Critical Congenital Heart Disease Screening Program:

In-Service Education Program Components and Recommendations

The following is an overview of educational tools and components that may be used to educate staff who will be directly involved in screening implementation.

1. PowerPoint Presentation:

a. Provides attendees with education on background, significance, and need for screening.
b. Provides attendees with education on critical CHD screening methods and guidelines.

2. Education for Providers:

a. Provide attendees with educational tool, "Critical Congenital Heart Disease Screening: Education for Providers."

3. Pulse Oximetry Demonstration:

a. Provide attendees with a demonstration of correct and safe use of pulse oximetry equipment in obtaining an accurate infant reading by in-service facilitator or representative from pulse oximeter manufacturer.
b. Provide attendees with an opportunity to practice performing screening on a doll.
c. Provide attendees with the opportunity to ask questions regarding correct and safe methods for performing critical CHD screening.

d. Provide attendees with the "Performing Pulse Oximetry (Pulse Ox) with the Infant Patient: Education for Providers" and "Pulse Ox Sensor Placement" education tools.

4. Knowledge Assessment Quiz:

a. Allow time for attendees to complete the "Knowledge Assessment Quiz."
b. Review the correct answer for each question.
c. Allow time for remediation of questions answered incorrectly.
d. Allow time for attendees to re-take quiz, if necessary.

5. Competency Checklist:

a. Allow adequate time for completion of competency checklist.
b. Provide each attendee with a copy of the complete competency checklist to forward to his or her manager.

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov

UNIVERSITY of VIRGINIA SCHOOL OF MEDICINE

UNIVERSITY of VIRGINIA Children's Hospital

Critical Congenital Heart Disease Screening Program:

Education for Providers

What is pulse oximetry?

Pulse oximetry, or "pulse ox," is a simple, non-invasive and painless test that is used to measure the percent oxygen saturation of hemoglobin in the arterial blood and the pulse rate. Pulse ox was invented in the 1970s and is now widely used and accepted in clinical care. It is often thought to be a basic vital sign.

Traditionally, pulse ox has been used to monitor an individual's oxygen saturation during acute and chronic illness as well as during procedures requiring general anesthesia or sedation.

What is a normal pulse ox reading for infants?

A pulse ox reading of 95 to 100 percent is normal in healthy infants. Infants with heart or lung problems may have lower readings. A low pulse oximetry reading can also be present in newborns whose circulation is adjusting to life outside of the womb.

What is congenital heart disease?

Congenital heart disease (CHD) is the most common birth defect. Infants born with CHD have abnormal structure to their heart which creates abnormal blood flow patterns. Approximately eight of every 1,000 babies born have a form of CHD. Some forms of CHD cause no or very few problems in the health, growth, and development of the infant. Many times, these forms of CHD do not require surgical repair or cardiac catheterization.

Critical CHD includes more serious forms of CHD that usually require intervention in the first year of life. Critical CHD occurs in 3-4 of every 1,000 babies and can bring a significant risk of morbidity and mortality. This risk is greater if an infant is not diagnosed soon after birth.

Failing to detect critical CHD while in the newborn nursery may lead to critical events such as cardiogenic shock or death. Survivors who present late are at greater risk for neurologic injury and subsequent developmental delay.

Why is pulse ox used to screen for critical CHD?

Physical examination is performed during the first 24 hours of life in most institutions and currently the only method used to screen for critical CHD. Physical examination is only 50 percent effective in detecting CHD after the baby is born.

The US Department of Health and Human Services, the American Heart Association, the American Academy of Pediatrics, the March of Dimes and American College of Cardiology endorse screening for critical CHD. It has been shown to increase the chances that infants with critical CHD are identified before leaving the newborn nursery.

It is possible that a baby with critical CHD can have a normal pulse ox reading. CHD can not be completely ruled out by a normal pulse oximetry reading.

Critical Congenital Heart Disease Screening Program

VDH VIRGINIA DEPARTMENT OF HEALTH Protecting You and Your Environment www.vdh.virginia.gov   UNIVERSITY of VIRGINIA SCHOOL OF MEDICINE   UNIVERSITY of VIRGINIA Children's Hospital

Critical Congenital Heart Disease Screening Program:

Performing Pulse Oximetry (Pulse Ox) with the Infant Patient: Education for Providers

Pulse Ox – Dos

1. If you are using disposable pulse ox sensors, use a new, clean sensor for each infant. If you are using reusable pulse ox sensors, clean the sensor with recommended disinfectant solution between each infant. Dirty sensors can decrease the accuracy of your reading and can transmit infection. A disposable wrap should be used to secure the sensor to the site if you are using reusable sensors.

