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Physical activity tracking in private insurance

A prospective framework for the policy implications of the use of physical activity trackers by private insurers

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Title

Physical activity tracking in private insurance: A prospective framework for the policy implications of the use of physical activity trackers by private insurers.

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Abstract

Private insurers including health, critical illness, income protection and life insurers are seeing a rise in claims due to the growing non-communicable disease (NCD) burden. Higher levels of physical activity have been suggested by the World Health Organization as a way to tackle rising morbidity and mortality from NCDs. Physical activity trackers are beginning to be used by some private insurers to track the physical activity of their insurees. These devices could provide cost saving opportunities for private insurers by allowing them to explore and exploit the link between physical activity and NCD. This paper draws on findings from a systematic examination of the literature on the long-term relationship between physical activity and NCDs to suggest a prospective framework for the policy implications of the use of physical activity trackers by private insurers.

Keywords

Physical activity; Private insurance; Wearables; Non-communicable disease

Introduction

Recently, several private health and life insurance companies have been offering insurees the opportunity to use physical activity trackers to monitor their daily physical activity. In addition to allowing insurees themselves to track their number of daily steps, the data from physical activity trackers can also be fed back to their private insurer. This presents insurers with an opportunity to utilise data on the physical activity of their insurees. It is important to explore the potential policy implications of this new technology over the short, medium and long-term to help encourage private insurers to use physical activity trackers to improve health, rather than to discriminate against the less physically active.

In developed countries, non-communicable diseases (NCDs) are now the most expensive health conditions to treat and they account for more than 60% of deaths worldwide (Soni, 2015; World Health Organization, 2005). NCDs (also known as chronic diseases) are defined by the World Health Organization (WHO) as non-infectious and non-transmissible diseases with a long duration and a typically slow progression (World Health Organization, 2005). Five conditions are generally considered dominant in NCD morbidity and mortality and are the most expensive in terms of treatment costs. These are: cardiovascular disease, diabetes, cancer, chronic respiratory disease and mental illness. Importantly, increasing physical activity has been identified by the WHO as a way to help reduce the global NCD disease burden, with the WHO's NCD global action plan setting a target of a 10% reduction in the prevalence of insufficient physical activity by 2020 (World Health Organization, 2014).

In recognition of the link between physical activity and NCDs, the use of physical activity tracking by the private insurance industry could provide opportunities for cost saving through a reduction in insurers' spending on NCD-related claims. In previous research, the author carried out a systematic literature review to assess the relationship between physical activity and NCDs from the lens of the private insurer (Altmann-Richer, 2016). This was achieved by assessing the existing evidence from large epidemiological studies of the long-term relationship between physical activity and those NCDs which are most expensive to treat. The results from this systematic literature review were used to consider the potential policy challenges of the use of physical activity tracking by private insurers, and this paper will summarise the main findings.

Short-term implications

The systematic literature review revealed several limitations in the current understanding of the relationship between physical activity and NCDs. These suggest several short-term implications for the role of physical activity trackers in private insurance (Figure 1). A major limitation highlighted by the results of the systematic literature review was that longitudinal studies to date have used self-reported measures of physical activity rather than objectively measuring physical activity with physical activity trackers. Although self-report questionnaires are widely used and have been validated, for example by the use of pedometers in similar populations to the ones used in the longitudinal studies, correlations between the self-reported and objective measures of physical activity are only in the order of around 0.6 (Yang et al., 2014). This discrepancy between self-reported and objective measures of physical activity is often not because people intend to misreport, but rather inherent cognitive biases mean that it is difficult to provide a truly objective assessment of one's own physical activity. Therefore, encouraging the use of physical activity trackers by insurees could provide users with a more accurate measure of their own physical activity. In addition, it could help to expand longitudinal research into the relationship between physical activity and NCD by allowing researchers to gain more objective measurements of the long-term relationship between physical activity and NCD.

Figure 1: Limitations arising from the systematic literature review and their short-term implications for the use of physical activity tracking by private insurers.

