Swiss Re Institute

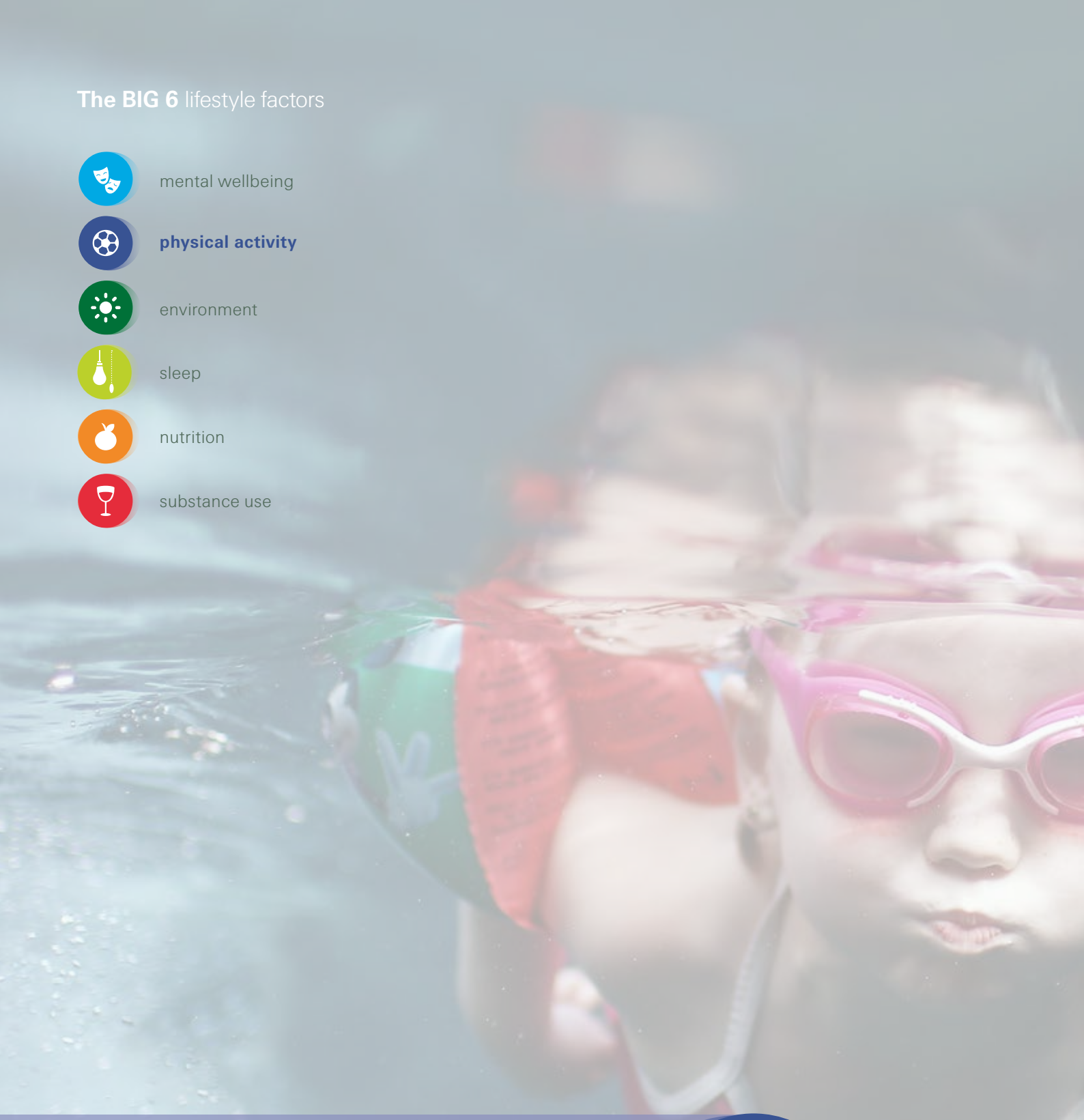
How does physical activity affect longevity?

