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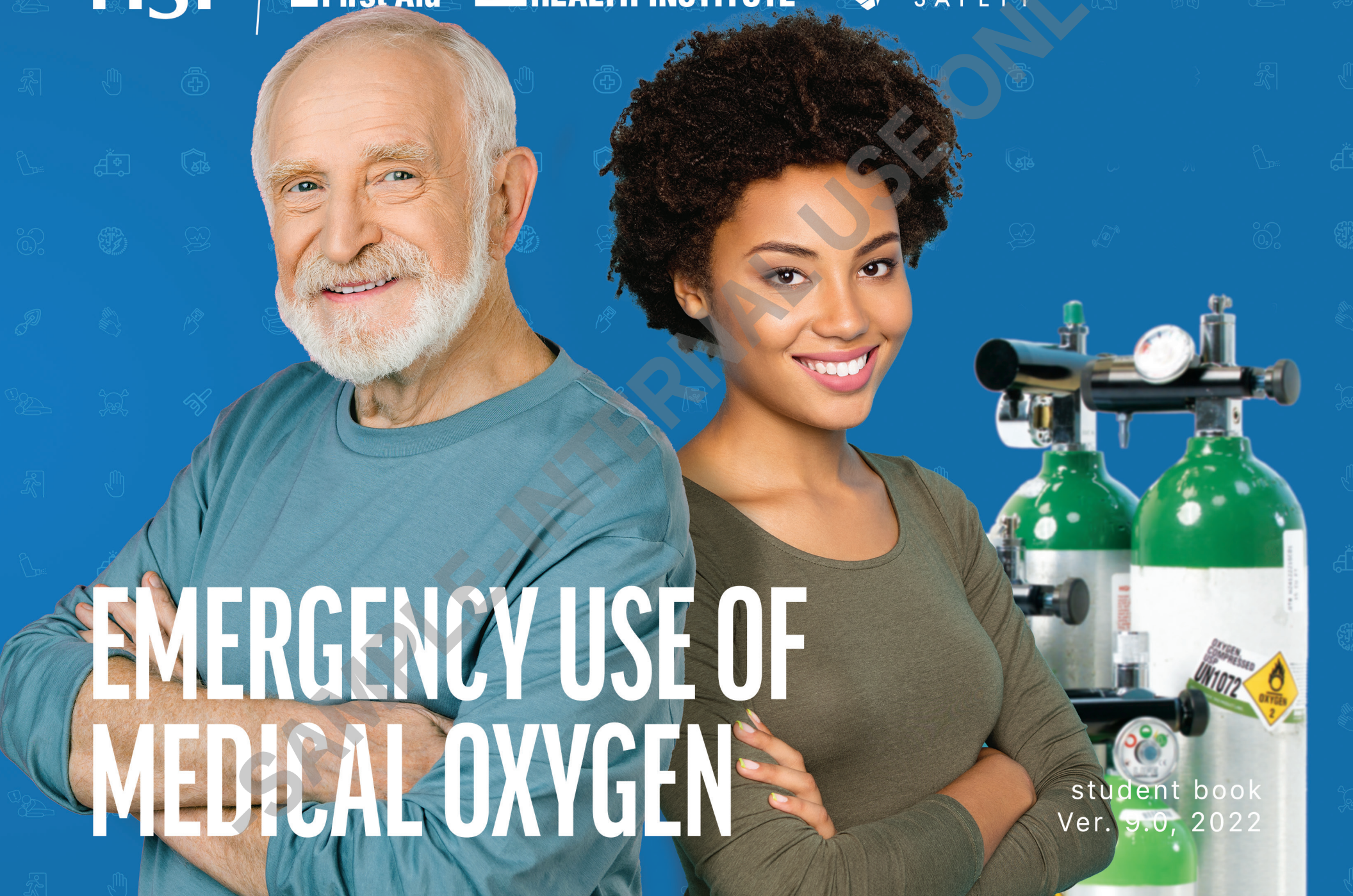

EMERGENCY USE OF MEDICAL OXYGEN

student book
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INTRODUCTION TO MEDICAL OXYGEN

The goal of this training program is to help you gain the knowledge, skills, and confidence necessary to give medical oxygen in an emergency to a person with oxygen deficiency and during resuscitation. Those who give medical oxygen for oxygen deficiency or during resuscitation must, at a minimum, be currently certified in Adult First Aid and CPR AED for adults and children.

The term “medical oxygen” means high-purity oxygen, which is used for medical treatment. Medical oxygen is different from industrial oxygen, which is not appropriate for human use. Industrial oxygen can contain impurities, which can make people ill.

Hypoxia is the medical term for oxygen deficiency. Hypoxia is caused by a low blood supply or low oxygen content in the blood.