Limitations arising from the systematic literature review	Short-term implications for private insurers
Physical activity is self-reported rather than objectively measured	Encouarge the use of physical activity trackers by insurees to increase reliablity of measurments in this field
Limited number of studies for chronic respiratory disease and cancer	Use physical activity trackers to longitudinally collect more evidence for these conditions
Contradictions found between subgroup populations e.g. gender	Use physical activity trackers to collect data that can help to resolve these contradictions
Populations included in studies may not be representative of population in insurers' insurance pool	Use physical activity trackers to collect data on population of interest

The results of the systematic literature review also revealed gaps in the current understanding of the link between physical activity and NCD. Only eight studies were identified that assessed the longitudinal association between physical activity and chronic respiratory disease and only eight studies were identified that assessed the longitudinal association between physical activity and cancer. There is therefore a need to collect additional evidence before associations between physical activity and cancer and physical activity and chronic respiratory disease can become clearer. Moreover, even for the conditions of mental illness, diabetes and cardiovascular disease where the number of studies looking at the relationship between physical activity and these three NCDs was larger, there were a number of contradictions between different subgroup populations that have yet to be clarified. For example, some studies found an association between physical activity and depression among males, but only a weak or no association among females (Monin et al., 2015; Ströhle et al., 2007). However, in other studies the converse relationship was found, with significant associations between physical activity and depression seen among females but not among males (Mikkelsen et al., 2010; Wang et al., 2011). Longitudinal data from physical activity trackers of insurees may help to resolve these contradictions.

Taken together, these findings highlight that there are gaps in the current understanding of the relationship between objectively measured physical activity and NCD and that these gaps are more acute at the subgroup level. Consequently, in the short-term insurers may be hesitant to rely on the existing literature linking physical activity to NCD. They may instead prefer to focus their efforts on building up their own databases of information on the appropriate level of physical activity that different population subgroups require to reduce their risk of NCD. This approach will help insurers to develop better validated physical activity guidelines for NCD prevention that can be personalised, for example, by tailoring recommendations to a person's age and gender. In order to create a reliable database of information on the links between physical activity and NCD, it will be important to improve the validity of measurements from physical activity trackers. There are currently significant variations in the physical activity tracking measurements of existing trackers with different devices recording physical activity levels that differ by up to 20% (Case et al., 2015). Progress also still needs to be made to ensure that all forms of physical activity, such as yoga, weightlifting and swimming, can be measured by physical activity trackers. Furthermore, it is important to ensure that there are validation systems in place to prevent the fraudulent use of physical activity trackers. Currently, people have been known to lend their physical activity trackers to a friend or even strap a wearable tracker onto a household pet to increase their recorded levels of physical activity.

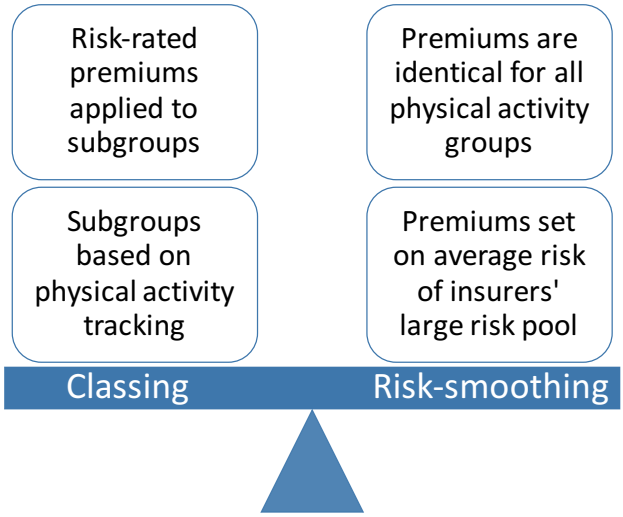
In their efforts to build up a more reliable database of information from physical activity trackers, many insurers are offering discounted premiums to those insurees who use physical activity trackers in exchange for access to the data from these devices. Encouraging the uptake of physical activity trackers in this way will also allow insurers to gather data that is better representative of the particular population in their insurance pool. Quantifying the size of the premium discount insurers are prepared to offer for access to data from their insurees' physical activity trackers would be an interesting area for further research. This is because it would give an indication of the level of investment that insurers are prepared to undertake in exchange for gaining access to data on their insurees' physical activity levels. Furthermore, to safeguard insurees from inappropriate third party use of the data from their physical activity trackers, the development of strong data protection policies will be important.

