

Introduction to Pediatric Phlebotomy Curriculum



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About the Author



Kasey Carlson has been a Registered Nurse for 19 years. She holds a Master's degree in Nursing Education from the University of Wisconsin – Eau Claire and taught associate degree nursing for over 13 years. She also has a second Master's degree in Learning Design and Technology from San Diego State University. She currently is a Curriculum Technology Manager with Adtalem Global Education. Ms. Carlson also specializes in healthcare simulation curriculum design.

Introduction to Pediatric Phlebotomy

This curriculum and accompanying pediatric manikin will help students learn about blood specimen collection through phlebotomy.

Curriculum Structure

The *Introduction to Pediatric Phlebotomy* curriculum is composed of the following lessons. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	FOCUS: Part 1 – Developing Awareness of Patient-Focused Care	10 minutes
One	FOCUS: Part 2 – Anatomy (Locate Veins Used in Phlebotomy)	10 minutes
One	LEARN: Introduction to Pediatric Phlebotomy Slide Presentation	20 minutes
One	REVIEW: Practice and Assessment of Phlebotomy	30 minutes
	Total	1-1½ hours

Lesson Structure

Each lesson begins with a Lesson Overview, Lesson Objectives, and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps, and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information, or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity, or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One – Introduction to Phlebotomy

Lesson Overview

In this lesson students will learn about blood specimen collection through phlebotomy.

Lesson Objectives

After completing this lesson, participants will be able to:

- Locate veins used for phlebotomy in children
- Demonstrate how to prepare a pediatric patient for phlebotomy
- Perform the steps in conducting pediatric phlebotomy

Pre-Lesson Knowledge

- Vascular anatomy
- Aseptic technique

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS: Part 1	• <i>Introduction to Pediatric Phlebotomy (Focus on Empathy)</i> worksheet • <i>Introduction to Pediatric Phlebotomy (Focus on Empathy) Instructor Resource</i>	1. Print/photocopy <i>Introduction to Pediatric Phlebotomy (Focus on Empathy)</i> worksheet (one per participant)	10 minutes
FOCUS: Part 2	• <i>Introduction to Pediatric Phlebotomy (Focus on Anatomy)</i> worksheet • <i>Introduction to Pediatric Phlebotomy (Focus on Anatomy) Instructor Resource</i>	1. Print/photocopy <i>Introduction to Pediatric Phlebotomy (Focus on Anatomy)</i> worksheet (one per participant)	10 minutes
LEARN	• <i>Introduction to Pediatric Phlebotomy</i> slide presentation • Pediatric manikin	1. Prepare <i>Introduction to Pediatric Phlebotomy</i> slide presentation for viewing	20 minutes
REVIEW	• <i>Introduction to Pediatric Phlebotomy Check-Off (Instructor Resource)</i> • <i>Introduction to Pediatric Phlebotomy Check-Off</i> worksheet • <i>Introduction to Pediatric Phlebotomy Quiz</i> • <i>Introduction to Pediatric Phlebotomy Quiz - Answer Key</i> • Pediatric manikin Supplies: • Hand sanitizer or access to soap/water • Laboratory sample tubes upright in a rack • Clean, non-sterile gloves • Different sizes of blood-sampling devices (safety-engineered devices or needles and syringes)	1. Print/photocopy <i>Introduction to Pediatric Phlebotomy Check-Off</i> worksheet and <i>Introduction to Pediatric Phlebotomy Quiz</i> (one per participant) 2. Get the supplies ready for the lesson	30 minutes

Introduction to Pediatric Phlebotomy

	• Tourniquet • Alcohol swabs for skin disinfection • Gauze or cotton ball to be applied over the puncture site • Laboratory specimen labels and forms • Laboratory transportation bags/containers • A sharps container		
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Lesson One – Introduction to Pediatric Phlebotomy

FOCUS: Part 1 – Developing Awareness of Patient-Focused Care

10 minutes

Purpose:

To help students develop an awareness of patient-focused care.

Materials:

- *Introduction to Pediatric Phlebotomy (Focus on Empathy)* worksheet
- *Introduction to Pediatric Phlebotomy (Focus on Empathy)* Instructor Resource

Facilitation Steps:

1. Distribute the *Introduction to Pediatric Phlebotomy (Focus on Empathy)* worksheets prior to or at the start of the class.
2. Have the *Introduction to Pediatric Phlebotomy (Focus on Empathy)* Instructor Resource available.
3. Have students read through the information and complete the worksheet.
4. Have students pair up upon completion and share answers.

