Changes in 24-hour movement behaviors after metabolic and bariatric surgery and their associations with weight loss: An actigraphy study

Leah Schumacher, J. Graham Thomas, Yin Wu, Sivamainthan Vithiananthan, Daniel B. Jones, Pavlos K. Papasavas, Jennifer Webster, Aurélie Baillot, Dale S. Bond

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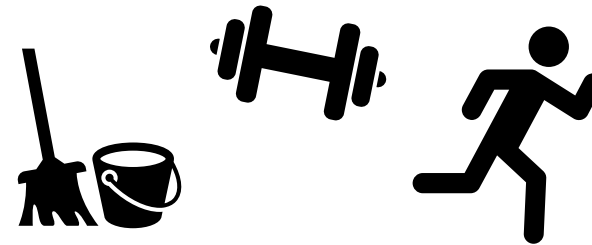
24-HOUR MOVEMENT GUIDELINES

Sleep

Sedentary time (ST)

Physical activity (PA)
- Light PA + moderate-to-vigorous PA (MVPA)
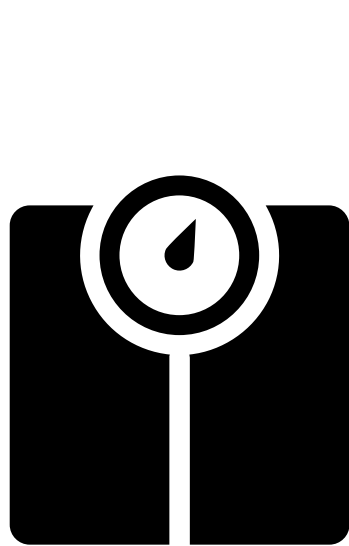
24-hour movement guidelines

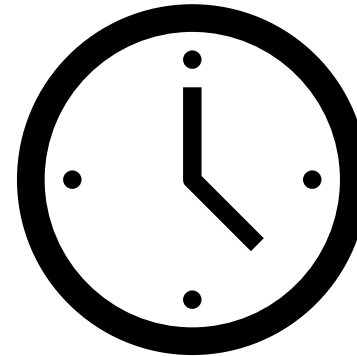*No movement*

High movement

METABOLIC & BARIATRIC SURGERY (MBS)

= better outcomes

= ?

= ?

Data on **change** in movement behaviors from 24-hr perspective lacking

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STUDY AIMS

1 Changes in 24-hour movement behaviors during first postoperative year

2 Associations of 24-hour movement behaviors with percent weight loss (%WL)

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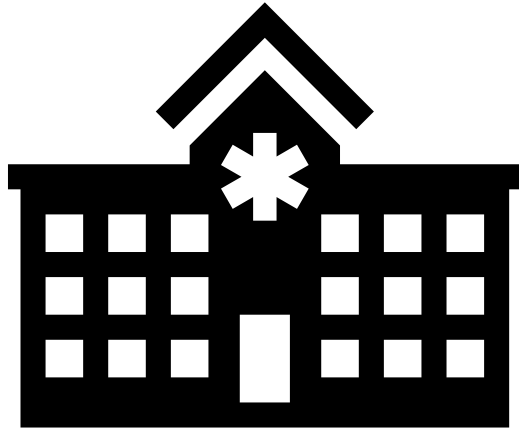# STRENGTHS

1

Accelerometry

2

4 timepoints

(Pre + 3, 6, & 12 M post)

