Vital Signs and Health Indicators Information

Basic Vital Signs

Wellness Score

The Wellness Score is a **prediction risk** score that is used to predict a person's cardiovascular risk for the next 5 to 10 years. The Wellness Score is based on the vital signs measured by our technology, and is designed to serve as a reference when measured at rest, under similar conditions during all of the measurements, and if the score is consistent in repeated measurements over time.

The higher the wellness score, the lower the cardiovascular risk.

How is it calculated?

Your Wellness Score is calculated using your vitals results from any single measurement. The values of each one of the vital sign measurements affect your Wellness Score prediction.

Generally, a lower Heart Rate at rest implies more efficient heart function and better cardiovascular fitness. Therefore, a higher Heart Rate reduces your Wellness Score - even when the heart rate is within the normal range. For example, heart rates that are higher than 65

reduce the wellness score to a **medium score**, and values that are higher than 84 reduce the wellness score to a **low score**.

HRV measures the variation in time between heartbeats. The Stress Level that is calculated from this variance also affects your Wellness Score. Thus, Very High and High stress levels are correlated with a **low score**, while Mild and Normal stress levels are correlated with a **medium score**.

Your Oxygen Saturation level measures the amount of oxygen in the blood delivered from the lungs to the rest of the body. A higher level implies a more efficient function, thus, a lower Oxygen Saturation level reduces the Wellness Score.

In addition, High Blood Pressure readings at rest may pose a higher risk of health problems and therefore may reduce the Wellness Score.

Blood Pressure

The pressure of blood is exerted on the walls of the arteries, which carry blood from the heart to other parts of the body. Normal systolic pressure is from 100 to 129.

Blood Pressure measures the pressure of circulating blood against artery walls, and it is measured by two numbers. The first number, or systolic pressure, refers to the pressure inside the artery when the heart contracts and pumps blood throughout the body. The second number, or diastolic pressure, refers to the pressure inside the artery when the heart is at rest and is filling with blood.

Most people don't know if they have high Blood Pressure – especially since there may be no noticeable warning signs or symptoms – and therefore the Blood Pressure must be measured.

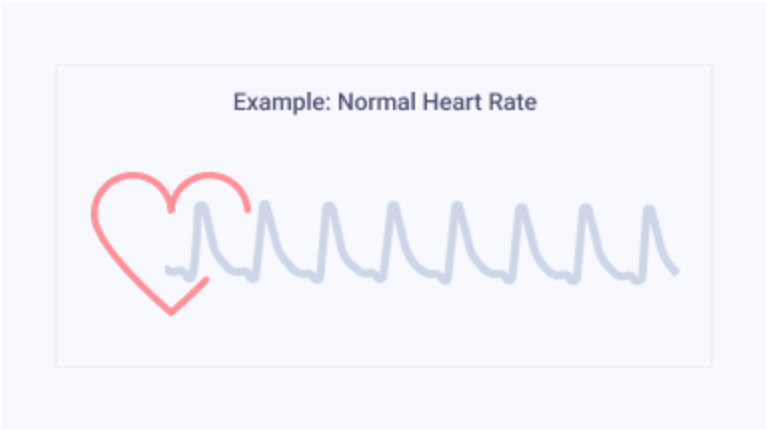
Blood pressure changes in response to different activities and is recommended to be measured while at rest. Consistently high blood pressure readings may result in a diagnosis of high blood pressure (hypertension), which poses a higher risk for health problems such as heart disease, heart attack, and stroke. In most cases, high blood pressure has no defined cause, and it is called primary hypertension. However, it is related to unhealthy lifestyles such as physical inactivity, stressful life, obesity, shift work, pregnancy, etc. It should be emphasized that Blood Pressure can be managed through diagnosis, lifestyle changes, medication and long-term monitoring.

Blood Pressure is categorized as low, normal, or elevated: low blood pressure is defined as systolic pressure of less than 100, normal blood pressure is defined as systolic pressure of 100 to 129, while elevated blood pressure is defined as systolic pressure of 130 or higher.

These numbers should be used as a guide only. A single Blood Pressure measurement that is higher than normal is not necessarily an indication of a problem. Your doctor will want to see multiple Blood Pressure measurements over several days or weeks before making a diagnosis of high blood pressure and commencing treatment.

Heart Rate

This is the number of times your heart beats per minute. The normal resting rate is 60 to 100 beats for a healthy adult.



