



**Lay summary: Weekly, seasonal and holiday body weight fluctuation patterns among individuals engaged in a European multi-centre behavioural weight loss maintenance intervention**

**Reference:** Turicchi, J. et al. Weekly, seasonal and holiday body weight fluctuation patterns among individuals engaged in a European multi-centre behavioural weight loss maintenance intervention. *PLOS One* (2020). DOI: 10.1371/journal.pone.0232152

**Why is this study important?** Body weight variability has been associated with increased risk of cardiovascular disease, type 2 diabetes and mortality, as well as long-term weight gain. However, due to difficulties associated with weighing people regularly, little is understood about the magnitude of weight fluctuations across different time scales (e.g. within weeks, across seasons, or during holiday periods such as Christmas)

**What did we do?** After setting minimum eligible data criteria and removing outliers, we removed the overall trends in each individual's body weight data (i.e. subtracted the gain/loss patterns), to isolate the fluctuation component. We then examined fluctuations within weeks, across seasons and across the Christmas period. We did this for different genders, BMI groups, age groups and regions, and tested the differences between these groups.

**What did we find?** We found clear fluctuations within a week, characterised by weekend weight gain and mid-week weight loss. Mean fluctuations were in the region of 0.4% body weight per week. Over Christmas, even after accounting for overall weight gain during the period, weight fluctuated upwards by around 1.3% on average, and was not fully compensated in the months afterwards. Seasonal patterns were unclear, and largely characterised by Christmas weight gain in Winter.

**What does it mean?** For the first time in such a large sample using frequent body weight measurements, we have quantified the amount of weight individuals might be expected to fluctuate across 3 different time periods.