

Long-Term Leisure-Time Physical Activity Intensity and All-Cause and Cause-Specific Mortality: A Prospective Cohort of US Adults

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INTRODUCTION

Background

The 2018 physical activity guidelines for Americans¹ recommend a minimum of 150-300 min/wk of moderate physical activity (MPA), 75-150 min/wk of vigorous physical activity (VPA), or an equivalent combination of both. However, it remains unclear whether higher levels of long-term VPA and MPA are, independently and jointly, associated with lower mortality.

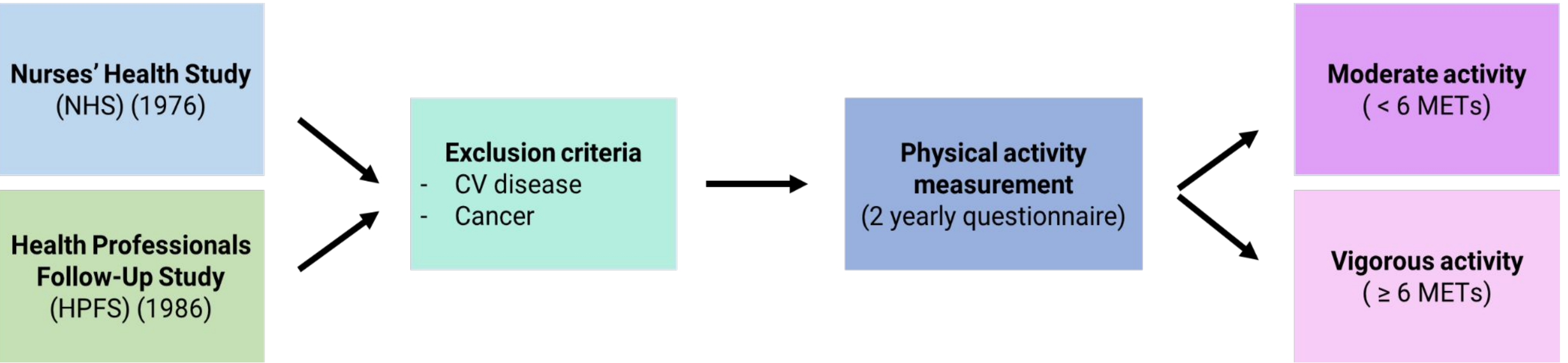
Furthermore, previous studies have not examined the long-term association of VPA and MPA, separately and jointly, with the explicit recognition that VPA and MPA may have different graded associations for different mortality outcomes. In addition to examining the independent association of physical activity intensity, it is critical to investigate the joint association of VPA and MPA.

Objectives

- To examine the graded association between long-term VPA and MPA and all-cause and cause-specific mortality
- To examine the joint association of different physical activity intensities with mortality

METHODS

Methodology



MPA and VPA were calculated by summing the corresponding physical activities in MET²-hours per week.

Statistical Analysis

- Covariate assessment was done to account for age, race, height, weight, diet, family history of disease, personal medical history, smoking, and sleep duration
- Cox regression was used to estimate the hazard ratio and 95% CI of the association between long-term leisure-time physical activity intensity and all-cause and cause-specific mortality after identifying deaths from the National Death Index^{3,4} and and classifying deaths via the International Classification of Diseases (8th and 9th revisions)