Think of your heart as a pump that pushes blood through your body. With every beat, the heart pumps blood containing oxygen and nutrients around the body and brings back waste products. A healthy heart supplies the body with the right amount of blood at a rate proportionate to whatever activity the body is undertaking.

Normal resting rates can differ between people. Furthermore, heart rates are lower when at rest and increase during exercise. Moreover, this rate can change with different situations such as the weather, body position, emotions, body size, medication, and the use of caffeine and nicotine.

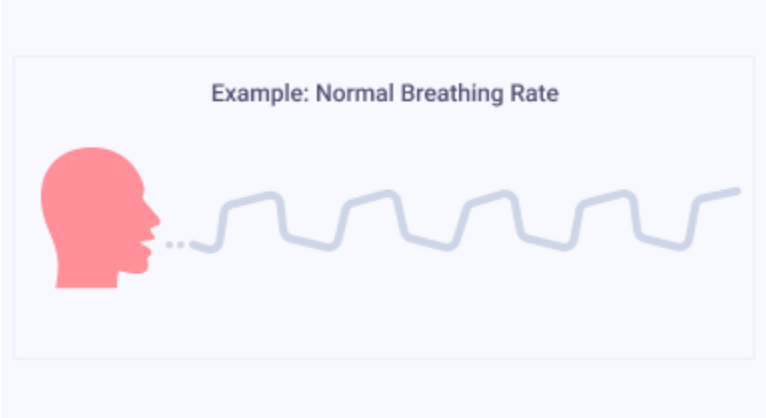
At rest, a fast Heart Rate may indicate acute health conditions such as an infection, dehydration, stress, anxiety, thyroid disorder, shock, anemia, or certain heart conditions. Moreover, it can predict long-term risk for cardiovascular events. A low Heart Rate is common for people who exercise frequently and participate in athletics.

Tracking Heart Rate can provide insight into fitness levels, heart health, and emotional health. Moreover, for individuals taking medication for cardiovascular conditions, daily Heart Rate measurements can assist the doctor in advising on the proper course of treatment.

A healthy heartbeat is important in protecting cardiac health. If you feel that your heart is beating out of rhythm (too fast or too slow), speak to a doctor about your symptoms.

Breathing Rate

The number of breaths you take per minute. The normal at-rest Breathing Rate is 12 to 20 breaths per minute for a healthy adult. In general, breathing rates are slightly faster in women than men.



When you inhale, oxygen enters your lungs and circulates to the various internal organs. When you exhale, carbon dioxide moves out of the body. A normal Breathing Rate plays a critical role in keeping the balance of oxygen and carbon dioxide even in the body. If the oxygen level in the blood is low, or if the carbon dioxide level in the blood is high, your Breathing Rate increases.

Various factors affect the Breathing Rate, including injuries, exercise, fever, anxiety, emotions, mood, alcohol, medication, metabolic issues, and medical conditions. A high or low rate might be the result of an activity and therefore does not indicate that there is anything wrong. However, in other cases, such as various diseases, injuries, dehydration, or heart problems, a change in the Breathing Rate may occur that can be considered abnormal, thereby necessitating medical attention.

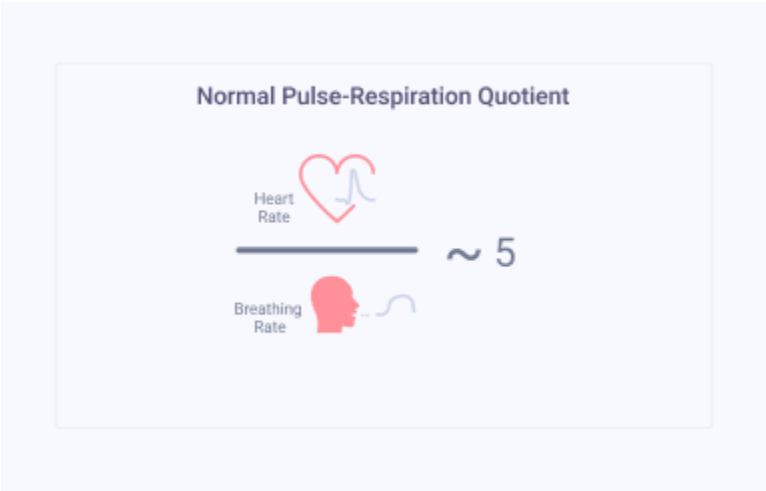
Knowing your Breathing Rate can help your doctor provide you with medical advice. If your Breathing Rate changes or if you feel that your breathing is too fast or too slow, speak to a doctor about your symptoms.