3

Fairly diverse sample

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PARTICIPANTS

- Recruited from clinics at regular pre-surgery appointment

Inclusion:
- ≥18 years old
- BMI ≥35.0 kg/m^2
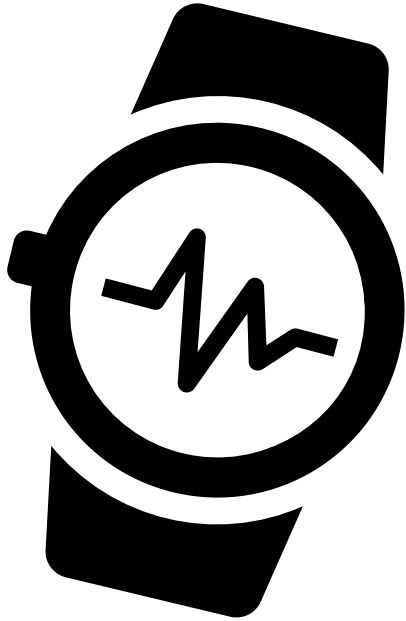- Receiving RYGB or sleeve gastrectomy at one of two academic study bariatric surgery clinics

Exclusion:
- Intervention outside standard surgical care
- Condition/situation preventing study completion (e.g., plans to move)
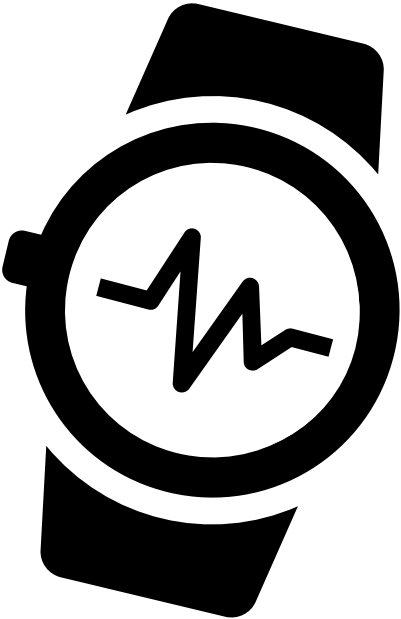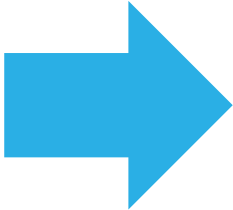
ASSESSMENTS

10 days

Surgery

Pre-surgery   3-mos post   6-mos post   12-mos post
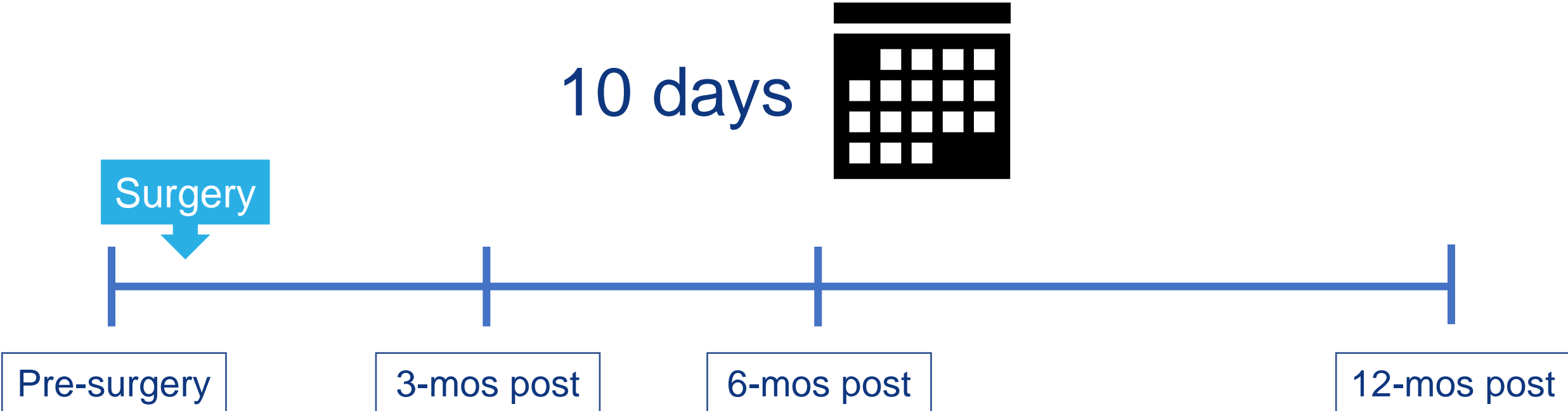
ACCELEROMETRY: 24-HR BEHAVIORS

