

Response Letter to Dibben and colleagues on the published manuscript 'Physical activity of UK adults with chronic disease: cross sectional analysis of accelerometer measured physical activity in 96,706 UK Biobank participants'.

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We thank Dibben and colleagues for their comments on our paper¹. A concern was raised that our analysis might introduce differential bias between those with versus without chronic disease, through the use of a fixed y-axis threshold (100mg) to determine whether an individual is likely to be moderately active at any given time. In an ideal scenario we would have access to validation datasets in a large sample of healthy and diseased individuals. Unfortunately, such datasets simply do not exist at present. The heart failure validation data shared by Dibben and colleagues is potentially relevant, but currently unpublished. At present, published validation data is only on healthy individuals², which we acknowledge as a potential limitation in our paper.

We would like to highlight that supplement table 1 of our paper reports the analysis of overall vector magnitude which is free from differential bias, when comparing those with versus without chronic disease. The intuition behind this measure is that it calculates the average of all movement recorded by a device, which is a good measure of physical activity energy expenditure^{3,4}. The vector magnitude analysis does not rely on a y-axis threshold to infer whether individuals are active above a given level or not. We found substantial agreement between the vector magnitude and moderate threshold health association results, with the strength of association broadly similar. As both moderate and vigorous physical activity are currently more intuitive to comprehend, we decided to prioritise the reporting of these analyses.

We agree with Dibben and colleagues that it is vital to appropriately analyse accelerometer data. To influence clinical recommendations, prospective studies of incident disease outcomes will be required. Such work will of course be enhanced by new measures of activity that are validated in large studies of healthy and diseased individuals, ideally in free-living scenarios⁵. However, for now, we stand by our conclusion that *“The cross-sectional association of physical activity with chronic disease is broad. Given the substantial health benefits of being physically active, clinicians and policymakers should be aware that their patients with any chronic disease are at greater health risk from other diseases than anticipated because of their physical inactivity.”*

References

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