PRQ

The Pulse-Respiration Quotient (PRQ) is a measure of the ratio of a person’s pulse rate (measured in beats per minute) to their respiratory rate (measured in breaths per minute).

The PRQ reflects the efficiency with which the heart and lungs are working together. In general, the normal PRQ ratio is around 5. This ratio is kept both when the pulse rate is low and when it

is high. When the pulse rate is 60bpm the respiration rate is expected to be around 12rpm, and at a pulse rate of 100bpm the expected respiration rate is about 20rpm. In case of a severe deviation from this ratio, the subject needs to consult a physician for further examination.



The pulse-respiration quotient metric measures to what extent this interplay is functioning normally. A low or high score would indicate that your HR and/or BR are working disproportionately, which may indicate that both the heart and the lungs are working inefficiently. Moreover, a person's pathophysiological state (the functional changes associated with or resulting from disease or injury) is indicated by abnormal PRQ readings.

Oxygen Saturation

Oxygen Saturation, or SpO2, is a measure of how much oxygen the red blood cells are carrying from the lungs to the rest of the body. Normal SpO2 for healthy lungs ranges between 95%-100%. For individuals with chronic conditions or lung diseases could be lower than 95%.

A low level of oxygen in the blood is called hypoxemia. Typically, an Oxygen Saturation level lower than 90% is considered hypoxemia, which can be caused by chronic pulmonary diseases (COPD, COVID-19, Asthma, Lung Fibrosis, pulmonary hypertension), heart failure, sleep apnea, anemia, and high-altitude exposure (insufficient oxygen in the air) and medications that suppress breathing control.

Common symptoms of hypoxemia include headache, rapid heart rate, coughing, shortness of breath, wheezing, confusion, and blueness of the skin and mucus membranes (cyanosis). Oxygen Saturation levels can also be used by athletes to understand whether a decrease in performance is a result of altitude changes or ability.

If you feel that your oxygen Saturation is low, speak to a doctor about your symptoms. They will let you know what is normal for your specific condition.

Cardiac Workload

Cardiac Workload is an index that measures how much effort a person’s heart muscle is putting in to pump blood throughout their body. Think of it as a measure of the intensity of the heart's job at any given moment. A lower value generally indicates that the heart is working efficiently, while a higher value signifies more strain.

This measurement is dynamic and changes based on daily activities. For example, Cardiac Workload will naturally be lower during rest and higher during exercise or moments of stress. By monitoring this indicator, you can gain a deeper understanding of how different activities and overall health status affect the heart. While individual results vary, consistently elevated readings during rest may suggest a higher cardiovascular strain, and it's a good idea to discuss this with a healthcare provider.

Pulse Pressure

Blood pressure readings provide two numbers: a top number (systolic) and a bottom number (diastolic). Pulse Pressure is the difference between them (Pulse Pressure=Systolic−Diastolic). While standard blood pressure measures the force of blood against artery walls, Pulse Pressure provides unique insight into the force the heart generates with each beat and the flexibility of a person’s arteries.

A normal Pulse Pressure at rest is typically around 40 mmHg. A consistently high Pulse Pressure may suggest that arteries are becoming less elastic, while a low Pulse Pressure could indicate the heart isn't pumping as much blood as it should. Because it provides different information than a standard blood pressure reading, tracking Pulse Pressure can help individuals and their caretakers providers get a more complete picture of their heart health.

Mean Arterial Pressure (MAP)

Mean Arterial Pressure (MAP) represents the average pressure in the arteries during one complete heartbeat. While a standard blood pressure reading shows the highest and lowest pressure points, MAP provides a single, powerful value that reflects the overall blood flow to vital organs, such as the brain and kidneys.

MAP is a crucial indicator for assessing whether a person’s organs are receiving a steady supply of oxygen-rich blood. A normal MAP for a resting adult is generally between 70−100 mmHg. A value below 60 mmHg could imply that blood flow to vital organs is reduced. Monitoring your MAP offers a more comprehensive view of the cardiovascular system's performance, complementing regular blood pressure measurements.

