

Your Test Result is Low Risk

Your test results indicate that your lungs are at low-risk level. To maintain or improve your lung health, try engaging in regular exercise, such as running or dancing, to strengthen your lungs. In addition, maintaining a healthy diet and ensuring a safe environment is important. Using the mediscan device to check your body condition on a regular basis (every 1-3 months) can save you time and effort and help safeguard your health.

01 Understanding Your Personal Lung Report

Sample



Lung Index

Spirometry is the gold standard for measuring lung function and is the most common lung function test used to aid in the diagnosis and monitoring of lung conditions. It involves measuring the amount of air a subject can forcefully exhale in one breath¹. The following are commonly used data in spirometry:

- 1. Forced Vital Capacity (FVC)** : Forced vital capacity refers to the maximum amount of air that can be exhaled as quickly as possible after taking a deep breath. The normal value for forced vital capacity (FVC) is 80% or more².
- 2. Forced Expiratory Volume in 1 second (FEV1)** : The forced expiratory volume in 1 second is the amount of air a person can forcefully exhale in the first second after taking a deep breath. The normal value for FEV1 is 80% or more³.
- 3. Forced Expiratory Volume in 1 second/ Forced Vital Capacity (FEV1/FVC)** : The ratio represents the proportion of a person's lung capacity that can be forcefully exhaled⁴. The FEV1/FVC ratio can be used to distinguish obstructive and restrictive lung diseases. In obstructive diseases, increased airway resistance reduces FEV1 hence sometimes FVC as well, resulting in FEV1/FVC ratio below 70%. In restrictive diseases, such as chest wall deformity and idiopathic pulmonary fibrosis, FVC may decrease more than FEV1, resulting in an FEV1/FVC ratio above 70%⁴.

Chart Index

We can determine lung health using three clinical measurements: FVC, FEV1, and FEV1/FVC ratio.

- 1. Estimated Forced Vital Capacity (eFVC)** : Forced vital capacity refers to the maximum amount of air that can be exhaled as quickly as possible after taking a deep breath². The normal value for forced vital capacity (FVC) is 80% or more of the predicted value*, which is calculated based on age, sex, and height.
- 2. Estimated Forced Expiratory Volume in 1 second (FEV1)** : The forced expiratory volume in 1 second is the amount of air a person can forcefully exhale during the first second after taking a deep breath³. The normal value for FEV1 is 80% or more of the predicted value*, which is calculated based on age, sex, and height.
- 3. Estimated Forced Expiratory Volume in 1 second / Estimated Forced Vital Capacity (FEV1/FVC)** : The ratio represents the proportion of a person's lung capacity that can be forcefully exhaled⁴. If it is less than 70%, it is indicative of a high risk of lung disease, such as COPD⁴.

Explanation

We combine eFVC (% pred) with eFEV1/eFVC ratio for analyzing lung health.

eFVC(%pred) \ eFEV1/eFVC ratio	>70%	60-70%	
>80%	■ Low Risk	■ Moderate Risk	■ Obstructive Disease - High Risk
70-80%	■ Moderate Risk	■ Moderate Risk	
<70%	■ Restrictive Disease - High Risk		■ Hyperinflation/Combined - High Risk

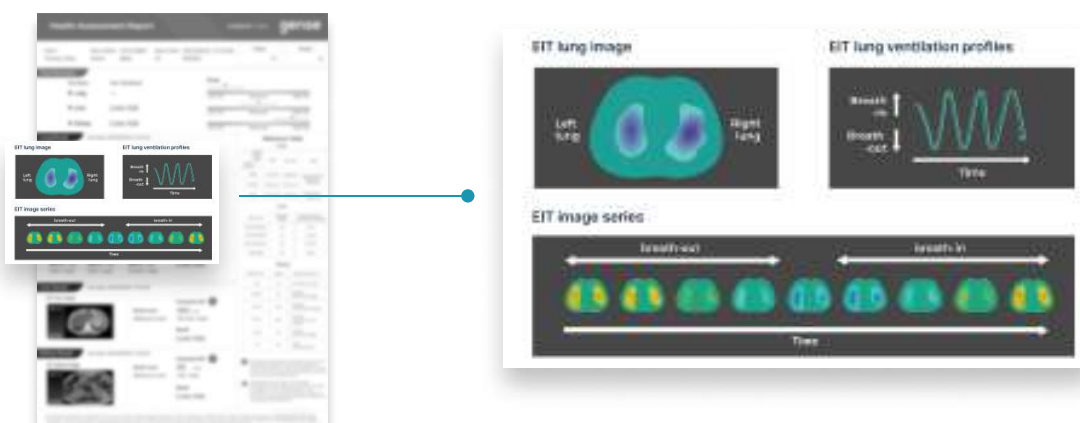
*Risk level indicates the risk level of getting the disease, but cannot be used to infer the severity of the illness.