Part 2 of The Big Six Lifestyle Factors research

A L&H Trend Spotlight

The BIG 6 lifestyle factors

- mental wellbeing
- **physical activity**
- environment
- sleep
- nutrition
- substance use



physical activity

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The goal?
To inform holistic credible risk assessment and drive better health outcomes.

Through our research on “The Big Six” Lifestyle Factors, we aim to help insurers answers these questions.

Eat well, get your rest and stay active. It’s timeless advice. Everyone knows physical activity is important to living a healthy life, yet when you ask people if they move their bodies enough during the day, the answer is almost always “no.” Our level of physical activity profoundly impacts our health and longevity. But similar to other lifestyle factors like sleep and nutrition, physical activity isn’t typically part of the underwriting equation.

As the use of wearables and other forms of activity tracking have increased, so has the credibility of the resulting data. More insurers are exploring the use of physical activity as part of their risk assessment. But incorporating physical activity doesn’t just mean including a question on the application or tapping into wearable data – how you embed it into your process is what matters. Should you treat resistance training different than running? Does occupational physical activity have the same benefits as leisure time activity? Is duration a good indication of cardiorespiratory fitness (CRF)?

Section 1

Have we engineered activity out of our daily lives?

Understanding the effects of physical activity on mortality and morbidity risk

Have we engineered activity out of our daily lives?
Physical activity means more than exercising. It includes all our daily movements like walking the dog or gardening and is commonly measured through metabolic equivalents (METs). MET is the ratio of a person's working metabolic rate relative to his or her resting metabolic rate. One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1kcal/kg/hour. A person's caloric consumption is three to six times higher when being moderately active (3–6 METs) and more than six times higher when being vigorously active (>6 METs). But physical activity is declining across the board – from daily walks to weekend activities, people simply don't move as much as they used to.

Our modern lives and increasingly sedentary jobs have largely engineered activity out of our daily lives. Projections indicate this will only get worse with continuing declines in activity patterns around the world. Decreases in physical activity are so severe that researchers have reduced their step count models.[1] Insurers need to acknowledge and account for these downward trends as they look to incorporate physical activity into new underwriting models.

"Insurers need to acknowledge and account for these downward trends as they look to incorporate physical activity into new underwriting models."

Section 2

To sink or swim?

Even when different physical activities use equivalent amounts of energy (METs), they don't always offer the same health benefits. For example, activities that require dynamic use of large muscle mass like swimming or racquet sports are associated with lower all-cause mortality and cardiovascular disease (CVD) risk compared to sports that consume similar METs but don't use as many different muscle groups such as running.[2]

Equally, being physically active doesn't guarantee cardiorespiratory fitness (CRF). Certain activities, like aerobic exercise, improve CRF while resistance training does more to increase strength and maintain muscle mass. Put simply, different activities affect health differently. As insurers consider how to incorporate physical activity into underwriting decisions, it is important they move beyond the yes/no binary and evaluate *how* someone is active.

This is best illustrated when we compare occupational vs. leisure time activity – which is another great paradox in the connection between activity and health. Occupational physical activity, or movement derived from a job, does not confer the same benefits as leisure time activity. Activity at work is often characterized by low intensity and long duration that may include heavy lifting or constant standing. In fact, this type of activity can even negatively impact health. For example, even though manual laborers can average 20 000 steps a day – which on the surface would indicate good health and fitness – in reality, such extended activity can cause sustained inflammation and increase 24-hour heart rate and blood pressure. If prolonged, this can impair cardiovascular health and increase mortality risk.[3,4,5] In contrast, leisure time physical activity is usually higher intensity, shorter duration and includes sufficient recovery time – all of which improve cardiovascular health.

