# Respiration Assessment Clinical Skills

Respiration is controlled by the respiratory center in the lateral medulla oblongata, respiration is the exchange of oxygen and carbon dioxide between the atmosphere and body cells. The diaphragm and chest muscles perform external respiration, delivering oxygen to the lower respiratory tract and alveoli.

Four measures of respiration—rate, rhythm, depth, and sound—reflect the body's metabolic state, diaphragm and chest-muscle condition, and airway patency.

Respiratory rate is recorded as the number of cycles (with one cycle comprising inspiration and expiration) per minute; rhythm, as the regularity of these cycles; depth, as the volume of air inhaled and exhaled with each respiration; and sound, as the audible deviation from normal, effortless breathing. The normal respiratory rate for an average adult is 12 to 18 breaths/minute. However, knowing a patient's normal baseline respiratory rate allows detection of changes in the patient's condition.

The best time to assess a patient's respirations is immediately after taking the pulse rate, although the patient's breathing should be observed with each patient's contact.

**Equipment**

- Disinfectant pad
- Stethoscope
- Watch or clock with second hand or digital timer
- Optional: personal protective equipment

**Preparation of Equipment**

Inspect all equipment and supplies. If a product is expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility.

**Implementation**

- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.
- Confirm the patient's identity using at least two patient identifiers.
- Provide privacy.
- Explain the procedure to the patient and family (if appropriate) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation.*
- Perform hand hygiene.
- Put on personal protective equipment, as needed, *to comply with standard precautions.*

- Place your fingertips over the patient's radial artery and don't tell the patient that you're counting respirations. *If you tell the patient, the rate may change because the patient will be conscious of breathing.*
- Count respirations by observing the rise and fall of the patient's chest during breathing.2 Alternatively, position the patient's opposite arm across the chest and count respirations by feeling its rise and fall. Consider one rise and one fall as one respiration.
- If the patient's respirations are regular, count the respirations for 30 seconds and multiply by two to determine the respiratory rate. Alternatively, if the patient's respirations are irregular, count the respirations for 60 seconds *to account for variations in respiratory rate and pattern.*
- As you count respirations, be alert for stertor, stridor, audible wheezing, and expiratory grunting.
    - Stertor is a snoring sound that results from secretions in the trachea and large bronchi. Listen for it in patients with neurologic disorders and in those who are comatose.
    - Stridor is an inspiratory crowing sound that results from upper airway obstruction. It occurs in laryngitis or croup or from the presence of a foreign body in the upper airway.
    - Wheezing is a high-pitched or whistling sound that may be audible with or without a stethoscope. It occurs as a result of airway narrowing.
    - An expiratory grunt is a deep, low-pitched sound heard at the end of each breath that coincides with the closure of the glottis and may indicate respiratory distress.

Older adult alert: In older patients, an expiratory grunt may result from partial airway obstruction or neuromuscular reflex.

- Observe chest movements for depth of respirations. Record the inhalation of a small volume of air as shallow. Record the inhalation of a large volume of air as deep.
- Listen to the patient's breathing *to determine the rhythm and sound of respirations.*

**IDENTIFYING RESPIRATORY PATTERNS**

The table below identifies different types of respiratory patterns along with their characteristics and possible causes.

| Type | Characteristics | Pattern | Possible causes |
|---|---|---|---|
| Apnea | Absence of breathing; may be temporary or periodic |  | • Mechanical airway obstruction<br>• Conditions that affect the brain's respiratory center |
| Bradypnea | Slow, regular respirations of equal depth |  | • Normal pattern during sleep<br>• Conditions that affect the brain's respiratory center, such as |

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| | | | tumors, metabolic disorders, and respiratory decompensation<br>• Use of opiates, alcohol, or both |
| Cheyne-Stokes | Gradual increase in respiratory rate and tidal volume, then gradual decrease to complete apnea, which may last several seconds before gradual increase again as cycle repeats |  | • Brain injury or stroke<br>• Heart failure<br>• Kidney failure<br>• Drug-induced respiratory depression<br>• Cerebral anoxia<br>• May occur in older adults during sleep |
| Eupnea | Normal rate and rhythm |  | • Normal respiration |
| Kussmaul | Rapid (over 20 breaths/minute), deep (resembling sighs), labored respirations without pause |  | • Kidney failure<br>• Metabolic acidosis, particularly diabetic ketoacidosis |
| Tachypnea | Rapid respirations; rate increase corresponds to increase in body temperature—about four breaths/minute for every 1° F (0.6° C) above normal |  | • Pneumonia<br>• Compensatory respiratory alkalosis<br>• Respiratory insufficiency<br>• Lesions in the brain's respiratory center<br>• Salicylate poisoning |

- Auscultate breath sounds using a stethoscope.

