



Is there an optimal daily movement pattern for heart health?

A study of Canadian workers' activity tracker data

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Acknowledgements

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Home > Journal of the American Heart Association > Ahead of Print > Workers' Activity Profiles Associated With Predicted 10-Year Cardiovascular Disease Risk

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Tools Share

Jump to

Abstract

Methods

Results

Discussion

Conclusions

Sources of Funding

Workers' Activity Profiles Associated With Predicted 10-Year Cardiovascular Disease Risk

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Abstract

Background

There is a need to explore common activity patterns undertaken by workers and the association between these activity profiles and cardiovascular disease (CVD). This study explored the number and type of distinct profiles of activity patterns among workers and the association between these profiles and predicted 10-year risk for a first atherosclerotic CVD event.

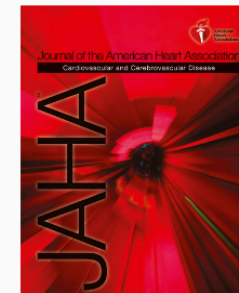
Methods and Results

Distinct activity patterns from a cross-section of workers' accelerometer data were sampled from Canadian Health Measures Survey participants (5 cycles, 2007–2017) and identified using hierarchical cluster analysis techniques. Covariates included accelerometer wear time, work factors, sociodemographic factors, clinical markers, and lifestyle variables. Associations between activity profiles and high-atherosclerotic CVD risk (10% were estimated using a...

Details

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References



Article Information

Metrics



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Key findings

- Canadian workers had 6 distinct daily physical activity (PA) patterns
 - Workers with moderate or high PA through the day or during evenings had lower heart disease risk compared to least active workers
 - Workers with high daytime activity were not different in their heart disease risk to the least active
- **Promoting PA outside work hours may be the optimal strategy for heart health benefits in working populations**

Physical activity and heart health

- Being physically inactive contributes to:
 - Unhealthy weight gain and obesity
 - High cholesterol
 - Elevated blood pressure and blood glucose levels
- All heighten the risk of developing cardiometabolic diseases

**Make your
whole day
matter.**



Move More. Reduce Sedentary Time. Sleep Well.

Source: Canadian Society for Exercise Physiology



World Health
Organization

“Adults accumulate a weekly average of 150 to 300 minutes of moderate intensity or ≥ 75 minutes of vigorous physical activity (PA), or an equivalent combination.”

<https://www.who.int/publications/i/item/9789240015128>

How working lives influence physical activity

Work stress

Long work hours

Multiple jobs

**Shift work /
Night work**

Physical work

Home stress

Time availability

Home responsibilities

Low motivation

Tiredness

Poll #1

Which of these make it hard for you to be physically active? Check all that apply.

- 1) Your workplace / the nature of your job
- 2) I don't have much time or energy after work
- 3) I'm not motivated right now
- 4) Other

Limitations of the Physical Activity guidelines

- Guidelines are agnostic to the settings in which PA occurs



Watch slidecast



The health paradox of physically demanding work: What is it and should we be concerned?

Avi Biswal, PhD
IWH Speaker Series
May 11th, 2021

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📄 The health paradox of physically demanding work: What is it and should we be concerned? (902.39 KB)

<https://www.iwh.on.ca/events/speaker-series/2021-may-11>

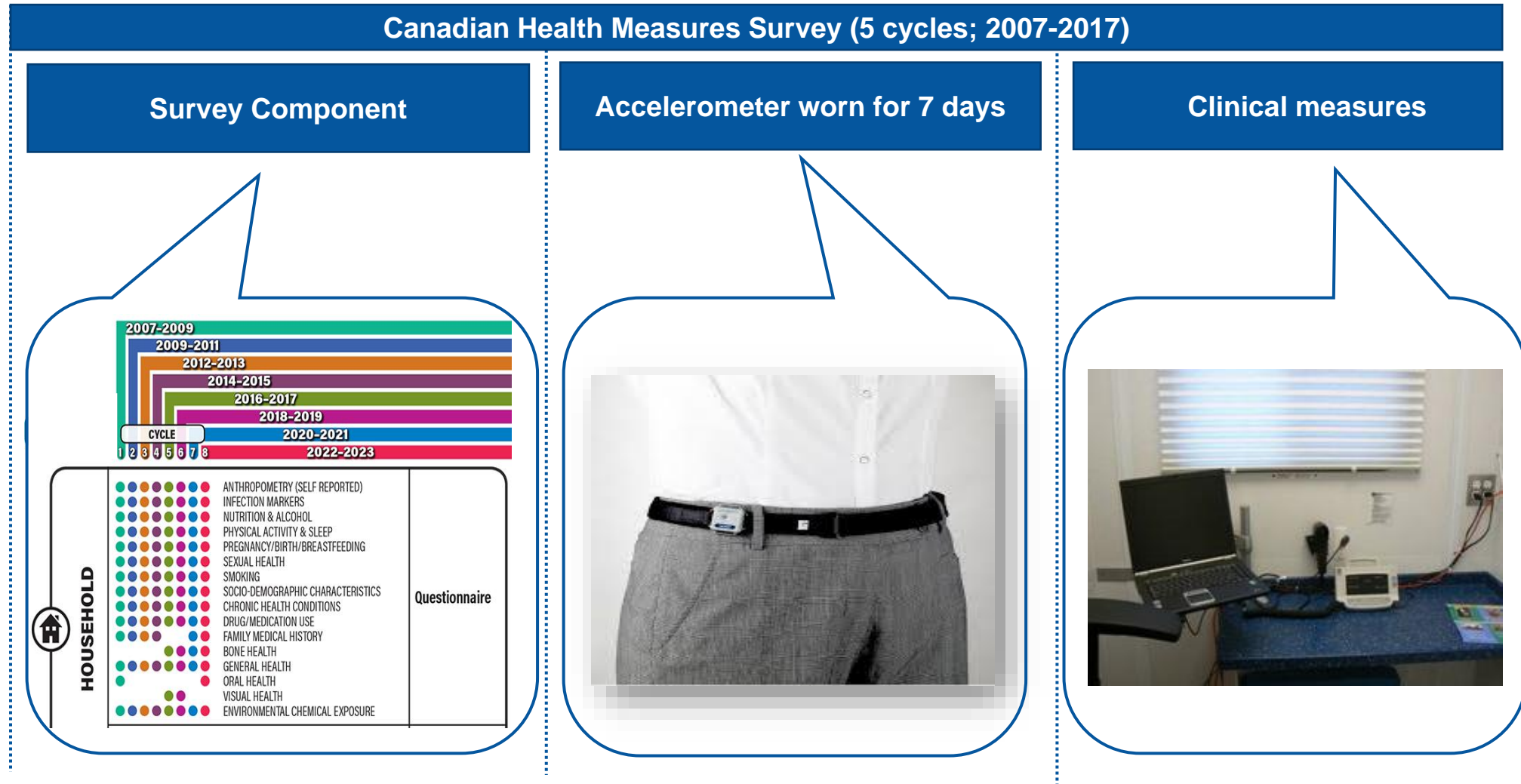
- Evidence from population-based studies mostly based on self-reported PA

Are there alternative PA strategies that are also heart healthy?