Medium-term implications

Despite the aforementioned limitations arising from the systematic literature review, the results revealed that on balance physical activity does decrease the risk of NCD. 84% of the 77 included studies revealed at least some supporting evidence of a longitudinal association between increased physical activity and reduced risk of NCD. Many of these studies found a significant association even when controlling for other variables such as a participant's age, gender, socioeconomic status, BMI, blood pressure and cholesterol levels. This relationship between physical activity and NCD means that insurance claims on health, life, income protection and critical illness insurance policies are likely to be higher for those insurees that are less physically active. Once longitudinal associations between physical activity and NCD have been validated and refined using reliably and objectively measured physical activity data from physical activity trackers, the relationship between physical activity and NCDs could provide private insurers with the opportunity to class their insurees according to their physical activity levels. In accordance with their corresponding risks of developing NCDs, insurers could charge cheaper premiums to more physically active individuals and more expensive premiums to the less physically active. Longitudinal studies from the systematic literature review of just three to five years in length found significant associations between physical activity and NCD (Williams et al., 2011; Kolli et al., 2009; Frisk et al., 2014; Williams et al., 2010). This suggests that classing by private insurers is a potential medium-term implication of physical activity trackers. Indeed, in motor insurance black boxes which record driving habits are already being used to class insurees by charging lower premiums to drivers with safer driving habits and higher premiums to drivers with more dangerous driving habits. As there is already a precedent for the use of telematics by private insurers in order to class insurees, it seems likely that once the reliability of measurements from physical activity trackers has been improved and a sufficient amount of data on the relationship between physical activity and NCD has been collected, private insurers will start to use the data from the physical activity trackers of their insurees to set differential risk-related premiums.

Policy makers may look to mitigate the discriminatory risk inherent in classing by implementing policies that aim to ensure an optimal balance between classing and risk-smoothing (Figure 2). Risk-smoothing policies would aim to ensure private insurance remains affordable for groups at high risk of ill health by, in the extreme, mandating that the same premiums are charged to all insurees regardless of their health and lifestyle risk factors. This tension between classing and risk-smoothing can be seen in other parts of the insurance industry. Returning to the example of the motor insurance industry, despite the ban on gender segregation of premiums in the EU which tipped the balance in favour of risk-smoothing, GPS tracking has emerged to class individuals based on the time of day and the routes that they drive. Furthermore, in addition to physical activity trackers, trackers for other elements of lifestyle and health, including heart rate and glucose levels, are beginning to come to market. Also, mobile phone-based diagnostics to detect infectious diseases are in the early stages of development. These trackers could one day be used by private insurers to gather additional data on, and further class their insurees into subgroups based on a wide range of health risks. The policy responses to the use of physical activity trackers by private insurers may therefore set a precedent for the way in which health and lifestyle trackers are used by the industry going forwards.

