

Understanding the benefits of health risk assessment tools

HRA screening and the use of wearable devices

Lalit Baveja



Most employee wellness programmes include a combination of health risk assessment (HRA) screening with relevant interventions. An HRA identifies health and wellness risks at an individual level to enhance employees' awareness about their health statuses and direct them to appropriate resources. At the corporate level, wellness screenings are used to understand and track the overall priorities and burden of health risks for planning, programme evaluation and risk management purposes. Another approach for wellness has been through the use of wearable devices (mobile applications, smart watches and fitness bands).

There are multiple publications highlighting the key learnings from the long and vast experience of employer-based wellness programs from developed markets. A common finding has been that a wellness assessment should be carefully selected to match appropriately to the programme objective and the targeted population. As most HRAs are generally accepted to be evidence-based in their scoring, we conducted a sensitivity analysis on HRA data elements that are parallel to the types of data that could be obtained through wearables (e.g., tracking exercise and activity levels). We varied the different input metrics in three independent HRAs to see which metrics had better predictive value for the overall outcome. We then investigated the impact of the activities that HRAs measure on overall reported HRA health scores. This has helped us to understand the influence that activities measured by wearable devices may have on overall levels of health, based on how significant the HRAs consider these activities to be.

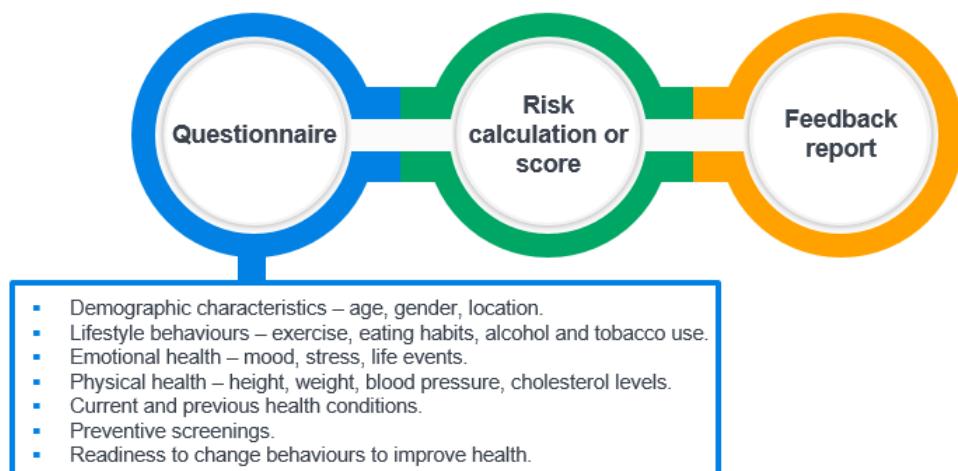
HEALTH RISK ASSESSMENTS

The US Centers for Disease Control and Prevention (CDC) has defined an HRA as:

A systematic approach to collecting information from individuals that identifies risk factors, provides individualised feedback and links the person with at least one intervention to promote health, sustain function and/or prevent disease.¹

HRAs typically incorporate three key elements, as shown in Figure 1.

FIGURE 1: TYPICAL HEALTH RISK ASSESSMENT PROCESS



We tested the consistency among three HRAs and the relative weightings that they give to metrics in terms of predicting overall health levels. We compared the questions and results for publicly available HRAs from Vitality, the heart risk assessment of the English National Health Service (NHS), and the Rapid HRA tool developed by Milliman.

¹ <https://www.cdc.gov/policy/hst/hra/HRAAWVGuidanceReportFINAL.pdf>

Each HRA also has a different type of output. The Vitality HRA produces a "Vitality Age" which should be interpreted relative to the member's age. A Vitality Age higher than the member's actual age signals that a member's health status is worse than expected based on the demographic profile, and vice versa. The NHS HRA produces a similar output but with a focus on "heart age." The Rapid HRA produces a score out of 100 where a score of 100 signals that the member is in perfect health.

Figure 2 shows there is a substantial overlap in question types for Vitality and the Rapid HRA, while the NHS HRA has a narrower focus.

FIGURE 2: THE MAIN QUESTION GROUPS WITHIN EACH TYPE OF HRA

Question types	HRA tool		
	Vitality	NHS (UK)	Rapid HRA developed by Milliman
Demographic features	✓	✓	✓
Lifestyle behaviours	✓		✓
Emotional health	✓		✓
Physical health metrics	✓	✓	✓
Current and previous health conditions		✓	✓
Preventive screenings		✓	✓
Readiness to change behaviours			✓
Output	Vitality Age	Heart Age	Health score out of 100

We defined a base case for a male member, aged 40 with the health and demographic characteristics described in Figure 3, as representing the "average" scenario. We also defined "very healthy" and "very unhealthy" scenarios for the member aged 40 by varying the base case inputs to test the impact on the HRA outputs. We used the base case scenario to test the sensitivity of each HRA's output metric to the input measures that wearables are able to capture. This is discussed in more detail in later sections.