Name: _____ Class: _____

Introduction to Pediatric Phlebotomy (Focus on Empathy)

READ the following:

Children receive 18 million needle sticks per year. IV placement and venipuncture are some of the most frequently performed interventions by nurses. In a study, children 3-18 years of age were asked to describe getting their blood drawn. They described it as:

- “It’s like when someone stabs you.”
- “It hurts, and it is horrible.”
- “Felt like someone smashing a hammer.”

65% said worse than anything else they could imagine despite the presence of parents.

REFLECT on the above.

- If you were going to draw blood from a child, how could you make the process less upsetting?
- How could the parents help?
- How could the parents hinder the process?

SHARE your thoughts with a peer.

University of Iowa. (n.d.) Pediatric Venipuncture. Retrieved from
http://www.healthcare.uiowa.edu/training/medtest/inservice/ped_stick.pdf

Introduction to Pediatric Phlebotomy (Focus on Empathy) Instructor Resource

READ the following:

Children receive 18 million needle sticks per year. IV placement and venipuncture are some of the most frequently performed interventions by nurses. In a study, children 3-18 years of age were asked to describe getting their blood drawn. They described it as:

- “It’s like when someone stabs you.”
- “It hurts, and it is horrible.”
- “Felt like someone smashing a hammer.”

65% said worse than anything else they could imagine despite the presence of parents.

REFLECT on the above.

- If you were going to draw blood from a child, how could you make the process less upsetting?

Calm voice, reassurance, touch, use of a topical numbing agent, distract child, answer questions and explain all actions, allow the child to touch and see items

- How could the parents help?

Have parent hold the child in an upright position; be calm and focus on the child, not the procedure

- How could the parents hinder the process?

Parent anxiety, which is highly predictive of a child’s anxiety

Use of restraints or holding the child down

Criticism of child

SHARE your thoughts with a peer.

University of Iowa. (n.d.) Pediatric Venipuncture. Retrieved from
http://www.healthcare.uiowa.edu/training/medtest/inservice/ped_stick.pdf

Lesson One – Introduction to Phlebotomy

FOCUS: Part 2 – Anatomy (Locate Veins Used in Phlebotomy)

10 minutes

Purpose:

To help students locate veins used in phlebotomy.

Materials:

- *Introduction to Pediatric Phlebotomy (Focus on Anatomy)* worksheet
- *Introduction to Pediatric Phlebotomy (Focus on Anatomy) Instructor Resource*

Facilitation Steps:

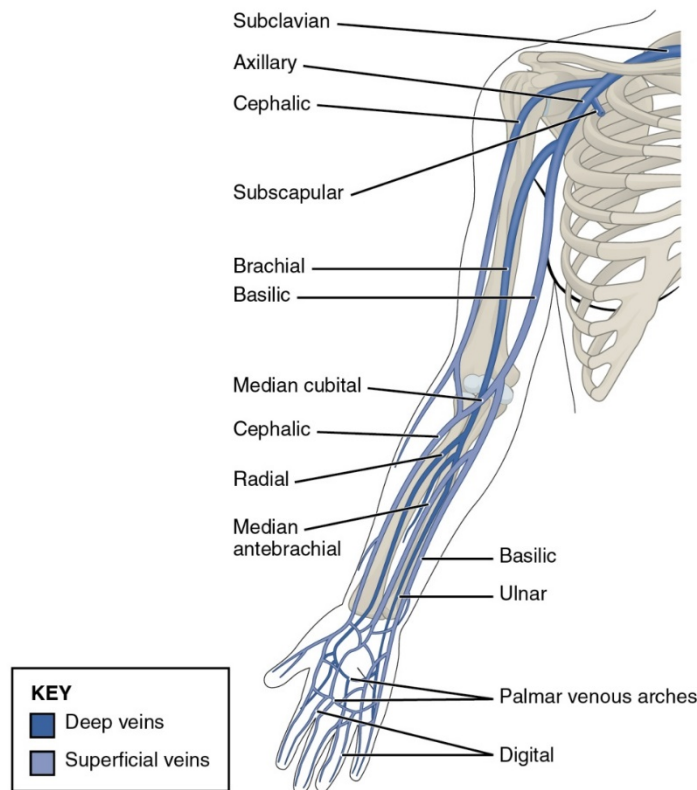
1. Distribute the *Introduction to Pediatric Phlebotomy (Focus on Anatomy)* worksheets prior to or at the start of the class.
2. Have the *Introduction to Pediatric Phlebotomy (Focus on Anatomy) Instructor Resource* available.
3. Have students read through the information and complete the worksheet.
4. Have students pair up upon completion and share answers.

