



Striking the Right Balance: Physical Activity, Work Conditions, and Cardiovascular Health

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Key Messages

- Physical activity matters for cardiovascular health in workers
- Small increases in moderate-to-vigorous intensity physical activity may have meaningful benefits
- Physically demanding work and work stress does not eliminate the benefits of physical activity

Physical Activity and Cardiovascular Disease

- Regular physical activity is a cornerstone of cardiovascular disease prevention.
- WHO recommends ≥ 150 min/week of moderate-to-vigorous physical activity plus muscle-strengthening activities
- Canadian 24-Hour Movement Guidelines emphasize healthy behaviours over a 24-H day

A healthy 24 hours includes:

PHYSICAL ACTIVITY

Performing a variety of types and intensities of physical activity, which includes:



- **Moderate to vigorous aerobic physical activities** such that there is an accumulation of at least 150 minutes per week

- Muscle strengthening activities using major muscle groups at least twice a week



- Several hours of **light physical activities**, including standing

SLEEP



Getting 7 to 9 hours of good-quality sleep on a regular basis, with consistent bed and wake-up times

SEDENTARY BEHAVIOUR



Limiting sedentary time to 8 hours or less, which includes:

- No more than 3 hours of recreational screen time
- Breaking up long periods of sitting as often as possible



....But Does the Work Context Matter?

 Latest Watchlist Markets Investing Barron's Economy Personal Finance Retirement

Sitting at your desk all day is killing you — Here's how to get moving again

Published: Apr 20, 2018 5:21 p.m. ET



Bad News: Now Standing at Work Is Killing You, Too

Wait, what?



BY JAY WILLIS
September 17, 2017

 INDEPENDENT 

NEWS POLITICS VOICES FINAL SAY SPORT CULTURE VIDEO **INDY LIFE** INDYBEST LONG READS INDY100 VOUCHERS MINDS



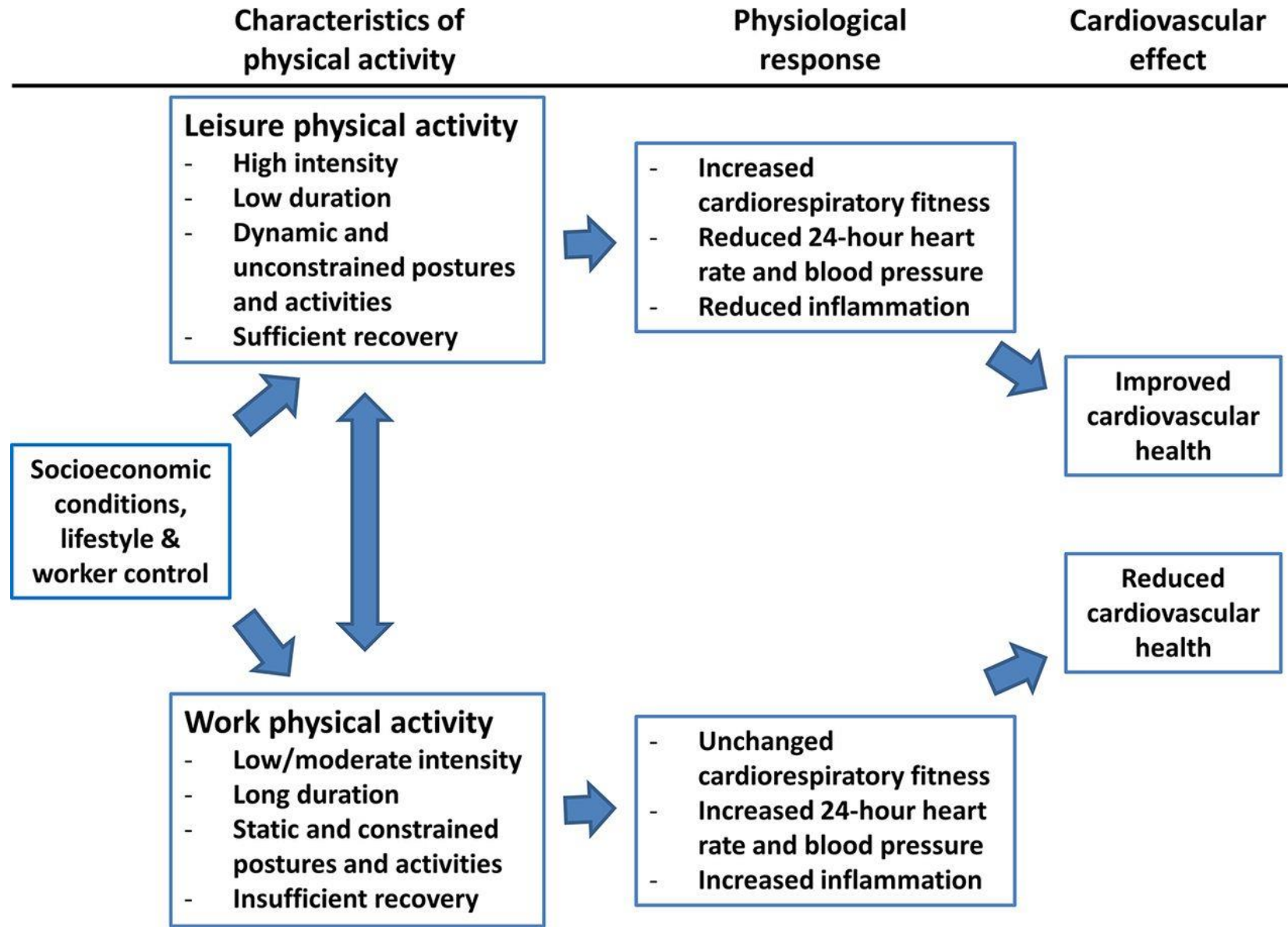
EXERCISE IS ONLY BENEFICIAL WHEN DONE OUTSIDE YOUR JOB, STUDY CLAIMS

New research has revealed a 'physical activity paradox'