FIGURE 3: AN EXAMPLE OF THE BASE CASE MEMBER AND WHAT IS CLASSED AS HEALTHY OR UNHEALTHY IN TERMS OF HEALTH SCORE OR AGE

 **Base case/Average**

Age	40
Gender	Male
Height	5' 7"
Weight	64 kg
Waist circumference	30 inches
Exercise	5 hours per week
Blood pressure	120/80 mmHg
Glucose	4.5 mmol/L
Cholesterol	5.0 mmol/L
Pre-existing conditions	None
Food	Average fruit and veg intake
Smoking	Never
Alcohol	3 drinks per week
Mental health status	Normal levels of stress and tiredness

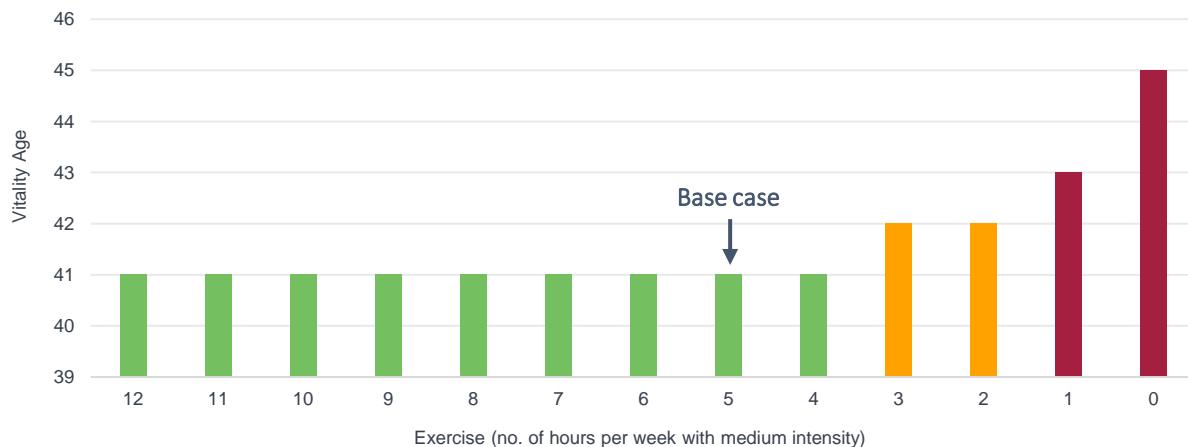


HEALTH RISK ASSESSMENTS AND WEARABLES

The wearable devices of today measure a limited amount of information, and insurers can only use the data that is made available from each device. For this research, we tested the sensitivity of the HRAs to the metrics that wearables measure, and compared it to other component metrics in an HRA. This gives us some additional insights into how HRAs and wearables interact with one another as well as the value that HRAs place on selected lifestyle behaviours.

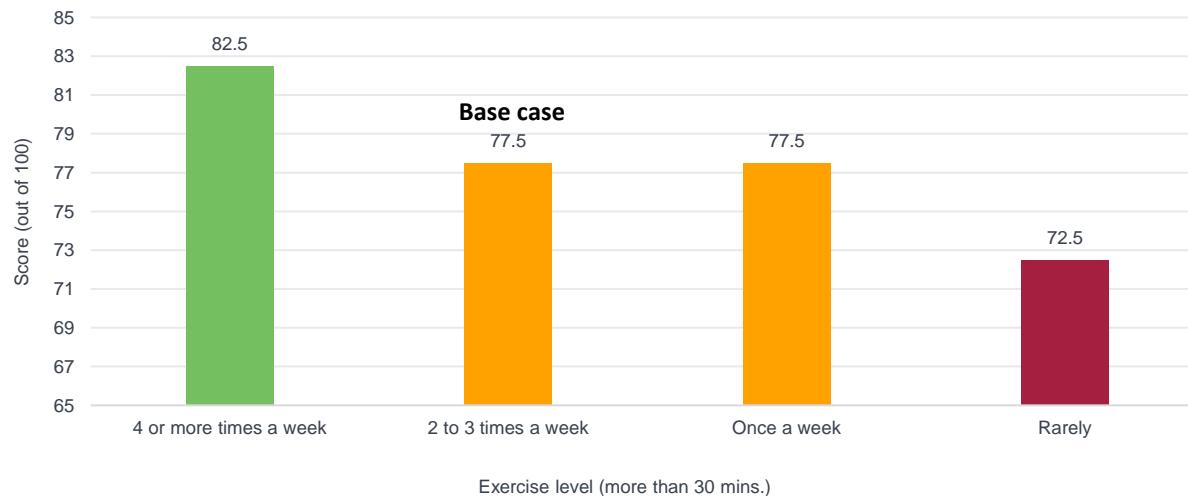
Regarding exercise, our research showed that, for Vitality Age, there is no marginal benefit from exercising more than four hours per week. However, exercising fewer than four hours per week has a negative impact on the member's Vitality Age, as shown in Figure 4.

