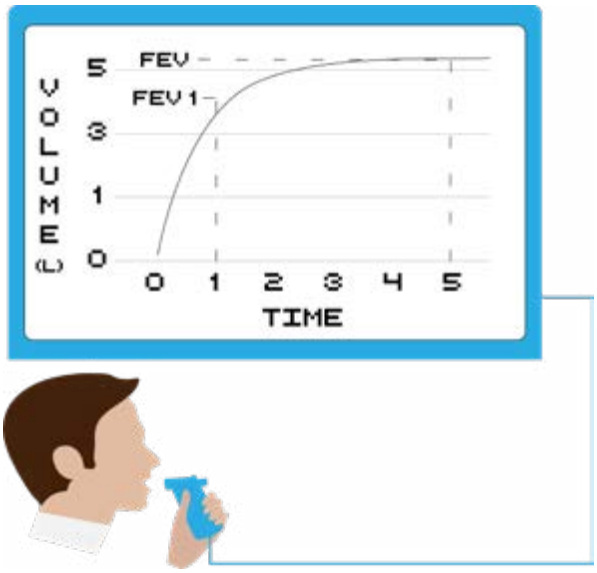
CYSTIC FIBROSIS

CF Fact
cystic fibrosis fact sheet

Spirometry

Spirometry is a common, and relatively easy, test used to measure pulmonary function — to assess how well the lungs are working. One of the most common symptoms of cystic fibrosis (CF) is a decline in lung health.

Spirometry is often used to help diagnose and monitor patients with CF, and to detect such problems as infections that can worsen the disease. It is also often used in clinical trials of potential CF therapies to determine how effective the treatment might be for a patient.



What Is the Test?

The test involves a person breathing into a small device, called a spirometer, to estimate the speed and the volume of air that is moving in and out of the lungs. How the test is performed can change depending on exactly what is being measured.

Normally, patients will have a clip placed on their nose to stop air from escaping. They will be asked to inhale to their maximum capacity, then exhale into the mouthpiece of the spirometer as quickly as they are able. They may have to repeat this multiple times or may be asked to breathe out slowly.

What Does It Measure?

The spirometry test can be used to determine several different measures.

These include:

Forced Vital Capacity (FVC)
Measures the total volume of air that can be exhaled quickly and forcefully in one breath.

Slow Vital Capacity (VC)
Measures the total volume of air exhaled slowly and gently in one breath.

Forced Expiratory Volume in One Second (FEV1)
Measures the total amount of air exhaled in one second.

FEV1/FVC or FEV1/VC
Calculates the proportion of the maximum inhaled air that can be exhaled in one second.

What Do the Results Mean?

The results can give information about different aspects of lung function: normal, obstructive, restrictive, or combined obstructive/restrictive.

A healthy individual is normally able to expel most of air in their lungs in one second. The "normal" expected reading varies based on age, size, and sex.

Airways that are obstructed, such as by the thick mucus produced in CF patients, can reduce the speed at which air can be exhaled. This is reflected as a reduced FEV1 compared to normal, combined with a low FEV1/FVC ratio.

Restrictive spirometry results reflect a reduced lung capacity, relative to what is normal for a person's age, size and sex. In CF patients, for example, this can be due to scarring (fibrosis) in the lungs. This can be seen as a lower than normal FVC. As the maximum air capacity is reduced, the FEV1 is lower than normal, but the ratio of FEV1/FVC remains the same.

Many CF patients can show a combined obstructive/restrictive pattern. These results demonstrate a poorer lung capacity, with a lower than normal FVC, and an FEV1 that is reduced out of proportion with the FVC, as the patient may struggle to exhale the air quickly. If so, this can be seen in a reduced FEV1/FVC ratio.

Useful Resources

- CFWA Factsheets

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