

LifeQ[®]

Activity Health Score

What is the LifeQ Activity Health Score?

The LifeQ Activity Health Score (AHS) evaluates the activity levels of an individual, and is provided as a score from 0 - 100. This activity score can be interpreted relative to healthy recommendations found in literature.

It is well known that low levels of activity are associated with an increased risk of cardiovascular disease and general poor health. Allowing an individual the opportunity to understand and track their activity levels, enables them to proactively manage their lifestyles and positively impact long-term health outcomes.

While 10 000 steps has been an activity benchmark for some time, wearable devices with heart rate monitors now allow for a more scientific approach to measuring the intensity, frequency and duration of an individual's activity as opposed to only distance, represented by steps.

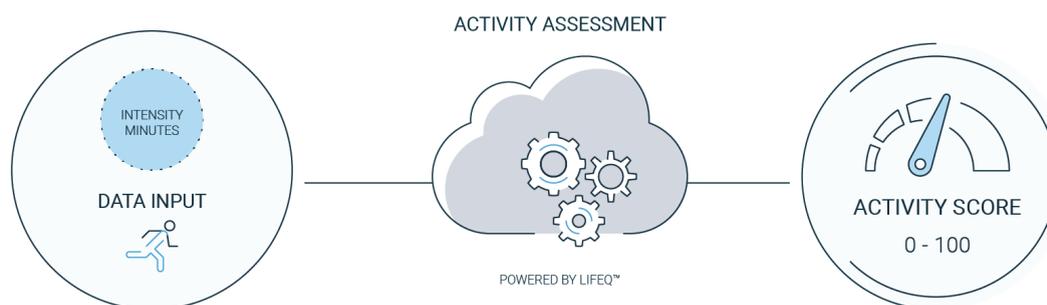
The LifeQ solution uses the individual's LifeQ Intensity Minutes as input to developing the Activity Health Score.

LifeQ Intensity Minutes

LifeQ distinguishes between Light, Moderate and Vigorous activity. These different levels of intensity are each weighted and then combined to calculate the LifeQ Intensity Minutes for a given activity session. The more intensity minutes an individual has, the higher their Activity Health Score will be.

LifeQ uses the real time Heart Rate and an individual's Heart Rate Reserve (HRR), to calculate which portion of an active session should be characterized as light, moderate or vigorous. HRR describes the difference between an individual's recorded Maximum Heart Rate and the recorded Resting Heart Rate. The real time heart rate as a percentage of HRR is calculated, in this way each part of the activity session can be categorized into light, moderate or vigorous activity.

- **Light activity** includes physical activity completed at a lower heart rate, as a percentage of HRR.
- **Moderate activity** includes physical activity completed at moderate heart rate, as a percentage of HRR.
- **Vigorous activity** includes physical activity completed at a high heart rate, as a percentage of HRR.



What AHS Output is provided by LifeQ?

The LifeQ AHS solution outputs a value 0-100. The table below provides guidance on how to interpret the AHS score providing an estimate of the percentage of the population that should fall in each category.

Table 1: Categorization of scores for Activity Health Score

Health performance	Score range	Percentage of test population within this range
Very poor	0 - 24	~ 10
Below average	25 - 39	~ 20
Average	40 - 59	~ 40
Above average	60 - 74	~ 20
Excellent	75 - 100	~ 10

The LifeQ Activity Score contextualizes a user's level of activity in comparison to healthy recommendations. There are numerous scientific and academic studies and publications that have investigated the relationship between activity levels and health by using daily step count or intensity minutes. LifeQ has leveraged this knowledge as well as population distribution outputs from pilot data to develop the Activity Health Score, a physiological measure of activity that allows an individual to compare themselves to healthy recommendations found in literature.

The score requires a minimum of 7 days of data, which do not have to be consecutive. The AHS has been further designed as a rolling 28 day average in order to smooth the score out over time and remove any anomalies that may cause sudden fluctuations. In this way, LifeQ can provide a more reliable view of an individual's long-term activity levels, and the impact this may have on their health.