Introduction to Phlebotomy

(Focus on Anatomy) Instructor Resource

Phlebotomy is defined as “the removal of blood from a vein chiefly for transfusion or diagnosis.” Below is a depiction of the veins in the arm.

Exercise: Locate and trace the median cubital and cephalic veins. These are commonly used to draw blood from pediatric patients.



Why do you think these veins are used for phlebotomy? Which direction does the blood flow? Why are arteries not used?

These veins are superficial and easier to access. Veins have thinner vessel walls than arteries since they return blood to the heart. Vein size goes from small to large, and blood flow goes up the arm. Veins are safer to access than arteries because they contain less pressure in the vessels. Less pressure means less bleeding.

OpenStax College [CC BY 3.0 (<http://creativecommons.org/licenses/by/3.0/>)], via Wikimedia Commons. Retrieved from https://commons.wikimedia.org/wiki/File%3A2134_Thoracic_Upper_Limb_Veins.jpg

Merriam-Webster (2016). Dictionary. Retrieved from <https://www.merriam-webster.com/>

Name: _____ Class: _____

Introduction to Pediatric Phlebotomy (Focus on Anatomy)

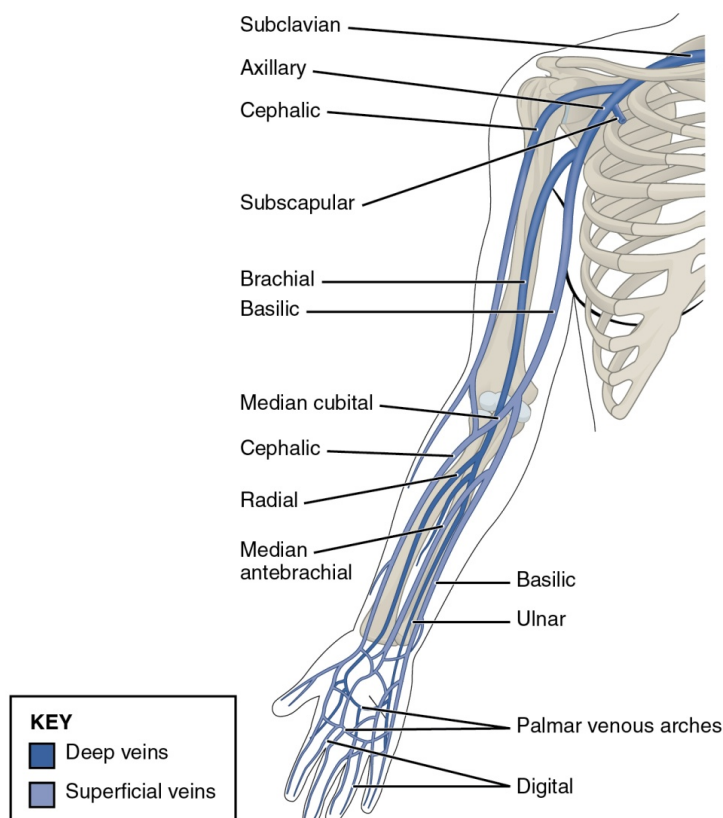
Phlebotomy is defined as “the removal of blood from a vein chiefly for transfusion or diagnosis.” Below is a depiction of the veins in the arm.

Exercise: Locate and trace the median cubital and cephalic veins. These are commonly used to draw blood from pediatric patients.

Why do you think these veins are used for phlebotomy?

Which direction does the blood flow?

Why are arteries not used?



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Merriam-Webster (2016). Dictionary. Retrieved from <https://www.merriam-webster.com/>

Lesson One – Introduction to Pediatric Phlebotomy

LEARN: Introduction to Pediatric Phlebotomy Slide Presentation

20 minutes

Purpose:

Participants will learn about blood specimen collection through phlebotomy.

