ARMY MEDICINE
Serving To Heal...Honored To Serve

I-STAT ANALYZER TRAINING

OBJECTIVES

- Understand the components of the iSTAT analyzer
- Correctly handle a specimen for blood gas analysis (ABG) and PT/INR
- Perform both ABG and PT/INR testing on the iSTAT
- Perform daily maintenance on the iSTAT

PURPOSE

- The use of the iSTAT allows quantitative blood gas analysis and PT/INR test results at the patient's bedside.

- In order to ensure accurate, reliable patient results, all personnel utilizing an iSTAT must be properly trained and that training must be documented.

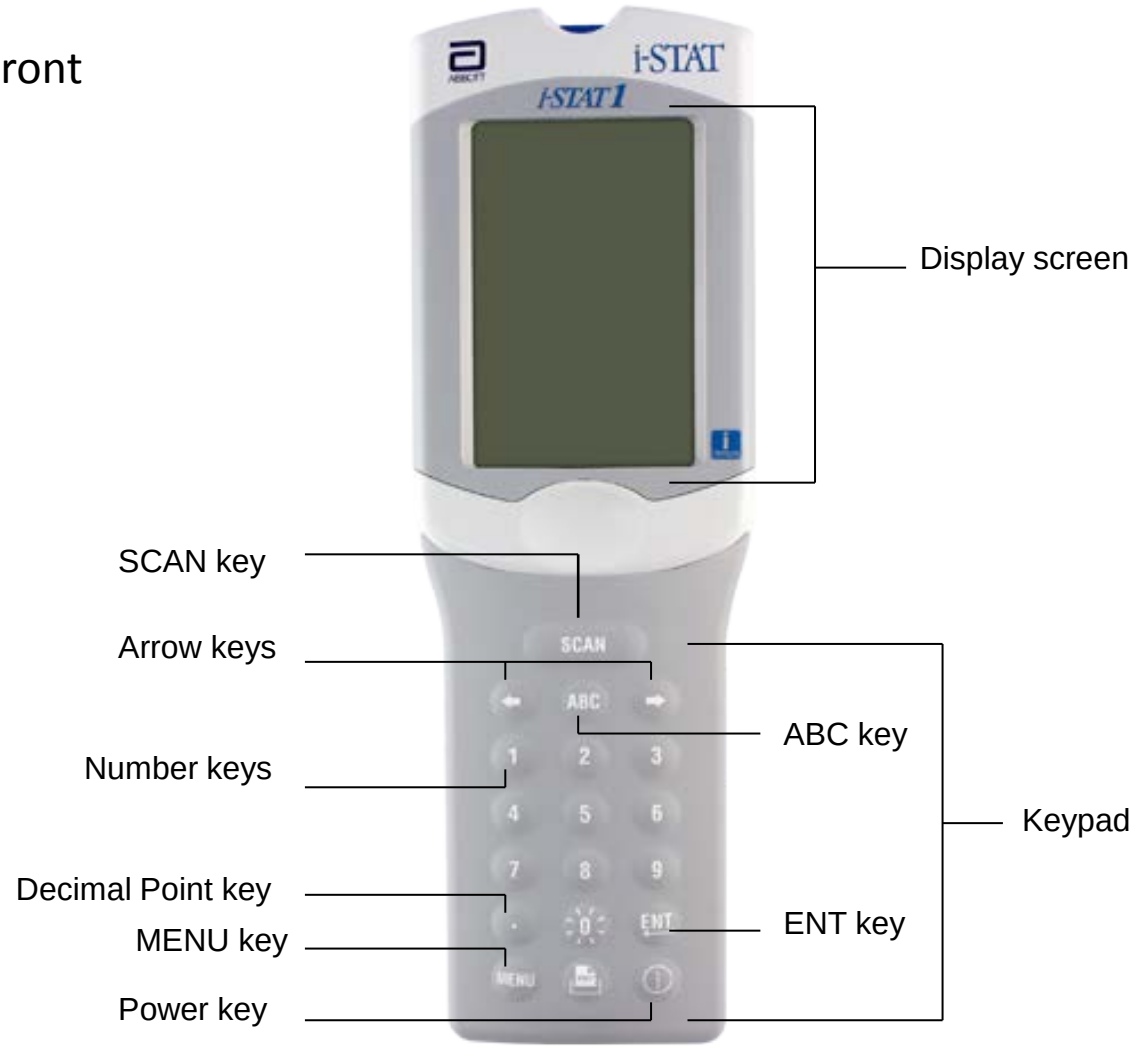
PURPOSE

- Training frequency is initial, at six months, at one year and annually there after.

- Initial training consist of lecture, hands-on and written exam. A competency checklist is also a part of the training; initial, 6 months, 1 year and annually.