The weeks contributing to the Activity Level are weighted according to how many weeks of uploaded data are included: the first week contributes 100%; after two weeks, each week contributes 50%; after three weeks, each week contributes 33%; and after four weeks, each week contributes 25%.

Validation

There is no single gold standard for measuring activity and the impact on the health and long term mortality risk of an individual. LifeQ has used multiple study outcomes and existing literature to develop the Activity Health Score, while being consistent with the known concept of intensity minutes. Generally activity thresholds of 75 minutes/week of vigorous intensity activity or 150 minutes/week of moderate intensity activity are recommended.

The LifeQ Activity Health Score was developed on data collected from LifeQ pilot cohorts, along with peer-reviewed scientific literature that investigated the relationship between intensity minutes and long term positive health outcomes.

Figure 1 below shows the relationship between moderate-to-vigorous activity and the relative risk of all-cause mortality.

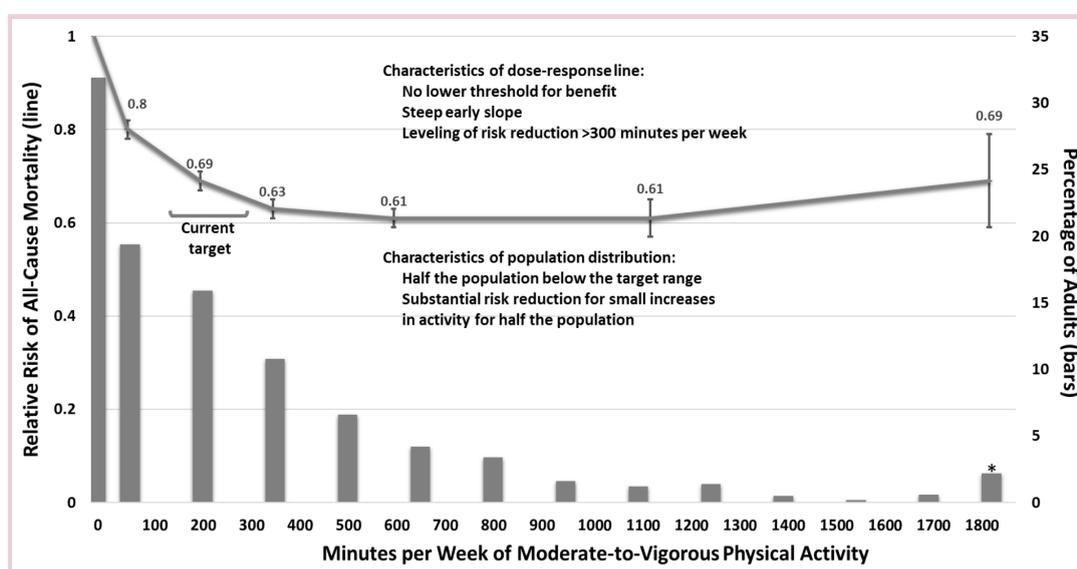


Figure 1: A typical dose-response curve for moderate-to-vigorous physical activity and the relative risk of all-cause mortality.

Constraints in estimating AHS accurately

The LifeQ AHS and LifeQ Intensity Minutes are heavily dependent on the accuracy of HR measurement during active times and the correct values for Maximum HR and [Resting HR](#).

Measuring HR from a wrist-based device is complex and the technology has limitations owing to the nature of the quality and coverage of the available PPG signal. LifeQ's solutions are built to overcome and mitigate as many as possible of these issues. The accuracy of HR can be reviewed in [LifeQ - Heart Rate \(HR\) - Product Validation - 2021-02](#).

Low motion or static forms of exercise such as yoga, pilates and low intensity stationary cycling may not be classified as activity due to low movement levels, low heart rate elevation, or both. In

this instance, these activities may not contribute to the LifeQ Intensity Minutes and AHS, or may only be detected sporadically.

The purpose of the AHS is to provide users with a guide of how active they are compared to healthy recommendations found in literature. LifeQ recommends that users seek professional advice if they are concerned about their AHS score or would like to make drastic improvements to their score.