Materials:

- *Introduction to Pediatric Phlebotomy* slide presentation
- Phlebotomy model, trainer or simulator

Facilitation Steps:

1. Share the following information with students as you show the slide presentation.

Slide 1: Introduction Slide

Slide 2: Phlebotomy is using a needle to access a blood vessel. If in a vein, this is called venipuncture. Purposes for phlebotomy include blood sampling for testing or blood collection for donation. The main focus of this presentation will be on venipuncture.

Slide 3: According to the World Health Organization, the following points are considered best practices. It is important to be skilled in phlebotomy as this is the best way to avoid injury to the vessels.

Ask students:

1. What protective equipment could be used? (gloves)
2. Why is post-exposure prophylaxis needed? (hepatitis, HIV, etc.)

(Source: World Health Organization. (2010). *WHO guidelines on drawing blood: best practices in phlebotomy*. Retrieved from https://www.who.int/infection-prevention/publications/drawing_blood_best/en/)

Slide 4: Many factors affect the ability to collect a blood sample. When working with children, it is important to address the fears and beliefs of the parent or guardian as well.

Slide 5: Toddlers are in the phase of mobility, discovery, separation anxiety, and basic language. They have just learned and understand the word “no.” It is important to tell the child what you are doing using simple terms. Offer comfort items such as a favorite stuffed animal and/or use distractions. Have a reward for the child for cooperative behavior like stickers. Parents, guardian, or staff will need to assist with positioning.

Slide 6: Preschoolers are similar to toddlers, but at this age, children may be more curious about the equipment. They may have a fear of the procedure or the loss of blood. Use imaginative play to ease these fears and enlist the help of the parent or guardian.

Slide 7: School-age children can understand the procedure at an age-appropriate level. Let the child have control over who is present in the room. Don’t tell the child to be brave. The child’s reaction will be based off of prior experience.

Slide 8: Some tests require meeting specific conditions to obtain an accurate measurement. (Example: fasting blood sugar requires patient to fast (NPO); drug peak and trough levels are based on time of medication administration).

Review standard precautions and needle safety with students.

Specimens should be labeled with the patient’s identification number, date and time the specimen was obtained, name of the test and source of the specimen/culture for each container.

Deliver specimens to the laboratory within the recommended time.

Slide 9: In some facilities, there are specially trained phlebotomists that obtain the blood samples. It is important to know the facility's policies and procedures.

Blood can be collected with a needle and syringe or a needle with a vacutainer.

Explain which method the students will be using to collect the blood.

Slide 10: Venipuncture can be a painful procedure, so the use of numbing agents is encouraged. Check your facility's policy. The gauge of the needle should be age-appropriate. Most sources say that a 23-25-gauge butterfly needle is preferred. Complete a self-check of your skills and approach. How comfortable are you with pediatric venipuncture? How comfortable are you with children? It is possible you will need to ask someone else with more experience to complete the order. Make sure you have educated not only the child, but the parent/guardian as well. If the parent/guardian is uncomfortable around needles and/or blood, other assistance may be needed.

Slide 11: Identify the patient by asking their name and date of birth. If too young, compare the ID band with information in the patient's chart. Assess the child's mood and behavior when explaining the procedure. Make sure there are no contraindicated conditions or sites. Drawing specimens from contraindicated sites can result in false test results or may injure the patient. Confirm the tests that are ordered.

Slide 12: For toddlers and preschool children, position them on the parent or guardian's lap in an upright position. Most children under the age of 6 will need someone to hold their arm still. Make sure the opposite hand and arm movement is being limited to avoid grabbing of the equipment.

The median cubital vein is the most common injection site. Locate a vein that is visible, straight and clear.

Review FOCUS Anatomy worksheet for the location of veins

Apply a tourniquet 4-5 finger-widths above potential site. The tourniquet blocks venous return, causing veins to dilate for easier visibility. It is important that it does not block arterial blood flow. Tourniquets left on for longer than 1 minute may cause complications.

If a numbing agent is used, apply it after a site is determined and allow the medication to numb the area.

Slide 13: When preparing the supplies, consider the age of the child. For younger children, keep the equipment out of reach. For older children, ask if they want to see equipment or watch the procedure. This will help you to indicate their comfort level. Have the needle attached to a syringe or Vacutainer depending on the method chosen.

Vacutainers are not recommended in children younger than 2 years of age. Swab the site. The alcohol drying process kills bacteria and decreases stinging feeling with a needle stick. Presence of liquid alcohol may contaminate the sample. Prepare the child using age appropriate techniques and obtain the sample. Release the tourniquet as soon as you are done collecting the sample.