ISTAT COMPONENTS

Handheld: Front



ISTAT COMPONENTS

Handheld: Bottom

Cartridge Port

Handheld: Top

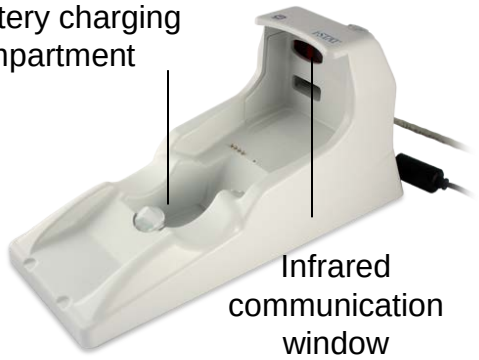
Battery compartment

Infrared eye

Barcode scanner

ISTAT COMPONENTS

Downloader/Recharger



- Used to charge Handheld and spare batteries
- The Handheld must be properly placed in Downloader/Recharger
- Spare battery must be properly placed in the battery charging compartment
- Red or green status light illuminates when charging
- The handheld must be properly aligned with the infrared communication window to transmit results to the Data Manager.

ISTAT COMPONENTS

Battery compartment

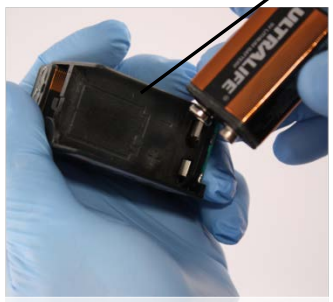
Abbott rechargeable battery pack

Recharging in the Downloader/Recharger

- Use the spare battery compartment
- Red dot facing up; gold contact pads facing the foot
- Green light near the battery compartment illuminates when charging

Important Note:
Batteries can be left in recharger- they will not overcharge!

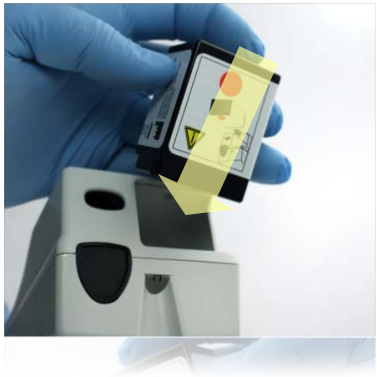
9-volt lithium disposable batteries with battery carrier



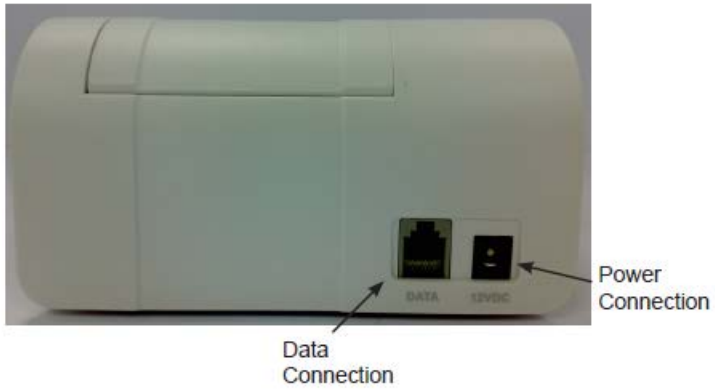
ISTAT COMPONENTS

Replacing Battery

- Slide open the battery compartment
- Tilt the Handheld to slide out the battery
- For **9-volt batteries**: remove batteries from battery carrier and replace with NEW 9-volt batteries
- Insert new battery pack/battery carrier with gold dots facing down and red dot facing the screen
- Slide the battery compartment cover back into place



ISTAT COMPONENTS



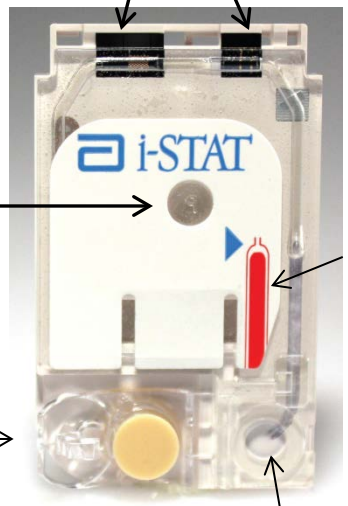
Portable Printer

- The printer can receive data directly from the analyzer via Infra-red (IR) transmission.