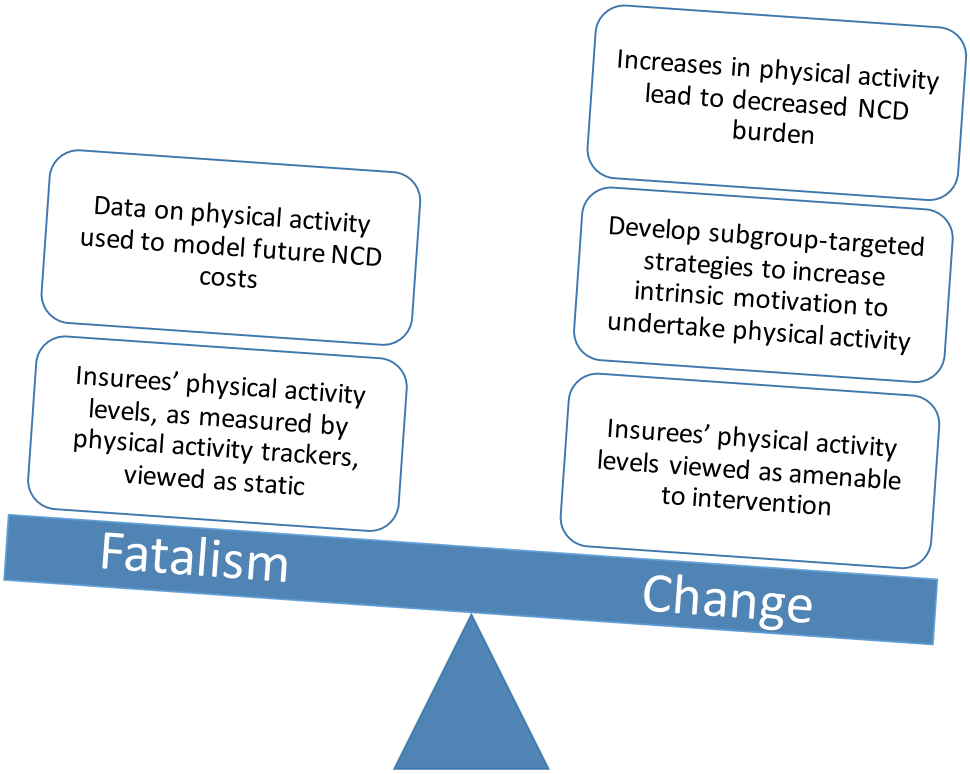
Figure 2: Balancing classing and risk-smoothing in private insurance.



Long-term implications

In the long-term, private insurers may be able to be encouraged by policy makers to move away from fatalistic models that class insurees into smaller and smaller subgroups based on their past physical activity patterns and their corresponding risk of NCD, and towards a model of behavioural change that helps to reduce the NCD disease burden through preventative strategies (Figure 3). The systematic literature review provided some evidence that targeted interventions to increase physical activity levels over time can been successful in reducing the risk of NCD. For example, one study showed that a prevention strategy, whereby increases in physical activity were encouraged in those not meeting physical activity guidelines, was associated with a greater reduction in risk of NCD than either a strategy that encouraged more than half-an-hour of physical activity per week for the whole population or a strategy that encouraged more than an hour of physical activity per week for the 25% of the population that was the least physically active (Peeters et al., 2014). Based on evidence such as this, physical activity trackers could be used by private insurers as part of targeted behavioural intervention strategies to identify those who are not meeting their personally-tailored physical activity guidelines and motivate them to increase their physical activity levels and thereby help to prevent these individuals from developing NCD. In addition to reducing the claims costs for insurers, this strategy would also be beneficial to society as a whole by helping to decrease the long-term care burden.

Figure 3: Tipping the balance away from fatalism and towards behavioural change.



However, encouraging and sustaining behavioural change over the long-term is challenging. There is a large literature on the theory of behavioural change which private insurers could draw on when trying to increase and sustain physical activity levels among their insurees. A useful theory which they could employ is Ryan and Deci's self-determination theory (Deci and Ryan, 2002). This theory identifies three innate psychological needs – autonomy, competence and relatedness – that when present foster intrinsic motivation to undertake an activity, but when absent diminish it. Long-term behavioural change can be brought about through appealing to intrinsic motivation by nurturing an individual's autonomy, competence and/or relatedness. Intrinsic motivation is driven from an interest that exists within an individual to carry out behaviours that he finds internally rewarding. Thus, even when the initial motivating stimulus is removed, a person who has been intrinsically motivated will want to continue to undertake that particular behaviour. This is in stark contrast to extrinsic motivation, which uses an externally motivating stimulus to encourage an individual to undertake a particular behaviour (Ryan and Deci, 2000). Extrinsically motivating stimuli, such as competitions with peers or monetary rewards in the form of discounted premiums, do not appeal to any of the three innate psychological needs. Consequently, once the initial motivating stimulus is removed, a person who has been extrinsically motivated will no longer want to continue to undertake that particular behaviour. In fact, he may even be less motivated to undertake that particular behaviour than before the extrinsic motivator was applied because the extrinsic reward may have undermined his intrinsic motivation to undertake that behaviour.