Objectives

1. Describe the distinct physical activity patterns of workers
2. Identify which physical activity patterns are associated with a lower future risk of heart disease over a 10-year period

Data collection



Data processing

1

Identify movements

Canadian Health Measures Survey (5 cycles; 2007-2017)

Survey Component

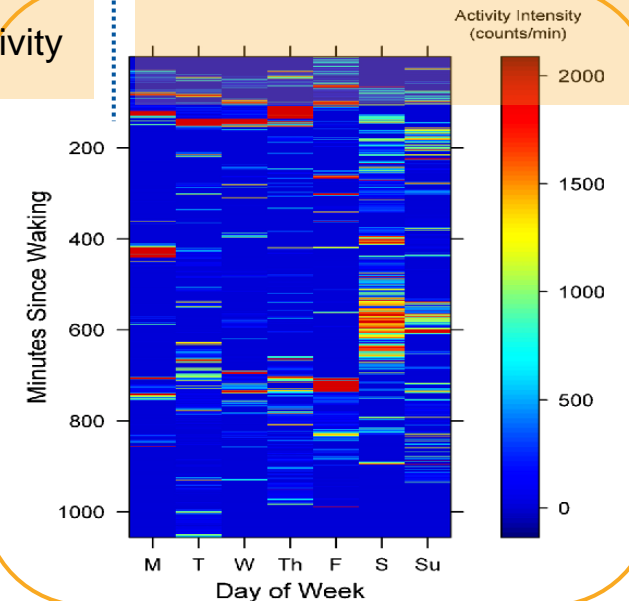
Working adults ≥ 18 years of age.
Sample: ~10,582 adults

Accelerometer worn for 7 days

Sedentary behaviour
Light-intensity physical activity
Moderate-intensity physical activity
Vigorous-intensity physical activity

Clinical measures

Height and weight
Waist circumference
Blood pressure
Cholesterol
Blood sugar



Identifying similar physical activity patterns



Outcome: Predicted 10-year risk of first heart disease event

- Defined as fatal or nonfatal heart attack or coronary heart disease, or stroke over a 10-year period among people free from heart disease at the time of study participation

A high risk corresponds to the upper risk threshold for prescribing low-to-moderate dose statins to reduce heart disease risk (US Preventive Services Task Force)

*Goff et al. ACC/AHA guideline on the assessment of cardiovascular risk. Circulation. 2014.

Outcome: Predicted 10-year risk of first heart disease event

AMERICAN COLLEGE of CARDIOLOGY | American Heart Association | ASCVD Risk Estimator

10-Year ASCVD Risk
~% calculated risk
~% risk with optimal risk factors ⓘ

Lifetime ASCVD Risk
~% calculated risk
~% risk with optimal risk factors ⓘ

ASCVD Risk Estimator Reset All

Intended for patients with LDL-C < 190 mg/dL (4.92 mmol/L), without ASCVD, not on LDL-C lowering therapy

Demographics

Sex: Male Female

Age: Age must be between 20-79

Race: White African American Other

Labs

Unit Type: US SI

Total Cholesterol (mg/dL): Value must be between 130 - 320

HDL-Cholesterol (mg/dL): Value must be between 20 - 100

Systolic Blood Pressure (mm Hg): Value must be between 90-200

Personal History

Diabetic: Yes No

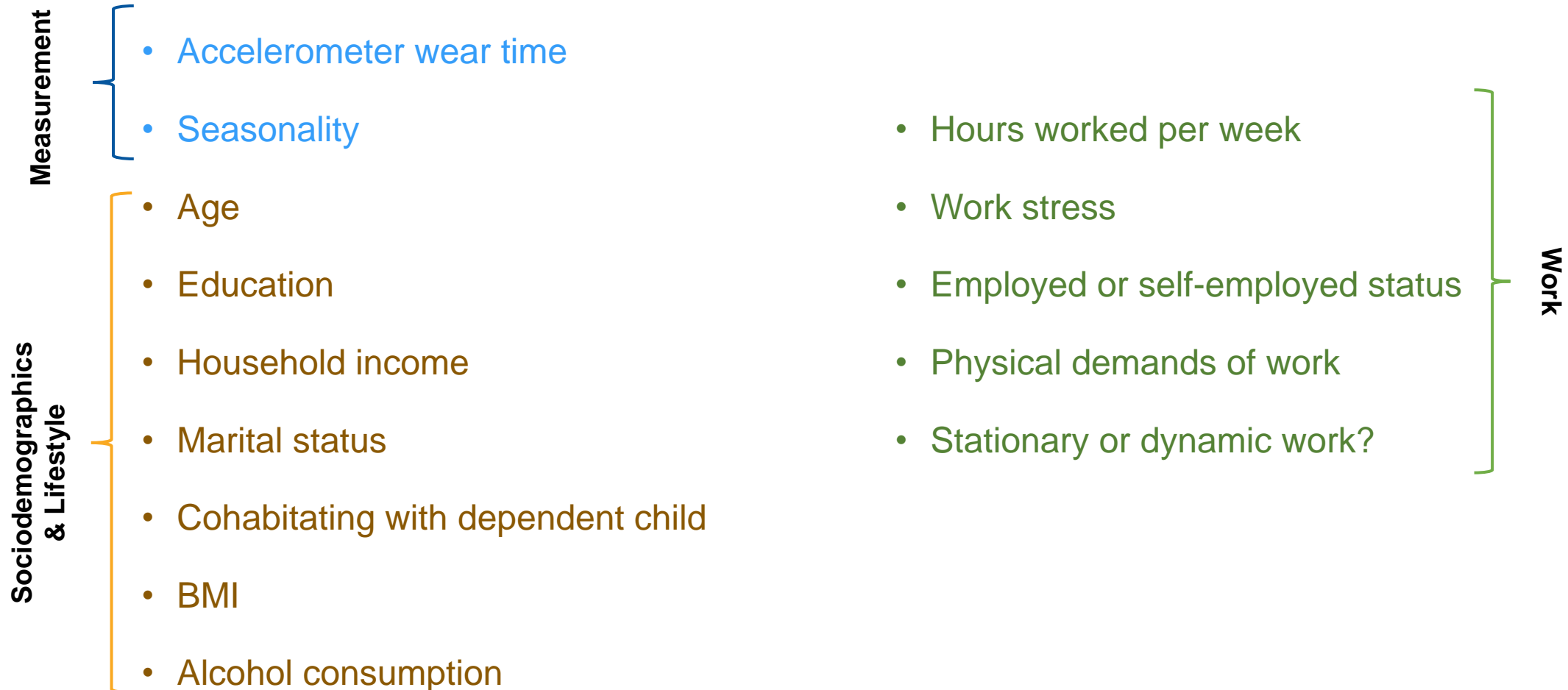
Smoker: Yes No

Treatment for Hypertension: Yes No

https://tools.acc.org/ldl/ascvd_risk_estimator/index.html#!/calculate/estimator/

Final models

All results were statistically adjusted for the following characteristics:



Study sample – 8,909 workers

47% women; 53% men

Average age of 42 years

66% were married/in a common-law relationship

69% had attained postsecondary education

40% had children under 12 years living at home

63% in higher household income group

82% were in full-time work

Average work hours of 40 hrs/wk

66% perceived a bit or quite a bit of work stress

59% were overweight or obese

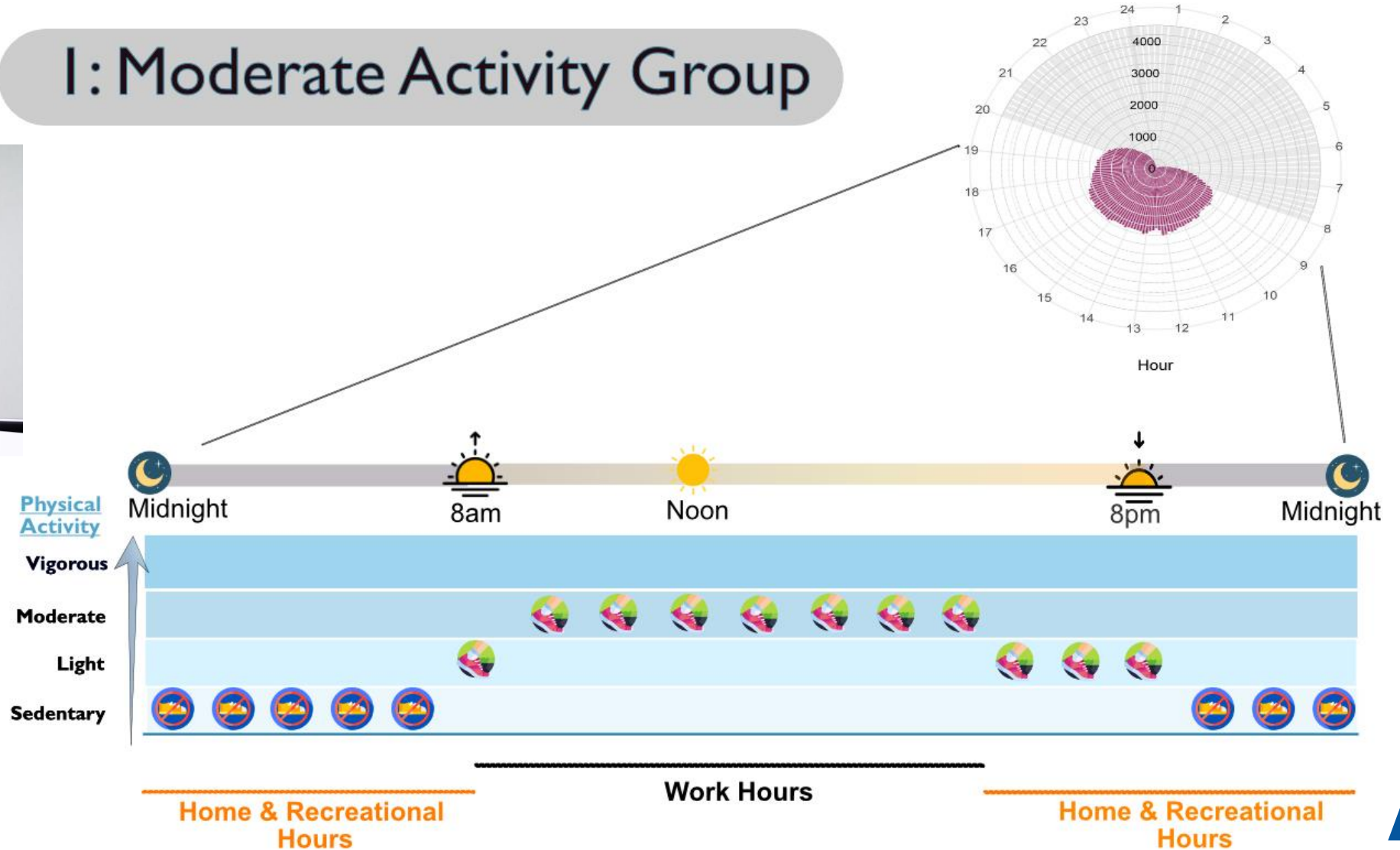
96% did not have pre-existing diabetes

Pattern 1 – 3,219 workers

I: Moderate Activity Group



Sales associate

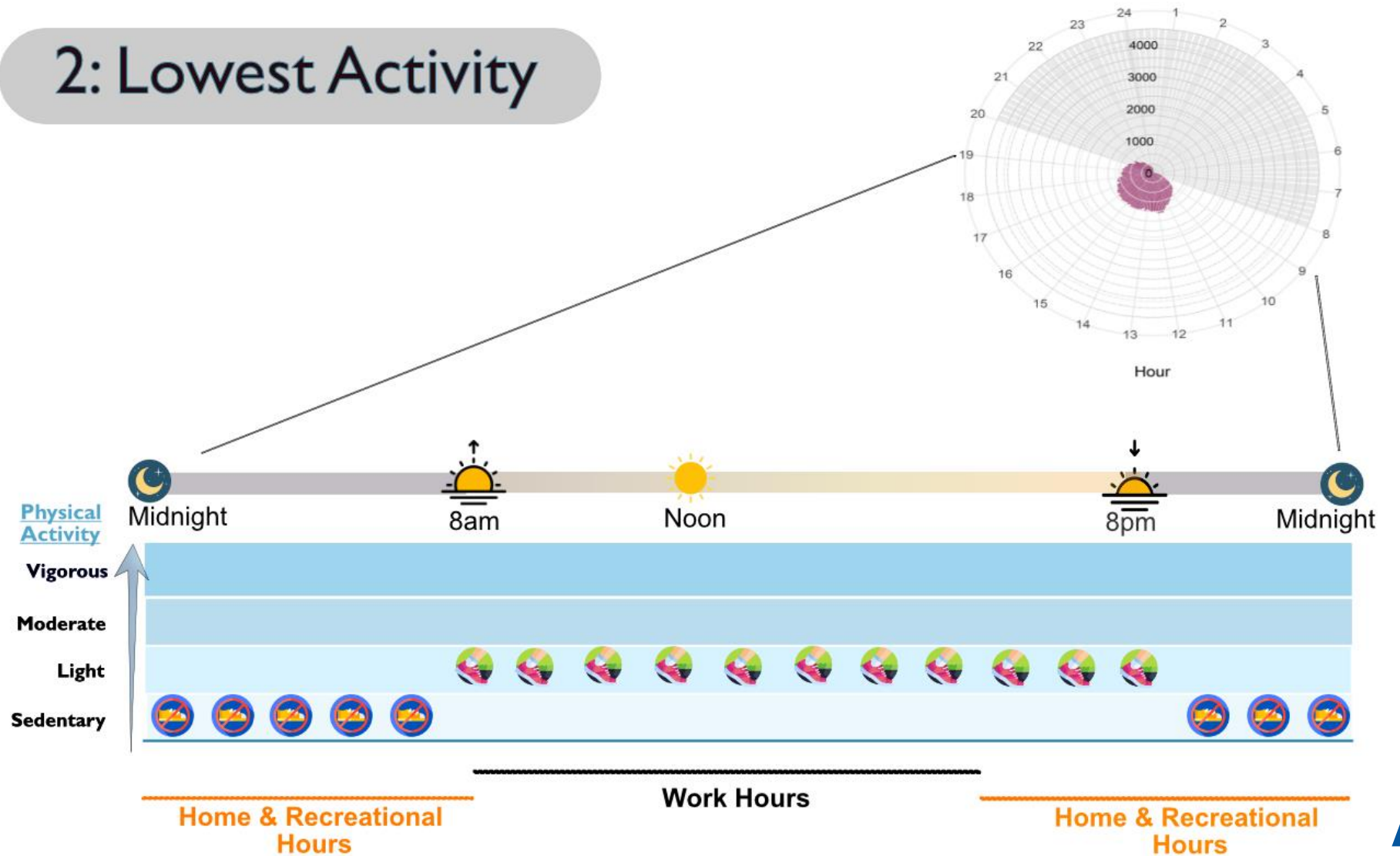


Pattern 2 – 2,808 workers

2: Lowest Activity



Sedentary person

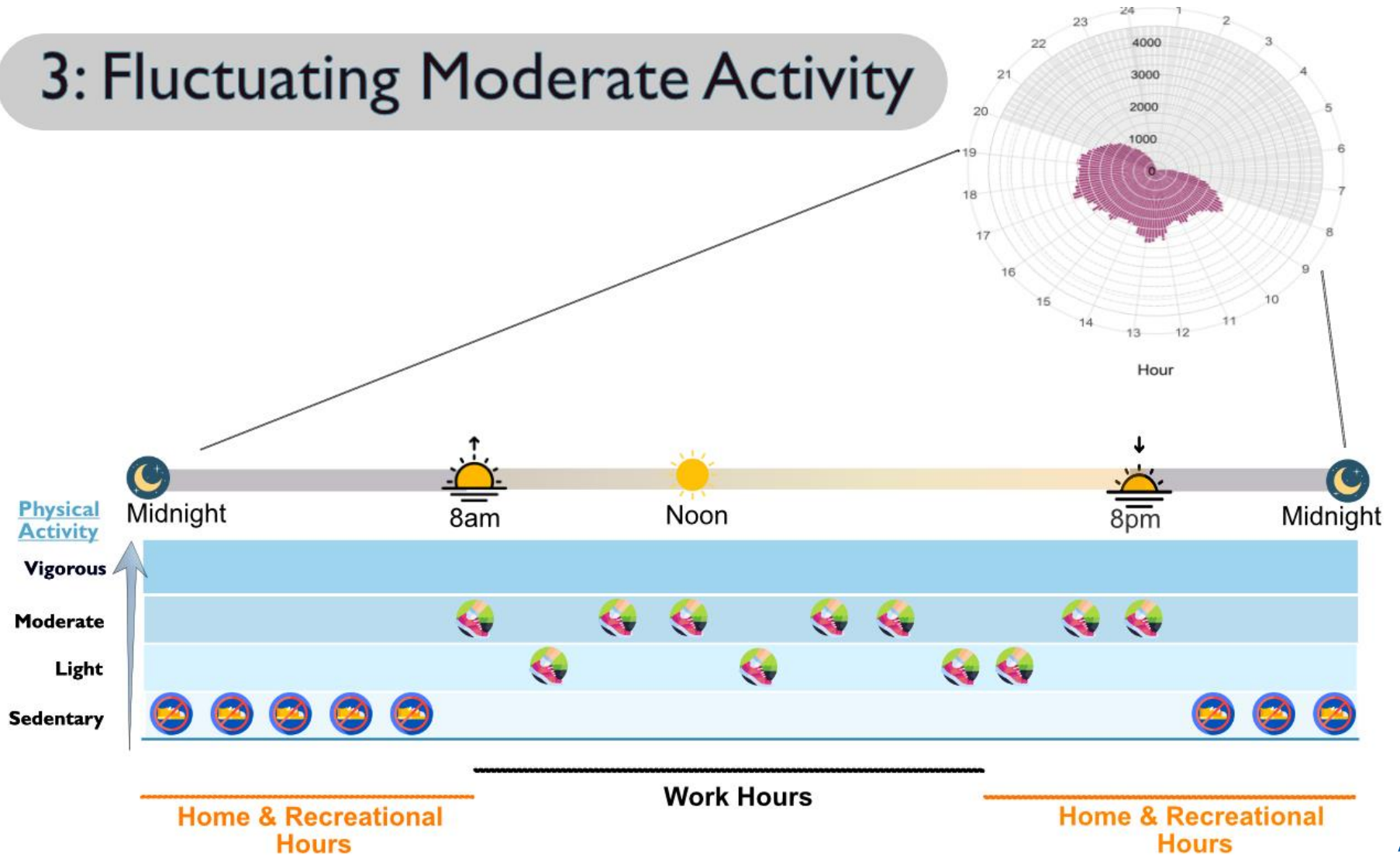


Pattern 3 – 1,194 workers

3: Fluctuating Moderate Activity



