

MILLIMAN REPORT

The role of wearables in private medical insurance

India survey report

October 2020

Lalit Baveja
Samyukta Achar



Table of Contents

EXECUTIVE SUMMARY	1
1. USE OF WEARABLES IN INSURANCE:	2
1.1 INTRODUCTION	2
1.2 RISKS TO STAKEHOLDERS	3
1.3 INSURANCE FIRMS ALREADY USING WEARABLES	4
2. WHAT DO "CONSUMERS" THINK? OUR SURVEY RESULTS	4
2.1 DEMOGRAPHIC PROFILE OF RESPONDENTS	4
2.2 CURRENT USE OF WEARABLES.....	4
2.3 CURRENT FOCUS OF TRACKING	5
2.4 STEP COUNT	6
2.5 SHARING PERSONAL DATA WITH INSURERS	7
2.6 INFLUENCE OF WEARABLES ON ACTIVITY AND HEALTH	7
2.7 FEEDBACK FROM USERS.....	9
3. HOW RELIABLE IS REAL-TIME DATA?	10
3.1 FRAUD AND ABUSE.....	10
3.2 FUNDING CONSIDERATIONS	10
3.3 ACCURACY OF RESULTS	11
3.4 CONSIDERATIONS FOR USE OF WEARABLES DATA	11
CONCLUSION	12

Executive Summary

Mass market wearable technology is relatively new, and it has evolved dramatically in recent years. Ever since the rollout of electronic devices capable of measuring and recording various types of health data, private medical insurers have been carefully eyeing the potential usage of these devices.

In this paper we discuss the implementation and practical uses of wearables in the private medical insurance (PMI) market. We review why insurers are considering using wearable devices and how these devices might benefit insurers' business models, as well as some of the pitfalls to consider.

Wearables provide real-time data points that we expect to be detailed and accurate. However, is this really the case? We look at the reliability of real-time data, potential areas of fraud and abuse and whether the data of wearables can really be considered reliable. We also look at funding considerations when incorporating wearables into an insurance product, alongside other key considerations for the use of wearables data. We found that, whilst wearables data can help insurers gain additional insight into the general fitness behaviour of their policyholders, the additional data collected might not necessarily improve upon existing claims cost prediction techniques.

As part of our research, we conducted a market survey designed to understand consumer opinions on their interaction levels with wearable devices and their thoughts on the use of wearables in insurance. We share the findings of our market research and discuss some of the key conclusions. An interesting outcome from this research is that, even though a significant proportion of our respondents regularly tracked their health data and worked within the insurance industry, views on the role of wearables data within insurance varied quite widely. We consider the range of devices used by survey participants, the type and frequency of activity captured and their views on the use of this information in determining the premium level for their insurance policies.¹

¹ Note that a version of this paper was originally published by Milliman in March and is available at <https://www.milliman.com/en/insight/the-role-of-wearables-in-private-medical-insurance>.

1. Use of wearables in insurance:

1.1 INTRODUCTION

The use of wearables in insurance is typically centred around three main objectives:

1. **Improve claims cost prediction:** Supplement underwriting processes and pricing models.
2. **Make people healthier and reduce healthcare claims costs.**
3. **Strengthen competitive position:** As they gain popularity, wearables are expected to be part of regular wellness offerings for insurers to remain competitive.

Although these objectives sound reasonable, it is important to question whether wearables do in fact add power to claims cost prediction beyond what traditional and other big data measures contribute, and if wearables are in fact capable of making people healthier.

Offering wearables to insurance policyholders certainly presents new opportunities not previously available to insurers. However, these opportunities are not without their pitfalls, as shown in Figure 1.

FIGURE 1: OPPORTUNITIES AND PITFALLS OF USING DATA FROM WEARABLES

Capability	Opportunities	Pitfalls
 <p>Collect real-time data</p>	<ul style="list-style-type: none"> ▪ Large amounts of real-time data to track activity and health indicators of individuals 	<ul style="list-style-type: none"> ▪ Storing, processing and creating business value can be tricky ▪ Risk of collecting incorrect or misleading data ▪ Regulatory and data protection concerns
 <p>Pricing rating factors</p>	<ul style="list-style-type: none"> ▪ New rating factors not otherwise available ▪ Enhance predictive power 	<ul style="list-style-type: none"> ▪ Complex "black box" pricing models ▪ May not provide additional insights compared to traditional methods because the underlying science is still not clear (i.e., we don't know which factors are most predictive of morbidity with any real level of precision) ▪ Potentially expensive to incorporate
 <p>Underwriting using additional data</p>	<ul style="list-style-type: none"> ▪ New underwriting criteria not otherwise available, e.g., having credible and reliable wearables data may be a useful source of information when classifying policyholders as standard or substandard risks 	<ul style="list-style-type: none"> ▪ Potential for fraudulent methods used to achieve high activity levels ▪ Discrepancy between devices may produce different conclusions for different measures ▪ Lack of evidence that high levels of activity recorded by wearable devices can be associated with better risks

The expectation is that insurers can positively impact their members' lifestyle behaviours with wearables, which should result in improved health and lower healthcare claims costs. However, actual experience could turn out quite differently from the expectation. A study by Rand Health on US wellness programmes in 2013² found that, while it is possible that the use of wearables can improve health and claims experience, further considerations are required to incentivise members. Two major findings from the Rand study included:

- Take-up rates for wellness tests are less than half for eligible employees. Less than one-fifth of employees provided with follow-up actions carry them out.
- When wearable technology is used in conjunction with loss-framed incentives, there are lower activity levels and higher financial costs to members. Conversely, gain-framed incentives can lead to higher activity and greater discounts for members with no additional financial costs incurred.