24 hr/day

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ACCELEROMETRY
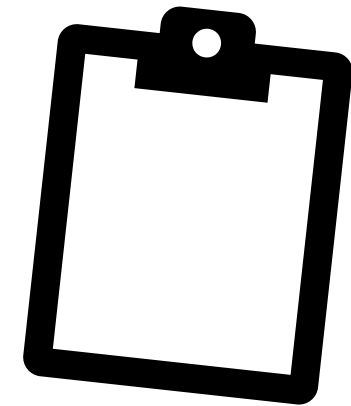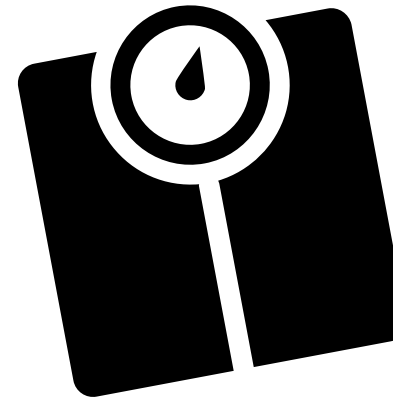
24 hr/day

Sleep

ST

MVPA

Light PA

Total PA

WEIGHT & DEMOGRAPHICS

At each timepoint…

- Percent weight loss (%WL)

Pre-surgery…

- Race & ethnicity
- Male/female
- Age
- Education
- Surgery type

ANALYTIC APPROACH

- Data requirement:
  - ≥4 days accelerometry with ≥10 hrs/day
- Modeling approach:
  - Each 24-hour movement behavior modeled separately
  - Mixed linear models in STATA
    - E.g., For Aim 2 re: weight loss
      - *DV: %LW*
      - *Fixed:* 24-hr movement variable, assessment (categorical), 24-hr movement variable*assessment
      - *Random*: ID
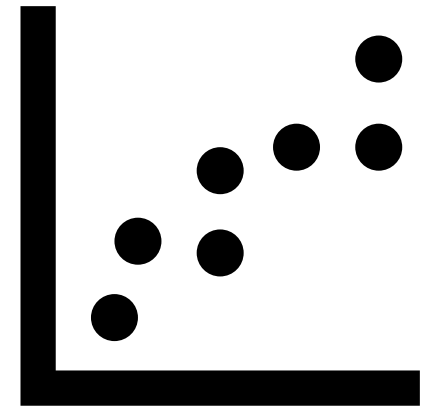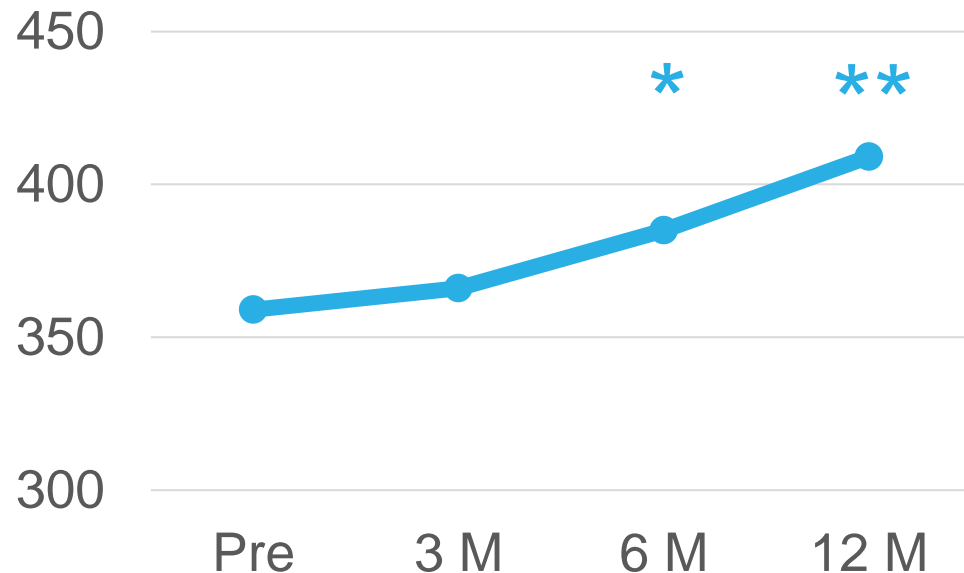
SAMPLE CHARACTERISTICS