There are already a number of companion applications accessible via online web-based platforms or mobile-based apps that can be used in conjunction with physical activity trackers to try to increase the user's physical activity. These applications appeal predominantly to extrinsic rather than intrinsic motivation as they overwhelmingly adopt a gamification approach, for example by using a competitive leaderboard or rewards such as digital badges to try to motivate individuals to undertake physical activity. However, as Ryan and Deci's theory shows, an intrinsically motivating approach that explains the true underlying virtues of physical activity, for example by using story-based games or other informal education approaches, would be more effective in bringing about sustained increases in insurees' physical activity levels.

Private insurers therefore have an opportunity to pioneer intrinsically motivating strategies that make use of physical activity trackers to bring about long-term behavioural change that increases and then sustains physical activity at personally-tailored recommended levels. In the case of using game-based digital applications with physical activity trackers, some types of games may be more intrinsically motivating for certain population subgroups than others. For example, different ages, genders or personality types may respond better to particular games and motivational messages. Analysing the data from physical activity trackers will be vital in determining which intervention strategies are beneficial in which population subgroups. In this way, private insurers could play a role in implementing personalised intervention approaches that help to increase the physical activity levels of their insurees and thereby prevent NCD and reduce society's long-term care burden. Due to the positive effect that this approach could have on society as a whole, policies that encourage insurers to adopt a behavioural change approach to the use of data from physical activity trackers could be beneficial.

Conclusions

The potential challenges and opportunities that physical activity tracking may bring to the private insurance industry can be formulated into a prospective policy framework covering the short, medium and long-term (Figure 4).

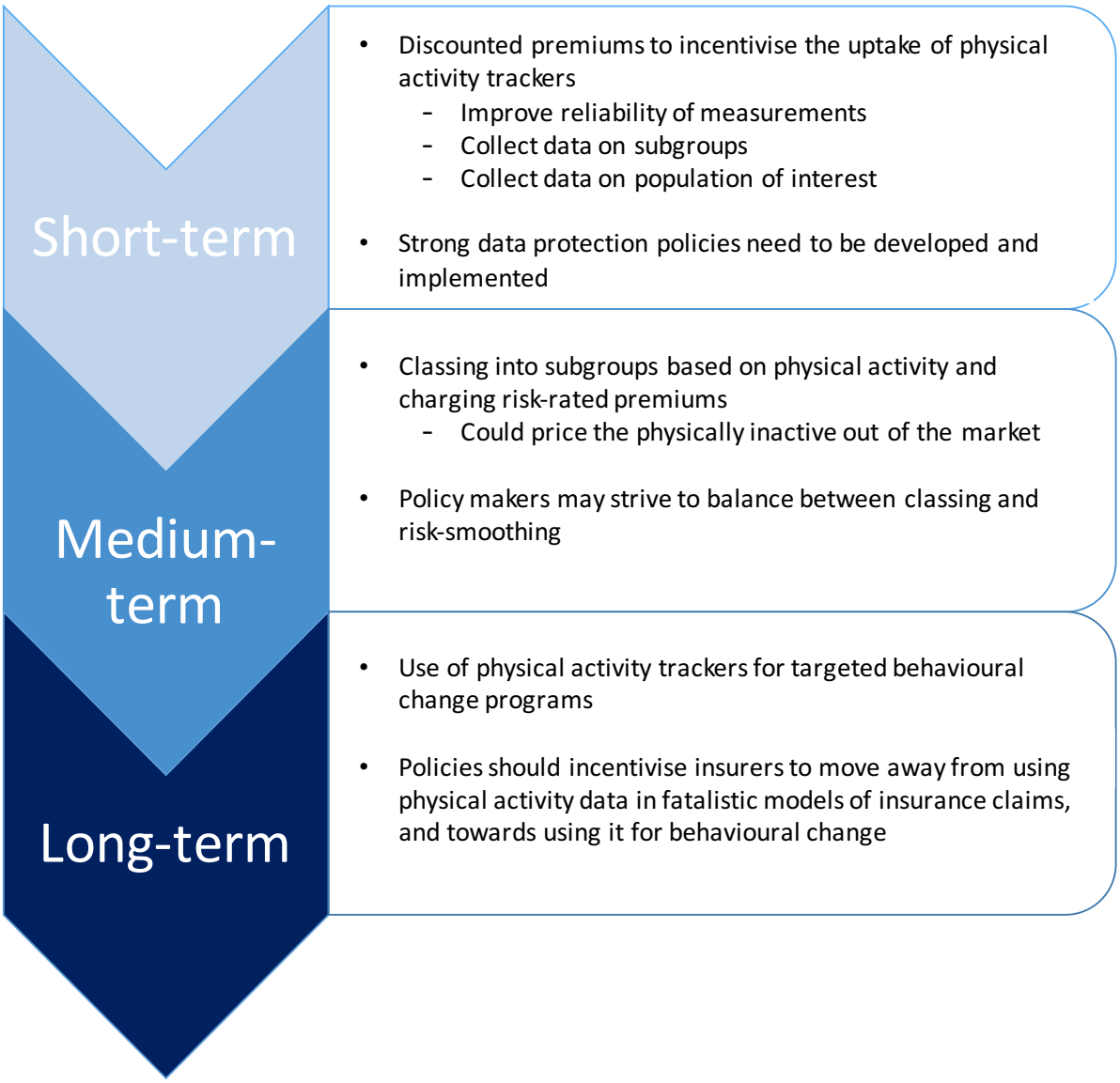
Whilst this prospective framework is a useful starting point, future work in this field should also look at issues surrounding data privacy in more depth, for example by assessing consumer attitudes towards the use of physical activity tracking technologies by private insurers. This is because adoption of physical activity tracking will largely depend on consumer attitudes towards and engagement with this piece of technology. For long-term behavioural gains from physical activity tracking to come to fruition, large-scale uptake of physical activity trackers will need to occur, and this in turn will rely on insurees being reassured of the privacy and safety of their data and on access to these devices being affordable even for those in lower socio-economic groups.