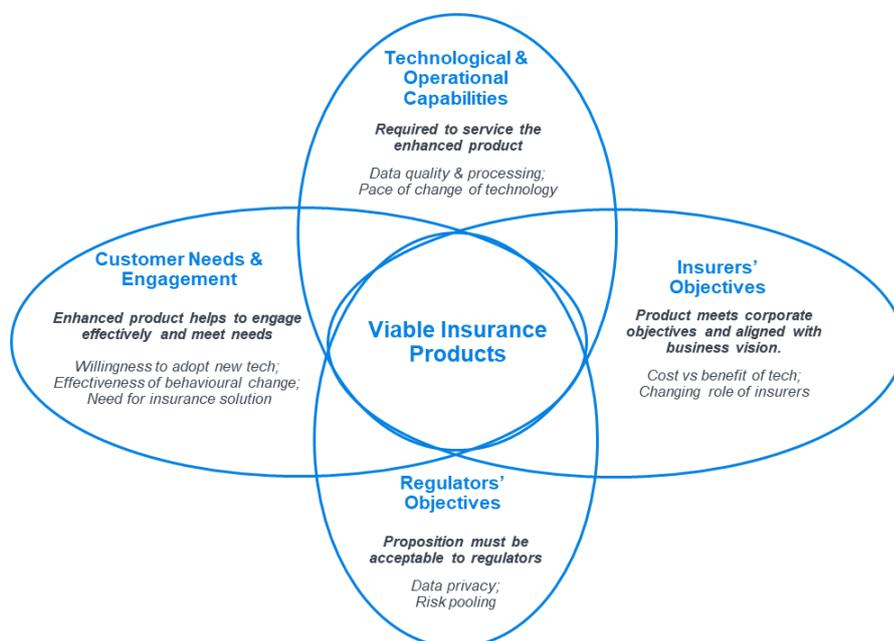
It is important to recognise that the use of wearable technologies alone is unlikely to be sufficient to drive real change in lifestyle behaviours and impact members' health. A comprehensive wellness programme that focuses on additional health-related activities with appropriate incentive structures is more likely to achieve the desired effects. In a separate Milliman publication, we discuss the considerations for implementing and evaluating wellness programmes.³

1.2 RISKS TO STAKEHOLDERS

For wearables to be integrated into a viable insurance product, risks faced by key stakeholders need to be addressed to achieve stakeholder alignment.

As shown in Figure 2, for insurers to achieve alignment with the relevant stakeholders they will need to consider their own objectives, as well as those of the stakeholders and regulators. They will also need to consider the needs of their customers and identify their operational and technological capabilities to ensure that they can create viable insurance products. Figure 2 is taken from the Institute and Faculty of Actuaries (IFoA) presentation "Wearables and the Internet of Things."⁴

FIGURE 2: STAKEHOLDER ALIGNMENT FOR VIABLE INSURANCE PRODUCTS⁵



² Mattle, S. et al. (2013). Workplace Wellness Programs Study. RAND Health. Retrieved 31 August 2020 from https://www.rand.org/content/dam/rand/pubs/research_reports/RR200/RR254/RAND_RR254.pdf.

³ Beveja, L. et al. (December 2019). How to Implement a Wellness Programme. Milliman Report. Retrieved 31 August 2020 from <https://www.milliman.com/insight/how-to-implement-a-wellness-programme>.

⁴ IFoA Wearables and Internet of Things Working Party (18 June 2018). Impact of Wearables and the Internet of Things. Retrieved 31 August 2020 from <https://www.actuaries.org.uk/practice-areas/health-and-care/disbanded-research-working-parties/impact-wearables-and-internet-things>.

⁵ Ibid.

1.3 INSURANCE FIRMS ALREADY USING WEARABLES

Many insurers globally are already making use of the technology in their insurance and wellness programme offerings. Figure presents examples of how some insurers are using the technology to incentivise policyholders. What incentives can be provided are also in the purview of the regulator; for example, the Insurance Regulatory Development Authority in India (IRDAI) limits the use of reward points for premium discounts and medical claims-related services only.

FIGURE 3: EXAMPLES OF CURRENT USE OF WEARABLES IN INSURANCE

<p>Aditya Birla Health Discounts for policyholders who record a specified number of steps using an activity tracker, attend gym sessions or have a health assessment.</p>	<p>The Vitality Programme Vitality members earn points and achieve higher Vitality statuses when they undertake activities that are assumed to impact health status. Higher Vitality statuses unlock higher rewards for benefits such as gym, travel and other discounts.</p>	<p>AXA Offers a free Withings Pulse fitness tracker. Participants receive discounts of over \$100 on their insurance policies, as well as discounts off any Withings product purchases when they complete a certain number of steps.</p>
<p>Oscar Rewards customers who track their fitness data gift cards when they reach their step goals.</p>	<p>United Healthcare Rewards users with healthcare credits for reaching daily fitness goals.</p>	<p>Qantas Assure Policyholders receive Qantas frequent flyer points if they lead more active lifestyles.</p>
<p>Aetna Offers an app that monitors daily activity and provides assistance in achieving personalised health goals. The app also provides recommendations, nudges and rewards.</p>	<p>Esurance SavorBand devices are offered which can capture information on food consumed, including recipes, cooking tips and purchasing discounts along with other data.</p>	<p>Beam Technologies Uses Bluetooth-enabled toothbrushes to reward good brushing habits with discounted insurance premiums and other rewards.</p>