Bloodless Blood Tests

Hemoglobin - Under research

Hemoglobin is a protein in a person’s red blood cells that carries oxygen to the human body's organs and tissues and transports carbon dioxide from your organs and tissues back to your lungs.
Hemoglobin is measured in g/dL and in resolution up to 0.1 g/dL

The category is based on your profile gender. The healthy ranges are:

- Men: 14 to 18 g/dL
- Women: 12 to 16 g/dL

Hemoglobin A1C - Under research

Hemoglobin A1C (or HbA1c) represents the average blood glucose (sugar) level for the last two to three months. HbA1c is measured in percentage with resolution up to 0.01%.

HbA1c ranges:

- Normal < 5.6 %
- Prediabetes risk 5.7-6.4 %
- Diabetes risk > 6.5 %

Risks

High Blood Pressure Risk

The High Blood Pressure Risk result indicates whether your blood pressure exceeds preset systolic/diastolic values.

Possible results: Low, Medium, or High.

Higher results indicate that your blood pressure is above the preset systolic/diastolic thresholds.

Blood pressure is the force exerted by blood against artery walls. Consistently high blood pressure can signal potential health concerns. High Blood Pressure Risk helps individuals understand if their blood pressure levels are elevated beyond a healthy range.

Maintaining optimal blood pressure is crucial for overall wellbeing. Prolonged high blood pressure can put extra strain on the heart and blood vessels. While it often shows no symptoms, unmanaged high blood pressure is a major risk factor for heart disease and can contribute to severe long-term health risks. By monitoring this indicator, individuals can take proactive steps toward lifestyle adjustments or seek professional guidance to support cardiovascular health.

High HbA1c Risk – Under Research

The High Hemoglobin A1c Risk (HbA1c) result indicates whether your Hemoglobin A1c level exceeds a preset threshold.

Possible results: Low, Medium, or High.

Higher results indicate that Hemoglobin A1c levels are above the preset threshold.

HbA1c reflects the average blood sugar levels over the past two to three months, providing insight into long-term blood sugar control. Consistently high HbA1c levels may indicate difficulty in maintaining balanced glucose levels.

Monitoring HbA1c is important because elevated levels can be an early sign of poor blood sugar management, which over time may lead to metabolic health concerns. Unlike daily blood sugar measurements, HbA1c offers a broader picture of glucose trends, making it a valuable tool for understanding long-term patterns. By tracking this indicator, individuals can gain awareness of their blood sugar stability and take proactive steps toward healthier lifestyle choices.

High Fasting Glucose Risk – Under Research

The High Fasting Glucose Risk result indicates whether your glucose level exceeds a preset threshold after at least 8 hours of fasting.
Fasting is essential for High Fasting Glucose Risk measurement. If you did not fast for 8-12 hours before taking a measurement, please disregard these results.

Possible results: Low or High.

A high result indicates that your fasting glucose level is above the preset threshold.

Glucose is the body’s primary source of energy, fuelling cells and vital functions. However, when blood glucose levels are consistently high, it may indicate poor sugar control, which can be a sign of prediabetes or diabetes mellitus.

Maintaining balanced glucose levels is essential for overall metabolic health. Prolonged high blood sugar can strain the body's ability to regulate glucose effectively, potentially leading to long-term health complications. Since elevated glucose levels may not always cause immediate symptoms, monitoring this indicator helps individuals stay aware of their blood sugar control and take steps toward healthier lifestyle choices.

High Total Cholesterol Risk – Under Research

The High Total Cholesterol Risk result indicates whether your total cholesterol level exceeds a preset threshold.

Possible results: Low, Medium, or High.

Higher results indicate that the total cholesterol level is above the preset thresholds.

Cholesterol is a lipid (fat-like substance) found in the blood, essential for cell function and hormone production. However, excessively high levels can contribute to the buildup of fatty deposits in blood vessels.

Managing cholesterol levels is important because excessive amounts can lead to atherosclerosis, a condition where arteries become narrowed and hardened, increasing the risk of cardiovascular diseases. Since high cholesterol often has no noticeable symptoms, monitoring this indicator helps individuals stay informed about their heart health and take proactive steps, such as lifestyle adjustments, to maintain balanced cholesterol levels.

Low Hemoglobin Risk – Under Research

The Low Hemoglobin Risk result indicates whether your hemoglobin level is below a preset threshold.

Possible results: Low or High.

