sedentary bouts, and sedentary bout duration

Total volume
but not
≡ *patterns* ≡
of *sedentary behaviour*
associated with
type 2 diabetes



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Paper submitted:

Associations of total volume and patterns of sedentary behaviour with type 2 diabetes and metabolic syndrome – The Maastricht Study
Van der Berg et al. 2015

Maastricht UMC+



Maastricht University

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Health Campus



*dit onderzoek wordt ondersteund door de
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