2. What do "consumers" think? Our survey results

We conducted a survey, shared via email, LinkedIn and other social media platforms within our social network, to investigate what consumers think about wearables in insurance given their role as "consumers" by asking questions relating to:

- Demographic profile
- Current use of wearables
- Opinions on sharing wearables data with insurers
- Opinions on fairness of using wearables data for premium calculations
- Opinions on the use of discounts for using wearables on insurance policy renewal

2.1 DEMOGRAPHIC PROFILE OF RESPONDENTS

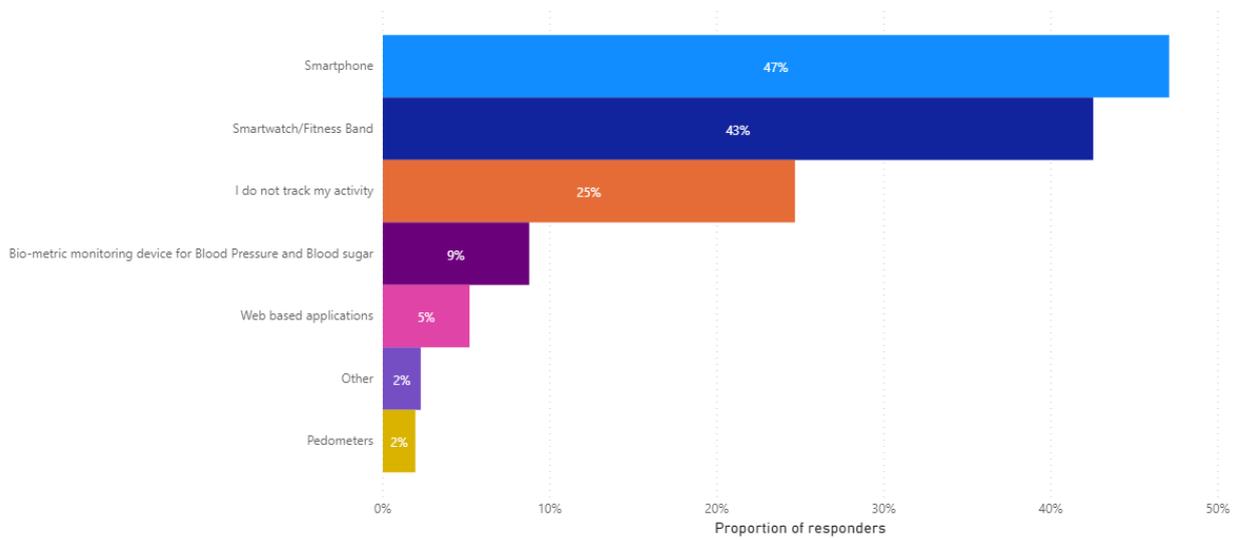
We gathered 300+ responses from this survey. Overall, 38% of our respondents were female, 59% were male, while the remainder chose not to answer. A majority of respondents were from the 25-34 (38%) and 35-44 (33%) age groups.

2.2 CURRENT USE OF WEARABLES

We asked our respondents what type of devices they use as their primary source for tracking their health data, and what activities they track. Figure 4 summarises the responses we collected. The smartphone was the most used device, with 47% of respondents using it as their primary tracking device. This is not surprising as most smartphones have inbuilt apps that automatically record metrics such as sleep, steps and distance. Not far behind, 43% of our respondents used either a Fitbit, Garmin, Apple Watch or other smartwatch to actively track their data, which suggests that there is a large proportion of people actively choosing to use these devices to pursue their tracking goals. About 25% of people said that they do not track any data at all.

FIGURE 4: DISTRIBUTION OF RESULTS BY SMART DEVICE USED

What is the main device you use to track your health and fitness activity?



2.3 CURRENT FOCUS OF TRACKING

Figure 5 presents the summary of responses as to what people are tracking. The major focus of tracking was physical activity through steps, sports/exercise activity and flights of stairs. Respondents reported using steps (66%), distance (44%), heart rate (38%) and time spent in activity (25%) as the measures of engagement. Only 2% of our respondents track calories burned, even though the metric is displayed in various health apps. Finally, 25% reported tracking sleep and 13% reporting tracking nutrition.