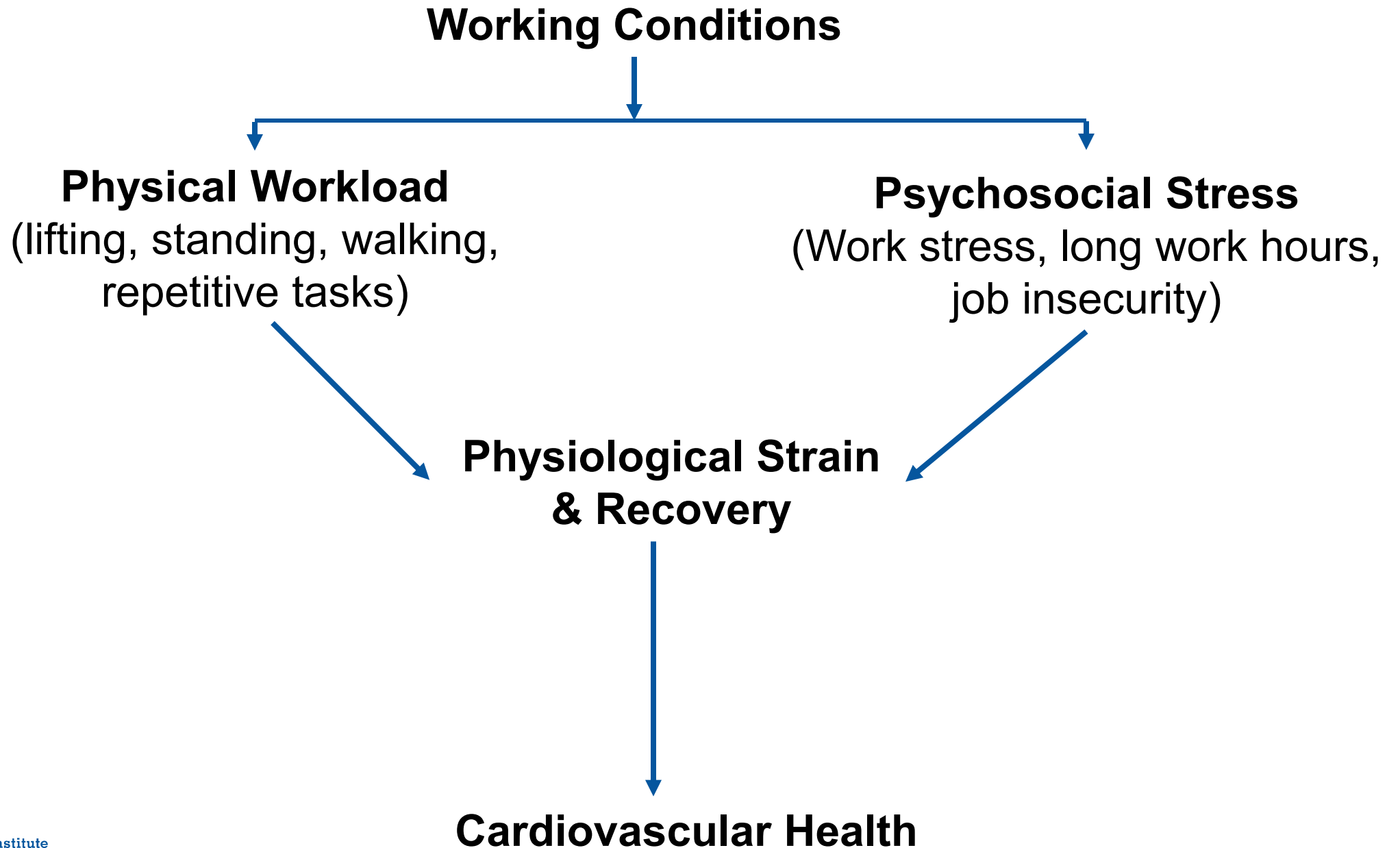
Poll #1

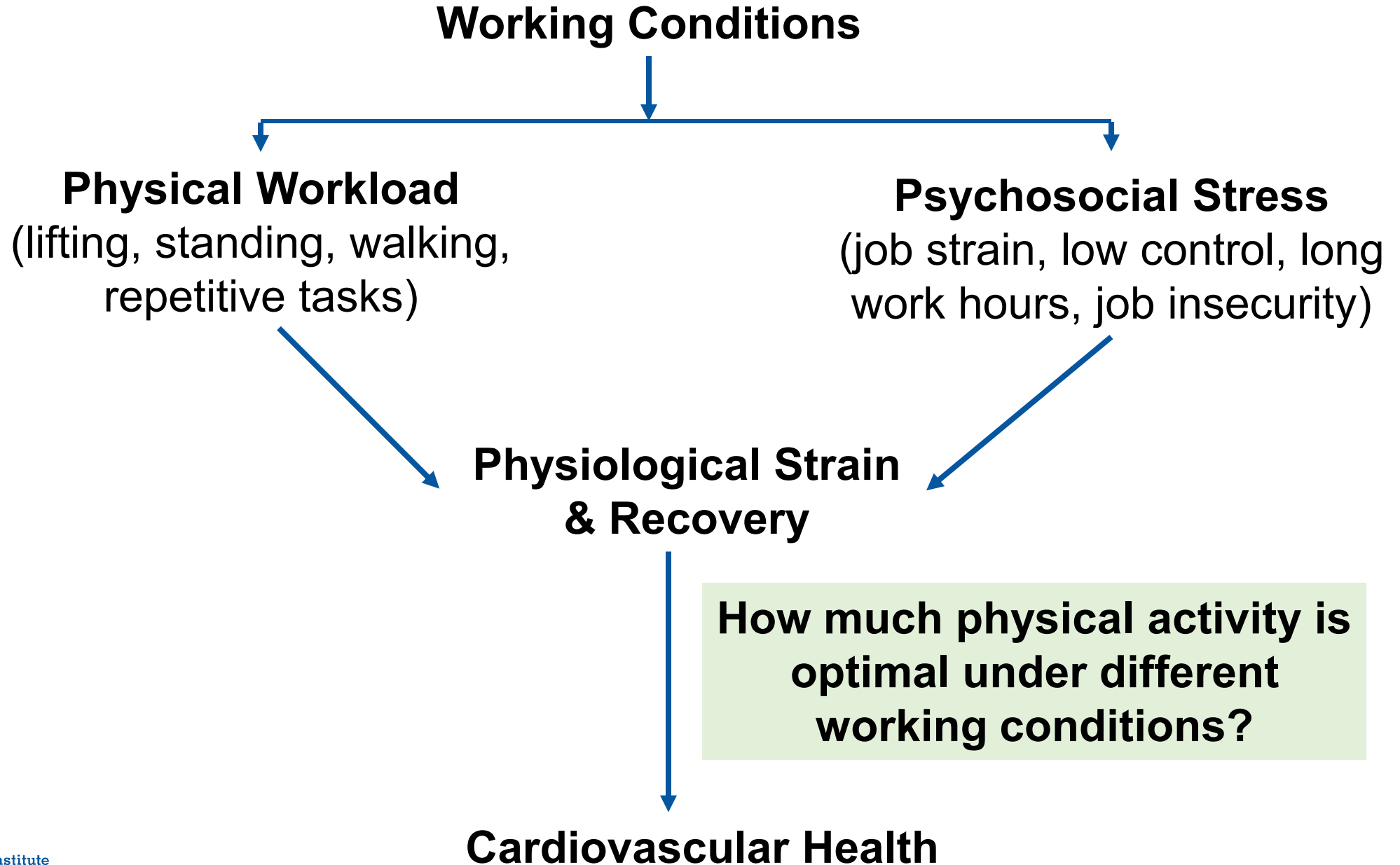
People who are active at work get the same health benefits as people who are active during their free time.

- True
- False
- Not sure



Credit: Holtermann A *et al.* The physical activity paradox: six reasons why occupational physical activity (OPA) does not confer the cardiovascular health benefits that leisure time physical activity does. *British Journal of Sports Medicine* 2018;**52**:149-150.