**UNDERSTANDING BREATH SOUNDS**

The four types of breath sounds that you'll hear over normal lungs are:

- tracheal—heard over the trachea; harsh and discontinuous
- bronchial—usually heard over the fourth intercostal space, between the sternum and the midclavicular line; loud, high-pitched, and discontinuous; loudest when the patient exhales
- bronchovesicular—heard when the patient inhales or exhales; medium-pitched and continuous; best heard over the upper third of the sternum and between the scapulae
- vesicular—heard over the rest of the lungs; soft and low-pitched; prolonged during inspiration and shortened during expiration.

Considered abnormal no matter where you hear them over the lungs, adventitious breath sounds include:

- crackles—intermittent, nonmusical, brief crackling sounds caused by collapsed or fluid-filled alveoli popping open; heard primarily during inspiration; classified as fine or coarse; usually don't clear with coughing unless caused by secretions
- wheezes—high-pitched sounds heard first during expiration; result from blocked airflow; also heard during inspiration when airflow is severely blocked
- rhonchi—low-pitched snoring, rattling sounds that occur primarily during exhalation; usually due to fluid or secretions in the large bronchial airways; may change or disappear with coughing
- stridor—loud, high-pitched crowing sound that occurs during inspiration; typically audible without a stethoscope; caused by obstruction of the upper airway; requires immediate intervention
- pleural friction rub—low-pitched grating, rubbing sound heard during inhalation and exhalation; results from pleural inflammation that causes the two layers of the pleura to rub together; may result in pain in the areas where the sound is heard.

- Observe the patient for use of accessory muscles, such as the scalene, sternocleidomastoid, trapezius, and latissimus dorsi. *Use of these muscles reflects a weakness of the diaphragm and the external intercostal muscles, the primary muscles of respiration.*
- Remove and discard your personal protective equipment, if worn.
- Perform hand hygiene.
- Clean and disinfect your stethoscope with a disinfectant pad.
- Perform hand hygiene.
- Document the procedure.

**Special Considerations**

- When assessing respiratory status, consider the patient's personal and family history. Ask the patient about smoking. If the patient smokes, ask for how many years and how many packs per day.
- A more detailed assessment (including palpating the chest for lymph node abnormalities, assessing tracheal position, and percussing for signs of fluid or trapped air in the chest) may be necessary for a patient with a respiratory disease, such as chronic obstructive pulmonary disease or asthma.
- If the patient's respiratory rate suddenly increases, assess for other signs and symptoms of

respiratory distress, such as anxiety, nasal flaring, accessory muscle use, abnormal breath sounds, grunting, and cyanosis. To detect cyanosis, look for the characteristic bluish discoloration in the nail beds, on the lips, under the tongue, in the buccal mucosa, and in the conjunctivae.

- Report your findings to the patient's practitioner.
- If the patient's respiratory rate suddenly decreases, assess for an underlying cause. Notify the patient's practitioner, as needed.
- If you find the patient unresponsive, shout for nearby help and activate the emergency response system via mobile device (if appropriate). Check for absent breathing or only gasping while simultaneously checking for a pulse *to minimize delay in detecting cardiac arrest and initiating cardiopulmonary resuscitation (CPR).* If the patient has a pulse but inadequate breathing, administer one rescue breath every 6 seconds; check the patient's pulse about every 2 minutes.28 If breathing is absent or if the patient is only gasping and you don't feel a pulse within 10 seconds, take these steps:
    - Have a coworker retrieve the defibrillator (or automated external defibrillator [AED]) and other emergency equipment. If you're alone, retrieve them yourself.
    - Immediately begin chest compressions. Continue until the defibrillator (or AED) is ready for use. Compress an adult's chest at a rate of 100 to 120 compressions per minute with a compression depth of at least 2" (5 cm) for an average adult but not to exceed a depth of 2.4" (6 cm). Avoid leaning on the chest between compressions *to allow full chest wall recoil.*
    - After 30 compressions, open the patient's airway and deliver two breaths (with each breath about 1 second long). Continue CPR using a ratio of 30 compressions to two breaths. When the defibrillator is ready for use, check the patient's rhythm and defibrillate for a shockable rhythm. Otherwise, continue CPR.

**Documentation**

Documentation associated with respiration assessment includes:

- date and time
- respiration characteristics
    - rate
    - depth
    - rhythm
    - sound
- inadequate breathing (if applicable)
    - name of the practitioner notified
    - date and time of notification
    - interventions performed (such as oxygen therapy)
    - response to those interventions
- teaching provided to the patient and family (if applicable)
    - understanding of that teaching
    - follow-up teaching needed.