A high result indicates that your hemoglobin level is below the preset threshold.

Hemoglobin is a protein in red blood cells that carries oxygen from the lungs to the rest of the body. When hemoglobin levels are too low, the body's ability to transport oxygen efficiently is reduced.

Maintaining healthy hemoglobin levels is crucial for energy, endurance, and well-being. Low hemoglobin can cause fatigue, dizziness, and shortness of breath, as the body struggles to supply enough oxygen to tissues and organs. By monitoring this indicator, individuals can become more aware of potential oxygen deficiencies and take steps to support their overall health.

ASCVD Risk

ASCVD (Atherosclerotic Cardiovascular Disease) Risk estimates the likelihood of experiencing an atherosclerotic cardiovascular event within 10 years. The ASCVD score is calculated using our SDK's vital signs data combined with user demographic information, including:

- Age – Within the Framingham-supported range
- Sex – Male/Female
- BMI (Height and weight)
- Smoker – Yes/No

This score strongly correlates with the Framingham ASCVD score for predicting 10-year risk. The ASCVD risk score will fall within one of the following categories:

- Below 1%
- Between 1%-30%
- Above 30%

ASCVD Risk Level

The ASCVD Risk Level indicates the level of a cardiovascular event within the next 10 years. There are 3 ASCVD Risk levels:

- Low - indicates ASCVD Risk of up to 10%
- Medium - indicates ASCVD Risk of between 10% to 20% inclusive
- High - indicates ASCVD Risk of above 20%

Heart Age

The Framingham Heart Age estimates the biological age of the heart based on risk factors and comparing it to an ideal healthy profile.

The Framingham Heart Age is a metric derived from the Framingham Heart Study and intended to communicate cardiovascular risk in a simple and intuitive way by comparing a person's cardiovascular health to that of an average, healthy individual of the same sex.
The resulting cardiovascular risk is compared to the risk level of an "ideal" individual of the same sex who has optimal risk factor values (e.g., healthy cholesterol, no smoking, normal blood pressure). The heart age is the chronological age of this "ideal" person with the same level of risk.

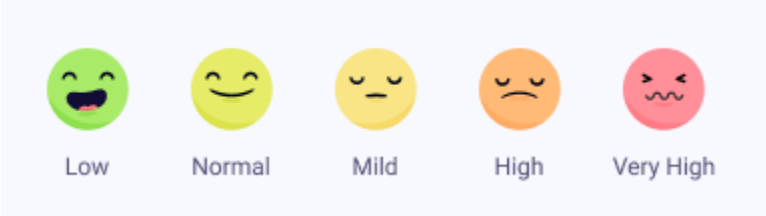
Interpretation

1. Heart age equals chronological age: Cardiovascular health aligns with average expectations for their age.
2. Heart age is younger than chronological age: Indicates better cardiovascular health than average.
3. Heart age is older than chronological age: Suggests higher cardiovascular risk and potential need for lifestyle changes or medical intervention.

Stress

Stress Level

The body's reaction to a challenge or demand. There are five levels of Stress:



The human body is designed to experience stress and react to it. When you deal with challenges and changes, your body produces physical and mental responses. Stress might be positive, keeping us alert, motivated, and ready to avoid danger. However, stress becomes a problem when stressors continue without relief or periods of relaxation.

The application's Stress Level measurement is based on Baevsky's Stress Index which is approved for use in the US and in Europe. The index is calculated using Heart Rate Variability (HRV) measurements.

It's important to note that Stress Levels are indicative only and need to be corroborated with other parameters by a doctor before making a valid diagnosis. Stress Levels are highly dynamic and should be monitored over longer periods to detect abnormal trends.

Stress Index

Stress is the body's reaction to a challenge or demand.

The application’s Stress Level measurement is based on Baevsky’s Stress Index which is approved for use in the US and in Europe. The index is calculated using Heart Rate Variability (HRV) measurements.

The stress index is calculated from the Heart Rate Variability (HRV) measurements, which means that stress levels are derived from physiological conditions. HRV analysis is a globally accepted methodology and technique for evaluating the functional state of an organism and, specifically, components of the autonomic nervous system.

The Stress Index is used to set the Stress Level.

Normalized Stress Index

Stress is the body's reaction to a challenge or demand.

