



Update: Shortness of Breath

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Difficulty in breathing (also known as shortness of breath, breathlessness, or dyspnea) is caused by various mechanisms related to different problems in the body. In one's lifetime, one may experience rare episodes of shortness of breath as part of high levels of activity such as exhaustive exertion or during environmental conditions such as high altitude or very warm or cold temperatures. Other than these extreme conditions, shortness of breath is commonly a sign of a medical problem.

When Is Shortness of Breath a Sign of a Medical Problem?

If the shortness of breath is prolonged and persistent, it is likely to be related to a medical condition. If it is sudden and severe in intensity or even of short duration, however, it may warrant medical evaluation. Other clues of the existence of a medical problem are given in Table 1.

What Causes Shortness of Breath?

Symptom of shortness of breath can be caused by a variety of abnormalities in different organ systems in the body (Figure).

Lung Problems

- Recent infections such as bronchitis or pneumonia or prolonged (chronic) infections such as tuberculosis or chronic bronchitis. Shortness of breath may be accompanied by discolored phlegm or fever.
- Asthma, chronic obstructive lung disease, and emphysema: The airways are narrowed with increased resistance to exhaling air from the lung, resulting in air entrapment in the lung. Shortness of breath may be accompanied by wheezing. In asthma, there is usually an allergy history, whereas in chronic obstructive lung disease or emphysema, there is usually a smoking history.
- Lung cancer and other tumors: Shortness of breath is commonly accompanied by unintentional appetite and weight loss. There is usually a long and heavy smoking history.
- Scarring and damage of lung tissue by toxins (such as asbestosis) or by systemic illnesses (such as rheumatoid arthritis). There is usually a known history of these systemic illnesses or occupational exposures.
- Clot in the lung circulation (pulmonary embolus): Breathlessness is

usually sudden, is associated with rapid breathing, and may be accompanied by chest pain. People with blood clots in the legs or pelvis (deep venous thrombosis), debilitating medical conditions, immobility, or inherited tendency to form clots may be prone to this condition. (For more information about pulmonary embolism, see the Cardiology Patient Page by Goldhaber and Morrison.¹)

- Diseases of the lung sac (pleura): If the pleura thickens, becomes scarred, or is filled with fluid or blood because of infection (pleurisy), cancer, or toxins (asbestosis), or if it becomes filled with air (called pneumothorax), it will hinder expansion of the lung, resulting in shortness of breath.
- Diseases of the diaphragm and/or chest wall: The diaphragm is the muscle that expands the lung. It may become paralyzed after chest surgery. Obesity and spine or chest wall deformities also can produce difficulty in breathing.
- Sleep disorders: Sleep apnea, which is usually manifested with excessive daytime sleepiness, loud snoring, and episodes of breathing cessation during sleep witnessed by another

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Table 1. Possible Medical Reasons for Shortness of Breath

Shortness of breath at rest
Shortness of breath with activity or exercise
Shortness of breath when lying down
Shortness of breath on exposure to allergens or provoking agents
Shortness of breath accompanied by
Chest pain or chest discomfort
Discomfort or pain in 1 or both arms, radiating to jaw or neck
Swelling in ankles and feet
Fluid weight gain or unintentional weight loss with loss of appetite
Unusual fatigue
Sweating
Yellow, green, or rusty sputum or phlegm, blood in the sputum
Fever
Wheezing or whistle-like sounds with breathing
Persistent, chronic cough
Blue discoloration of lips or fingertips
Fainting, dizzy spells, light-headedness
Club-shaped deformation of fingertips

person, may be accompanied by shortness of breath, usually following abrupt awakenings after apnea.

Heart Problems

- **Heart failure:** The shortness of breath in heart failure is caused by the decreased ability of the heart to fill and empty, producing elevated pressures in the blood vessels around the lung. Common symptoms of heart failure include difficult breathing when lying down (this is a specific symptom of heart failure); having to prop up the head of the bed with many pillows; waking up at night with shortness of breath; coughing at night or when lying down; experiencing shortness of breath with activity; swelling in ankles or legs; experiencing unusual fatigue with activity; and experiencing fluid weight gain. Heart muscle damage usually causes heart failure. In the majority, this is caused by heart attacks (coronary artery disease) or reduction in blood flow to the muscle of the heart (ischemia). In some, it is caused by

leakage or narrowing of the heart valves (in this condition, the doctor will report hearing a murmur) or weakening of the heart muscle caused by immune problems (pregnancy or systemic rheumatologic or autoimmune problems such as systemic lupus erythematosus), toxins (such as chemotherapy, alcohol, cocaine), viral infections, hereditary or genetic factors, or unknown factors. In some, the heart muscle is not weak but rather stiff, resulting in impaired filling of the heart. This is usually caused by high blood pressure or aging.

Obesity

In obesity, most patients experience shortness of breath with activity. Reasons include inability of chest to expand fully because of excessive weight against the chest wall and alterations in the control of the brain over breathing, making it hard for a person to take a deep breath, which usually results in retention of carbon dioxide and not enough oxygen in blood (obesity hypoventilation syndrome). Most patients with obesity hypoventilation syndrome also have sleep apnea.

Deconditioning

If you are not active or do not exercise regularly, as a result of being out of shape and experiencing muscle fatigue, you may develop shortness of breath with physical exertion beyond your customary activity such as when climbing stairs.