Early childhood educator

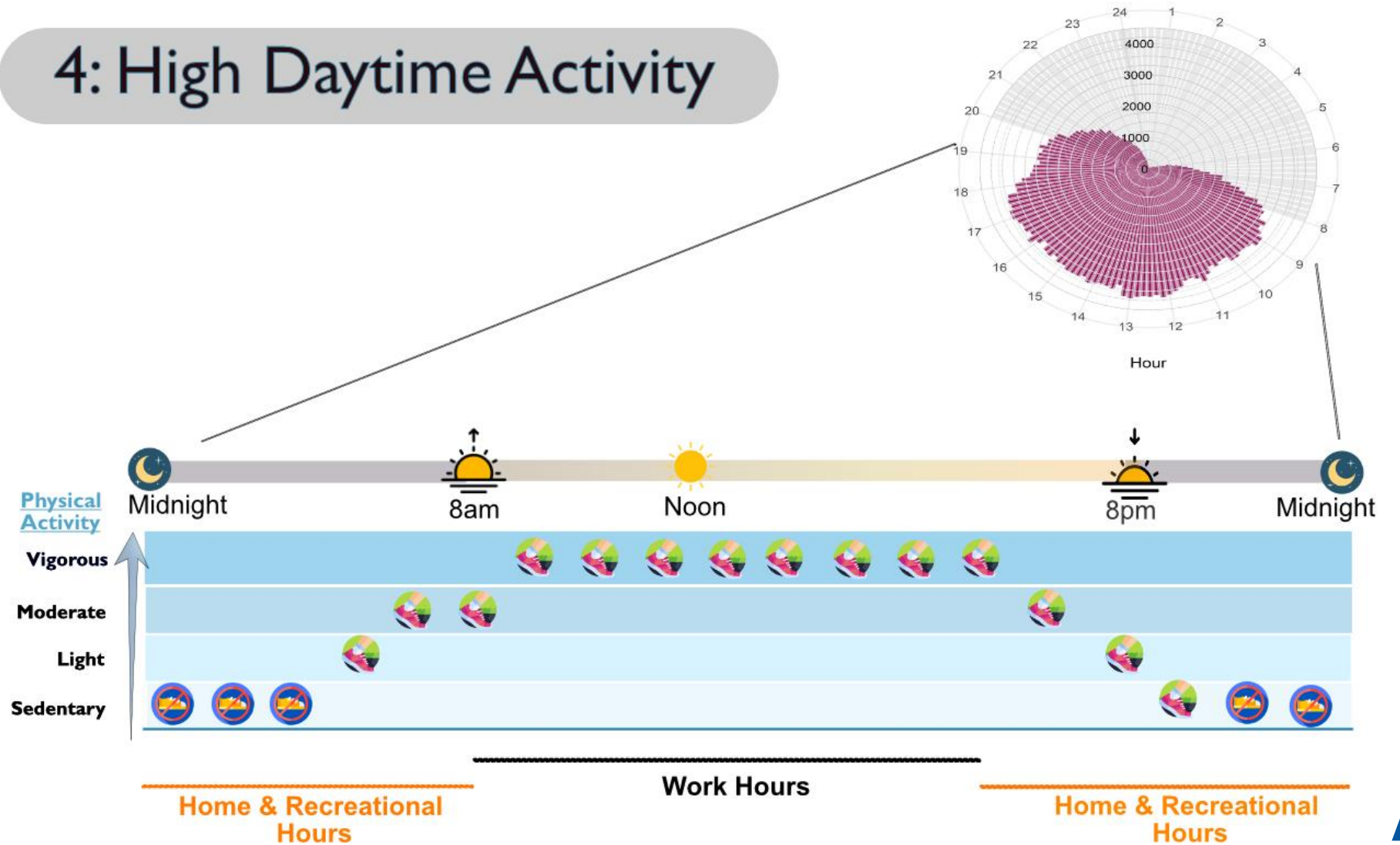


Pattern 4 – 713 workers

4: High Daytime Activity



Construction worker

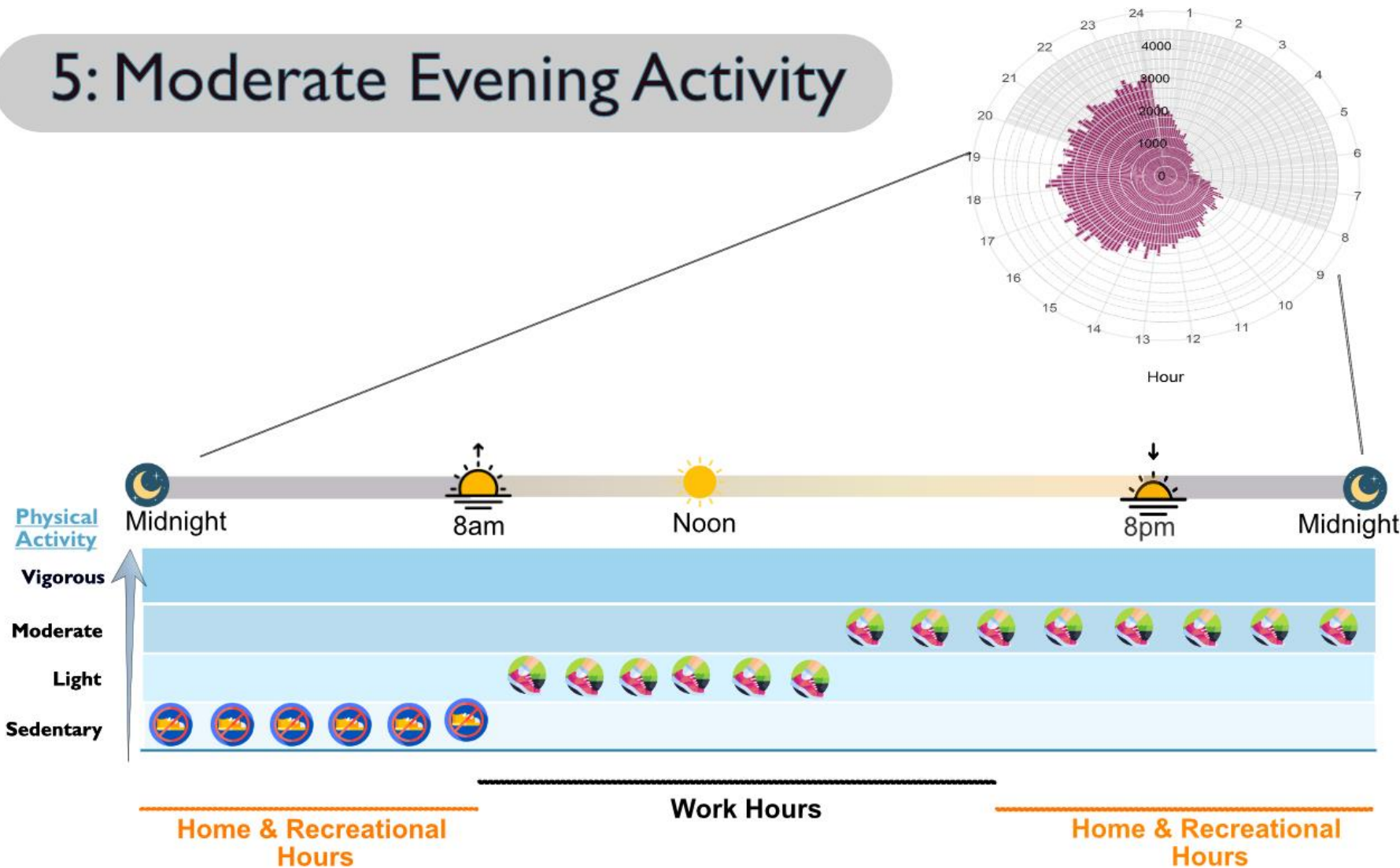


Pattern 5 – 225 workers

5: Moderate Evening Activity

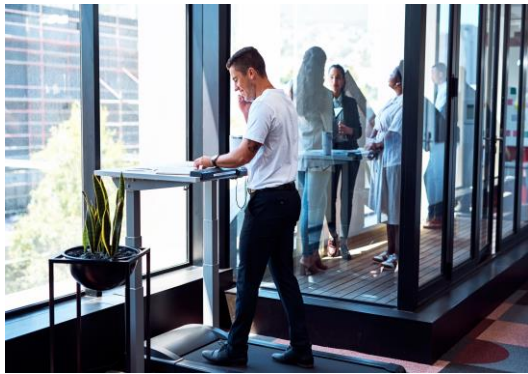


Night shift workers

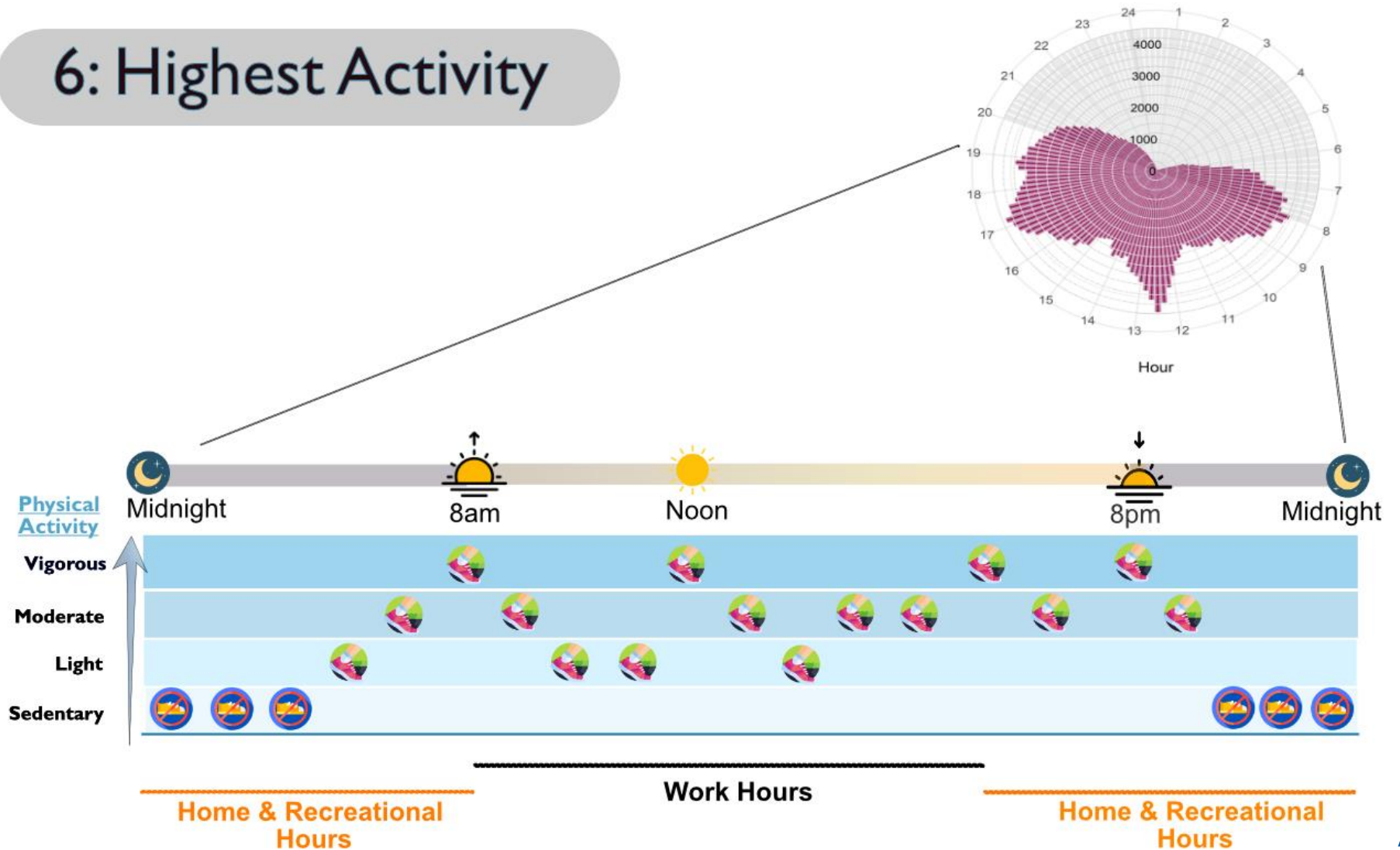


Pattern 6 – 750 workers