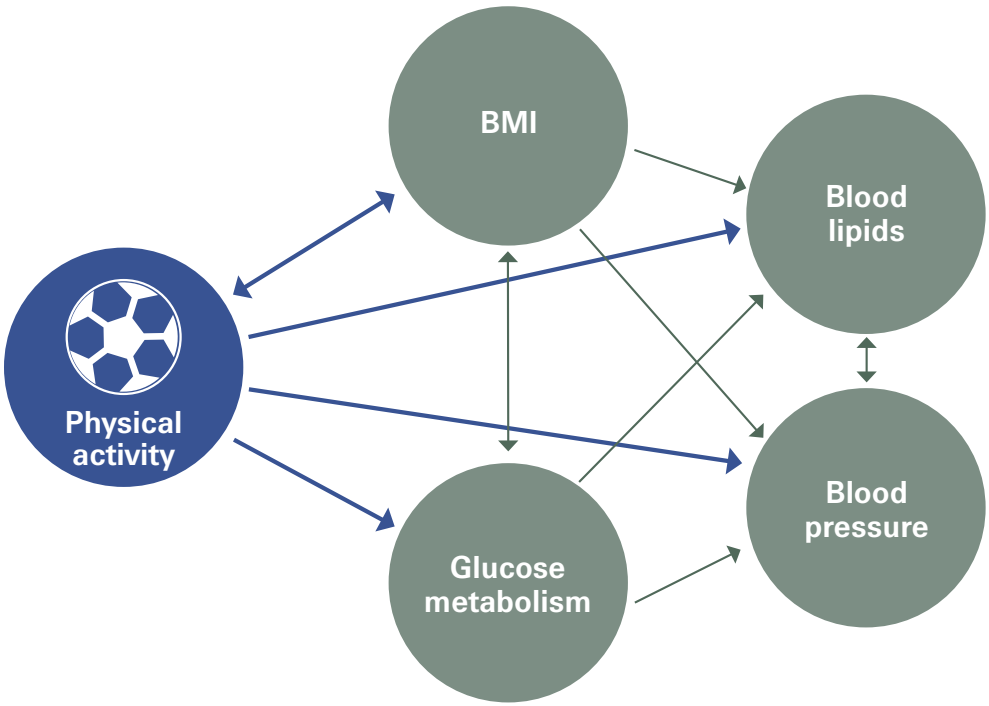
"Different activities affect health differently. It is important to evaluate how someone is active."

You can't outrun a bad diet

About half the protective effects of physical activity contribute to reduced clinical CVD risk factors.[6] However, pinpointing the degree of the contributions is much harder due to the "healthy user effect".

Highly active people are usually health conscious and therefore more likely to take better care of themselves. Teasing out the effect of only physical activity on CVD factors proves more difficult due to confounding factors. Our research helps you sift through the noise and directly addresses each of the four leading contributors to CVD: body mass index (BMI), blood lipids, blood pressure, and glucose metabolism.

Figure 1
Interactions between physical activity and traditional clinical risk factors



Body mass index
Conventional wisdom says physical activity leads to weight loss, but the evidence is conflicting. While caloric expenditure plays a role in weight gain and loss, more scientific studies are finding that the benefits are less than previously believed, and weight fluctuation is driven more by the types of food we eat. In other words, you can't outrun a bad diet.

If you do successfully lose weight, a combination of aerobic activity and resistance training can help keep it off.[7,8] The relationship between BMI and physical activity is also bi-directional. While physical activity plays a role in maintaining a healthy weight, weight itself – especially extreme weight – can be a barrier to movement.[9]

