Dose-response associations of vigorous intermittent lifestyle physical activity (VILPA) with mortality, CVD, and cancer: findings from 3 UK Biobank accelerometry-based studies

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Background: Advances in wearable sensor technologies now enable detailed, objective quantification of real-world movement patterns across the full intensity spectrum. Such data have revealed that brief, naturally occurring higher-intensity bouts of physical activity lasting up to 1 minute each, termed vigorous intermittent lifestyle physical activity (VILPA), common in daily life even among those who do not exercise, may hold preventive potential. The aim of this presentation is to summarise three UK Biobank accelerometry VILPA studies with mortality, CVD, and cancer outcomes.

Methods: Participants with valid 7-day wrist-worn device data and no baseline disease were followed via linked mortality, cancer, and hospital records. Exposures included average daily duration of VILPA vigorous intermittent lifestyle physical activity (VILPA; ≤1-min bouts) and its daily frequency. Associations with all-cause mortality, incident cancer, and incident cardiovascular disease (CVD) were modelled using Cox or Fine–Gray competing-risk approaches, adjusting for demographic, lifestyle, and clinical factors.

Results: VILPA was strongly associated with all outcomes in a near-linear or L-shaped manner, independent of total activity volume. Daily VILPA durations of only 4–4.5 minutes were associated with 16–48% lower cancer incidence, cardiovascular disease morality, and major adverse cardiovascular events, compared to registering little or no VILPA. Associations of VILPA with cardiovascular outcomes were more pronounced in women.

Conclusions: small amount of VILPA accrued through short naturally occurring bouts were consistently linked to steeply lower mortality, cancer, and CVD risk. Wearables-based evidence in the UK Biobank highlights scalable behavioural targets with high population relevance. Daily VILPA may be a promising intervention for CVD and cancer prevention in populations not able or motivated to exercise in leisure time.

Studies:

- Stamatakis E, et al. Nature Medicine 2022, DOI: 10.1038/s41591-022-02100-x;
- Stamatakis E, et al. JAMA Oncology 2023;9(9):1255-1259.
- Stamatakis E, et al. Br J Sports Med. 2025 Feb 20;59(5):316-324. doi: 10.1136/bjsports-2024-108484.