- 89% female
- 47% racial/ethnic minority group
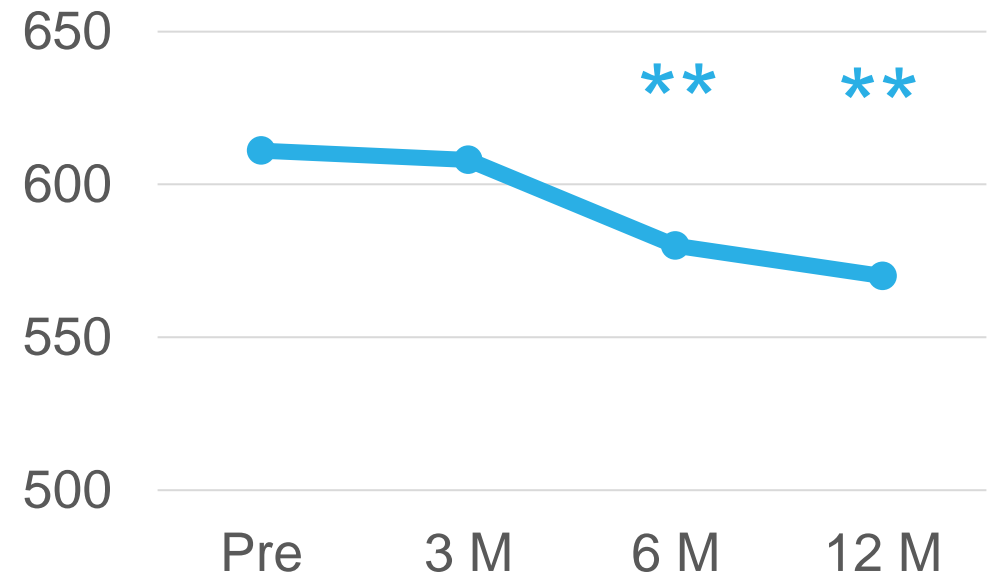- Pre-surgery BMI = 45.8 kg/m^2 (SD = 6.9)

| n = 73 | n = 61 (84%) | n = 56 (77%) | n = 46 (63%) |
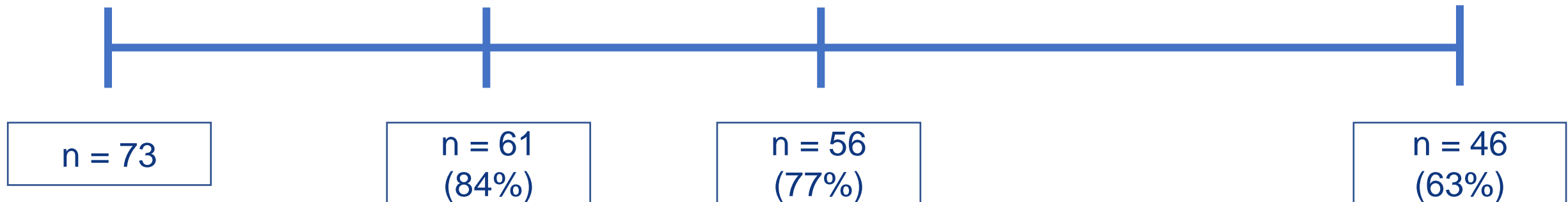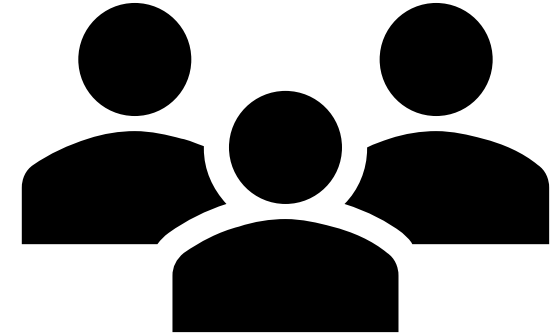
AIM 1: CHANGE OVER TIME