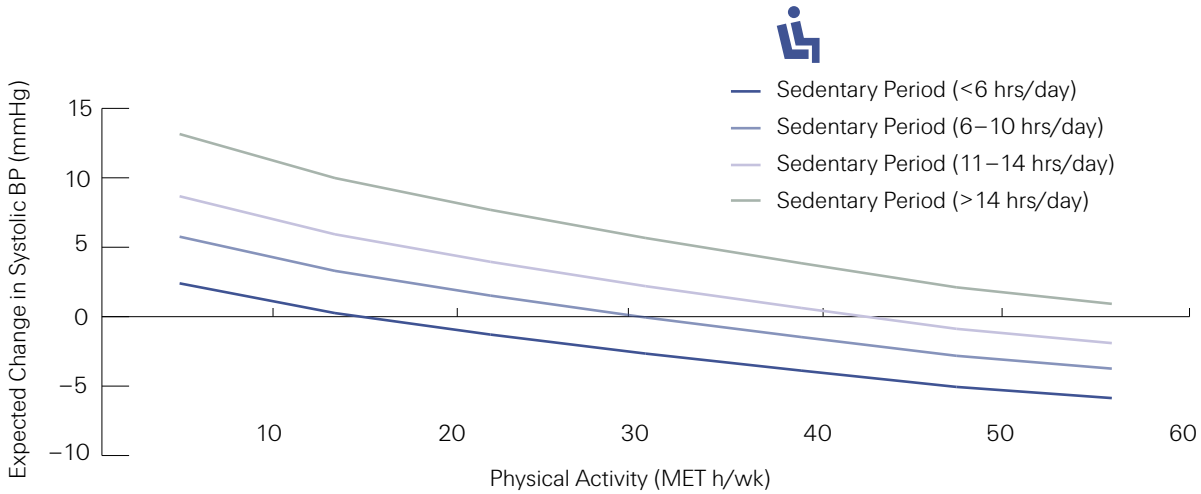
"Conventional wisdom says physical activity leads to weight loss, but the evidence is conflicting."

Blood lipids
Physical activity also has significant beneficial effects on blood lipids. In fact, just one session of vigorous activity can increase high-density lipoproteins (HDL – the 'good' cholesterol) and lower triglycerides. These improvements are temporary and typically return to baseline after roughly 48 hours, but long-term aerobic activity is shown to have more lasting positive effects.[10, 11]

Blood pressure
Large studies have also linked a lower risk for high blood pressure with leisure time physical activity. Even better, it doesn't require excessive effort to see clinical benefits – just 10 MET hours per week can lower your risk of developing high blood pressure (hypertension) by 10% (compared to the most sedentary group). This could include swimming laps vigorously for an hour. The more active you are, the more you decrease your risk and those who are the least active stand to reap the greatest health benefits.

Glucose metabolism
Physical activity also has a significant effect on glucose metabolism. Active individuals reduce their risk for developing Type 2 diabetes. And those who have Type 2 diabetes can better manage it with regular exercise.[12,13] While endurance training has slightly different muscular effects than resistance training, both improve insulin sensitivity.[14]

Figure 2
Expected change in blood pressure as a result of how active you are



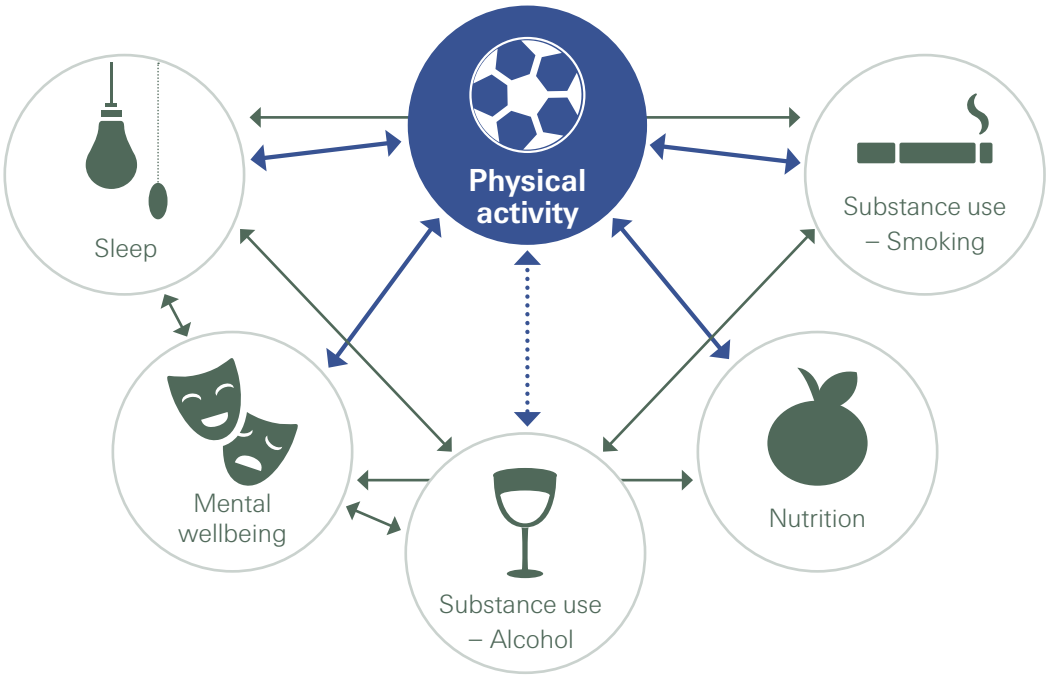
Physical activity and lifestyle factors – "moving" to a healthier lifestyle