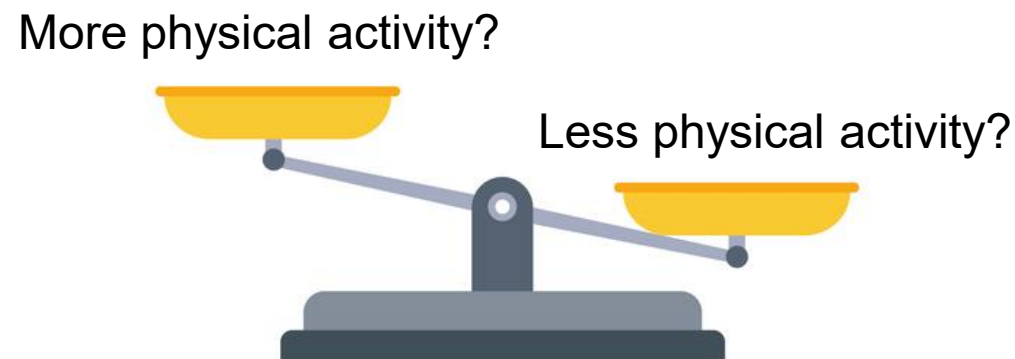
Study 1 – Identifying physical activity “sweet spots” for working populations



Study 1 – Physical Activity “Sweet Spots”

Objective:

Understand how the daily balance of sleep, sitting, and physical activity across a 24-hour day influences workers’ risk of cardiovascular disease



Studying the Whole 24-Hour Day

When workers spend more time:

- Being physically active,
- Sitting, or
- Sleeping

That time must come from somewhere else

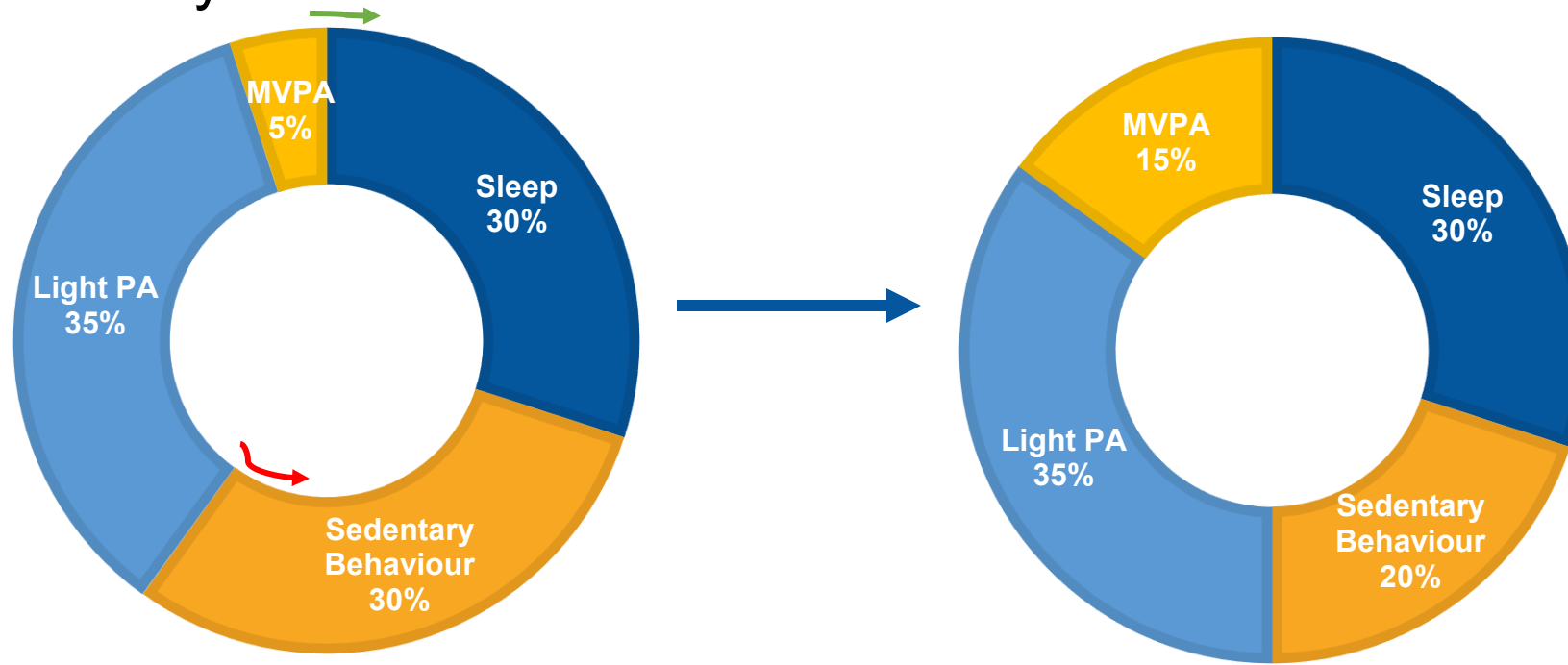
Traditional question:

What happens if workers are physically active for 1 more hour?

Studying the Whole 24-Hour Day

24-hour approach:

What happens to health if 1 hour of sitting is replaced with 1 hour of physical activity?



Study Population

- Data from the Canadian Health Measures Survey (2007-2017)
 - Only ongoing nationally representative survey that collects direct physical measures of health.

We included:

- Adults aged 18 years and older
- Currently employed
- No previous cardiovascular disease

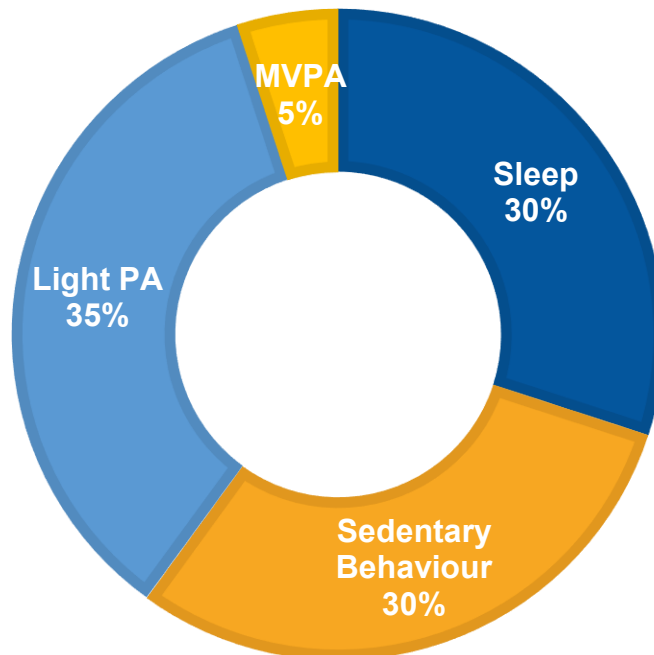
~8,000 participants analyzed

Exposures & Outcome

- **Sleep:** Self-reported daily sleep time.
- **Sedentary Behaviour:** Measured using waist-worn accelerometers and classified according to validated cut points.
- **Light Physical Activity:** Measured using waist-worn accelerometers and classified according to validated cut points.
- **Moderate-Vigorous Physical Activity:** Measured using waist-worn accelerometers and classified according to validated cut points.
- **Outcome - First CVD event:** ICD-10-CA diagnostic codes for cardiovascular diseases and cardiovascular disease-related mortality

Analysis

- Converted time in different behaviours to proportions of a 24-H day using Compositional Data Analysis
- Looked at associations between 24-H behaviours and risk of a first cardiovascular disease event



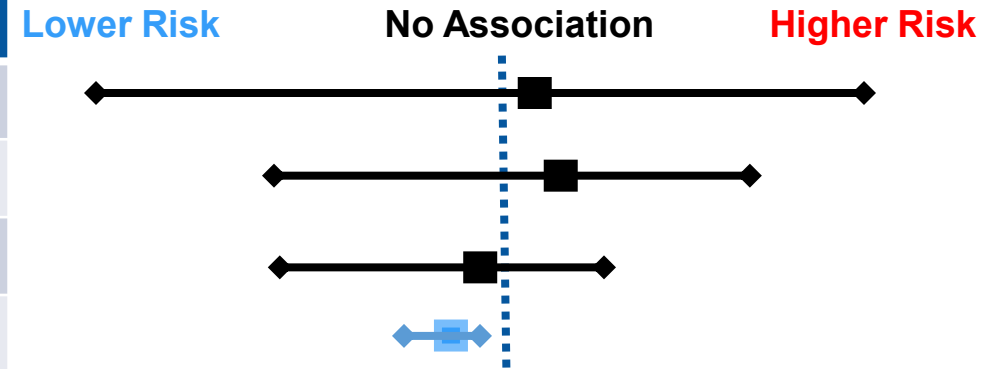
Time-to-event
survival modelling

CVD-related
hospitalization
and mortality

Models adjusted for potential confounders:
Age, sex, education, household income, having a
dependent child, work hours, smoking status,
alcohol use, seasonality