Severe hypoxia is a medical emergency. It will cause loss of consciousness, organ failure, and death. Medical oxygen is used to treat hypoxia. Giving medical oxygen helps to correct hypoxia in body tissues and prevent organ damage, including damage to the brain and heart. Healthcare professionals prescribe medical oxygen for patient use in the hospital and for home therapy to treat conditions such as chronic obstructive pulmonary disease, pneumonia, and sleep apnea. Medical oxygen is also used to treat hypoxia in emergency situations such as the depressurization of an aircraft cabin, decompression illness in scuba divers, drowning, carbon monoxide poisoning, or other critical illnesses and injuries, including cardiac arrest. The brain is the organ most vulnerable to hypoxia, and brain injury from hypoxia is the most common long-term complication in survivors of cardiac arrest. When medical oxygen is available, it is reasonable to ventilate both adults and children with 100% oxygen, as long as it does not delay CPR and AED use.

In the United States, medical oxygen is regulated as a prescription drug under the Federal Food, Drug, and Cosmetic Act. Typically, medical oxygen is prescribed by a licensed healthcare professional, such as a physician, physician assistant, or nurse practitioner. The prescription includes the flow rate, concentration, delivery device, duration, and method for monitoring treatment. However, the U.S. Food and Drug Administration (FDA) provides an exemption from the prescription requirement when medical oxygen is used for oxygen deficiency or emergency resuscitation when administered by properly trained personnel. While giving medical oxygen can help correct hypoxia and sustain life, it is also potentially harmful. Hyperoxia is the opposite of hypoxia. Hyperoxia refers to a state in which the oxygen supply in tissues and organs is excessive. Uninterrupted use of high concentrations of oxygen over a long duration, such as greater than 12 hours, without monitoring its effect on the oxygen content of arterial blood, can cause oxygen poisoning, which may be fatal. Hyperoxia is generally not an issue when medical oxygen is given over a short duration in an emergency by someone who is properly trained.

ASSEMBLY OF A PORTABLE MEDICAL OXYGEN DELIVERY SYSTEM

Begin assembly of a portable medical oxygen delivery system by checking the cylinder.

- The cylinder should be green or have a green top.
- The cylinder should be labeled “USP” and have a yellow diamond that says “Oxygen.”
- The cylinder should be free of rust, corrosion, foreign substances, or residues.

Next, clear and check the valve.

- Remove the protective seal on the valve of the cylinder.
- Make sure the oxygen equipment cylinder valve points away from you and others.
- Briefly open and close the valve to blow any debris from the valve’s outlet port.
- Check to ensure a single sealing gasket or washer is in place on the regulator’s inlet port and that it is in good condition.

Then, attach the regulator.

- Slide the regulator onto the neck of the cylinder and align the pins on the regulator with the holes on the cylinder neck.
- Hand-tighten the regulator to the cylinder.

Once the regulator is attached, open the valve and check the pressure.

- Open the valve one full turn.
- Check the pressure gauge.
- If the pressure is lower than 200 pounds per square inch (PSI), do not use it.
- Attach the supply tubing to the regulator and to the delivery device. Delivery devices include simple face masks, CPR masks, non-rebreather masks, and bag-mask devices.

Although all medical oxygen delivery systems include the same basic features, individual systems may have other unique features to consider. You should train with the medical oxygen system you would use in an emergency.

EMERGENCY USE OF MEDICAL OXYGEN FOR A RESPONSIVE, BREATHING ADULT. MODERATE TO SEVERE HYPOXIA

If the person is breathing and responsive, obtain consent. Introduce yourself and ask, “May I help you?” If the person consents, rapidly assess them for life-threatening conditions, including observing for signs and symptoms of hypoxia. If any life-threatening conditions are present, immediately provide appropriate care.

Never delay appropriate care for life-threatening conditions such as CPR AED or control of severe bleeding to get, set up, or administer medical oxygen.

Switch on the pulse oximeter and place it on the person’s middle or index finger.

If a responsive person with signs and symptoms of mild hypoxia worsens or they have signs and symptoms of moderate to severe hypoxia, such as rapid breathing, shortness of breath, coughing wheezing, and a SpO2 below 90%, explain that breathing medical oxygen may help. *Never withhold medical oxygen in an emergency when a person has signs and symptoms of hypoxia, with or without a pulse oximeter.*

If the person consents, place the medical oxygen delivery system in a stable position near the person.

Pressurize the regulator and check for leaks. Connect a non-rebreather mask to the regulator using the supply tubing.

Set the regulator’s flow rate to 12–15 LPM.

Inflate the reservoir bag before placing the mask on the person’s face. To do this, seal the valve between the mask and bag with your fingers or thumb.