6: Highest Activity



Active person

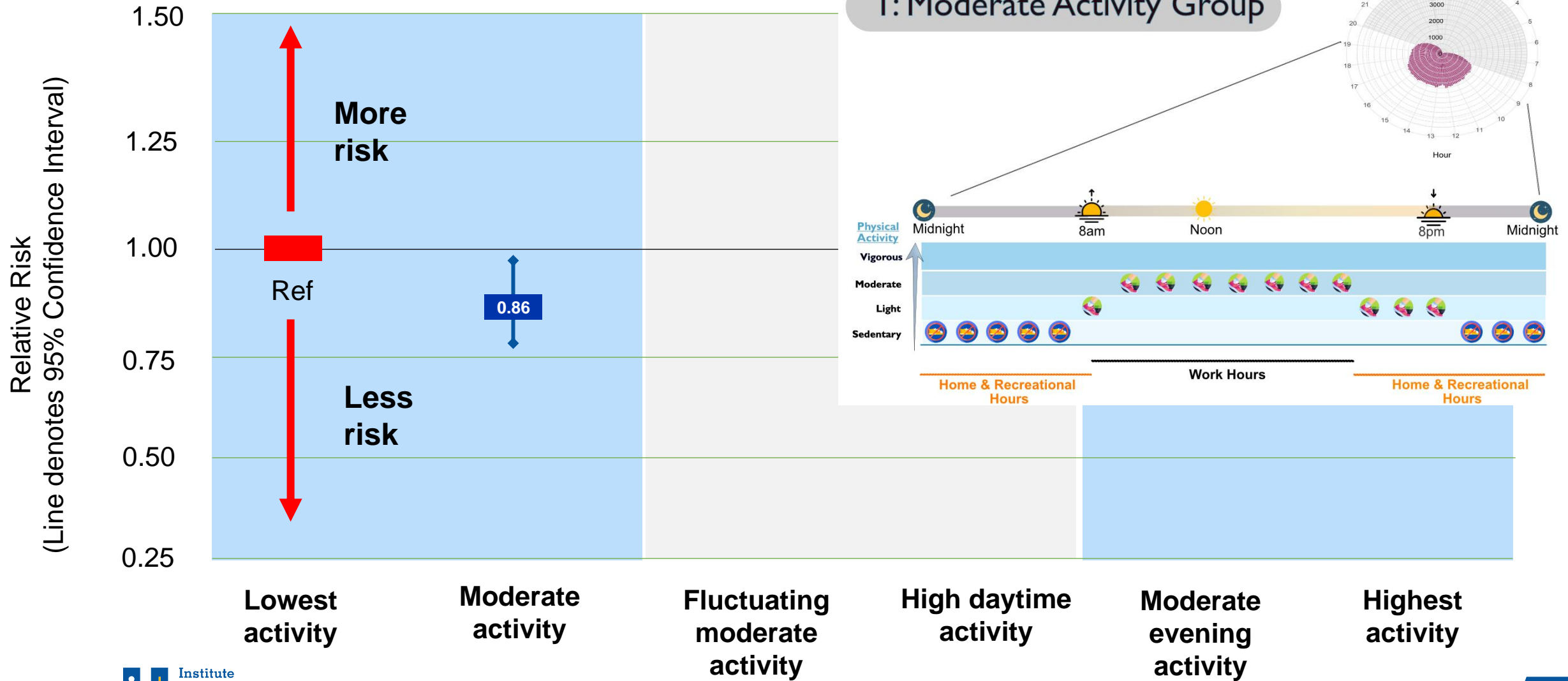


Poll #2

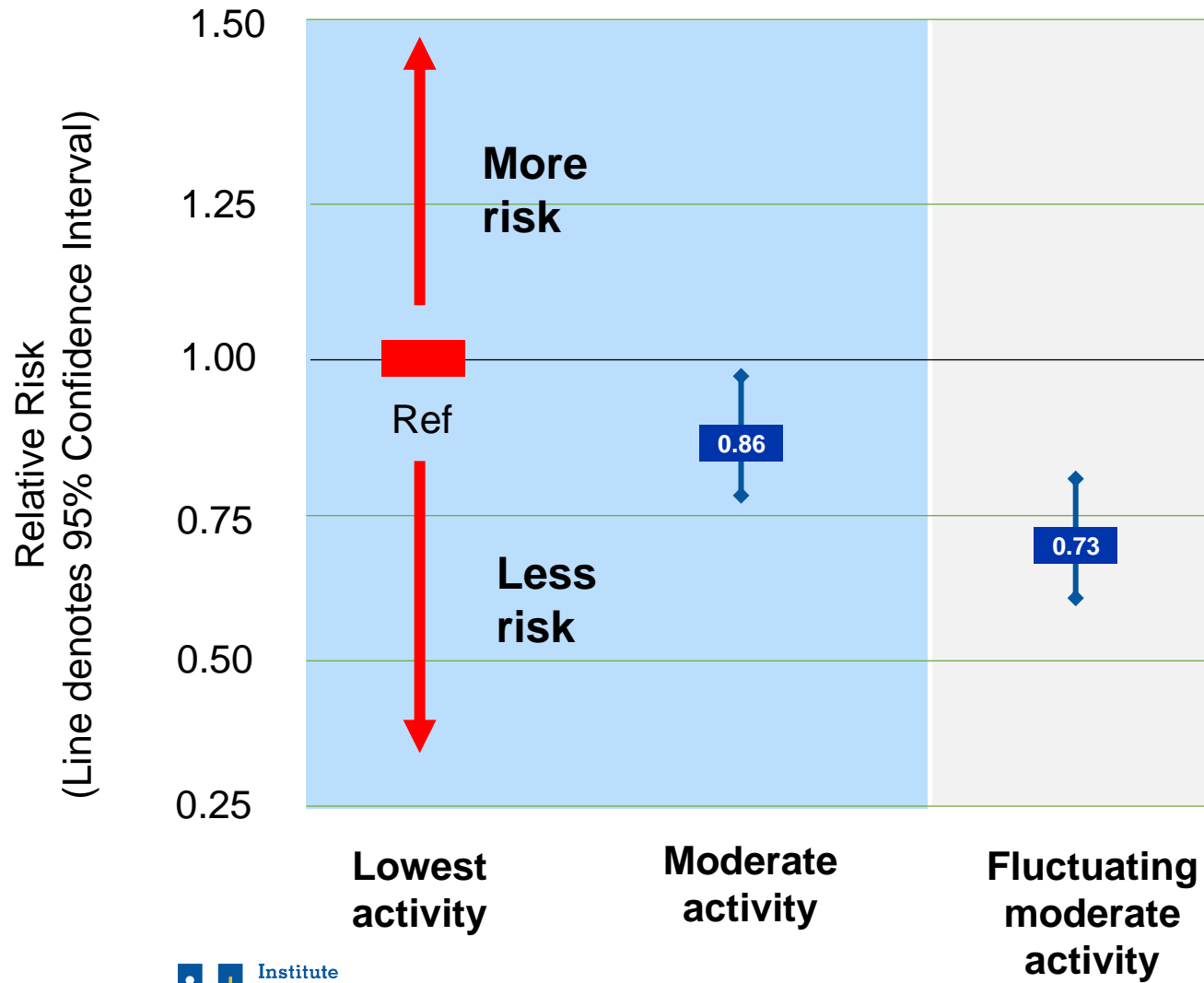
Which activity pattern fits closest to your own activity on an average day?

- 1) Lowest activity
- 2) High daytime activity
- 3) Fluctuating moderate activity or moderate activity
- 4) Moderate evening activity
- 5) Highest activity