To print results

- While viewing the results hold down the print button on the handheld while pointing at the IR window on the printer.
- The results will begin to print.
- The printer is recharged using a power adapter connect to an outlet

CARTRIDGES



- Room Temperature Store indicated on the box:
  - Number 14 and a “d”= 14 days room temperature storage
  - Number 2 and a “m”= 2 months room temperature storage

CARTRIDGES

***DO NOT RETURN CARTRIDES TO THE REFRIDGERATOR ONCE AT ROOM TEMPERATURE**

Put room temperature
Exp.: expiration date HERE

Put room temperature
expiration date
Exp.: HERE

Sample Collection and Handling: Arterial Blood

- An arterial blood sample is collected from an artery, primarily to determine arterial blood gases. Arterial blood sampling should only be performed by health workers for whom the procedure is in the legal scope of practice for their position in their country and who have demonstrated proficiency after formal training.

- The sample can be obtained either through a catheter placed in an artery, or by using a needle and syringe to puncture an artery. These syringes are pre-heparinized and handled to minimize air exposure that will alter the blood gas values.

Sample Collection and Handling: Arterial Blood

- Several different arteries can be used for blood collection. The first choice is the radial artery, which is located on the thumb side of the wrist; because of its small size, use of this artery requires extensive skill in arterial blood sampling.

- Reason for inaccurate results:
  - presence of air in the sample
  - an improper quantity of heparin in the syringe, or improper mixing after blood is drawn
  - a delay in testing

Sample Collection and Handling: Arterial Blood

Complications related to arterial blood sampling

- ***Arteriospasm*** or involuntary contraction of the artery may be prevented simply by helping the patient relax; this can be achieved, for example, by explaining the procedure and positioning the person comfortably.

- ***Haematoma*** or excessive bleeding can be prevented by inserting the needle without puncturing the far side of the vessel and by applying pressure immediately after blood is drawn. Due to the higher pressure present in **arteries**, pressure should be applied for a longer time than when sampling from a vein, and should be supervised more closely, to check for cessation of bleeding.

Sample Collection and Handling: Arterial Blood

Complications related to arterial blood sampling

- ***Nerve damage*** can be prevented by choosing an appropriate sampling site and avoiding redirection of the needle.

- ***Fainting*** **or a** ***vasovagal response*** can be prevented by ensuring that the patient is supine (lying down on their back) with feet elevated before beginning the blood draw. Patients requiring **arterial** blood sampling are usually inpatients or in the emergency ward, so will generally already be lying in a hospital bed. Children may feel a loss of control and fight more if placed in a supine position; in such cases, it may be preferable to have the child sitting on the parent's lap, so that the parent can gently restrain the child.

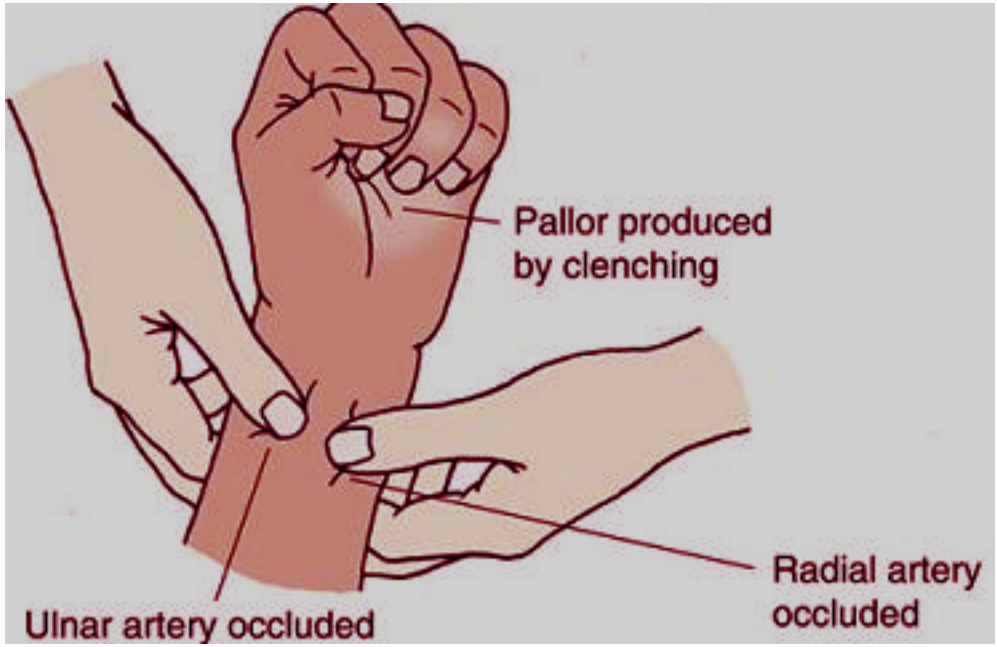
- ***Other problems*** can include a drop in blood pressure, complaints of feeling faint, sweating or pallor that may precede a loss of consciousness.

Sample Collection and Handling: Arterial Blood

- Before performing an arterial blood draw the patient's collateral circulation must be determined. This will be accomplished by performing a Modified Allen's Test.