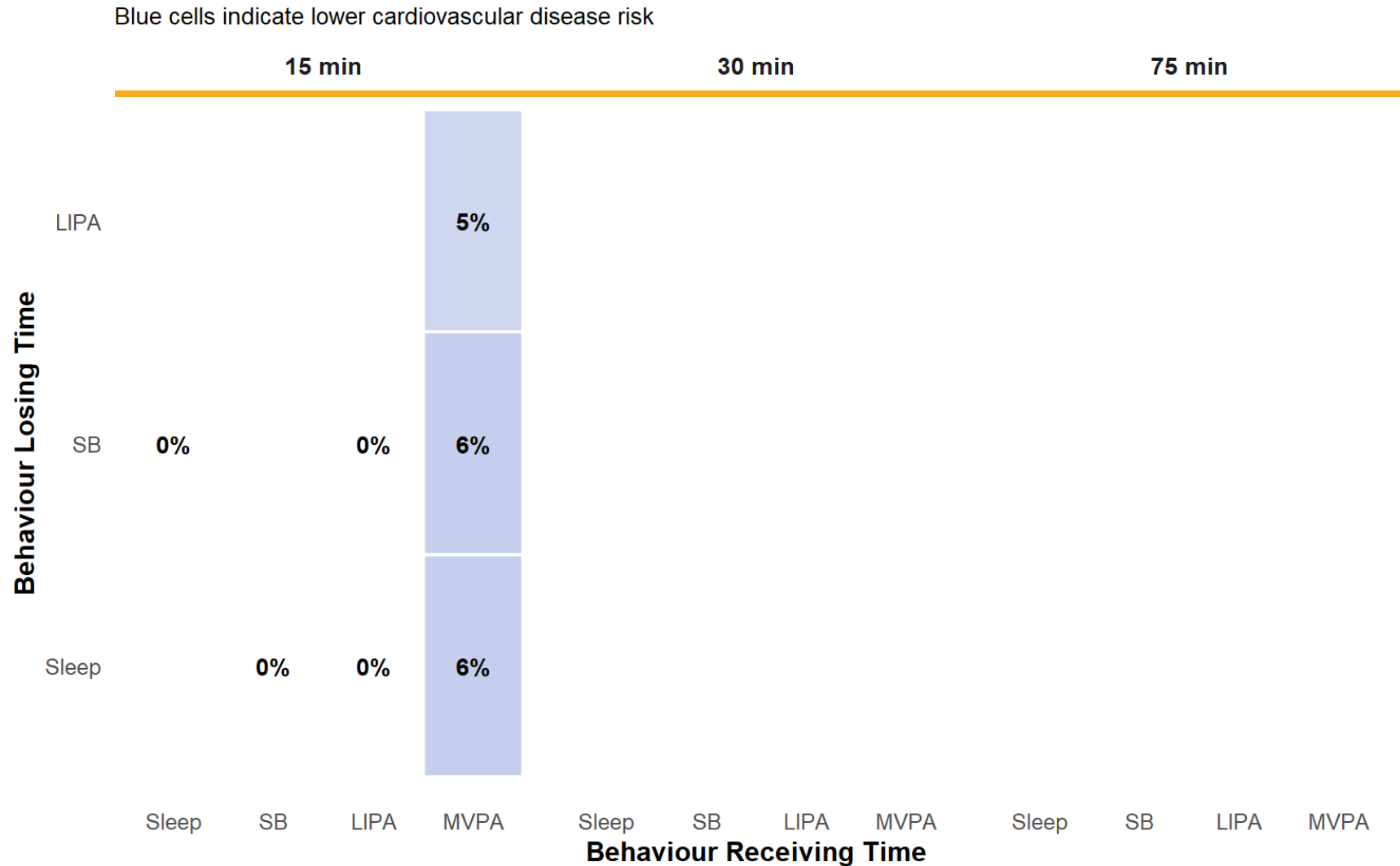
Results

24-Hour Behaviours	
Sleep	No clear association
Sedentary Behaviour	No clear association
Light Physical Activity	No clear association
Moderate-Vigorous Physical Activity	↓ 13% lower risk