RESULTS

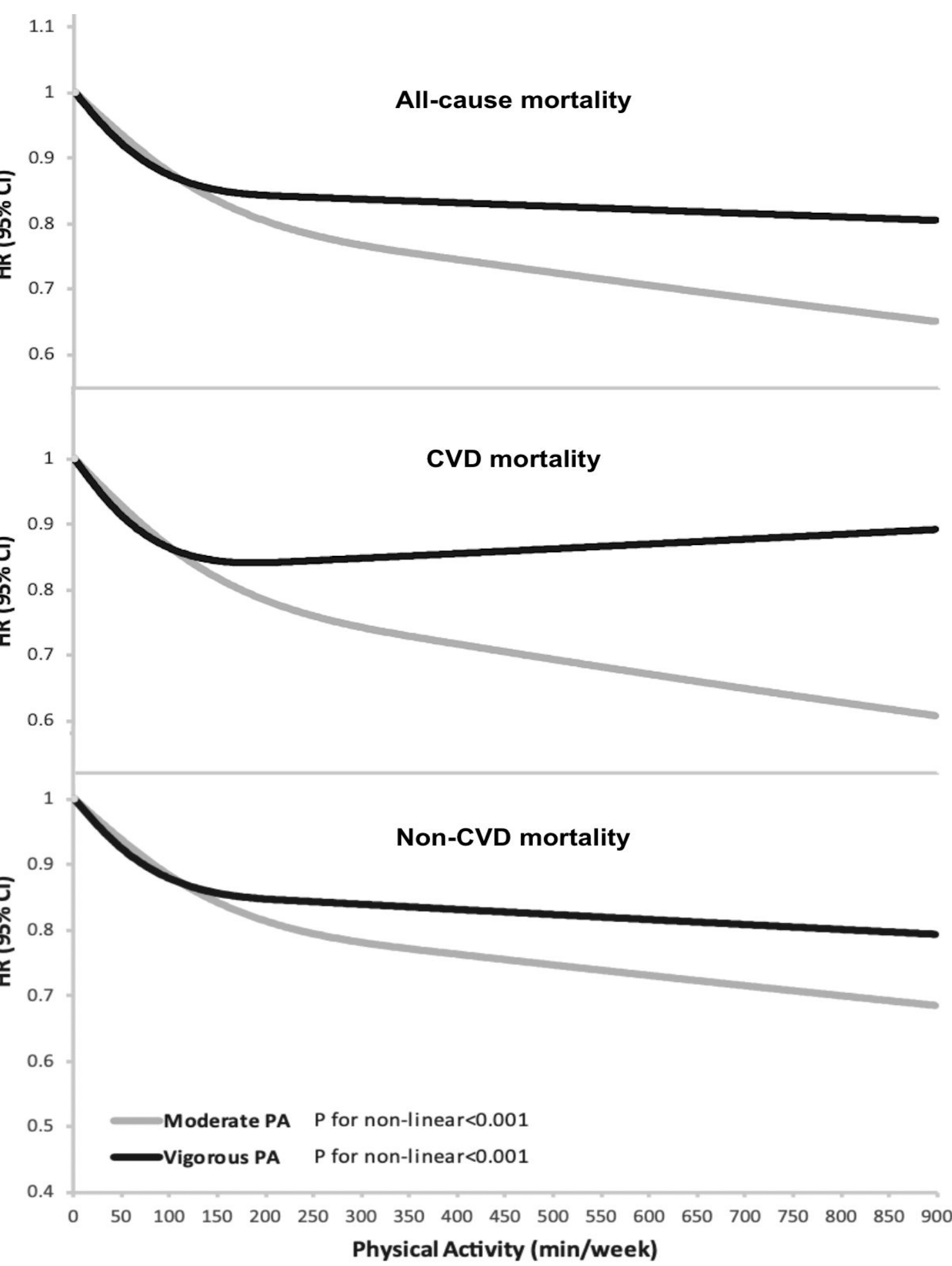


Figure 1. Dose–response relationship of long-term leisure-time MPA and VPA with all-cause mortality, CVD mortality and Non-CVD mortality.

Near-maximal reduction in mortality risk was seen with 150-300 min/wk of long-term leisure-time VPA, or 300-600 min/wk long-term leisure-time MPA, or an equivalent combination of both.

Higher levels of either long-term leisure-time VPA (≥300 min/wk) or MPA (≥600 min/wk) did not clearly show further lower all-cause, CVD, and non-CVD mortality or harm.