- https://www.youtube.com/watch?v=gdgomN6TsuE

The procedure for performing a modified Allen's Test



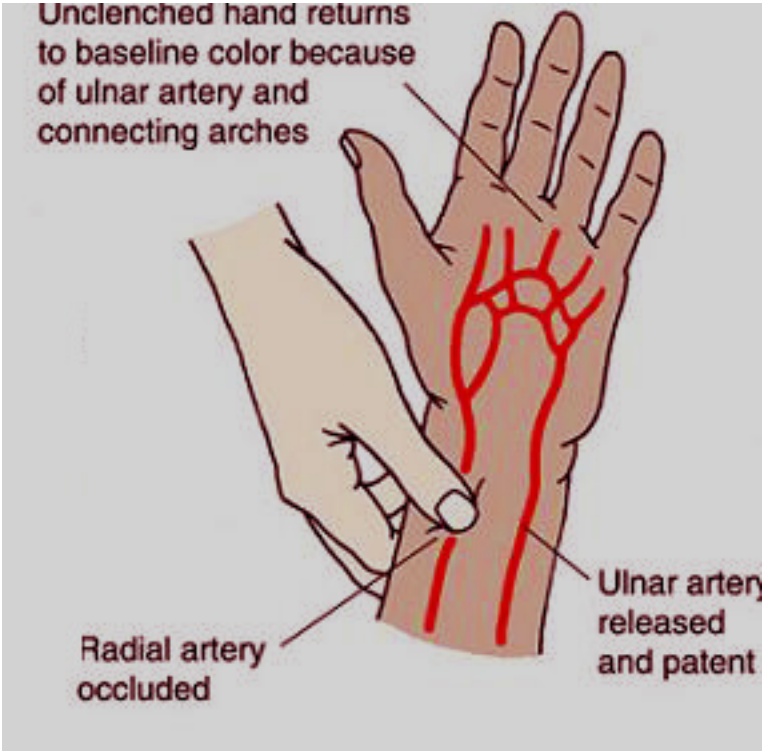
1. Instruct the patient clench his/her fist, or if the patient is unable, you may close the hand tightly.

2. Using your fingers, apply occlusive pressure to both the ulnar and radial arteries. This maneuver obstructs blood flow to the hand.

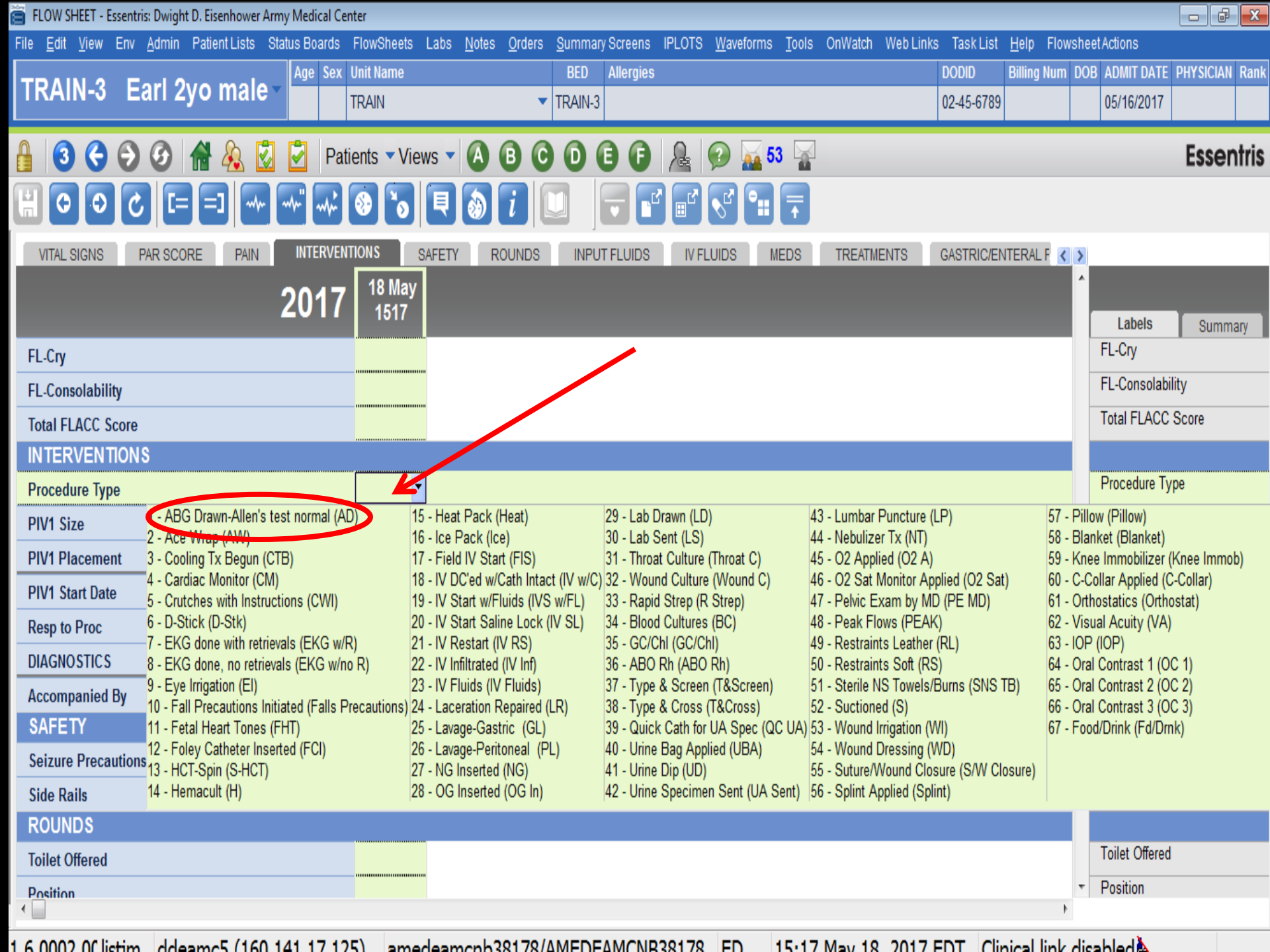
The procedure for performing a modified Allen's Test