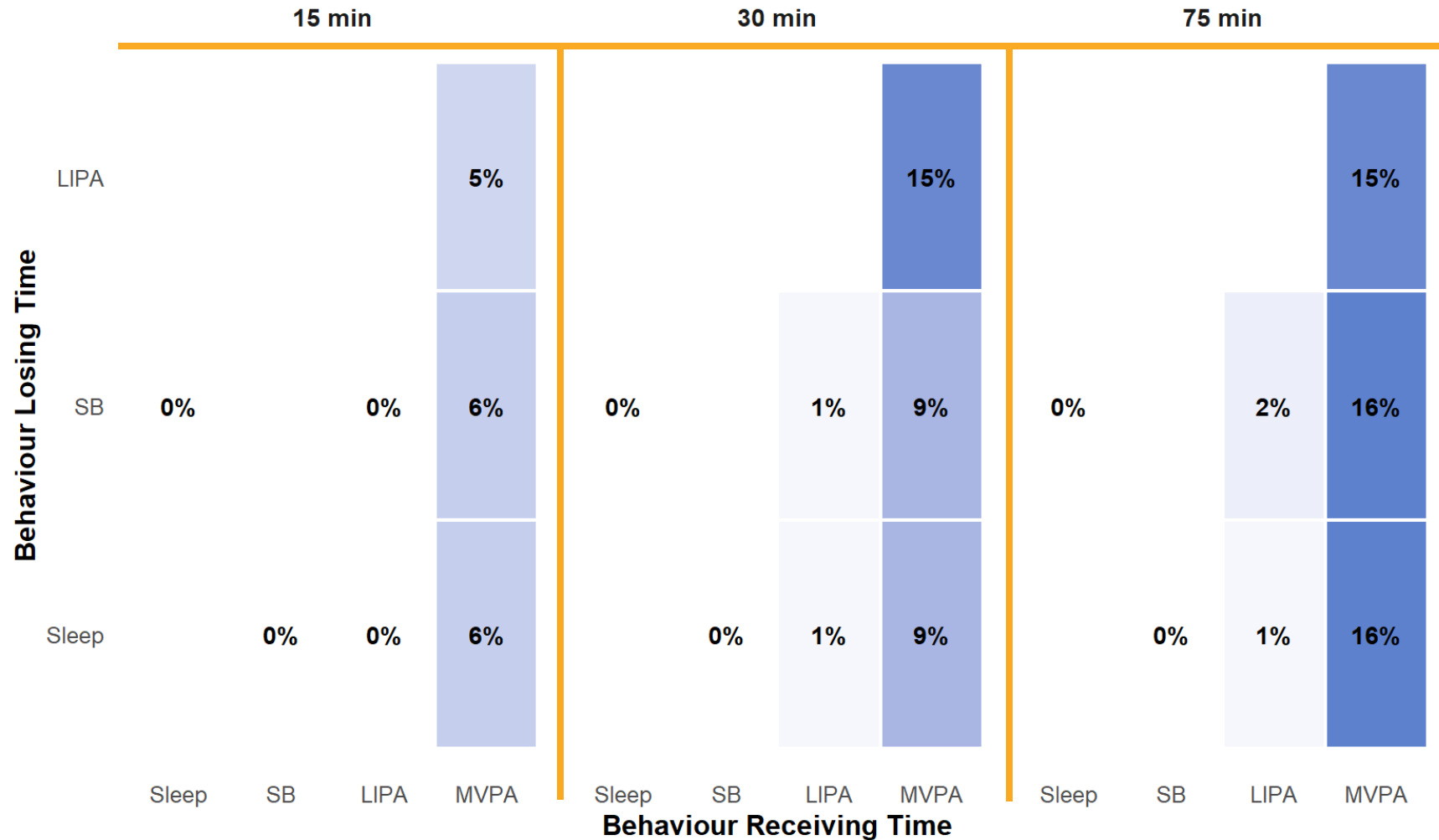
Only moderate-to-vigorous physical activity was associated with lower cardiovascular disease risk.

Change in CVD Risk When Reallocating Time



Change in CVD Risk When Reallocating Time

Blue cells indicate lower cardiovascular disease risk



Key Takeaways

- More MVPA was associated with lower cardiovascular disease risk
- Even small changes may matter
- Not all movement substitutions are equal in the cardiovascular disease risk of workers

Should public health recommendations focus on simply increasing MVPA for workers?

Ongoing Work

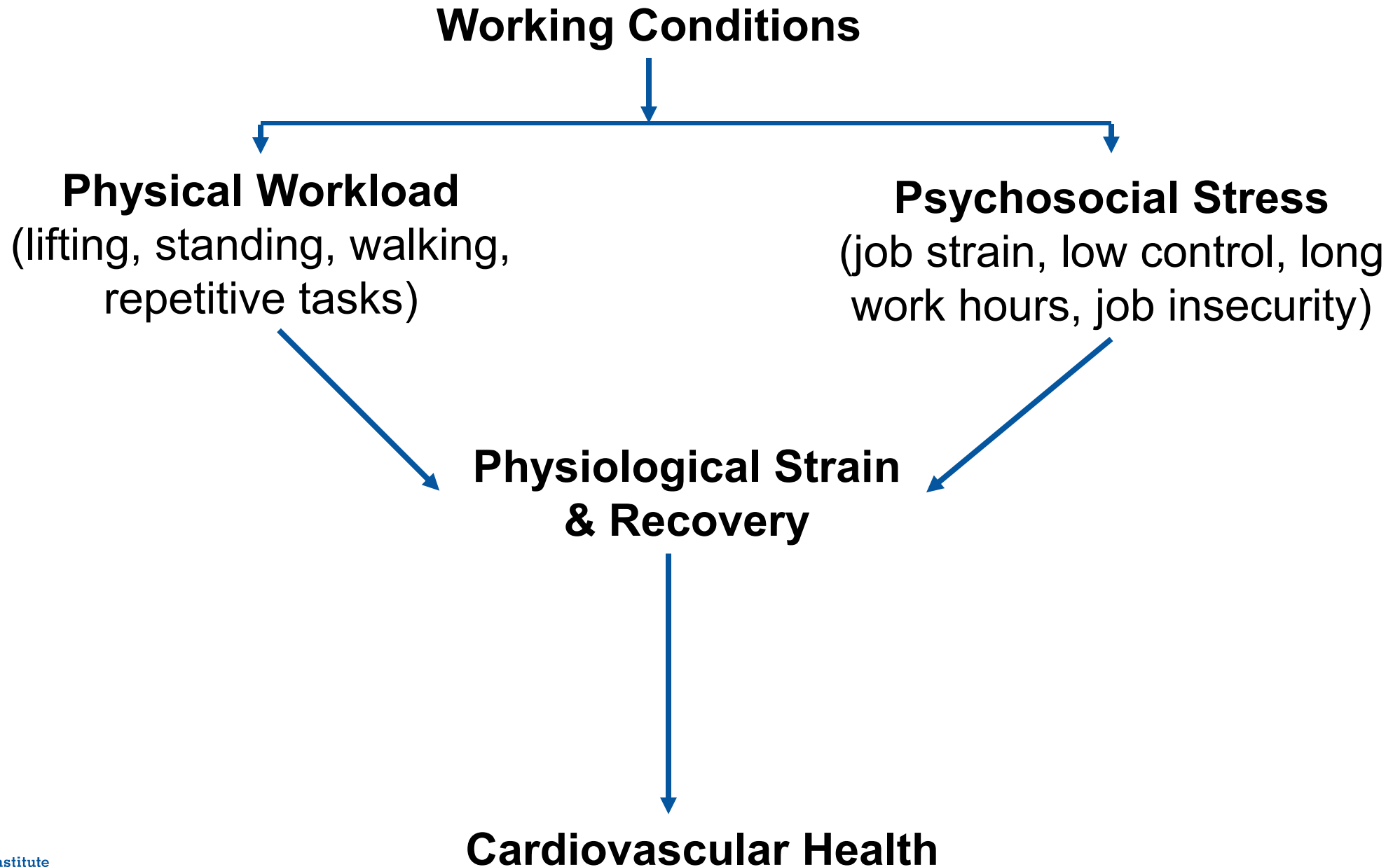
- Explore optimal 24-H behaviours for workers with:
 - Different jobs
 - Different physical work demands
 - Difference work stress levels
- Re-examine with newly released hospitalization data up to 2025 (previously 2019)