- ↑ **25 & 50 min of** <u>**sleep**</u> **at 6 and 12 months (vs pre)**
- ↓ **31 & 51 min of** <u>**sedentary time**</u> **at 6 and 12 months (vs pre)**
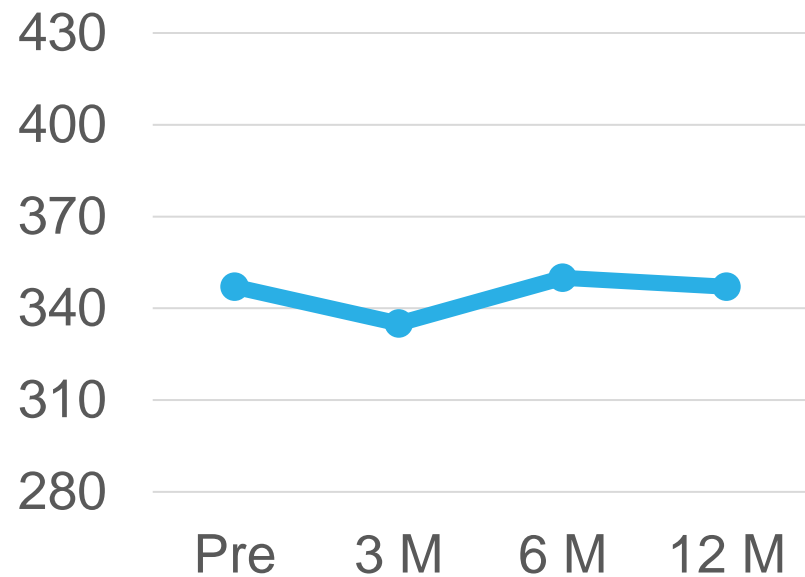
Sleep min per day