First, we can look at the ratio of eFEV1/eFVC at the top row. If the ratio of eFEV1/eFVC is greater than 70%, then your value is in the low-risk range. However, if the eFEV1/eFVC is less than 70%, you should pay special attention to your lung health.

Next, let's try to understand eFVC (% pred) on the left column of the chart. When your test result is 80% or more of the expected value, your score is in the low-risk range. The lower the eFVC (estimated percentage) value, the less optimal the lung function, and treatment regarding your lung health should be implemented as soon as possible.

Finally, we combine the two indicators to check your overall lung health.

Example : If your eFEV1/eFVC ratio is 80% and eFVC is 73%, your lung health score is under moderate-risk.



Lung Image

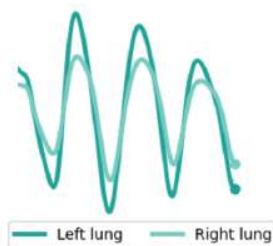
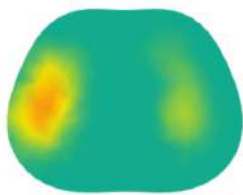
The image ① EIT lung image shows the ventilation capacity of the left and right lungs, with greater ventilation resulting in larger changes in impedance and hence the darker colors. In a normal EIT lung image, the left and right clusters have uniform color changes and similar sizes. If there is a lung dysfunction, there will be significant difference in color and size between left and right clusters.

The image ② EIT lung ventilation profiles shows two curves representing the respiratory trajectories of left and right lungs of testing subject. For normal lung function, two curves should be well overlapped as two lungs breath simultaneously; for lung dysfunction, two curves will be asynchrony with clear difference in amplitude across time.

The image ③ EIT image series represents the testing subject during guided breathing. The colour changes in the lung clusters indicate the breathing ability and the lung volume changes overtime.

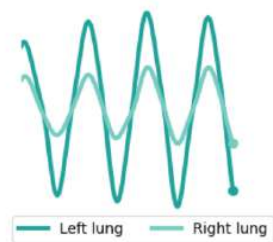
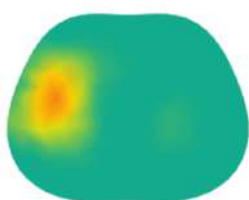
Abnormal Lung Images

Situation 1



When lungs are damaged, the contraction of left and right lungs are not synchronized, and the remaining air volume in each lung is also different. Therefore, the two curves are not aligned and do not overlap in height.

Situation 2



As shown in the left figure, if the right lung has undergone surgical resection, it can result in weaker breathing in the right lung.

Foods for Healthy Lungs

Quercetin (Onions)

Quercetin is a flavonoid found in many fruits and vegetables, including apples and onions. It is an antioxidant with anti-inflammatory properties and some studies suggest that quercetin may help to reduce respiratory inflammation and improve lung function in respiratory diseases such as asthma⁴⁶. Adults can consume approximately 14.90-16.39 mg of quercetin a day⁴⁶. 100g of onions contain approx. 28.4-48.6 mg of quercetin⁴⁷. The weight of half an onion is about 100 grams.