The Normalized Stress Level is calculated from the Stress Index and scaled to a range of 0 to 100. A high value indicates high stress.
The Normalized Stress Index is calculated from the Heart Rate Variability (HRV) measurements and derived from physiological conditions. HRV analysis is a globally accepted methodology and technique for evaluating the functional state of an organism and, specifically, components of the autonomic nervous system.

Heart Rate Variability

HRV SDNN

SDNN is a calculated parameter of Heart Rate Variability (HRV) that represents the standard deviation of normal-to-normal R-R-intervals. SDNN is expressed in milliseconds, and a normal value for this is over 50. However, SDNN values are also dependent on age and gender and normally become lower with age.

An individual's heartbeats do not occur at constant intervals, but rather with a small variance between them. HRV measures the variation in time between the heartbeats.

High levels of HRV generally indicate aerobic and general fitness. Athletes may track HRV to adjust their training program. They can learn when the body is being overworked, which often results in a drop in HRV, and can learn how fast they recover. Moreover, persons with high HRV may be more resilient to stress.

HRV measurements provide feedback about your lifestyle and can help inspire taking steps toward a healthier life. If you are implementing changes in your lifestyle such as meditation, better sleep, better nutrition, and participation in sports and physical activity, you may notice changes in the HRV. In addition, this could help to track your nervous system's reactions to the environment, emotions, thoughts, and feelings.

The sympathetic system (Stress Response) is activated when the body is under stress, causing the heart to beat faster and more regularly, and causing HRV to decrease. The parasympathetic system (Recovery Ability) manages the heart’s activity to help the body reach a relaxed state and to recover from a stressful event. This relaxation response results in a slower and less regular heartbeat and is indicated by a higher HRV.

If you have questions about your results, seek a doctor’s advice and they will let you know what’s normal for your specific condition.

Mean RRi

Mean RRi is the average time between the RR intervals (RRi) in milliseconds. RRi is the variation of the interval between successive heartbeats. A longer Mean RR interval indicates a lower heart rate and higher parasympathetic cardiac activation.

The Mean RRi is one of the parameters used to calculate the PNS Index, along with RMSSD and SD1.

RMSSD

An important measure of the Heart Rate Variability. RMSSD is the root mean square of successive RR interval differences. It reflects the beat-to-beat variance in the heart rate. RMSSD can help identify a general level of fatigue. In addition, a higher RMSSD is linked to parasympathetic control, a sign that you are in the “rest and digest” mode. A lower RMSSD is linked to elevated sympathetic activity, an indication of a Stress Response.

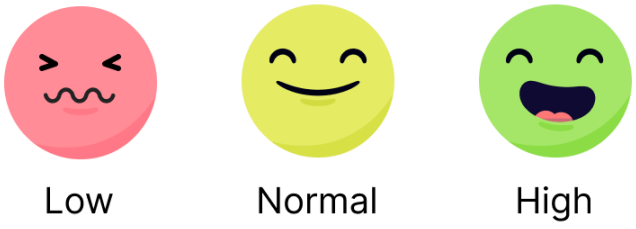
RMSSD is one of the parameters used to calculate the PNS Index, along with Mean RRi and SD1.

Advanced Heart Rate Variability

Recovery Ability (PNS Zone)

The Recovery Ability that is also known as “rest and digest" response refers to the body’s ability to recover, accumulate energy, and regulate bodily functions after stressful occurrences. This is part of the autonomic system that consists of two sub-systems, the sympathetic (Stress Response) system and the parasympathetic (Recovery Ability) system. Your Heart Rate Variability is reflected in the balance between these two sub-systems.

There are three zones of Recovery Ability:



The normal and high zones are more desirable than the low zone. In the normal and high zones, the body is able to effectively conserve energy, relax, or recover from a stressful occurrence.

The parasympathetic metric measures the activity of the PNS and indicates how capable a person is of relaxing or recovering after stressful events. A low zone would indicate a stressful state, while a high zone would suggest calmness.