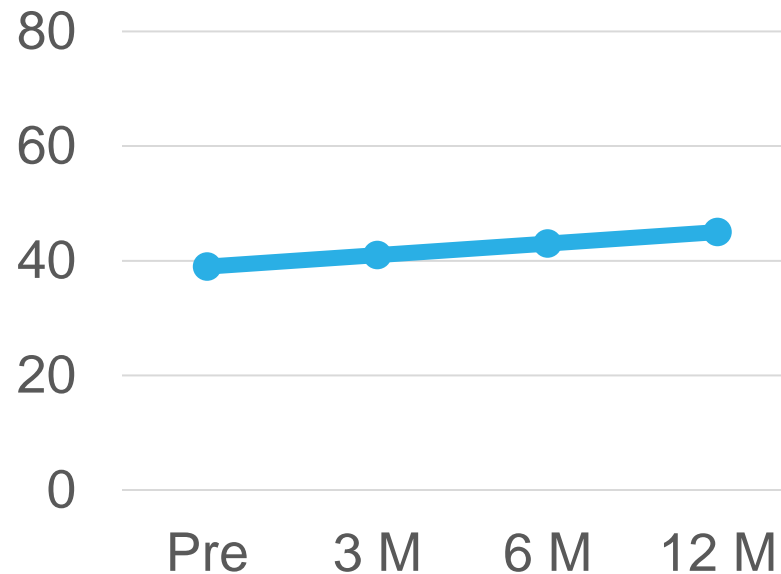## Sedentary min per day

*p<.05, **p<.001

AIM 1: CHANGE OVER TIME

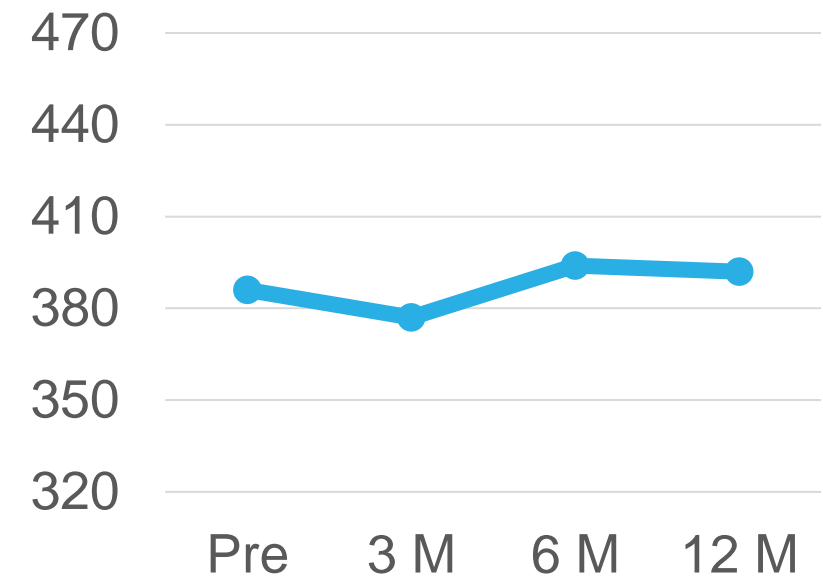- **No significant change in light PA, MVPA, or total PA**
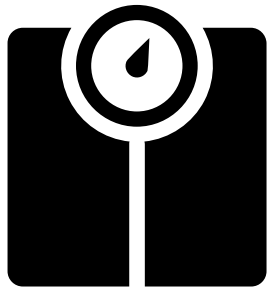

Light PA per day

MVPA per day

Total PA per day

AIM 2: ASSOCIATION WITH %WL

- Greater light & total PA related to greater %WL
  - 100 min/day increase → ~1.0% unit increase in %WL
    - Light PA: 1.09 unit increase
    - Total PA: 0.84 unit increase
- MVPA, sleep, and ST unrelated to %WL

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TAKEAWAYS

1 Modest improvements in sleep and ST

2 PA change minimal, but associations observed with %WL for light & total PA
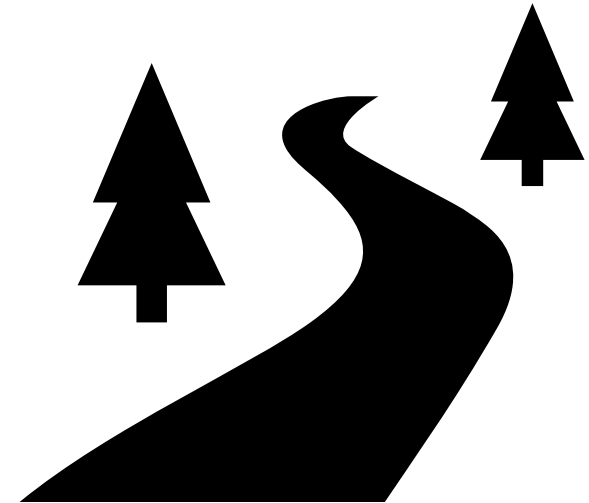
IMPLICATIONS / NEXT STEPS

1 Does increased sleep and decreased ST positively impact other health outcomes, consistent with "whole day" approach to health?

2 Helpful to increase <u>all</u> types of movement, not just MVPA

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- Study participants

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