Beyond these clinical risk factors, our level of physical activity also has a two-way effect on other lifestyle factors – especially mental wellbeing, sleep, nutrition and substance use.

Sleep
Studies show individuals with a higher daily energy expenditure may fall asleep faster; however, this relationship is only found in younger adults.[15]

Mental wellbeing
It's no secret that mental wellbeing and physical activity are also intertwined. Many of us have experienced the endorphin buzz from exercise, and there are plenty of studies that document both the positive effects of movement on our mental health and the converse effects of not moving. A recent study found that sedentary activity like watching television could actually increase the risk of depression by 17%.[16]

Figure 3
Interactions between physical activity and lifestyle risk factors



Nutrition
What we eat impacts how we feel physically, which in turn, influences our likelihood to be active. For example, food choice can increase insulin levels which drive fatigue. All this can make the prospect of being active more daunting. On the other hand, your nutritional state when moving may actually impact the biological benefits you reap. Performing physical activity in a fasted state has shown to be more effective in improving insulin sensitivity.[17] As a result, this technique of 'fasted physical activity' is increasingly being used as an intervention for Type 2 diabetics.

Substance use
Smoking is clearly a detriment to physical activity, even among relatively young and fit individuals. If you do smoke, some activity is clearly better than none. Active smokers have a lower risk of developing lung cancer and are less likely to experience increased arterial stiffness.[18,19] The association between alcohol and physical activity is less straight forward. Findings are often inconsistent and likely driven by cultural behaviours and vary by the type of physical activity.

"Our level of physical activity has a two-way effect on other lifestyle factors – especially our mental wellbeing, sleep, nutrition and substance use."

Section 5

A case for 'weekend warriors'

The good news is you don't have to be physically active every day to reap the benefits. Even 'weekend warriors' who are moderately or vigorously active once or twice a week have significantly reduced risk for all-cause, CVD and cancer mortality.

According to one study, weekend warriors have a 30% lower mortality risk compared to inactive individuals. In fact, their risk is only marginally higher than individuals who are regularly active.[20]

We analysed four leading studies with more than 2.8 million participants to provide a more granular breakdown of how physical activity impacts all-cause mortality (See Fig. 4). It only takes 5 MET hours/week to lower your mortality risk by 13% compared to simply doing nothing. This equates to around 60 minutes of jogging per week. Individuals who report 40 or more MET hours/week reap the biggest benefits, with an average reduction in mortality risk of 33% compared to their inactive peers.

"Even **'weekend warriors'** have significantly reduced risk."

The impacts of physical activity include other health risks such as CVD and cancer. One study found a 21% reduction in heart attacks and stroke respectively for those who engage in moderate to vigorous activity three to four times per week compared to those who don't.[25] Other studies suggest that low levels of physical activity may increase the risk of developing colon or breast cancer, by upwards of 20–30% (compared to high levels of activity). Read our Move! Publication for more on this.

"You don't have to be physically active every day to reap the benefits. Even 'weekend warriors' see reduced risk."

Figure 4
Relative risk of all-cause mortality per MET hours/week

MET-h/week	0	0–7.5	7.6–15	15.1–22.5	22.6–40	40+
Relative Risk (all-cause mortality)	**1.00**	**0.87**	**0.80**	**0.74**	**0.70**	**0.67**
	95% CI	**95% CI**	**95% CI**	**95% CI**	**95% CI**	**95% CI**
	(Ref)	0.84–0.90	0.76–0.82	0.70–0.78	0.66–0.73	0.61–0.77

Weighted averages of 4 large analyses (n>2.8 million) for different physical activity duration subgroups [21,22,23,24].