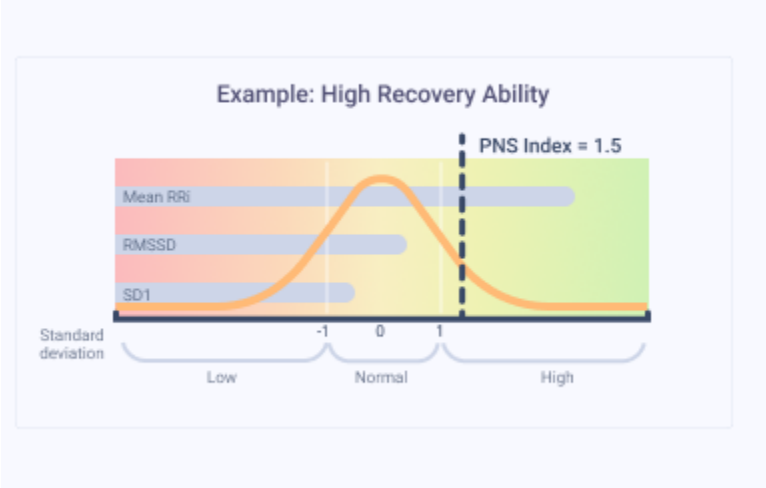
The system plays an important role in alleviating stress and promoting recovery. It does so by inhibiting the activity of the sympathetic nervous system and ceasing the production of stress hormones. It returns bodily functions to their resting state by slowing the heart rate, lowering blood pressure, reducing muscle tension, and restoring regular breathing, digestion, and glandular activity.

The recovery ability is derived from the parasympathetic nervous system (PNS) index. The PNS Index calculation is based on the following three parameters: Mean RRi, RMSSD, and SD1.

These zones should be used as a guide only. Seek a doctor’s advice in order to obtain a valid diagnosis.

PNS Index

The PNS Index calculation is based on the following three parameters: Mean RRi, RMSSD, and SD1, and is used to indicate the body’s Recovery Ability zones.



Stress Response (SNS Zone)

The Stress Response, which is also known as “fight or flight” response, refers to a physiological reaction to imminent danger that occurs when we are scared, anxious, stressed, attacked, or threatened. Essentially, it prepares our body to either deal with a threat or to run for safety. This is part of the autonomic system that consists of two sub-systems, the sympathetic (Stress Response) system and the parasympathetic (recovery ability) system. Your Heart Rate Variability is reflected in the balance between those two sub-systems.

There are three zones of Stress Response:

The normal and low zones are more desirable than the high zone. In the normal and low zones, the body is able to effectively respond to stressful situations and emergencies.

When preparing for an emergency, the sympathetic nervous system (SNS) activates numerous complex pathways and components. These physiological activities help to achieve a faster heart rate, breathing rate, and blood pressure. Noticeable changes include blood flow that moves away from the skin and stomach, and is redirected from the intestines to the brain, heart, and muscles, as well as sweating, “goose-bumps”, dilation of the pupils, and a host of other feelings that appear during the Stress Response. In addition, there is a psychological aspect to the Stress Response. Automated responses include quick thinking and focusing on salient targets such as the source of the threat and escape options.

The stress created by a situation is helpful and increases the chances of coping effectively with the threat. This type of stress can help you perform better in situations where you are under pressure to do well.

This Stress Response is derived from the sympathetic nervous system (SNS) Index. The SNS Index is calculated based on the following three parameters: Heart Rate, Baevsky’s Stress Index, and SD2.

These zones should be used as a guide only. Seek a doctor’s advice in order to obtain a valid diagnosis.

SNS Index

The SNS index is calculated based on the following three parameters: Heart Rate, Baevsky's stress index, SD2, and is used to set the stress response zone.

SD1

SD1 is a poincaré plot standard deviation perpendicular to the line of identity.

SD1 is one of the parameters used to calculate the PNS Index, along with RRi and RMSSD.

SD 2

SD2 is a poincaré plot standard deviation along the line of identity.

SD2 is one of the parameters used to calculate the SNS Index, along with Heart Rate and Baevsky's Stress Index.

LF/HF

LF and HF stand for Low-Frequency and High-Frequency bands, which represent the Sympathetic and Parasympathetic activity, respectively.

The LF/HF ratio reflects the balance between sympathetic and parasympathetic activity. The normal range is between LF(ms^2)/HF(ms^2) = 0.27 - 0.38. A lower ratio of LF/HF indicates a high Parasympathetic stress level, and a higher ratio indicates an increased Sympathetic activity which is a biomarker of stress.

RRi Data

The RR interval is the time between the "R" peaks of successive heartbeats, in milliseconds.

An individual's heartbeats do not occur at constant intervals, but rather with a small variance between them. Heart Rate Variability (HRV) is the variation in time between the heartbeats. You can export the RR interval data for analysis use.