3. While applying occlusive pressure to both the arteries, have the patient relax his/her hand. Blanching of the palm and fingers should occur. If it does not, you have not completely occluded the arteries with your fingers.

4. Release the occlusive pressure on the ulnar artery. You should notice a flushing of the hand within 5 to 15 seconds. This denotes that the ulnar artery if patent and has good blood flow. This normal flushing of the hand is considered to be ***a positive modified Allen's test***.



- A negative modified Allen's test is one in which the hand does not flush within the specified time period. This indicates that ulnar circulation is inadequate or nonexistence. The radial artery supplying arterial blood to that hand should not be punctured.


FLOW SHEET - Essentris: Dwight D. Eisenhower Army Medical Center
File Edit View Env Admin Patient Lists Status Boards FlowSheets Labs Notes Orders Summary Screens IPLOTS Waveforms Tools OnWatch Web Links Task List Help Flowsheet Actions
TRAIN-3 Earl 2yo male
Age Sex Unit Name BED Allergies DODID Billing Num DOB ADMIT DATE PHYSICIAN Rank
TRAIN TRAIN-3 02-45-6789 05/16/2017
Patients Views
Essentris
VITAL SIGNS PAR SCORE PAIN INTERVENTIONS SAFETY ROUNDS INPUT FLUIDS IV FLUIDS MEDS TREATMENTS GASTRIC/ENTERAL F
2017
18 May 1517
Labels Summary
FL-Cry
FL-Consolability
Total FLACC Score
INTERVENTIONS
Procedure Type
PIV1 Size
PIV1 Placement
PIV1 Start Date
Resp to Proc
DIAGNOSTICS
Accompanied By
SAFETY
Seizure Precautions
Side Rails
1 - ABG Drawn-Allen's test normal (AD)
2 - Ace Wrap (AW)
3 - Cooling Tx Begun (CTB)
4 - Cardiac Monitor (CM)
5 - Crutches with Instructions (CWI)
6 - D-Stick (D-Stk)
7 - EKG done with retrievals (EKG w/R)
8 - EKG done, no retrievals (EKG w/no R)
9 - Eye Irrigation (EI)
10 - Fall Precautions Initiated (Falls Precautions)
11 - Fetal Heart Tones (FHT)
12 - Foley Catheter Inserted (FCI)
13 - HCT-Spin (S-HCT)
14 - Hemacult (H)
15 - Heat Pack (Heat)
16 - Ice Pack (Ice)
17 - Field IV Start (FIS)
18 - IV DC'ed w/Cath Intact (IV w/C)
19 - IV Start w/Fluids (IVS w/FL)
20 - IV Start Saline Lock (IV SL)
21 - IV Restart (IV RS)
22 - IV Infiltrated (IV Inf)
23 - IV Fluids (IV Fluids)
24 - Laceration Repaired (LR)
25 - Lavage-Gastric (GL)
26 - Lavage-Peritoneal (PL)
27 - NG Inserted (NG)
28 - OG Inserted (OG In)
29 - Lab Drawn (LD)
30 - Lab Sent (LS)
31 - Throat Culture (Throat C)
32 - Wound Culture (Wound C)
33 - Rapid Strep (R Strep)
34 - Blood Cultures (BC)
35 - GC/Chl (GC/Chl)
36 - ABO Rh (ABO Rh)
37 - Type & Screen (T&Screen)
38 - Type & Cross (T&Cross)
39 - Quick Cath for UA Spec (QC UA)
40 - Urine Bag Applied (UBA)
41 - Urine Dip (UD)
42 - Urine Specimen Sent (UA Sent)
43 - Lumbar Puncture (LP)
44 - Nebulizer Tx (NT)
45 - O2 Applied (O2 A)
46 - O2 Sat Monitor Applied (O2 Sat)
47 - Pelvic Exam by MD (PE MD)
48 - Peak Flows (PEAK)
49 - Restraints Leather (RL)
50 - Restraints Soft (RS)
51 - Sterile NS Towels/Burns (SNS TB)
52 - Suctioned (S)
53 - Wound Irrigation (WI)
54 - Wound Dressing (WD)
55 - Suture/Wound Closure (S/W Closure)
56 - Splint Applied (Splint)
57 - Pillow (Pillow)
58 - Blanket (Blanket)
59 - Knee Immobilizer (Knee Immob)
60 - C-Collar Applied (C-Collar)
61 - Orthostatics (Orthostat)
62 - Visual Acuity (VA)
63 - IOP (IOP)
64 - Oral Contrast 1 (OC 1)
65 - Oral Contrast 2 (OC 2)
66 - Oral Contrast 3 (OC 3)
67 - Food/Drink (Fd/Drnk)
ROUNDS
Toilet Offered
Position