Even if we dedicate an hour a day towards moving our bodies, it doesn't eliminate the eight hours or more we may spend sitting – at a desk or on a couch. Sitting for countless hours a day is detrimental, even when we adjust for physical activity.[26] Evidence is mixed as to what duration of physical activity is needed to fully negate the negative effects of being sedentary all day. Meeting minimum recommendations for physical activity of 150 minutes of moderate-intensity or 75 minutes of vigorous physical activity per week is a good place to start.

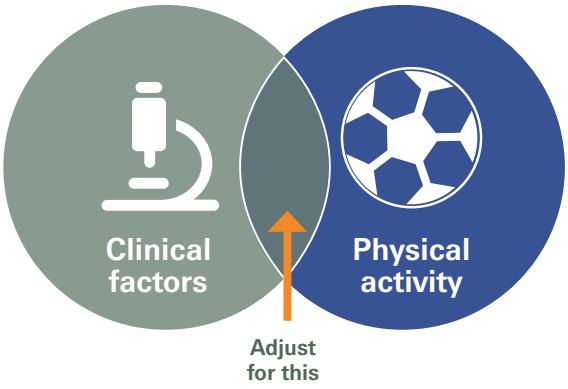
Section 6

What does this mean for insurers?

Physical activity has a clear impact on health and mortality and the explosion of wearables technology is making it easier than ever to track and measure. That's why more and more insurers are piloting physical activity programs or looking to leverage it in their risk assessment. Yet the landscape is confusing, so where's the best place to begin? Check out our 5 practical considerations on next page.

If you're considering how to incorporate lifestyle factors in underwriting, physical activity is a good place to begin. It is relatively easy to track basic metrics and it impacts key L&H risks like mortality, CVD and cancer. Incorporating it into the fold not only allows for more holistic, personalized risk assessment but it also creates an opportunity for insurers to strengthen relationships with their customers and help improve health outcomes. We are here to help you creatively look at physical activity to improve the holistic power and strength of your underwriting.

Figure 5
Quantifying & adjusting for overlap between physical activity and clinical risk factors is key to accurate risk assessment



5 ways to factor physical activity into underwriting

practical considerations:

1

Not all physical activity is created equal.

Certain activities (swimming vs. running; occupational vs. leisure) have greater effects on health and mortality than others, and this is further influenced by who is doing the activity.

- Remember less healthy individuals stand to benefit most from physical activity.
- Try to move from beyond understanding if someone is active to understand how they are active. Addressing these differences will allow you to be more precise and accurate when it comes to risk assessment.

2

Even 'weekend warriors' stand to benefit.

Think about how you might incentivize your policyholders to be physically active – even just once or twice a week – and improve their health.

- Our dedicated Inforce Solutions team can help improve engagement by leveraging the power of behavioural economics.

3

Some tracking metrics are better than others.

Steps and distance are more commonly recorded but heart rate, duration and frequency are more accurate and better aligned to MET hours. We can help you consider the tradeoff of using different metrics.

4

Sedentary behaviour is also important.

Consider incorporating both active and non-active behaviours to have a more holistic understanding of a policyholder's health.

5

Adjust for overlaps.

Physical activity improves clinical risk factors (and impacts other lifestyle factors). But we cannot simply add them together. Be careful in how you calculate their overlap to avoid over-crediting or over-debiting when assessing risk. (see Fig. 5)

But the possibilities don't stop with physical activity.

Other lifestyle factors like nutrition and the environment present similar opportunities to change the way we underwrite. That's why our "Big Six" lifestyle research addresses a multitude of the leading lifestyle factors – combining leading scientific studies with our underwriting expertise. We're embedding our research directly into our own models and using it to enhance the value of Life Guide, our flagship underwriting guide and philosophy. Our Underwriting Propositions Leads are here to help you unleash the value of physical activity or one of the other "Big Six" lifestyle factors in your own business practices. Get in touch to learn more.

We're smarter together

Key Contributors

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