

## **Shaun Azam and Dr Mark T. Elliott – Written evidence (NPS0037)**

### **The need for incentives and rewards platforms for driving physical activity behaviour change**

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### **Background**

1. Physical activity (PA) is an essential pillar to healthy living. Yet, insufficient physical activity remains a consistent issue across the world, with over 25% of adults worldwide not participating in enough regular physical activity(1). Developed Westernised countries show an even higher prevalence of physical inactivity, with between 40-50% of the population being classified as insufficiently active(1). There is substantial evidence that physical inactivity, or sedentary behaviour, is a major contributor to non-communicable diseases, increasing the risk of some cancers, heart disease, stroke and diabetes by 20-30%(2). Therefore, increasing levels of physical activity can have a positive impact on physical health, reducing the risk of developing chronic diseases in later life. In addition to improving physical health, physical activity can also improve mental health, with symptoms of depression reduced in those who complete moderate to vigorous physical activity(3). A recently published white paper emphasised the link between physical activity and health, through an analysis of step count data collected using wearable devices from over 14,000 individuals participating in clinical research studies. These analyses showed daily step count was a strong predictor of mortality, second only to age(4).
2. In addition to the impacts on health and quality of life, sedentary behaviour has a subsequent economic impact. It is estimated that physical health issues resulting from inactive lifestyles cost the UK's National Health Service (NHS) between £1-2 billion annually(5,6), based on estimates from 2007-2011. Public Health England have reported the wider impact of physical inactivity on the UK economy to be around £7.4 billion annually(7). These wider costs result from factors a loss in productivity (presenteeism and absenteeism), employment and social care.
3. Given the health and economic impacts of sedentary behaviour, there is scope for investment into novel interventions. Here we give evidence from our own and other research into the use of incentives and rewards for motivating physical activity behaviour change. Based on this research we believe there is scope for wider collaboration between commercial and public health organisations to deliver effective incentives platforms for increasing physical activity levels, through the use of smartphone apps and wearable technologies.

### **The role of incentives for physical activity behaviour change**

4. As the full economic and social costs of unhealthy behaviours have become apparent it has become economically viable to invest in incentives

given that they have been found to have a positive impact on changing health related behaviours(8). Therefore, there is an opportunity to invest some of the potential future economic value generated by populations who are physically active populations to incentivise those with sedentary lifestyles to increase their levels of physical activity. Incentivising health related behaviour change, using financial or other rewards, is an effective intervention and a relatively recent phenomenon(9). Health benefits from physical activity are slow to emerge and hence require long-term engagement that relies on self-motivation. Despite the well-publicised benefits of physical activity people often prioritise other activities (e.g., work) over physical activity, due to the rewards being in the distant future (known as “present bias” (10)). Incentives have been found to be effective as an immediate reward (therefore overcoming present bias) for exercise with individuals subsequently increasing levels of physical activity (11–13).

5. Until recently, studies focussing on incentivising physical activity have often been limited to short-term trials, due to restricted funding that is necessary to provide and administer the incentives (11). This changed with the increased ubiquity of smartphone and wearable technologies used to track fitness levels. By using these devices, an objective and accurate measure of physical activity can be recorded over long periods of time. As such, through the use of these devices, it is possible to suitably reward (or in some cases penalise!) users based on their change in activity levels compared to some baseline measure.
6. This has led to a rise in innovative ways to incentivise physical activity. Examples include apps converting step-counts into currency (to purchase real products and services as rewards)(14), life insurance offering a reward for free but then charging an additional premium each month physical activity targets are not achieved(15), and an app that allows users to bet on achieving their target level of activity(16). These commercially funded initiatives have led to the availability of sustainable business models that allow long-term incentive programmes to be delivered(14,15). Moreover, they have been shown to be effective in increasing sustained levels of physical activity by a beneficial amount(17) and reducing mortality rates (observed by a lower incidence of insurance claims from policy holders engaging with the incentives programme(18)). Hence there is both a public health and economic impact of incentivising sedentary populations to increase levels of physical activity, with physical inactivity estimated to cost the UK economy around £7.4 billion annually(7).

## **Recommendations**

7. There is now a need for wider research in this area, in particular around personalised incentives schemes, that optimise the level of behaviour change. At the moment most examples of incentives programmes are based on a limited set of rewards that does not necessarily take into account an individual’s profile (e.g. current activity level, demographics, reward preferences). We suggest its important to learn how people react to different levels of difficulty in achieving rewards – too easy, and long-term change will fail; too difficult and there will continue to be limited motivation. Finally, we need to understand how reward-based motivation

can be used to drive habit formation, eventually reducing long-term reliance on the incentives.

### **Case Study: Sweatcoin**

8. Sweatcoin converts the step-count recorded on smartphones into a virtual currency. Using this app, users generate financial rewards through physical activity, with higher levels of activity creating a higher 'income'. Sweatcoins can subsequently be used to purchase commercially available products from an in-app marketplace.
9. There is a risk that stopping an incentives programme makes it more difficult to drive sustainable levels of physical activity behaviour change, even if the programme delivers behaviour change in the short run (12). The Sweatcoin concept has been developed to solve this issue, by providing a continuous incentive to be physically active. Sweatcoin has had more than 20m users installing the app globally. It has 300 partners regularly offering products on the marketplace. Products range from low-value items such as free subscriptions to apps and music services, through to high value items, including TVs and smartphones. Furthermore, it is possible to transfer coins, allowing users to pay for services or goods outside of the Sweatcoin marketplace.
10. Sweatcoin works as a very simple concept: to convert physical activity (measured through step count) into a virtual currency, creating the incentive that you earn more if you move more. Unlike many other incentive schemes and fitness trackers, there are no explicit goals a user has to achieve to be rewarded, the incentive is continuous. The goal setting becomes implicit in the products that a user desires to purchase on the marketplace, i.e. they must earn enough currency to purchase their chosen product while it remains available. The currency remains robust by using a proprietary algorithm to verify the steps recorded are genuine.
11. Sweatco Ltd collaborated with Dr Elliott and his team at the Institute of Digital Healthcare, WMG, University of Warwick to investigate and quantify the level of physical activity behaviour change resulting from use of the app. This was achieved by comparing the step count recorded by users' smartphones for 3-months prior to downloading the Sweatcoin app, with the 6-month period after registration. From this data we found that on average users increased their mean daily step count by almost 20%, sustained over the 6-month period of analysis. Importantly, further investigation into these results found those who were classed as overweight were most likely to show the biggest positive increases compared to normal weight (17).
12. Following this study, Sweatco Ltd joined the NHS Digital Health.London Accelerator programme, a prestigious accelerator designed to promote uptake of the leading digital innovators, across the UK healthcare system. Through this scheme, Sweatco partnered with the NHS Merton CCG to co-design a new type of diabetes prevention programme. Sweatco designed a version of their app in conjunction with the NHS, to offer a bespoke app tailored for specific demographics – in this project, they created a custom leaderboard for the participants, who were randomly placed in groups. Each group then had challenges and checklists to complete, related to physical activity, education, and participation. Sweatcoins were awarded for learning about low carb eating, attending the physical in-person

session, or encouraging your fellow participant when they are feeling unmotivated.

13. The resulting outcomes were positive with over 80% completion rate, compared to 20% for the existing National Diabetes Prevention programme, and an average weight loss per participant of over 1.1kg over 10 weeks.

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