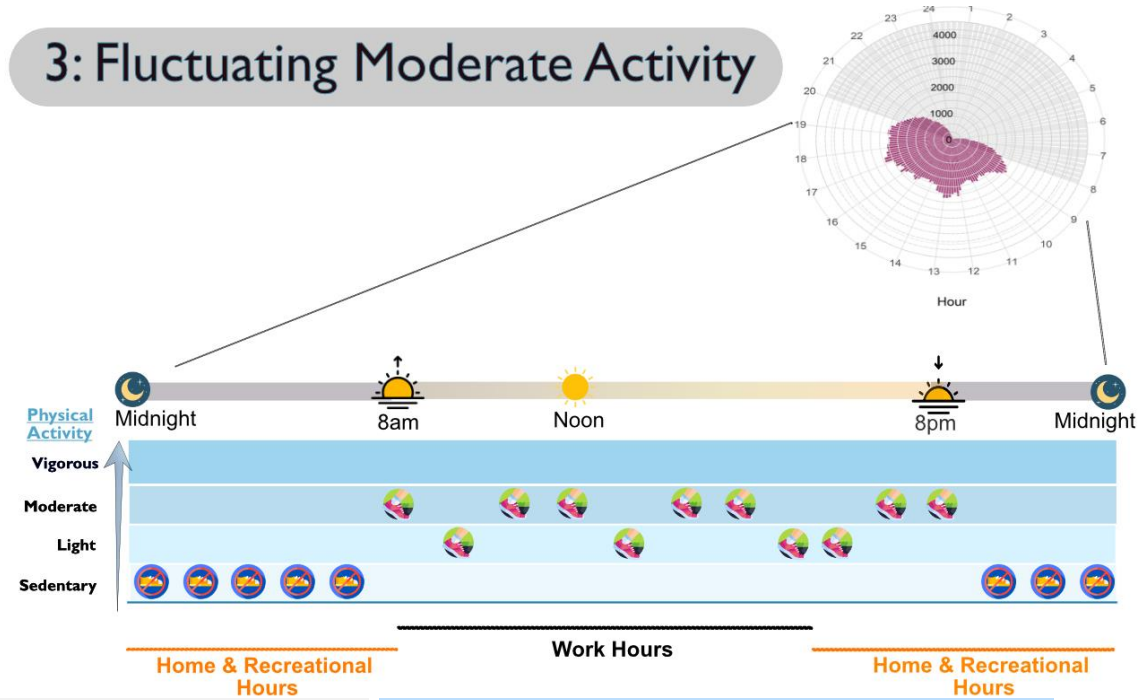
10-year heart disease risk



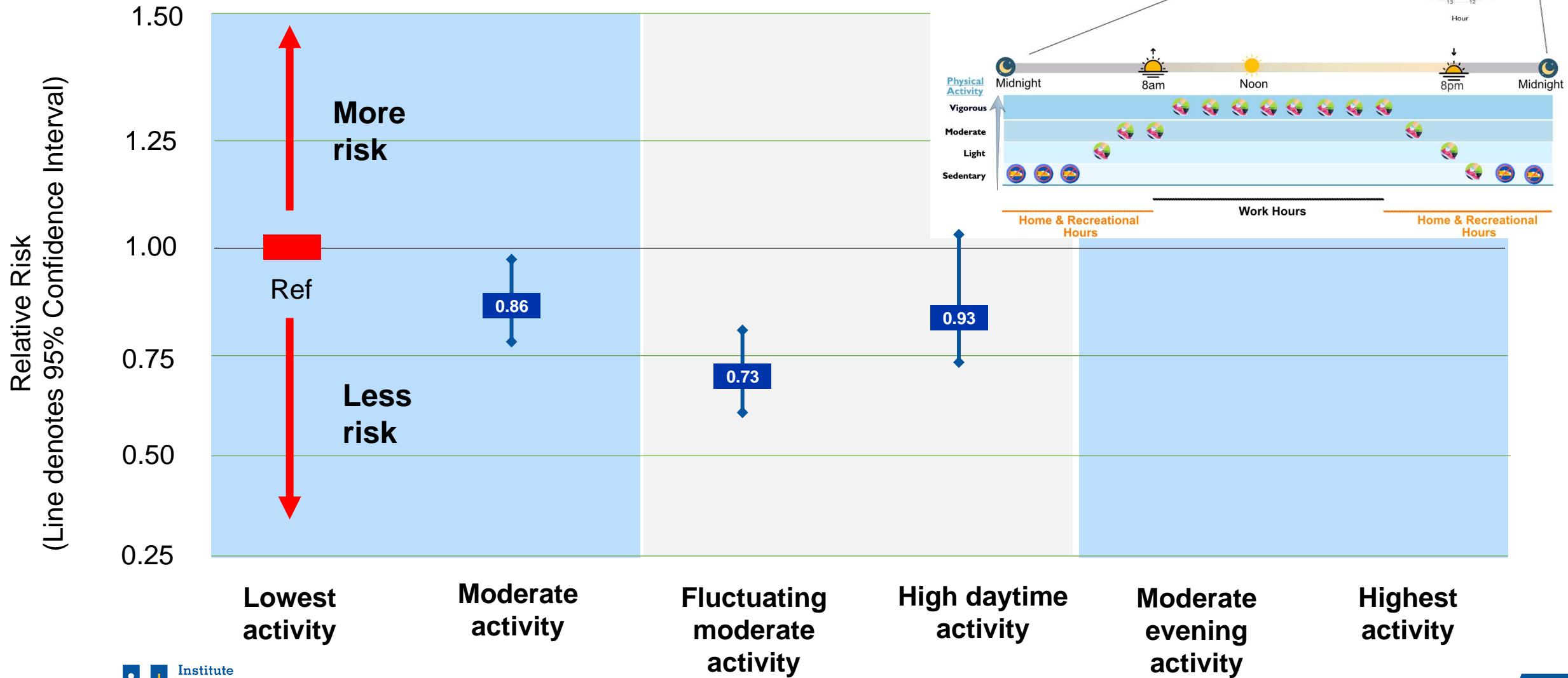
10-year heart disease risk



3: Fluctuating Moderate Activity

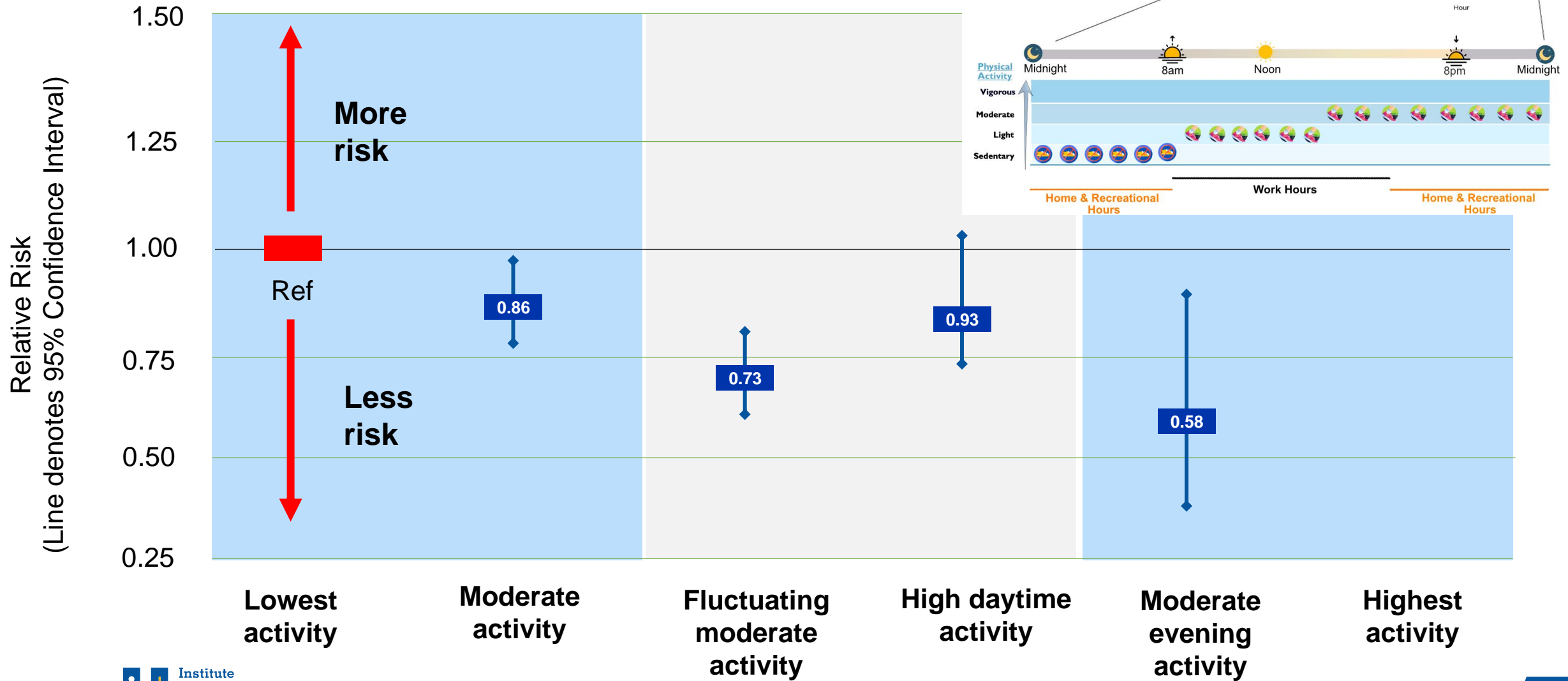


10-year heart disease risk

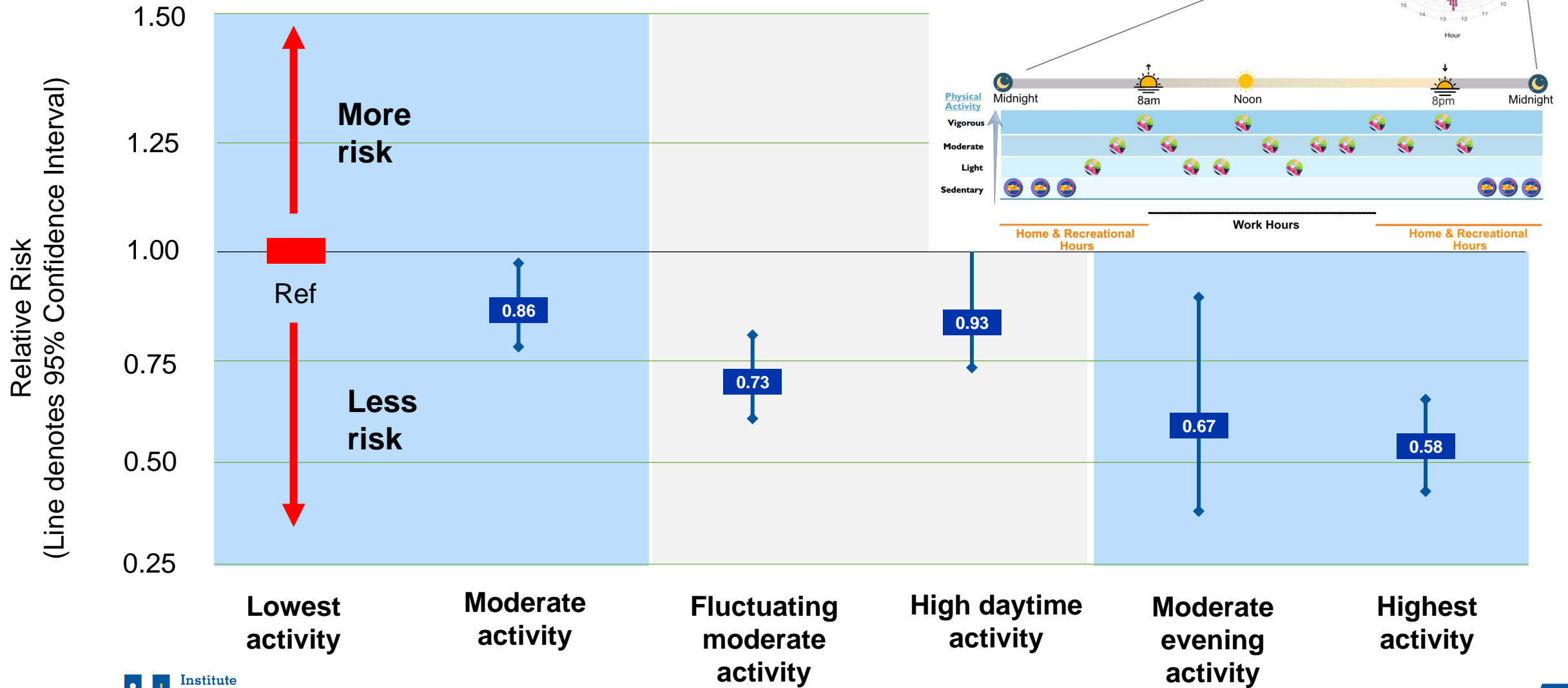


10-year heart disease risk

5: Moderate Evening Activity



10-year heart disease risk



Worker characteristics in each activity pattern

	1: Moderate consistent activity	2: Lowest activity	3: Fluctuating moderate activity	4: High daytime activity	5: Moderate evening activity	6: Highest activity
High physically demanding job	31%	17%	12%	27%	29%	14%
Self-reported physical activity (PA)						
Total recreational PA / week (min)	81.1 (7.5)	87.0 (8.0)	152.3 (17.7)	88.2 (33.1)	124.3 (15.9)	179.7 (17.7)
Total active transportation / week (min)	81.9 (20.1)	47.4 (5.5)	91.7 (11.0)	118.8 (24.0)	41.6 (16.7)	76.6 (15.1)
Total other PA / week (min)	278.6 (32.1)	156.4 (22.7)	99.9 (19.2)	190.7 (55.5)	443.3 (188.0)	103.5 (25.1)

Limitations and considerations

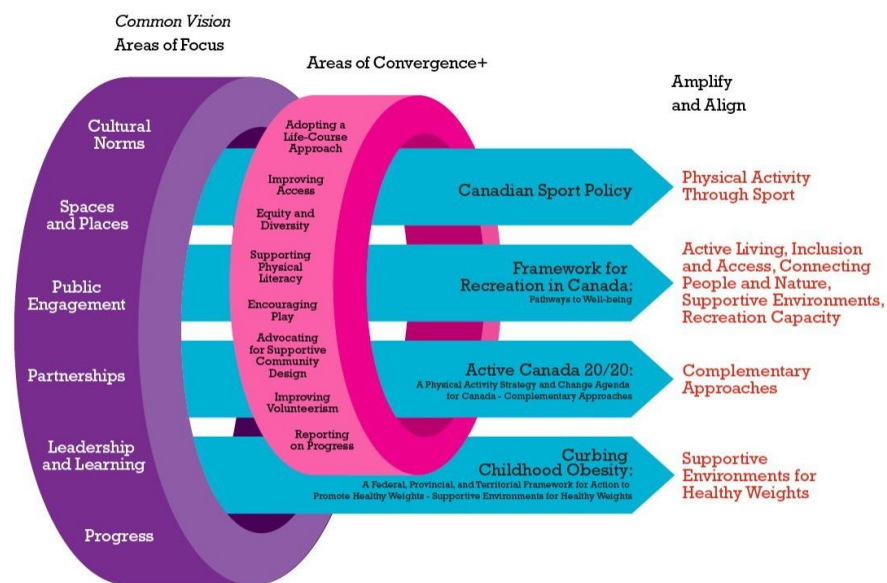
- Limitations of accelerometer devices
- Cross-sectional survey
- Limited work schedule information



Discussion

- Strategies promoting PA only in daytime work hours may be less effective than those promoting PA outside daytime work hours
- What roles do the PA paradox and recreational sitting play?
- A more feasible approach for people with socioeconomic and work-related barriers to PA

Implications