Sample Collection and Handling: Arterial Blood

After a pulse is found, a blood sample is taken from the artery

A.D.A.M.

Sample Collection and Handling: Arterial Blood

- Perform hand hygiene, clear off a bedside work area and prepare supplies. Put on an impervious gown or apron, and face protection, if exposure to blood is anticipated.

- Disinfect the sampling site on the patient with 70% alcohol and allow it to dry.

- If the needle and syringe are not preassembled, assemble the needle and heparinized syringe and pull the syringe plunger to the required fill level.

Sample Collection and Handling: Arterial Blood

- Holding the syringe and needle like a dart, use the index finger to locate the pulse again, inform the patient that the skin is about to be pierced then insert the needle at a 45 degree angle, approximately 1 cm distal to (i.e. away from) the index finger, to avoid contaminating the area where the needle enters the skin.

- Advance the needle into the radial artery until a blood flashback appears, then allow the syringe to fill to the appropriate level. DO NOT pull back the syringe plunger.

Sample Collection and Handling: Arterial Blood

- Withdraw the needle and syringe; place a clean, dry piece of gauze or cotton wool over the site and have the patient or an assistant apply firm pressure for sufficient time to stop the bleeding. Check whether bleeding has stopped after 2–3 minutes. Five minutes or more may be needed for patients who have high blood pressure or a bleeding disorder, or are taking anticoagulants.

- Activate the mechanisms of a safety needle to cover the needle.

- Label the sample syringe.

- Perform testing.

Sample Collection and Handling: Syringe

- When collecting a syringe sample from an arterial stick, venipuncture, etc., care should be taken to prevent the introduction of ambient air into the sample when it is collected.

- If using a syringe, expel all air bubbles. Cap or seal the end of the collection device.

NOTE: If air bubbles are present in the sample, results may be invalid for PO2. If small air bubbles are present, please annotate it on the final report in the patient's chart.

Ensure air bubbles are not trapped in the syringe

Sample Collection and Handling: Syringe

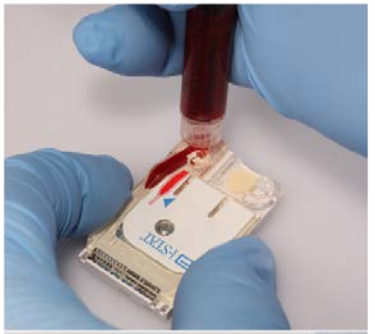
Always mix properly!

Mix sample by vigorously rolling the syringe between palms for 5 seconds; invert and repeat.

Sample Collection and Handling: Syringe

Avoid Quality Check Codes!