Allergic Reactions

Severe allergic reaction (anaphylaxis) can occur in individuals with known allergies or asthma, which usually causes itching, hives, swelling of skin in face and lips, a rash, and shortness of breath. Anaphylaxis is a potentially deadly allergic reaction that is rapid in onset and requires immediate attention and treatment. Chronic allergies, on the other hand, can result in episodic shortness of breath or wheezing (asthma) each time the individual is exposed to the allergen.

Systemic Illness Problems

- **Anemia, low red blood cell count:** Because the red cells carry oxygen, when their number is extremely low, the oxygen demands of the body will not be met, resulting in shortness of breath.

Organs That May Be Involved in Development of Shortness of Breath

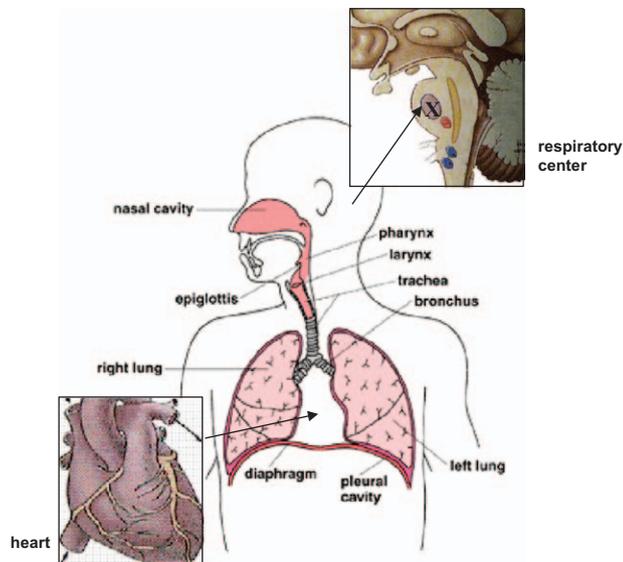


Figure. Drawing of organs that may be involved in development of shortness of breath, including the central nervous system, airway, lungs, chest, and heart.

- Increased metabolic states such as high thyroid level, shock (extremely low blood pressure), severe systemic infection (sepsis), or fever: The body will try to meet the increased oxygen demands through heavy and rapid breathing.
- Kidney or chronic liver problems: Because of increased fluid in the lungs and body and impaired oxygen exchange in the lungs, patients may experience shortness of breath in the advanced stages of both conditions.

Nervous System Problems

- Increased pressure in the brain caused by trauma, tumors, stroke, or bleeding. When the portion of the brain that regulates respiration is affected, these rare conditions may result in difficulty in breathing. Other neurological symptoms usually precede shortness of breath.
- Nerve and muscle disorders that affect the ability to coordinate and expand the chest and that affect movement of the diaphragm may produce difficulty in breathing.
- Anxiety disorder: Anxiety is sometimes accompanied by heavy and rapid breathing (hyperventilation). Shortness of breath usually resolves once the anxiety episode terminates.

How Is Shortness of Breath Evaluated?

Your doctor will perform a thorough physical examination and may obtain laboratory analysis such as natriuretic peptide levels (which are usually elevated in heart failure), blood counts (to check for anemia), and oximetry or

blood oxygen or carbon dioxide levels. Your doctor also may obtain a chest x-ray. If heart disease is suspected, you may undergo an electrocardiogram, an echocardiogram (or nuclear scan of the heart) to evaluate its pumping function and valves, or a stress test to evaluate possible blockages in the vessels feeding the heart (coronary artery disease). If lung disease is suspected, you may undergo a lung function study (spirometry or pulmonary function test). Occasionally, an exercise test (cardiopulmonary exercise test) may be conducted on a treadmill or a bike to measure lung gas exchange, physical fitness, and heart function. Additional testing such as computerized tomography and position emission tomography scans may be required in some cases.

How Is Shortness of Breath Treated?

The type of treatment depends on the underlying cause (Table 2). If you are diagnosed with heart failure, you may be treated with medications such as fluid pills (diuretics), angiotensin-converting enzyme inhibitors, digoxin, and β -blockers. If asthma or chronic lung disease is the cause, you may be treated with oxygen. For infection, you may be prescribed an antibiotic.

Additional Reading

- American College of Chest Physicians. Shortness of Breath: Patient Education. <http://www.onebreath.org/document.doc?id=113>. Accessed March 25, 2014.

Table 2. What Can I Do to Take Care of Myself?

Quit smoking. Cessation of smoking will help to relieve some of your symptoms and to reduce your risk for lung cancer.

Avoid exposure to allergens, dust, toxic substances. If you are asthmatic, avoid exposure to the allergens that cause shortness of breath.

Avoid becoming overweight and exercise regularly. Always consult your physician before beginning a weight loss or exercise program.

If you have heart failure, take your medications regularly, avoid salt intake, and weigh yourself daily to monitor fluid status.

Learn about your medical condition. Talk with your healthcare provider to learn about methods to alleviate or resolve shortness of breath.

Develop an action plan for worsening symptoms.

- Dyspnea, mechanisms, assessment, and management: a consensus statement by American Thoracic Society. *Am J Respir Crit Care Med.* 1999;159:321–340. <http://www.atsjournals.org/doi/full/10.1164/ajrccm.159.1.ats898#.UnH7zGQo5aQ>.
- Morgan WC, Hodge HL. Diagnostic evaluation of dyspnea. *Am Fam Physician.* 1998;57:711–716. <http://www.aafp.org/afp/980215ap/morgan.html>.

Disclosures

None.

Reference

1. Goldhaber SZ, Morrison RB. Cardiology patient pages: pulmonary embolism and deep vein thrombosis. *Circulation.* 2002;106:1436–1438.

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