+ Federal, Provincial and Territorial Ministers Responsible for Sport, Physical Activity and Recreation. *Towards Alignment: A Collaborative Agenda for Recreation, Sport and Physical Activity in Canada, 2015.*

May 31, 2018

<https://www.canada.ca/en/public-health/services/publications/healthy-living/lets-get-moving.html>



Only **18%** of Canadian adults are active enough to reap health benefits. ParticipACTION wanted to understand why, so we set out to learn more about Canadians' attitudes, beliefs and opinions on physical activity.

- 1 Canadians know physical inactivity is a problem. **> 83%** said it's a more serious health issue than tobacco and alcohol use.
- 2 Canadians are aware people need to be more active. **>** Yet **82%** of Canadian adults are not.
- 3 Canadians have positive feelings about being active. **> 74%** said they enjoy being active.
- 4 Canadians think that a more active life is within reach. **> 61%** said they wouldn't need to change too much to be more active.
- 5 Canadians think everyone contributes to the physical inactivity problem. **>** parents • employers • schools • government parks & recreation • fitness industry
- 6 Canadians think individuals are at the heart of the issue. **>** **88%** believe individuals are the solution.
- 7 Canadians support public policy to encourage increased physical activity. **>**
 - mandatory physical activity in schools
 - access to recreation facilities
 - enhanced green spaces

Thank you

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