- Mix the sample thoroughly and gently
- Discard first few drops
- Fill to the fill mark
- Close the closure to seal



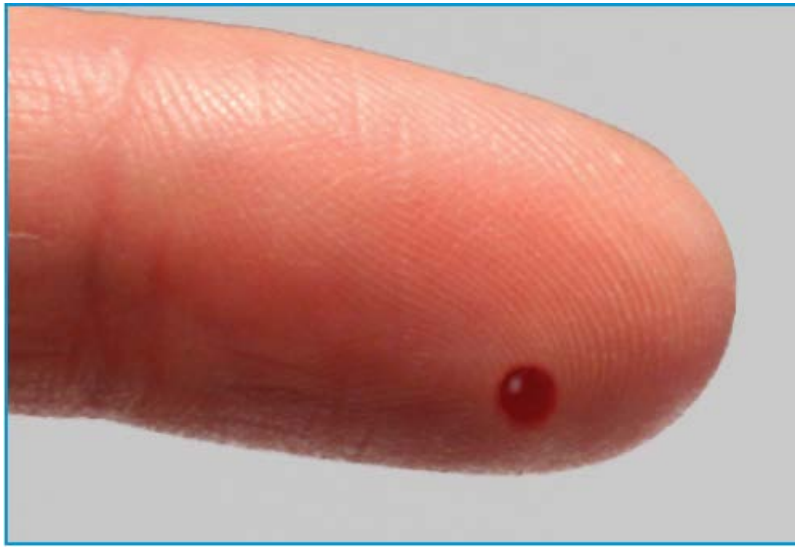
If the cartridge is not sealed, the handheld will return an *Unable to Position Sample* Quality Check Code.

Sample Collection and Handling: Fingerstick

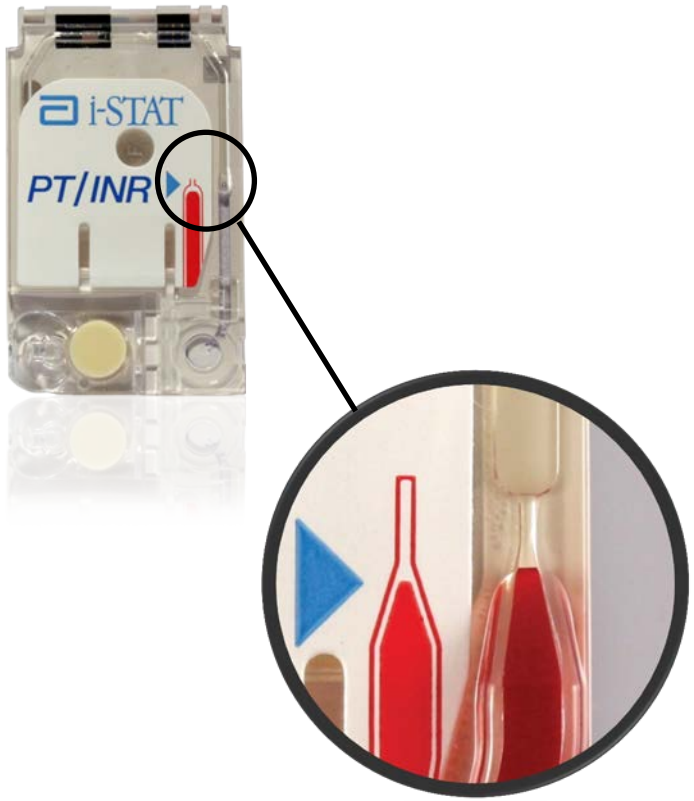
- Use a skin puncture device that provides free-flowing blood.

Inadequate blood flow may affect results

- Gently squeeze the finger to develop a hanging drop of blood.
- Use the first sample of blood to perform the test.



Sample Collection and Handling: Fingerstick



Fill cartridge to the fill mark

- Bring PT/INR cartridge up to the finger
- Immediately close the cartridge

PT/INR Testing

- Interfering substances
  - Cubicin
  - Chlorhexidine Gluconate
- A Patient INR results greater than 3.5 requires the patient be sent to the lab for testing.
- Code 19 displayed on the iSTAT monitor indicates no clot detected.

HOW DO I COMPLETE TESTING

STEP 1:
Turn i-STAT analyzer on

STEP 2:
Press “2” for i-STAT Cartridge

HOW DO I COMPLETE TESTING

- STEP 3: Scan your operator ID using your barcoded badge.

- STEP 4: Scan the patient's ID number using the patient's armband. If this is not feasible, manually enter.

Per Hospital policy all patients must be identified with two identifiers
Full Name and Date of Birth