Study 2 – Understanding how work stress and physical work demands contribute to CVD risk



Work Stress and Cardiovascular Disease

- Occupational exposures are an important, potentially modifiable contributor to cardiovascular disease (CVD).
- Work stress has been linked to CVD, but the magnitude and independence of this association remain uncertain.



What We Still Don't Know

We still do not know enough about:

- How work stress and physical work demands work together to affect cardiovascular health
- Whether regular physical activity protects workers from potential risks

Answering these questions could help inform better ways to prevent cardiovascular disease in workers

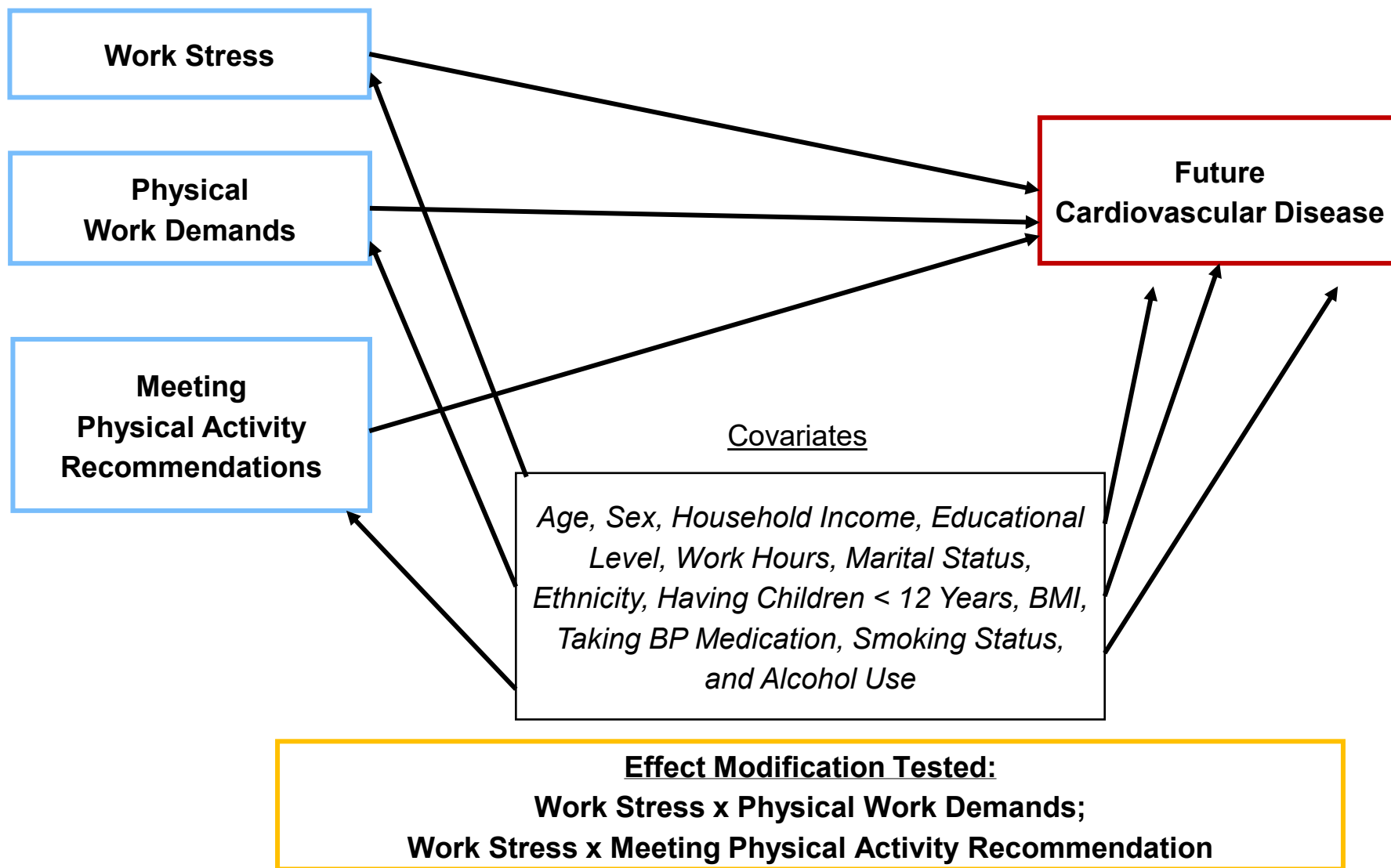
Poll #2

Which do you think has a bigger impact on heart health?