Place the non-rebreather mask on the person’s face around the mouth and nose. Adjust the elastic band around the head to ensure a snug fit. Squeeze the metal clip over the nose to improve the mask seal. Tell the person to breathe normally.

Encourage them to maintain the most upright posture possible. Make sure the reservoir bag remains inflated. If needed, increase the flow rate until the reservoir bag slightly inflates and deflates with the person’s breathing. Reassure and comfort the person.

Reassess scene safety, responsiveness, breathing, and SpO2 at least every 5 minutes.

The goal is to maintain an oxygen saturation of 95% or higher.

Monitor the regulator’s pressure gauge. When the pressure falls below 200 PSI, prepare to change cylinders.

Continue to follow the procedure for first aid/CPR AED, including emergency use of medical oxygen.

PROCEDURE FOR ADULT BASIC LIFE SUPPORT INCLUDING EMERGENCY USE OF MEDICAL OXYGEN

BLS PROVIDER

PERFORM AN ASSESSMENT

- Assess scene safety.
- Take standard precautions.*
- Assess responsiveness.
- Activate EMS and/or EAP.†
- Get an AED, emergency response equipment & medical oxygen (or send someone else to).

ASSESS BREATHING & PULSE AT THE SAME TIME. IS THE PULSE DEFINITELY FELT WITHIN 10 SECONDS?

UNRESPONSIVE, PULSE FELT. BREATHING NORMALLY.

MAINTAIN AN OPEN AIRWAY

- Regularly reassess responsiveness, airway, breathing, pulse, and SPO2 until another BLS or ALS provider takes over.
- To help protect the airway, place an uninjured patient on their side in the recovery position.
- S/S of moderate to severe hypoxia/Sp02 below 91%? Give medical oxygen at 12-15 LPM using a non-rebreather mask.‡

UNRESPONSIVE, PULSE FELT. NOT BREATHING NORMALLY.

PROVIDE RESCUE BREATHING OR BAG MASK VENTILATION

- Adult or child with signs of puberty: Give 1 breath every 6 seconds.
- Give naloxone if opioid overdose possible.‡
- Check carotid pulse every 2 minutes.
- If no pulse, start CPR.

UNRESPONSIVE, NO PULSE FELT. NOT BREATHING NORMALLY OR ONLY GASPING.

START CPR

- Position patient on a firm flat surface.
- Perform cycles of 30 high-quality chest compressions and 2 rescue breaths.

GIVE MEDICAL OXYGEN AT 12-15 LPM BY CPR MASK WITH OXYGEN INLET OR BAG-MASK WITH RESERVOIR BAG.‡ DO NOT DELAY CPR AED TO GIVE IT.

USE THE AED AS SOON AS IT IS AVAILABLE. APPLY PADS TO PATIENT'S BARE CHEST.
CONTINUE HIGH-QUALITY CPR WHILE AED CHARGES. FOLLOW AED PROMPTS.

SHOCK ADVISED?

YES§

- Give 1 shock.
- Immediately resume CPR.
- Follow AED prompts.

NO

- Immediately resume CPR.
- Follow AED prompts.

CONTINUE CPR AND AED USE UNTIL OTHER BLS OR ALS PROVIDERS TAKE OVER OR PATIENT STARTS RESPONDING (BREATHING, MOVING, REACTING).

* Use appropriate personal protective equipment (PPE) to protect against possible exposure to infectious agents (gloves, gowns, masks, respirators, bag-mask device with HEPA filter and goggles/face shield). Perform hand hygiene immediately after removing gloves.

† Call 911 to activate Emergency Medical Services (EMS) using a mobile device (if appropriate) and/or activate your occupational emergency action plan (EAP).

‡ Per local protocol/standing orders.

§ Move the medical oxygen delivery device away from defibrillation pads.

CPR TASKS FOR TWO BLS PROVIDERS: ADULT PATIENT

BLS PROVIDER 1: GIVE COMPRESSIONS

- Position yourself at patient's side.
- Perform cycles of 30 high-quality chest compressions. Count out loud.
- Push hard and fast at a rate of 100-120 compressions per minute.
- Compress the chest at least 2 inches (5cm).
- Allow the chest to recoil completely after each compression. Do not lean on the chest between compressions.
- Switch task of giving compressions every 2 minutes (when the AED is analyzing, or sooner if tired).
- Minimize interruptions in chest compressions. Try to limit switches to <5 seconds.

BLS PROVIDER 2: GIVE BREATHS

- Position yourself at the patient's head.
- Maintain an open airway with head tilt-chin lift or jaw thrust.
- Give 2 rescue breaths. Each breath should cause visible chest rise.
- Avoid excessive ventilation (too many breaths or too much volume).
- Encourage the compressor to compress hard and fast, and allow for complete recoil.

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