FIGURE 5: DISTRIBUTION OF RESULTS BY TRACKED ACTIVITIES

What all do you track (select all that apply)

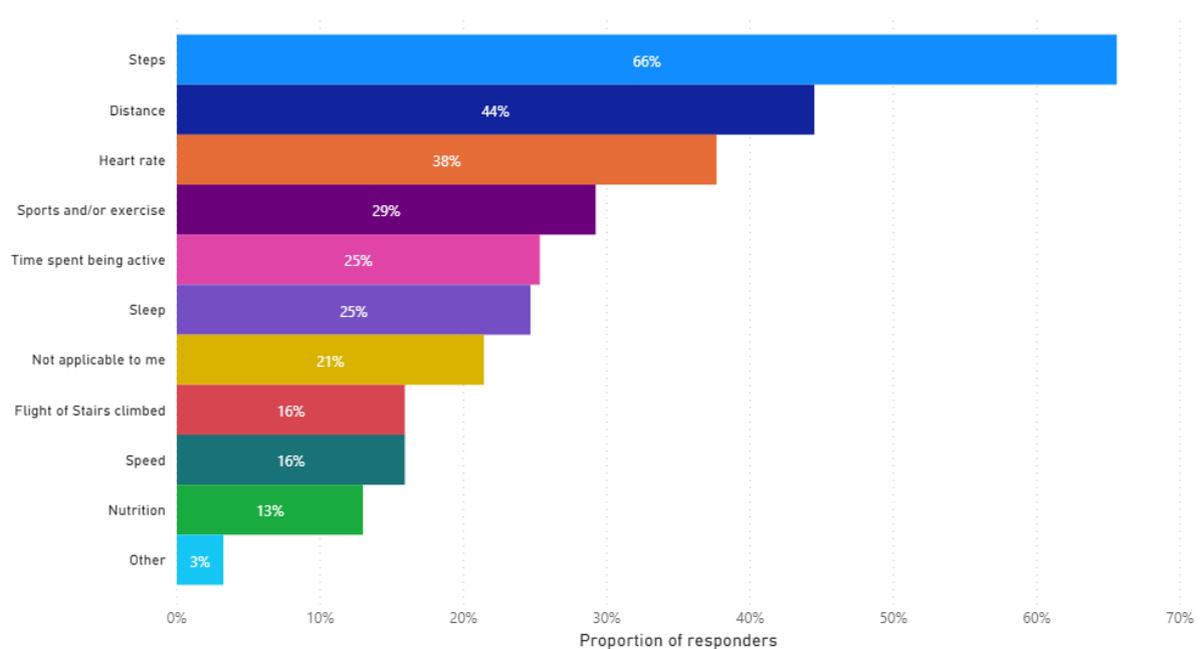
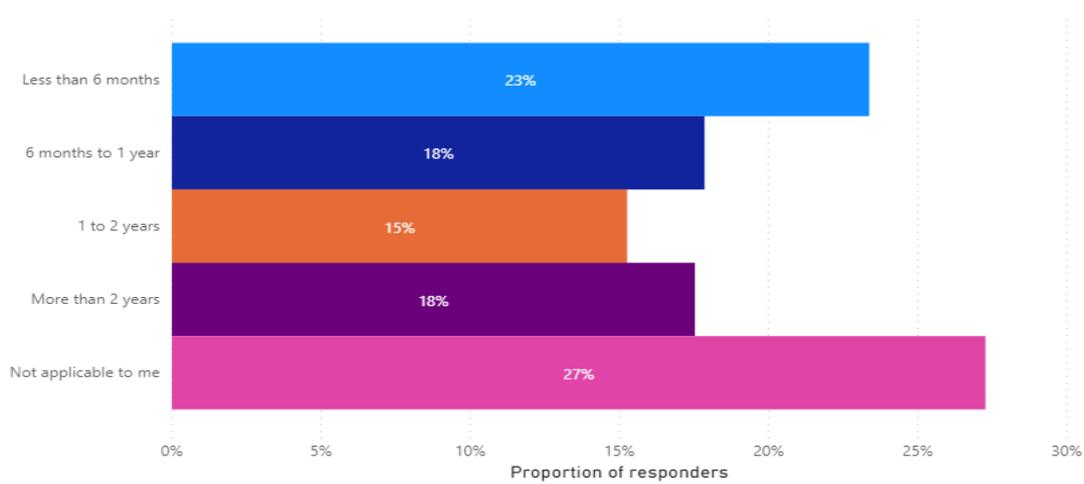


Figure 6 shows that about 23% of the respondents have recently (in the past six months) started tracking their activities and about 18% in the last year. Only 18% reported tracking for longer than two years. This suggests that the uptake of wearables and tracking is still fairly recent.

FIGURE 6: DISTRIBUTION OF RESULTS BY DURATION OF TRACKING ACTIVITIES

How long have you been tracking your activity?