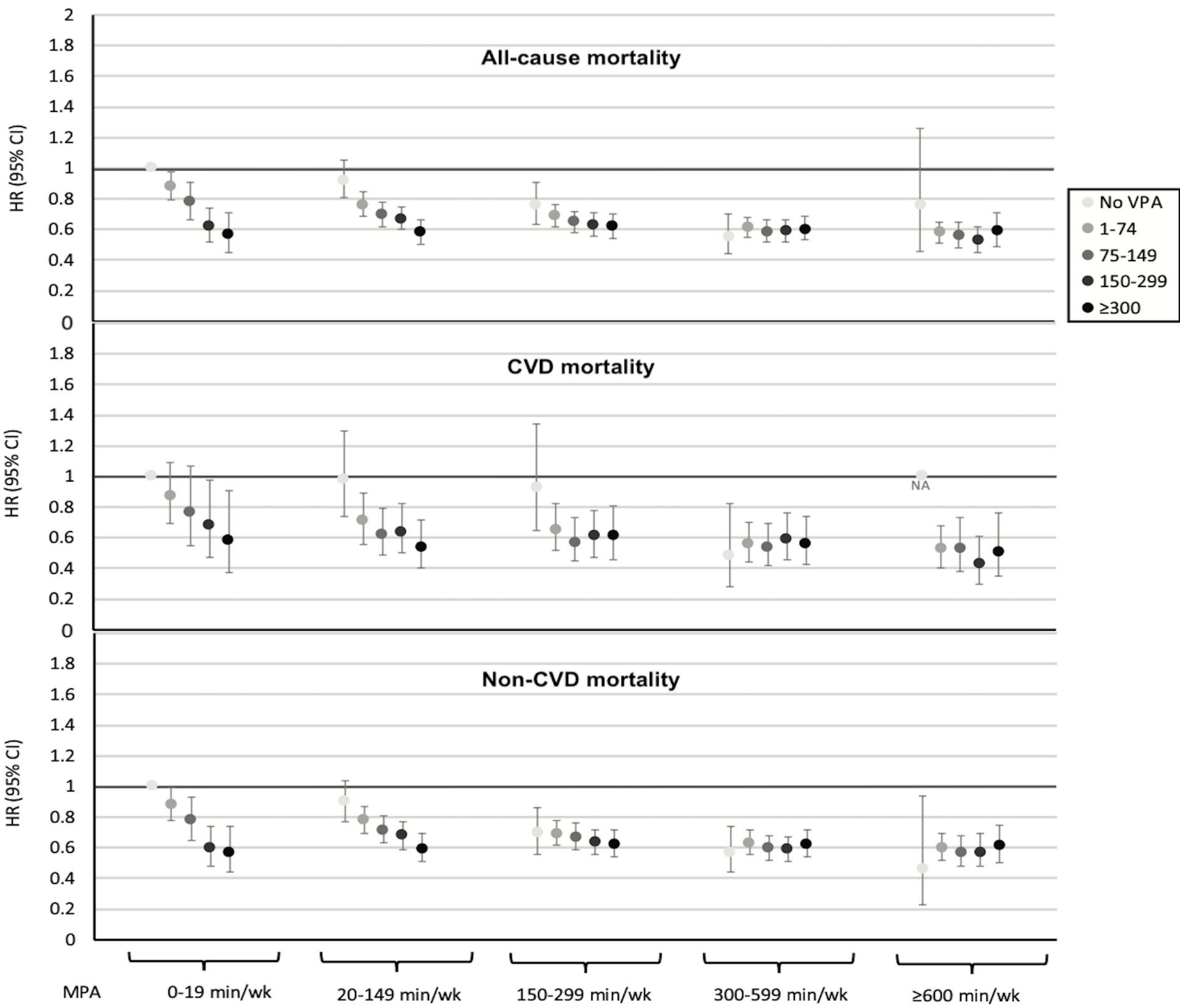


Figure 2. Joint association of long-term leisure-time VPA and MPA with all-cause and cause-specific mortality.

For individuals who reported

- <300 min/wk of long-term leisure-time MPA: additional leisure-time VPA was associated with lower mortality
- ≥300 min/wk of long-term leisure-time MPA: additional leisure-time VPA was not associated with lower mortality beyond MPA

DISCUSSION

Comparison to other studies

- Leveraged repeated measures of self-reported leisure time physical activity over decades, as opposed to single-measures of physical activity
- Quantified the graded association of long-term leisure time MPA and VPA levels that were > 4 to 8 times the recommended guidelines
- Offers practical evidence for optimal levels of combined MPA and VPA by analysing the joint effects of both

Strengths and Limitations

Large study population	Inevitable measurement error
Long follow-up time	Does not account for non-leisure time physical activity
Detailed information on covariates	Limited generalisability
	Residual confounding

CONCLUSION

Our study has revealed the following:

- Support for the **current physical activity guidelines**
- Mortality risk reduction (CVD & all-cause) is nearly maximal at **150-300 min/wk VPA** or **300-600 min/wk MPA**
- For **< 300 min/wk of long-term leisure-time MPA**, lower mortality was seen with additional **long-term leisure-time VPA**

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