2. The best sites for performing pulse ox on infants are the great toe, thumb and the outer aspect of the palm and the foot. An infant pulse ox sensor (not an adult pulse ox clip) should always be used for infants.

3. When placing the sensor on the infant's skin, there should not be gaps between the sensor and the infant's skin. **The sides of the sensor should be directly opposite of each other.**

4. Nail polish dyes and substances with dark pigmentation (such as dried blood) can affect the pulse ox reading. Assure that the skin is clean and dry before placing the sensor on the infant. Skin color and jaundice do not affect the pulse ox reading.

5. Movement, shivering and crying may affect the accuracy of the pulse ox reading. Ensure that the infant is calm and warm during the reading. Swaddle the infant and encourage family involvement to promote comfort while obtaining the reading. If possible conduct screening while the infant is awake.

6. Pulse oximeters have different confidence indicators to ensure that the pulse ox reading is accurate. Determine the confidence indicators for the pulse oximetry equipment that you are using.

7. If an infant requires pulse ox monitoring for an extended amount of time, assess the site where the sensor is placed at least every two hours. Monitor for signs of irritation.

Pulse Ox – Don'ts

1. Never use an adult pulse ox clip when obtaining a pulse ox reading for an infant. Using an adult clip on an infant will give you an inaccurate reading.

2. Blood flow is needed to obtain an accurate pulse ox reading. Never attempt to obtain a pulse ox reading on the same extremity that you have an automatic blood pressure cuff.

3. Bright or infrared light, including bilirubin lamps and surgical lights, can affect the accuracy of the reading. Ensure that the infant is not placed in bright or infrared light while pulse ox is being performed. You may cover the pulse ox sensor with a blanket to ensure that extraneous light does not affect the accuracy of your reading.

4. Do not use tape or your hand to apply the pulse ox sensor to the infant's skin.

Pulse Ox - Caution!

1. The pulse is needed to determine the oximetry reading. Pulse ox is not accurate if the patient is coding or is having a cardiac arrhythmia. Remember: No pulse, no oximetry!

2. Pulse ox readings are not instantaneous. The oximetry reading that is displayed on the monitor is an average of readings over the past few seconds.

Critical Congenital Heart Disease Screening Program:

Pulse Ox Sensor Placement Education

1. Select appropriate site for sensor placement according to manufacturer instructions. Most common application sites include the great toe, thumb and the outer aspect of the hand or foot.
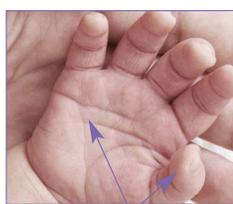
RH Application Sites

Foot Application Sites

2. Place the photodetector portion of the sensor on the top of the selected site.

3. Place the light emitter directly opposite of the photodetector on the fleshy portion of the site.

4. Remember that the photodetector and light emitter should be **directly opposite** of one another to obtain an accurate reading.

5. If you are using a reusable sensor, secure the sensor to the site using the appropriate wrap as recommended by the vendor. Do not use tape or your hand to secure the sensor to the site.

© Masimo Corporation 2011.

Critical Congenital Heart Disease Screening Program

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov

UNIVERSITY *of* VIRGINIA
SCHOOL OF MEDICINE

UNIVERSITY *of* VIRGINIA
Children's Hospital

Critical Congenital Heart Disease Screening Program:

Knowledge Assessment

1. The following may affect the accuracy of the pulse oximetry (pulse ox) reading:
   a. Cold extremities or shivering
   b. Crying
   c. Bilirubin lamps and surgical lights
   d. All of the above

2. One clean, disposable pulse ox sensor can be used on up to five patients.
   a. True
   b. False

3. All of the following can affect the accuracy of the pulse ox reading except:
   a. Placing the pulse ox sensor on the same extremity that you are taking the blood pressure
   b. Performing the pulse ox test while the infant is crying
   c. Using a clip on the finger of an infant
   d. Infant skin color or jaundice