Demonstrate the method being used.

Slide 14: After removing the needle, apply pressure. Dispose of any sharps. Rotate the tube to mix additives. Do not shake the tubes; this could cause a breakdown of the red blood cells. Label the specimen and bandage the site. Reward the child before leaving to send specimen to lab.

Slide 15: Notify the healthcare provider if bleeding continues at the site, if there are signs and symptoms of infection, or if the results are critical.

Lesson One – Introduction to Phlebotomy

REVIEW: Practice and Assessment of Phlebotomy

10 minutes

Purpose:

Participants will practice phlebotomy on models and then complete a quiz to assess mastery.

Materials:

- *Introduction to Pediatric Phlebotomy Check-Off (Instructor Resource)*
- *Introduction to Pediatric Phlebotomy Check-Off* worksheet
- *Introduction to Pediatric Phlebotomy Quiz*
- *Introduction to Pediatric Phlebotomy Quiz - Answer Key*
- Phlebotomy trainer or simulator

Supplies:

- Hand sanitizer or access to soap and water
- Laboratory sample tubes upright in a rack
- Clean, non-sterile gloves
- Different sizes of blood-sampling devices (safety-engineered devices or needles and syringes)
- Tourniquet
- Alcohol swabs for skin disinfection
- Gauze or cotton ball to be applied over puncture site
- Laboratory specimen labels and forms
- Laboratory transportation bags/containers
- A sharps container

Facilitation Steps:

1. Give students the *Introduction to Pediatric Phlebotomy Check-Off* worksheet.
2. Access the *Introduction to Pediatric Phlebotomy Check-Off (Instructor Resource)* page. Following the steps on the check-off page,

demonstrate phlebotomy on the phlebotomy trainer or simulator available.

3. Following the steps on their *Introduction to Pediatric Phlebotomy Check-Off* worksheet, have students practice phlebotomy on the phlebotomy trainer or simulator available.
4. Hand out the *Introduction to Pediatric Phlebotomy Quiz*. Give them a couple of minutes to complete it.
5. Have students self-check or peer check their answers as you share them from the *Introduction to Pediatric Phlebotomy Quiz - Answer Key*.

Introduction to Pediatric Phlebotomy

Check-Off

(Instructor Resource)

PREPARATION:

Supplies:

- Hand sanitizer
- Laboratory sample tubes upright in a rack
- Clean, non-sterile gloves
- Different sizes of blood-sampling devices (safety-engineered devices or needles and syringes)
- Tourniquet
- Alcohol swabs for skin disinfection
- Gauze or cotton ball to be applied over puncture site
- Laboratory specimen labels and forms
- Laboratory transportation bags/containers
- A sharps container

After demonstration, have students practice phlebotomy on the models using the steps on the following page. You may pair the students in order for there to a “parent” role.

Optional: Evaluate the student’s ability to complete phlebotomy using the steps on the following page. You may score via points or satisfactory/unsatisfactory.

Introduction to Pediatric Phlebotomy

1.	Verify written order from provider to determine type of test	
2.	Gather supplies needed	
3.	Knock, enter room and provide for privacy	
4.	Identify yourself with name and title (student nurse, medical assistant, etc)	
5.	Wash your hands with sanitizer or soap/water	
6.	Identify patient. Verify this information	
7.	Explain the procedure appropriately to the patient and parent	
8.	Place patient in an appropriate position and extend the patient's arm	
9.	Explain what age appropriate techniques will be used (example: distraction)	
10.	Inspect the antecubital area and locate a vein that is visible, straight and clear	
11.	Apply tourniquet 4-5 finger widths above potential site	
12.	Palpate radial pulse to confirm arterial blood flow	
13.	Inspect the antecubital area to confirm site	
14.	Apply clean gloves and palpate selected vein	
15.	Cleanse site with alcohol swab	
16.	Anchor the vein by holding the patient's arm and placing a thumb below the venipuncture site	
17.	Enter the vein at a 30-degree angle or less	
18.	Draw blood collection tubes in the correct order (if applicable)	
19.	Once sufficient blood has been collected, release the tourniquet before withdrawing the needle	
20.	Withdraw the needle gently and apply gentle pressure to the site with a clean gauze	
21.	Discard the used needle and syringe or blood sampling device into sharps container	
22.	Verify the label on samples and forms for accuracy	
23.	Check the insertion site for bleeding; provide for patient comfort and safety	
24.	Remove gloves and perform hand hygiene. Reward patient	
25.	Prepare samples for transportation	
	Score	

Name: _____ Class: _____

Introduction to Pediatric Phlebotomy

Check-Off

Practice venipuncture on the models using the following steps. Depending on the method used (syringe, vacutainer, etc) to draw the blood specimen, you may have to verbalize some steps.