- How active you are
- How much stress you have
- Both equally
- Not sure

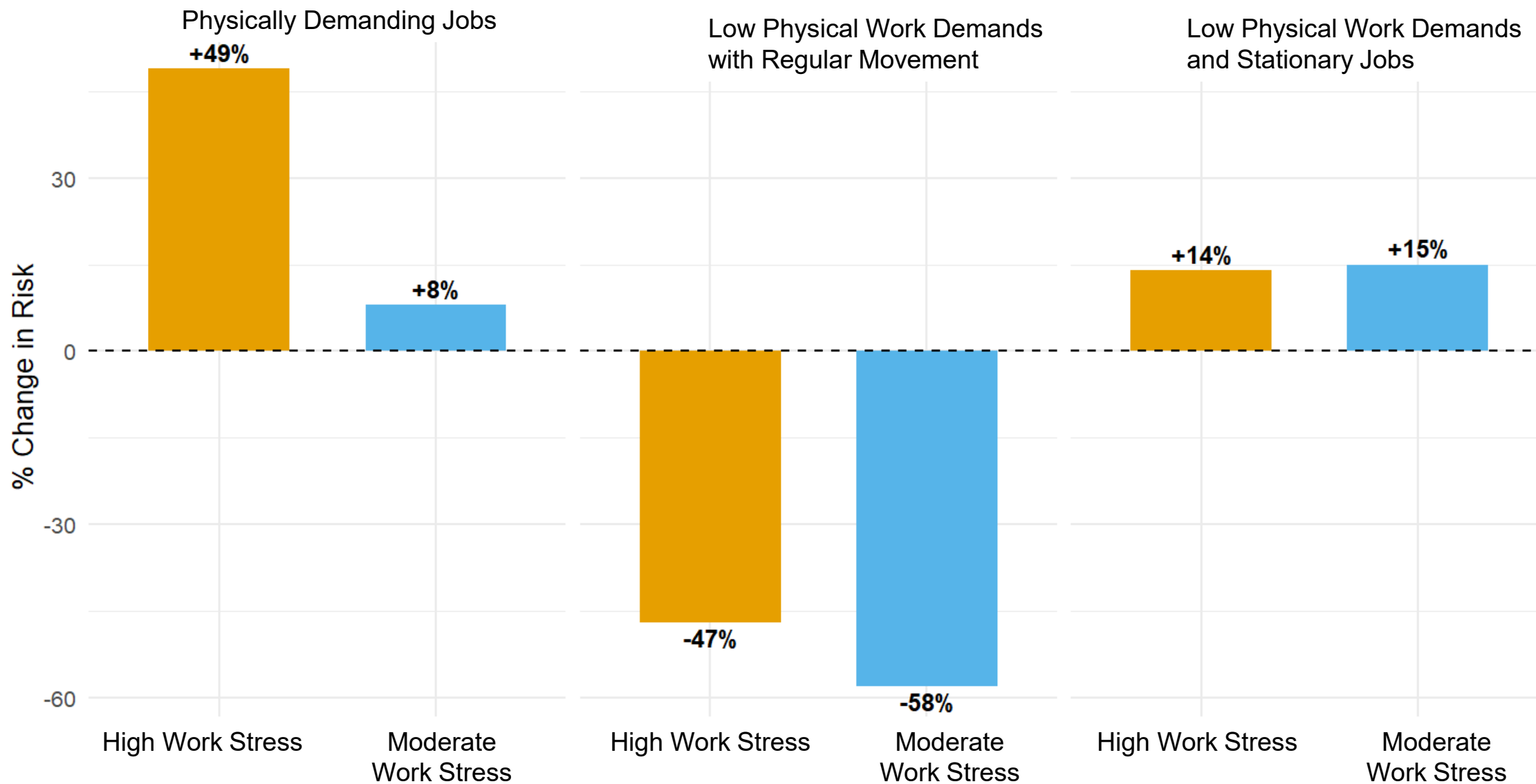
Exposures & Outcome

- **Work stress:** Measured using a single self-reported item and categorized as low, moderate, or high (reference = low).
- **Meeting physical activity recommendations:** Measured using waist-worn accelerometers and categorized as meeting (≥ 150 min/week MVPA) or not meeting (< 150 min/week MVPA) the PA recommendations.
- **Physical work demands:** Imputed from validated job exposure matrix of minimum strength ratings and body postures from Canada's National Occupational Classification (NOC) taxonomy
- **Outcome - First CVD event:** ICD-10-CA diagnostic codes for cardiovascular diseases and cardiovascular disease-related mortality



Key Findings

- Workers who met the physical activity recommendation had a 34% lower risk of developing CVD
- This association remained after accounting for demographic, work, and health factors
- Work stress and physical work demands alone were not strongly associated with CVD risk



Physical Activity Benefits Workers Regardless of Their Work Conditions

- The benefits of meeting the physical activity recommendation was generally similar regardless of work stress level or physical work demands
- Stressful or physically demanding jobs did not appear to substantially reduce these benefits

Key Messages

- Workers who meet physical activity recommendations had about a 34% lower risk of CVD
- Even small increases in MVPA may provide meaningful benefits
- The benefits of physical activity appeared constituent across different levels of work stress and physical work demands

Supporting workers to be physically active remains an important CVD prevention strategy.

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