4. Pulse ox screening will detect all forms of CHD.
   a. True
   b. False

5. The screening guidelines state that pulse ox should be performed on:
   a. The right hand
   b. One foot
   c. Both a and b
   d. Neither a or b

6. Screening for CCHD was endorsed as a test that should be included in the recommended uniform screening panel (RUSP).
   a. True
   b. False

7. Pass or Fail? Right Hand Saturation – 100%
   Foot Saturation – 94%

8. Pass or Fail? Right Hand Saturation – 96%
   Foot Saturation – 95%

9. Pass or Fail? Right Hand Saturation – 96%
   Foot Saturation – 94%

10. Pass or Fail? Right Hand Saturation – 89%
    Foot Saturation – 82%

Critical Congenital Heart Disease Screening Program

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov

UNIVERSITY of VIRGINIA
SCHOOL OF MEDICINE

UNIVERSITY of VIRGINIA
Children's Hospital

Critical Congenital Heart Disease Screening Program:

Knowledge Assessment Answers

1. The following may affect the accuracy of the pulse oximetry (pulse ox) reading:
   a. Cold extremities or shivering
   b. Crying
   c. Bilirubin lamps and surgical lights
   d. All of the above

2. One clean, disposable pulse ox sensor can be used on up to five patients.
   a. True
   b. False

3. All of the following can affect the accuracy of the pulse ox reading except:
   a. Placing the pulse ox sensor on the same extremity that you are taking the blood pressure
   b. Performing the pulse ox test while the infant is crying
   c. Using a clip on the finger of an infant
   d. Infant skin color or jaundice

4. Pulse ox screening will detect all forms of CHD.
   a. True
   b. False

5. The screening guidelines state that pulse ox should be performed on:
   a. The right hand
   b. One foot
   c. Both a and b
   d. Neither a or b

6. Screening for CCHD was endorsed as a test that should be included in the recommended uniform screening panel (RUSP).
   a. True
   b. False

7. Pass or Fail? Right Hand Saturation – 100%
   Foot Saturation – 94%

8. Pass or Fail? Right Hand Saturation – 96%
   Foot Saturation – 95%

9. Pass or Fail? Right Hand Saturation – 96%
   Foot Saturation – 94%

10. Pass or Fail? Right Hand Saturation – 89%
    Foot Saturation – 82%

Critical Congenital Heart Disease Screening Program:

Competency Checklist

♥ Competency Title: Critical CHD Screening Process

♥ Competency Criteria includes the following:
   (1) Completion of the in-service education.
   (2) Accomplishment of 90 percent or more on the knowledge assessment quiz with remediation as necessary.
   (3) Appropriate application of pulse oximetry.
   (4) Accurate reading and documentation of the pulse oximetry readings.

♥ Competency Statement: Proficiently perform the required activities defined in research protocol.
   Validation Criteria: A. Discussion (D)   C. Written Test (T)
                              B. Verbal Feedback (VF)   D. Return Demonstration (RD)

Directions for completing evaluation form: Evaluator, please circle the appropriate method of validation, initial each line and place signature in the appropriate place at the end of the document.

Name: _____   Job Title _____

Competency	Date	Method of Validation	Supervisor Initials	Comments
Explains screening eligibility guidelines for critical CHD screening		D VF T		
Identifies safe and correct methods for performing pulse oximetry on an infant		D VF T RD		
Describes methods to ensure that pulse oximetry reading is accurate		D VF T RD		
Explains and understands screening methods and guidelines for pulse oximetry screening		D VF T		
Discuss HIPAA confidentiality standards		D VF T		

Employee Signature: _____   Date: _____

Supervisor Name (Printed) _____

Supervisor Signature: _____

Critical Congenital Heart Disease Screening Program

Critical Congenital Heart Disease Screening Program:

Training Log

(For the records of unit managers or nursing educators)

Employee Name and Title	Date	Completion of Competency Checklist		Manager Initials
		Yes	No	

* Each employee responsible for performing critical CHD screening methods should complete the competency checklist prior to participation.

Unit: _____

Manager Name (Printed): _____

Manager Signature: _____

Critical Congenital Heart Disease Screening Program

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov

UNIVERSITY of VIRGINIA
SCHOOL OF MEDICINE

UNIVERSITY of VIRGINIA
Children's Hospital