Airway clearance techniques (ACTs) are treatments that help people with cystic fibrosis (CF) stay healthy and breathe easier. ACTs loosen thick, sticky lung mucus so it can be cleared by coughing or huffing. Clearing the airways reduces lung infections and improves lung function. There are many ACTs. Most are easy to do. For infants and toddlers, ACTs can be done by almost anyone. Older kids and adults can do their own ACTs.

ACTs are often used with other treatments, like inhaled bronchodilators and antibiotics. Bronchodilators should be taken before or with ACTs to open airways. I nhaled antibiotics should be taken after ACTs to treat opened airways. Your CF care team will help you choose the best ACT and other treatments. Each year, review and update your routine with your CF care team.

Learning about breathing and the lungs can help you to see how ACTs work. ACTs move mucus from small to large (more central) airways to be coughed or huffed out. The right lung has three lobes: the upper, middle and lower lobes. The left lung has two lobes: the upper and lower lobes. Lobes divide into smaller segments. ACTs clear these segments. Each segment has airways (bronchi), air sacs (alveoli) and blood vessels (arteries, veins and capillaries). Oxygen and carbon dioxide flow bet ween the blood and air through the air sacs.

The lungs make mucus to help defend against germs. CF changes the mucus, making it thick and hard to clear. This mucus is where infections can occur. Infections cause inflammation or swelli

Mucus moves three ways:

Mucus builds and lines the bronchi walls. ACTs increase air flow through the bronchi. As air rushes over the mucus in the bronchi, the mucus is pulled toward the large airways. This is like wind on the water making a crest on waves, or wind across a dry plain blowing dust. The faster the air flows, the better it moves mucus.

Tiny hairs, called cilia, line bronchi. Cilia move back and forth. Mucus is carried on top of cilia. Cilia cannot carry thick, extra mucus as well.

If air gets behind thick mucus, it can push it into larger airways. More air behind mucus means more air flowing over it, pulling the mucus along. If air does not get behind mucus, mucus is hard to move.

Airway Clearance Techniques

Coughing is the most basic ACT. It is a reflex. It clears mucus with high-speed airflow. But sometimes mucus cannot be cleared just with a lot of coughing. Coughing a lot can make you feel more short of breath and worse, not better. Huffing is a type of cough. It also involves taking a breath in and actively exhaling. It is more like "huffing" onto a mirror or window to steam it up. It is not as forceful as a cough but can work better and be less tiring.