FIGURE 4: THE IMPACT OF ACTIVITY LEVELS ON HEALTH AGE (VITALITY HRA)



For Rapid HRA, on the other hand, we saw that increasing activity levels from the base case can improve the overall health score significantly. Additionally, reducing activity levels has a negative effect on the health score, as shown in Figure 5.

FIGURE 5: THE IMPACT OF ACTIVITY LEVELS ON HEALTH SCORE (RAPID HRA)



Another area we assessed was the impact of a changing body mass index (BMI) against the overall health score or health age.

We found that, for the Vitality HRA and the Rapid HRA, any BMI value that moved further away from the "healthy" range² had a significant impact on the overall health score/age and shown in Figures 6 and 8. The NHS HRA is less sensitive to changes in BMI, with a step change only occurring at a BMI of 30, as shown in Figure 7.

FIGURE 6: THE IMPACT OF BMI ON HEALTH AGE (VITALITY HRA)

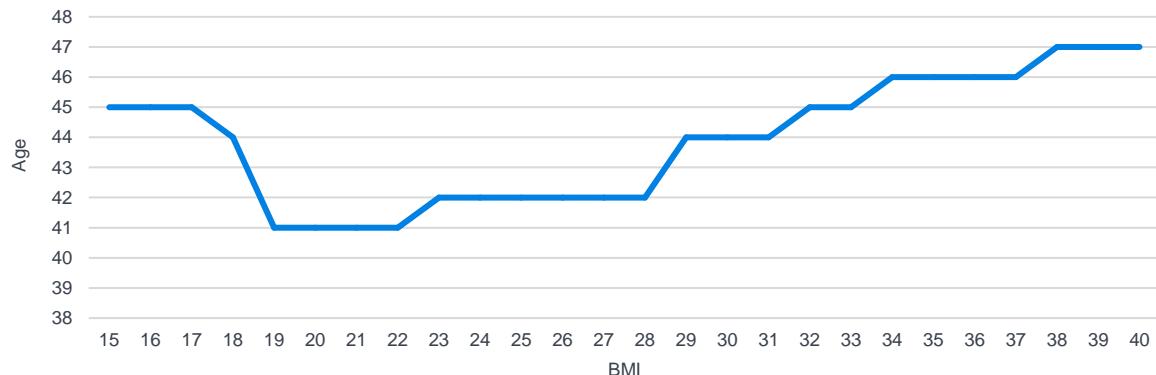


FIGURE 7: THE IMPACT OF BMI ON HEALTH AGE (NHS HRA)