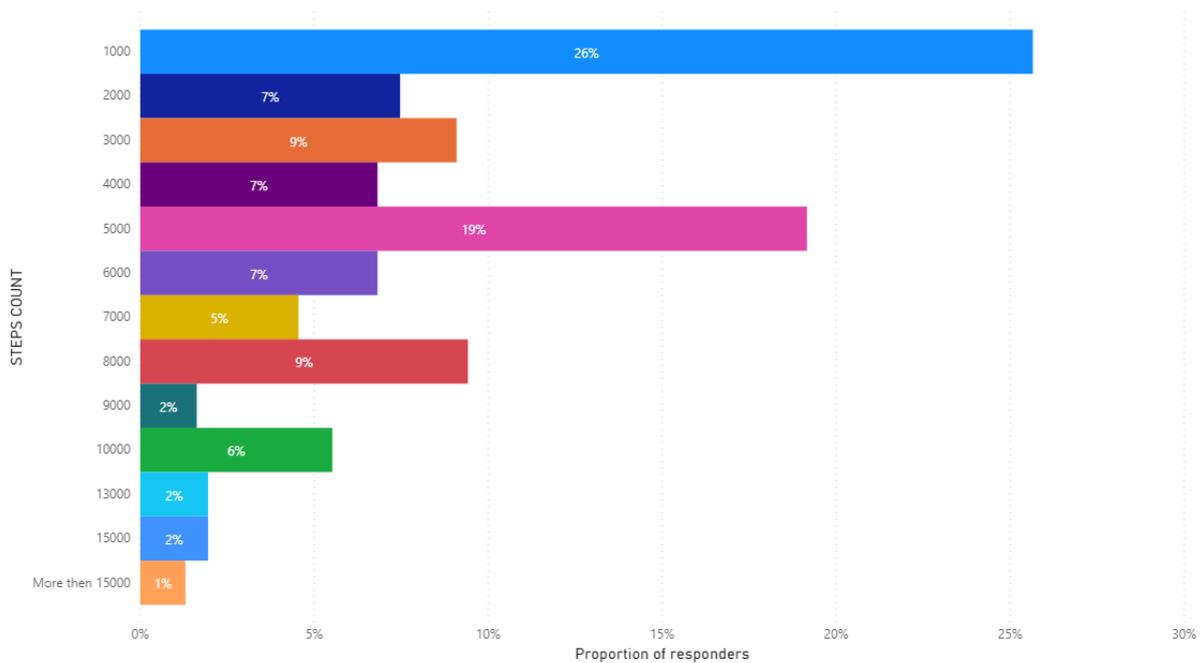


2.4 STEP COUNT

Figure 7 shows the distribution of average daily step counts for our respondents who track steps. While various publications recommend at least 10,000 steps daily as a reasonable target, only 11% of respondents in this survey reported their current step counts to be meeting or exceeding the target. About 26% are managing only 1,000 steps per day.

FIGURE 7: DISTRIBUTION OF RESPONSES FOR AVERAGE STEPS COVERED PER DAY

On average, how many steps do you do per day?



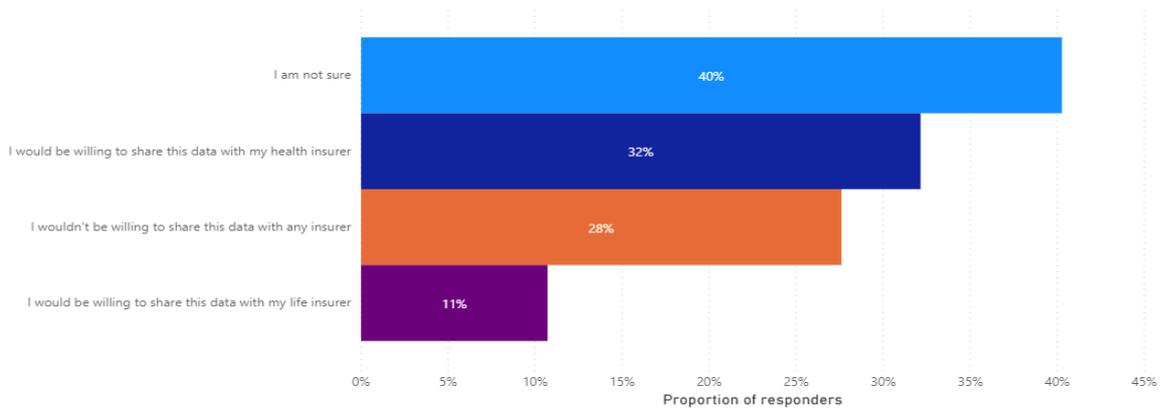
It is important to highlight that this survey was conducted during the lockdown phase of the COVID-19 pandemic. The responses may reflect current activity levels where respondents may have different challenges due to restricted travel and work-from-home scenarios. Also, we acknowledge that these results may have a bias as people who responded to our survey may be more likely to make use of wearables and more interested in being active and tracking activity. Additionally, because the data are self-reported it may also not reflect respondents' actual step counts.

2.5 SHARING PERSONAL DATA WITH INSURERS

We asked our respondents how they felt about sharing their wearables data with insurers, as shown in Figure 8. Among our respondents, 32% were willing to share any health tracking data with their health insurers and only 11% were willing to share their data with their life insurers. The main concerns of our respondents seem to be that wearables data may influence their premiums or the security of their personal data.

FIGURE 8: DISTRIBUTION OF RESULTS BY OPINION ON INSURERS TRACKING WEARABLES DATA

Would you be willing to share your activity tracking data with your health or life insurer?



We also asked respondents, as shown in Figure 9, what they thought about premium loading at various stages throughout a contract and whether being provided with a free wearable device by their insurer would increase their likelihood of renewing their policy.

FIGURE 9: USE OF WEARABLES FOR PREMIUM LOADING AND INCREASING LIKELIHOOD OF RENEWAL

Do you think it is fair for wearables data to be used to set premiums at the start of the insurance contract?

- Yes, 41%
- No, 54%
- Others, 5%

If your insurer offered you a free wearable device annually, would it make you more likely to renew your policy?

