especially for clients with pulmonary or cardiac conditions. The
test requires the client’s full cooperation. Normal total lung
capacity is 6,000 mL and vital capacity is 4,800 mL. PFTs also
measure inspiratory reserve volume (3,100 mL), expiratory
reserve volume (1,200 mL), and residual volume (1,200 mL).
Figure 24-7 illustrates lung volumes and capacities.

Visualization Procedures
A number of visualization procedures can be done to examine the
respiratory tract and cardiovascular system. Roentgenography
(x-ray), lung scan, endoscopy (in which a tube is threaded into the
bronchus [bronchoscopy] or the larynx [laryngoscopy] for direct
visualization), angiography, and echocardiography are a few visu-
alization procedures.

OXYGEN THERAPY
Clients who have difficulty ventilating all areas of their lungs,
those whose gas exchange is impaired, or people with heart
failure may require oxygen therapy to prevent hypoxia.

Oxygen therapy is prescribed by the physician, who spec-
ifies the concentration, method of delivery, and liter flow per
minute. The nurse may initiate oxygen therapy in an emergency
situation. As mentioned earlier, a low-flow oxygen system is essenti-
al for clients who have chronic obstructive pulmonary
disease (COPD). Safety precautions are essential during oxygen
therapy. Box 24-4 provides instructions for oxygen safety.

Because oxygen is colorless, odorless, and tasteless, peo-
ple are often unaware of its presence. Although oxygen by
itself will not burn or explode, it does facilitate combustion
and burning. For example, a bed sheet ordinarily burns slowly
when ignited in the atmosphere. However, if the sheet is satu-
rated with oxygen and ignited by a spark, it will burn rapidly.
The greater the concentration of the oxygen, the more rapidly
fires start and burn, and the harder they are to extinguish.

Oxygen is supplied in several different ways. In hospi-
tals and some long-term care facilities, it is usually piped into
wall outlets at the client’s bedside, making it readily available
for use at all times (Figure 24-8). Tanks or cylinders of oxy-
gen under pressure are also frequently available for use when
wall oxygen either is unavailable or impractical.

Oxygen administered from a cylinder or wall-outlet
system is dry. Dry gases dehydrate the respiratory mucus
membranes. Humidifying devices that add water vapor to
inspired air are thus an essential adjunct of oxygen therapy,
particularly for liter flows over 2 liters per minute (see Figure
24-8B). These devices provide 20 to 40 percent humidity.

### BOX 24-4 NURSING CARE CHECKLIST

**Oxygen Therapy Safety Precautions**

- Place cautionary signs reading “No Smoking: Oxygen in
  Use” on the client’s door, at the foot or head of the bed, and
  on the oxygen equipment.
- Handle and store oxygen cylinders with caution, and strap
  them securely in wheeled transport devices or stands to
  prevent possible falls and outlet breakages. Place them
  away from traffic areas and heaters.
- Instruct the client and visitors about the hazard of smok-
  ing with oxygen in use. Teach family members and room-
  mates to smoke only outside or in provided smoking
  rooms away from the client.
- Make sure that electric devices (e.g., razors, hearing aids,
  radios, televisions, and heating pads) are in good working
  order to prevent the occurrence of short-circuit sparks.
- Avoid materials that generate static electricity, such as
  woolen blankets and synthetic fabrics. Advise clients and
  caregivers to wear cotton fabrics and use cotton blankets.
- Avoid the use of volatile, flammable materials, such as oils,
  greases, alcohol, ether, and acetone (e.g., nail polish
  remover), near clients receiving oxygen.