Omega-3 (Salmon)

Fatty fish such as salmon and tuna are rich in Omega-3 fatty acids, which can reduce lung infection, increase respiratory resistance⁴⁸. Adult males are recommended to consume 1.6 grams and females 1.1 grams of Omega-3 per day⁴⁹. A 3-ounce (85-gram) serving of wild salmon contains approximately 1.57 grams of Omega-3, while a 3-ounce (85-gram) serving of farmed salmon contains about 1.83 grams of Omega-3⁴⁹. (The weight of a salmon fillet is about 200 grams)



Vitamin C (Kiwi)

Vitamin C is an antioxidant that helps to reduce oxidative stress in the lungs, helping to reduce lung damage and disease. Many fruits and vegetables are rich in vitamin C, such as kiwi, orange and broccoli⁵⁰. A daily intake of 90 mg is recommended for adult men and 75 mg for adult women⁵¹. One medium-sized kiwi contains 64 mg of vitamin C⁵².



04 Targeted Advice for Lung Abnormalities

Tips for Managing Lung Abnormalities

Incorporating proper exercise and physical activity

- Exercise can help improve lung function and heart health by increasing endurance and reducing symptoms such as fatigue and shortness of breath. Every individual is different and should set feasible exercise goals based on their own condition and expectations, and if unsure can consult a health professional. In general, patients with COPD are instructed to exercise **3-4 days a week with 20-30 minutes of exercise**. Aerobic exercises such as walking, swimming, and cycling have been shown to be beneficial in lung function. Weight training can also improve breathing ability. Weight training can also strengthen the breathing ability of patients, but it is not necessary to go to the gym. Patients can consult with healthcare professionals to learn about related exercises. Experiences of **fever, chest pain, shortness of breath, weakness**, or other conditions with exercise **should be stopped immediately**⁵³.

Sit-ups

Bend the knees to perform sit-ups, starting with 20 sit-ups per session and increasing the number as tolerated by the individual. During this movement, inhale as you lift your torso. Each exercise should be performed at least 4 days per week, and maintain this routine for 8 weeks⁵⁵.



Bicep curls

Bicep curls can be performed using dumbbells, gradually increasing the weight according to personal ability. Three sets of 8-10 repetitions can be done daily, with a 5-minute rest between sets. Training can be done 4-5 times per week for 8 weeks⁵⁵.



- Patients with respiratory conditions such as asthma, pulmonary fibrosis, lung cancer, and COPD may benefit from various **pulmonary rehabilitation programs** offered by different hospitals and clinics. These programs combine education and exercise to help patients improve their understanding of lung health and respiratory diseases, as well as their physical and mental well-being. Some common activities in pulmonary rehabilitation programs include light training, cycling, walking on a treadmill, and stretching exercises⁵⁶.
- For individuals recovering from COVID-19, it may be helpful to seek out prevention and improvement recommendations from nearby hospitals, clinics, and wellness centers. Gradual reintroduction of physical activity is recommended, starting with gentle stretching exercises in the initial stages and progressing to aerobic exercises such as walking, dancing, and resistance training such as light weightlifting. Finally, individuals can increase the intensity of their exercise routine and engage in sporting activities.

Maintain a healthy weight and enhance immunity

Eating a balanced diet is essential for maintaining a healthy weight and boosting immunity, which in turn increases your body's energy. Overweight or underweight can both affect the respiratory system, leading to breathing difficulties and weakened respiratory muscles, BMI should be controlled within the standard range of 18.5-22.9 as much as possible Within the standard range. Consuming sufficient amounts of protein, carbohydrates, essential fats, vitamins, and minerals can strengthen the immune system, greatly aiding in the prevention of infection and other diseases. Patients with lung diseases often require more energy to maintain controlled breathing, so it is important to include adequate amounts of protein in your daily meals and consume high-protein foods such as meat and dairy products (such as yogurt and cheese), and drink 2~3 liters of water per day. These dietary recommendations are intended to maintain normal physical strength and aid in breathing and recovery⁵⁷.

Don't smoke or quit smoking

Smoking is a major cause of COPD, and smoking can cause lung abnormalities to continue to worsen, so it is beneficial for patients to quit smoking at any time⁵⁸.

To reduce exposure, it is recommended to wear a mask in areas with high pollution.

Air pollution can worsen symptoms of respiratory diseases. It is recommended to limit outdoor activities in areas with high pollution or to wear a mask while outdoors to reduce inhalation of air pollutants⁵⁹.