- Yes, 58%
- No, 37%
- Others, 5 %

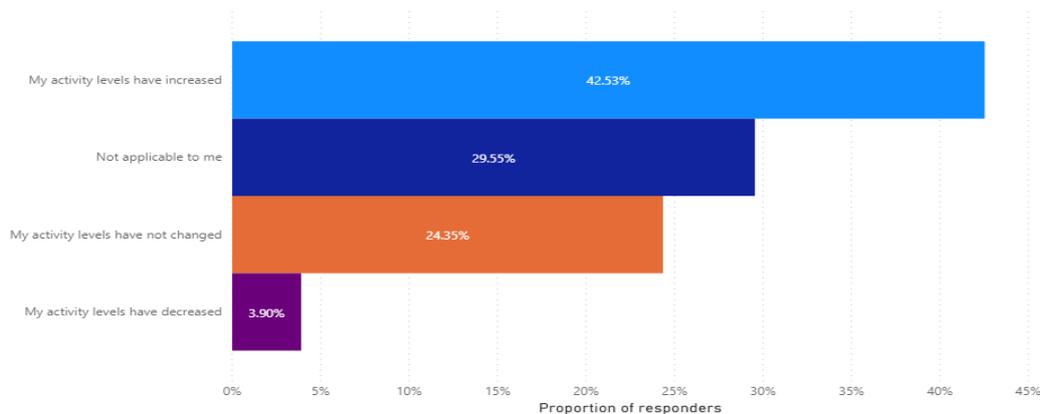
Over half of the respondents, 54%, responded it is not fair for wearable data to be used to set premiums at the start of the insurance contract and 58% would be willing to renew their policies if offered a free wearable device.

2.6 INFLUENCE OF WEARABLES ON ACTIVITY AND HEALTH

We asked respondents about changes to their activity levels since they began tracking their activity and health information, as shown in Figure 10. Overall, respondents thought that tracking health information helped improve their activity levels, with 43% of respondents reporting an increase in activity levels. However, 24% of people stated that their activity levels had either not changed or decreased since they started using wearables.

FIGURE 10: DISTRIBUTION OF RESULTS ON THE IMPACT OF WEARABLES ON GENERAL ACTIVITY LEVELS

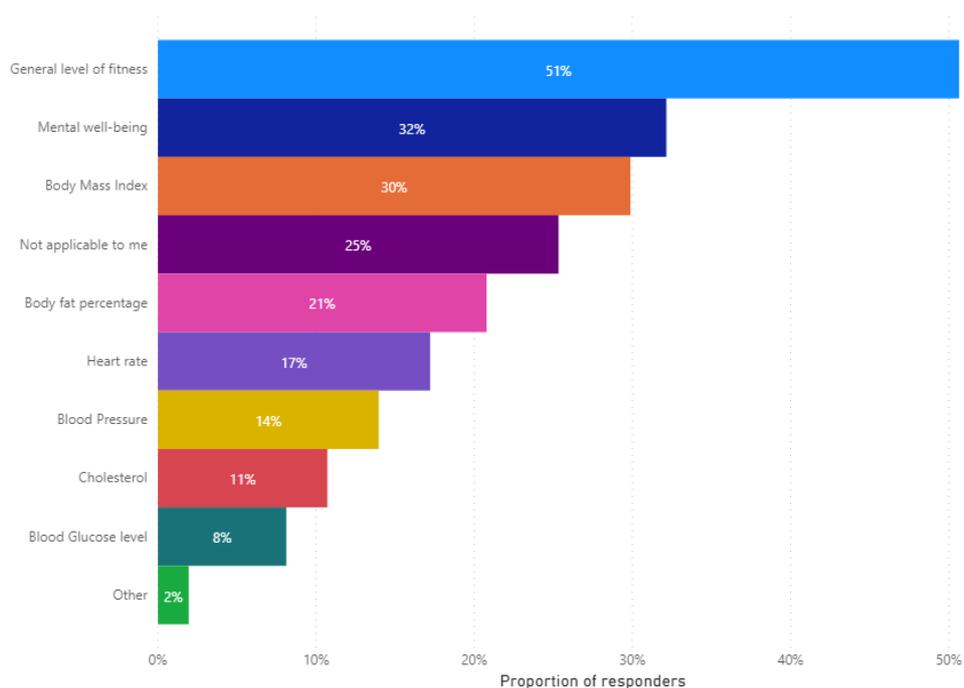
How has your wearable device influenced your level of activity



Almost 51% of respondents stated that their general levels of fitness have improved due to activity tracking while 32% of respondents claimed their mental health has improved, as shown in Figure 11. Interestingly, almost everyone who responded (about 98%) reported improvement in at least one biometric measure because of activity tracking, e.g., body mass index (BMI), heart rate, blood glucose, cholesterol, body fat percentage and blood pressure.

FIGURE 11: DISTRIBUTION OF RESULTS ON THE PERCEIVED MEASURES IMPROVED AS A RESULT OF ACTIVITY TRACKING

Select the measures that you think have improved as a result of tracking your activity?