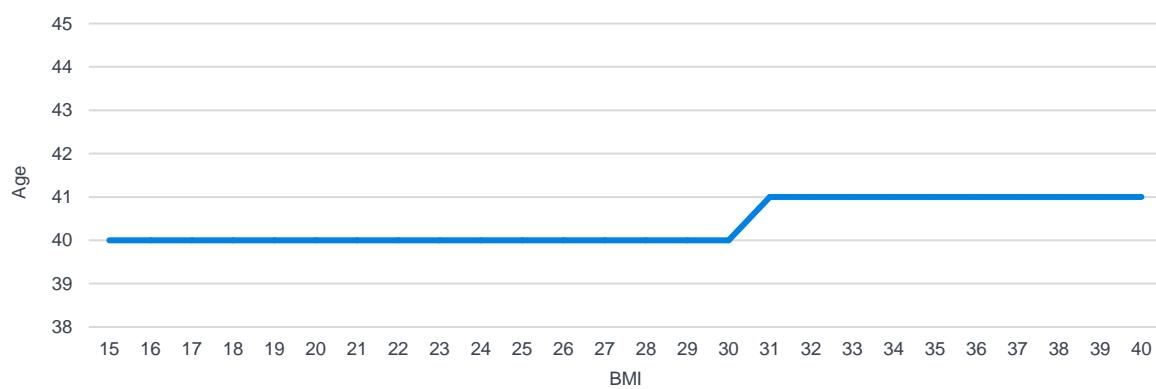
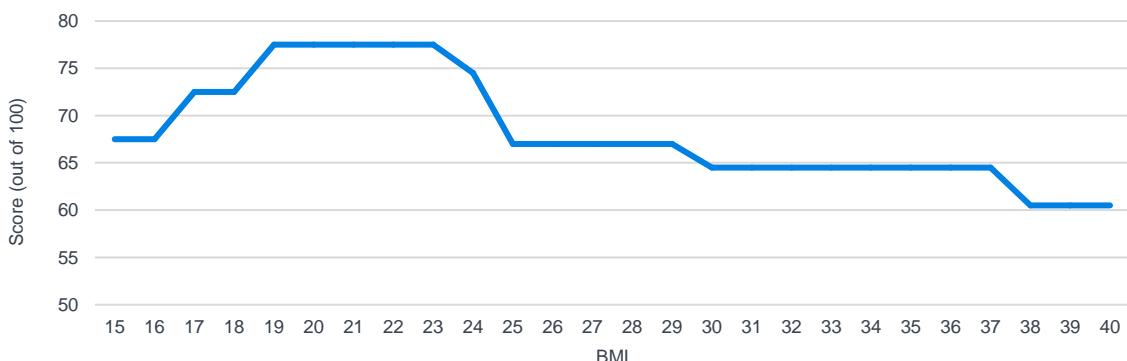


FIGURE 8: THE IMPACT OF BMI ON HEALTH SCORE (RAPID HRA)



Finally, we looked at the sensitivity of HRAs to some key health metrics not measured by wearables. We looked at the effect on the health age/score after varying each metric to "good" and "bad" values from the base case shown in Figure 3.

² A BMI of between 19 and 25 is typically considered a healthy range.

While we found that *not* exercising has a negative impact on the health score, it was not always the most important health factor. As shown in Figure 9, Figure 10 and Figure 11, metrics such as cholesterol, smoking and BMI can all have higher impacts on a member's Vitality Age, Heart Age, or health score, respectively.

For the Vitality HRA, it is only possible to improve the Vitality Age by improving cholesterol and eating habits from our defined base case (Figure 9). For the Rapid HRA, it is possible to improve the overall health score by improving on various factors (Figure 11). For the NHS HRA, we found that it was not possible to improve the heart age by improving on particular factors but worsening on particular factors could result in a deterioration of the heart age (Figure 10).