Verify written order from provider to determine type of test
Gather supplies needed
Knock, enter room and provide for privacy
Identify yourself with name and title (student nurse, medical assistant, etc)
Wash your hands with sanitizer or soap/water
Identify patient. Verify this information
Explain the procedure appropriately to the patient and parent
Place patient in an appropriate position and extend the patient's arm
Explain what age appropriate techniques will be used (example: distraction)
Inspect the antecubital area and locate a vein that is visible, straight and clear
Apply tourniquet 4-5 finger widths above potential site
Palpate radial pulse to confirm arterial blood flow
Inspect the antecubital area to confirm site
Apply clean gloves and palpate selected vein
Cleanse site with alcohol swab
Anchor the vein by holding the patient's arm and placing a thumb below the venipuncture site
Enter the vein at a 30-degree angle or less
Draw blood collection tubes in the correct order (if applicable)
Once sufficient blood has been collected, release the tourniquet before withdrawing the needle
Withdraw the needle gently and apply gentle pressure to the site with a clean gauze
Discard the used needle and syringe or blood sampling device into sharps container

Introduction to Pediatric Phlebotomy

Verify the label on samples and forms for accuracy
Check the insertion site for bleeding; provide for patient comfort and safety
Remove gloves and perform hand hygiene. Reward patient
Prepare samples for transportation

Name: _____ Class: _____

Introduction to Pediatric Phlebotomy Quiz

Directions: Select the best answer to the following multiple-choice questions:

1. When completing a blood draw, which of the following veins is most commonly used?
 - a. Radial
 - b. Brachial
 - c. Median cubital
 - d. Subclavian
2. Which of the following sites are contraindicated?
 - a. Site is in same arm as IV
 - b. Site is by a joint
 - c. Site is on same arm as ID band
 - d. Site has dried alcohol on it
3. Which is appropriate for a 12-year-old child?
 - a. Mimic procedure on a stuffed animal
 - b. Tell child to be brave
 - c. Distract with counting, songs, or games
 - d. Let the child have control over who is present in the room
4. Which of the following should be included on a specimen label?
 - a. Admission date
 - b. Medical diagnosis
 - c. Patient's phone number
 - d. Date/time of collection
5. Why are specimen tubes rotated 8 to 10 times immediately after collection?
 - a. To mix the additives in the tubes
 - b. To warm the specimen
 - c. To sift out any residue
 - d. To create a clearer sample

Introduction to Pediatric Phlebotomy Quiz - Answer Key

1. When completing a blood draw, which of the following veins is most commonly used?

- a. Radial
- b. Brachial
- c. Median cubital**
- d. Subclavian

The median cubital is the most common site. The other options are deep veins.

2. Which of the following sites are contraindicated?

- a. Site is in same arm as IV**
- b. Site is by a joint
- c. Site is on same arm as ID band
- d. Site has dried alcohol on it

A site in the arm with an IV is a contraindicated site. Drawing specimens from contraindicated sites can result in false test results or may injure the patient.

3. Which is appropriate for a 12-year-old child?

- a. Mimic procedure on a stuffed animal
- b. Tell child to be brave
- c. Distract with counting, songs, or games

d. Let the child have control over who is present in the room

School age children should be given choices of who they believe they need in the room. This will vary by age.

4. Which of the following should be included on a specimen label?

- a. Admission date
- b. Medical diagnosis
- c. Patient's phone number

d. Date/time of collection

Specimens should be labeled with patient's identification number, date and time the specimen was obtained, name of the test and source of the specimen/culture for each container.

5. Why are specimen tubes rotated 8 to 10 times immediately after collection?

- a. To mix the additives in the tubes**
- b. To warm the specimen
- c. To sift out any residue
- d. To create a clearer sample

Rotate tubes 8-10 times to mix with additives. Shaking can disrupt the red blood cells.

Source

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World Health Organization. (2010). *WHO guidelines on drawing blood: best practices in phlebotomy: Paediatric and neonatal blood sampling*. Retrieved from:
<https://www.ncbi.nlm.nih.gov/books/NBK138647>