2.7 FEEDBACK FROM USERS

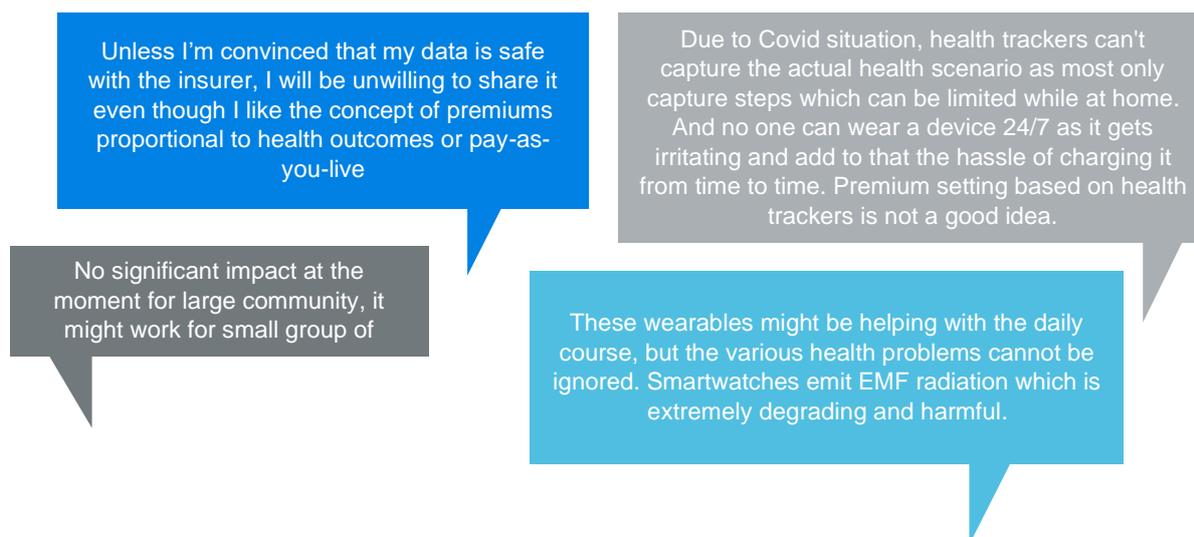
We grouped the open comments made by respondents on the survey into categories to reflect the essence of the comments. Figure 12 shows that 27 respondents' opinions were in support of use of wearables in health insurance while 11 were not in favour. We have compiled some of the interesting examples in Figure 13.

FIGURE 12: FEEDBACK CATEGORIES

	CATEGORY	COUNT
1	Respondents who are in favour	18
2	Respondents who are not in favour	11
3	Respondents who are in favour but don't use wearables	5
4	Respondents who are in favour but need to be incentivised to use wearables	4
5	Respondents who use wearables but are concerned about health hazards	4
6	Respondents who are in favour but are concerned about data sharing	3
7	Others	11

FIGURE 13: FEEDBACK FROM RESPONDENTS





3. How reliable is real-time data?

The proliferation of wearables and the data that they generate have some benefits to insurers. However, the potential for fraud will need to be managed and the accuracy of the collected data will need to be assessed.

3.1 FRAUD AND ABUSE

The use of wearables opens up many opportunities for members to commit fraud. New ways to game the system are being invented continuously. If insurers track data in real-time and use this to influence members' benefits, they will need to develop methods to guard themselves against new types of fraud that will arise. For example, devices to help members fabricate their levels of activity are widely available to purchase. To prevent this type of fraud from occurring, insurers could consider using combinations of biometric data such as heart rate combined with steps or distance covered with steps.

3.2 FUNDING CONSIDERATIONS

To develop an insurance product that incorporates the use of wearables, the insurance firms designing such products will need to weigh the costs and benefits of the various fitness devices available on the market. As seen in Figure 14, prices can range from free applications in smartphones up to INR 49,900 or more, and yet key fitness metrics are quite similar across the entire range. However, insurers will also have to consider wider features of the products that are not so measurable. For example, the strength of the Apple brand may make an expensive Apple Watch more attractive to customers than cheaper products with similar features.

FIGURE 14: A COMPARISON OF THE FEATURES OF TOP-RATED FITNESS TRACKERS, 2020⁶

Device	Inbuilt GPS?	Heart Rate Tracker?	Activity Tracking?	Sleep Monitoring?	Water-proof?	Max Battery Life in Days (with GPS off)	Highest Price (on Amazon India)
Samsung Gear Fit 2 Pro Fitness Band	No	Yes	Yes	Yes	50 m	3 days	₹ 13,999.00
Fitbit Charge 2 Fitness Band	No	Yes	Yes	Yes	50 m	5 days	₹ 14,999.00
HONOR Band 5 Fitness Tracker	No	Yes	Yes	Yes	50 m	14 days	₹ 2,999.00
Garmin Vívofit 4 Fitness Band	No	Yes	Yes	Yes	50 m	7 days	₹ 7,999.00
Mi Band 4 Smart Band	No	Yes	Yes	Yes	50 m	20 days	₹ 2,499.00
Apple Watch Series 5	Yes	Yes	Yes	Yes	50 m	2 days	₹ 49,900.00