FIGURE 9: SENSITIVITY TESTING RESULTS OF EXISTING QUESTION GROUPS ON VITALITY HEALTH AGE

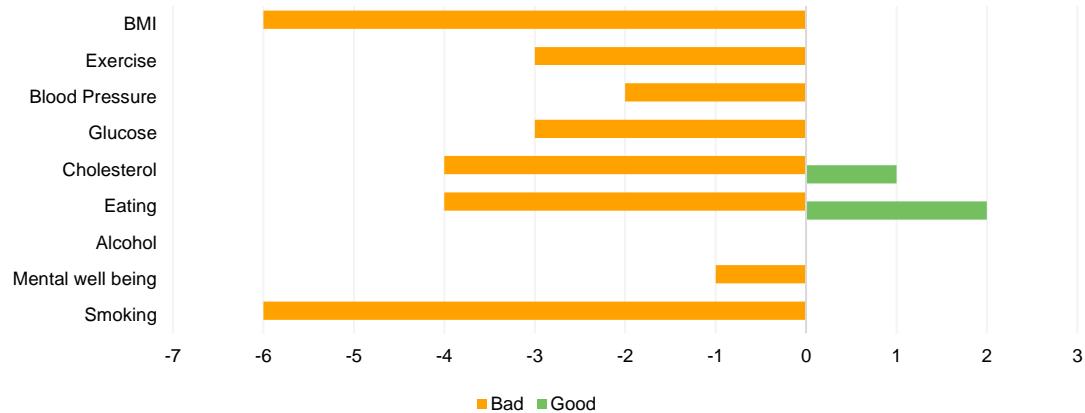


FIGURE 10: SENSITIVITY TESTING RESULTS OF EXISTING QUESTION GROUPS ON NHS HEALTH AGE

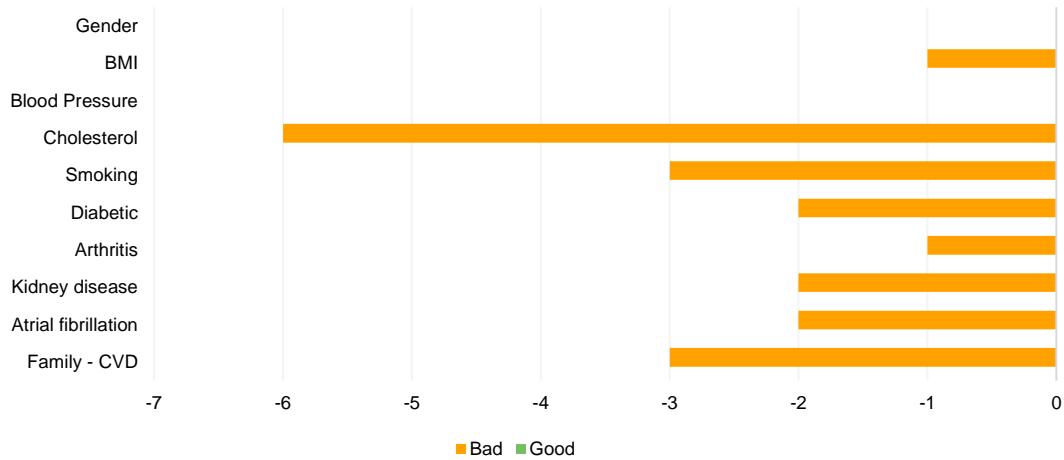
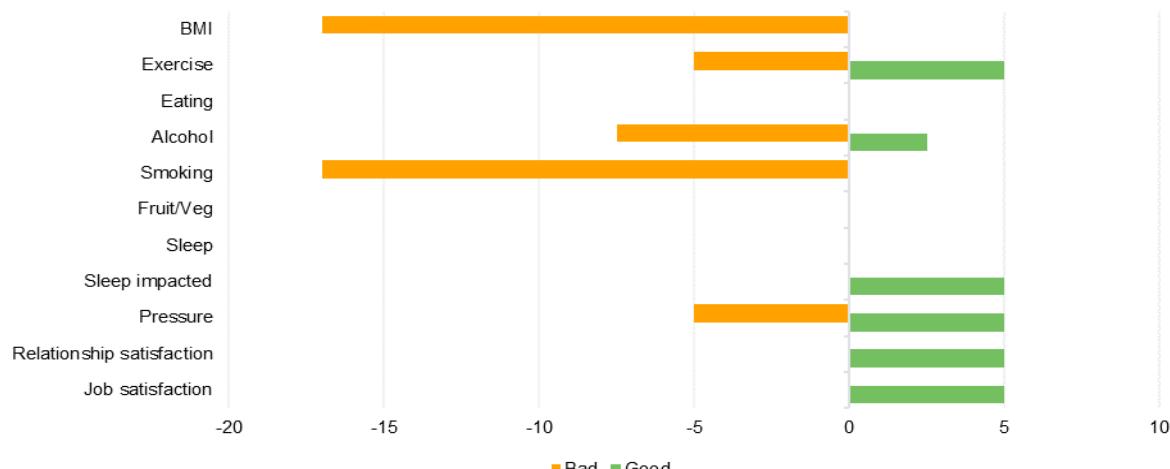


FIGURE 11: SENSITIVITY TESTING RESULTS OF EXISTING QUESTION GROUPS ON RAPID HRA HEALTH SCORE

Conclusion

Our review of the factors that influence health risk assessments (HRAs) indicates that, although wearables may encourage members to increase their activity levels, the implementation should be considered as part of a comprehensive wellness offering because many of the most important factors that influence HRA scores, and (by implication) health status, are not captured by wearables.

A wellness assessment should be carefully selected to match appropriately to the programme objective and the targeted population. The assessment campaign should have a clear objective and purpose. To achieve this objective, employers and wellness vendors should carefully select the assessment approach that resonates with these best practices. An employer-focused analysis of the risk profiles of employee allows employers to customise programmes to suit their specific objectives and employee risk profiles. To use HRAs to encourage behaviour change by respondents, the results should be sensitive to changes in behaviour to help monitor the employee and employer progress of wellness interventions.³

³ A version of this paper was originally published in March on milliman.com. <https://www.milliman.com/en/insight/the-role-of-wearables-in-private-medical-insurance>



Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in life insurance and financial services, property & casualty insurance, healthcare, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

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CONTACT

Lalit Baveja
lalit.baveja@milliman.com