Even if physical activity trackers are widely adopted by insurees, realising positive societal gains from this technology does not appear to be straightforward. Firstly, it will be important to improve the accuracy and validity of the data from physical activity trackers by ensuring that they can reliably track multiple forms of physical activity and that fraudulent use of these devices is prevented. Once these issues have been resolved, this paper proposes that policies designed to encourage private insurers to adopt a behavioural change approach that helps insurees to achieve personally-tailored recommended levels of physical activity will be more beneficial to society in terms of reducing the societal NCD and long-term care burden than if insurers adopt a fatalistic approach that uses physical activity data to class insurees according to their physical activity levels and thus assigns them a corresponding risk-rated premium. To implement effective policies that help to bring about a behavioural change approach, it will be important to carry out further industry research into the extent to which private insurers would be willing to use physical activity data in order to class their insurees. It would also be useful to gain further insight into the extent of fatalism amongst insurers by examining how far insurers view the physical activity data that they collect as static data that is not amenable to improvement over time through intervention strategies.

If classing and fatalism are found to be significant future concerns, then limiting them will require carefully designed policies which support the use of data from physical activity trackers to bring about behavioural change. Policy makers may look to encourage risk-smoothing as a way to help prevent the physically inactive from being priced out of the private insurance market. More crucially, they may also consider providing public funding and other assistance to help incentivise insurer-led behavioural change initiatives. This is because private insurers will need to be able to actualise the cost saving opportunities that implementing a data driven behavioural change approach could bring them in terms of reducing their NCD morbidity and mortality burdens. If insurees are able to switch providers easily, then private sector behavioural change research and initiatives may require public support. Achieving this delicate policy balance will require thoughtfully designed policies that are proactive in leading

insurers towards a model of behavioural change. Furthermore, as lifestyle trackers expand beyond the remit of physical activity to track other health and lifestyle factors, such as heart rate, glucose levels and even pathogenic infections, it will be increasingly important to have well-developed policies that encourage insurers to adopt a behavioural change approach that helps to prevent disease rather than fatalistically predicting it.

Figure 4: Summary of a prospective policy framework for the use of physical activity tracking by private insurers.



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