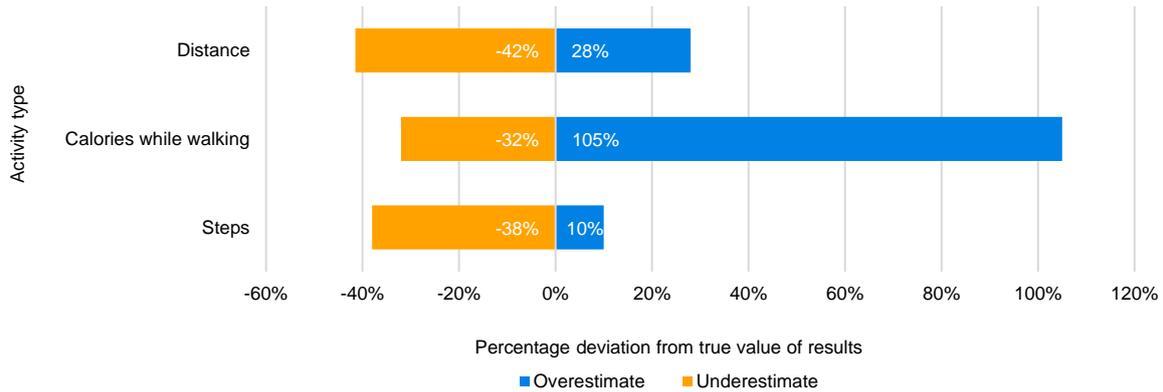
⁶ Abdul Q (19 May 2020). Best fitness tracker in India: The top activity bands in 2020. TechRadar Retrieved 31 August 2020 from <https://www.techradar.com/in/news/wearables/10-best-fitness-trackers-1277905>.

3.3 ACCURACY OF RESULTS

Currently there seem to be discrepancies among the results recorded by different types of devices, which brings the accuracy of these devices into question. The UK consumer watchdog "Which?" tested the consistency of results produced by over 100 wearable wrist devices by considering a range of metrics for all of these devices. Which? found that there was significant variability in the results among devices. These discrepancies mean that policyholders could be unfairly rewarded or penalised depending on the device they use.

Figure 15 shows the results of using various wrist devices alongside a chest strap to monitor heart rates. This shows that some devices are much worse than others in terms of providing accurate results.

FIGURE 15: WHICH? MAGAZINE'S FINDINGS ON ACTUAL VS. RECORDED MEASURABLE DATA



3.4 CONSIDERATIONS FOR USE OF WEARABLES DATA

Insurers will also have to consider how to they collect, store, analyse and use the data generated by wearable devices. Figure 16 highlights key considerations for insurers in this context.

FIGURE 16: CONSIDERATIONS FOR USE OF WEARABLES DATA

What influences health?	The overall effectiveness of most comprehensive wellness programmes in motivating healthy behaviors is unclear, so it is highly unlikely that wearables alone can achieve lower claims costs.
Regulation	Insurers will need to consider the relevant insurance and data protection regulations in their regions.
Engagement levels	Only some policyholders will be willing to share their data. Insurers will need to consider how to design benefits that are fair to all. For example, can you penalise those who share data but not penalise those who do not?
Data interpretation	The type and frequency of data being captured may make it challenging to derive any meaning from data analysis. (Additional data does not necessarily give rise to improved claims cost predictions.)
Absolute improvement vs. trend	How do you reward both those who are making improvements to their health (e.g., move from 3,000 to 8,000 steps per day) and those who are already at a high level (e.g., 15,000 steps per day).
Costs	There will be significant costs associated. For example: <ul style="list-style-type: none"> ▪ Funding or subsidising wearable devices ▪ Infrastructure (e.g., cloud storage, computing power) ▪ Staff hiring and training
Measures captured	What measures are being captured and used, and what are the challenges associated with them? For example, if distance is a measure of interest, what about the scenario where someone runs on a treadmill for an hour and logs 0 km.

Conclusion

The stated use cases of wearables in medical insurance focus primarily on improving claims cost predictions, making members healthier and reducing overall claims frequency and amounts, while at the same time strengthening an insurer's competitive position.

However, currently there is limited evidence that wearables can change the long-term behaviour of policyholders. There is also limited evidence that metrics captured by wearables today are strong influencers of long-term health and it is important to recognise that wearable technologies alone are unlikely to sufficiently drive real change in lifestyle behaviours and impact members' health statuses.

While wearable technology provides a stream of health-related data and, hence, potential additional rating factors to use for pricing and underwriting purposes, each stated benefit comes with potential pitfalls. The additional complexity of incorporating these data elements may not be warranted. Potential risks, such as tracking unreliable information or manufactured data, must be addressed. Further, the variability in the data coming from different devices is problematic.

Our research among our contacts on the use of wearables in insurance highlighted that our respondents were fairly engaged with wearable technology, with nearly 75% of all respondents tracking their activity in some form and almost 60% stating that their general levels of fitness had improved due to activity tracking. The most interesting finding is that even within the cohort of our respondents (who were typically actuaries or analysts) there were widely varying views towards the use of wearables in the insurance market, with different levels of understanding of the wearables landscape, the use of wearables in insurance and a range of attitudes towards insurers using their wearables data. This may indicate that in the wider population there is likely to be a very wide range of acceptance of the use of wearables in insurance decisions.

Finally, even though real-time data is an exciting big data opportunity, its use needs to be carefully considered with the high potential for fraud, high potential costs for insurers, questionable accuracy of the data and considerations around fairness in how using wearables translates into pricing and underwriting decisions that affect individual members.



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.

in.milliman.com

CONTACT

Lalit Baveja

Principal and Senior Healthcare
Management Consultant

lalit.baveja@milliman.com

Samyukta Achar

Healthcare Consultant

samyukta.achar@milliman.com