REMEMBER

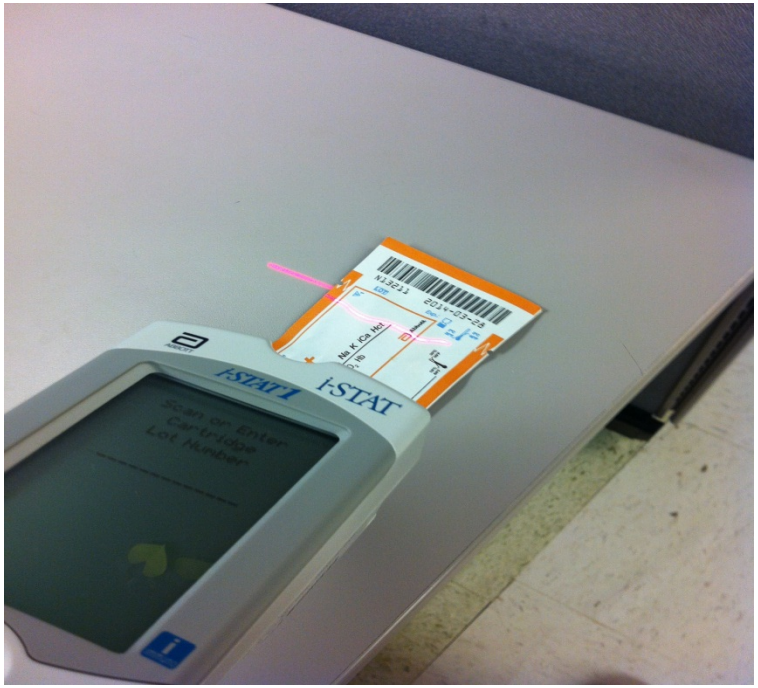
Scanning is everything

- Scanning prevents manual entry errors and results going to the wrong patient chart.

- If you must manually enter a number, double check it before you press the enter button.

SAMPLE TESTING

- Step 5: Scan Lot number on the cartridge pouch. The analyzer will prompt you to insert the cartridge.



SAMPLE TESTING

Insert cartridge into the handheld promptly.

SAMPLE TESTING

- At the end of the procedure, remove the iSTAT cartridge and insert the iSTAT analyzer into the docking station.

HOW DO I RECORD RESULTS CONT'D

- If a result is flagged with "<" or ">", the result is Out of Reportable Range.
- If a result is flagged with "***", the cartridge sensor may have been compromised.
- If a result is flagged with " ⬆ or ⬇", the result is critical.
- In either case, repeat test with new cartridge.

HANDHELD CLEANING

1. Clean the display screen with
   - PDI® Super Sani-Cloth®
2. Rinse using gauze pad moistened with water
2. Allow to dry

Decontaminating the handheld

1. Use 1:10 bleach solution
2. Soak gauze pads, remove excess solution
3. Soften, then remove dried blood; do not scrape
4. Clean entire surface twice
5. Rinse with gauze pad moistened with tap water

Important note:
Do NOT let liquid enter the cartridge port or battery compartment.

QUALITY CONTROL TESTS

- The i-STAT analyzer will automatically perform electronic quality control & complete the testing.
- PT/INR quality control is performed by Coumadin Clinic Staff.
- All other cartridges have QC performed prior to distribution by logistics.

INTERFERENCES

ANALYTE	INTERFERENCE	INTERFERENCE CONCENTRATION	EFFECT ON ANALYTE RESULT
Sodium	Bromide	37.5 mmol/L	Increase (↑) Na
Ionized Calcium	Acetominophen	1.32 mmol/L	Decrease (↓)iCa
	Magnesium	1.0 mmol/L 10.2 mmol/L	Increase (↑) iCa by 0.04 mmol/L
	Acetylcysteine	37.5 mmol/L	
	Bromide	6.6 mmol/L	Decrease (↓) iCa
	Lactate		Increase (↑) iCa
	Salicylate (Therapeutic)	0.5 mmol/L	Decrease (↓) iCa by 0.07 mmol/L
	Salicylate	4.34 mmol/L	Decrease (↓) iCa by approx 0.03 mmol/L
			Decrease (↓) iCa

INTERFERENCES

ANALYTE	INTERFERENCE	INTERFERENCE CONCENTRATION	EFFECT ON ANALYTE RESULT
Hematocrit	White Blood Count (WBC) Total Protein	Greater than 50,000 WBC µL <u>For measured Hct<40%</u> For each g/dL below 6.5 For each g/dL above 8.0 <u>For measured Hct >40%</u> For each g/dL below 6.5 For each g/dL above 8.0 Abnormally high	May increase (↑) hematocrit Decrease (↓) Hct by 1% PCV Increase (↑) Hct by 1% PCV Decrease (↓)Hct by 0.75% PCV Increase (↑)Hct by 0.75% PCV Increase (↑) Hct

INTERFERENCES

ANALYTE	INTERFERENCE	INTERFERENCE CONCENTRATION	EFFECT ON ANALYTE RESULT
PCO_2	Propofol (Diprovan®) Thiopental Sodium		For patients administered propofol or thiopental sodium i-STAT recommends the use of G3+, CG4+, CG8+, EG6+, and EG7+ cartridges, which are free from clinically significant interference at all relevant therapeutic doses. I-STAT does not recommend the use of EC8+ cartridges for patients receiving propofol or thiopental sodium

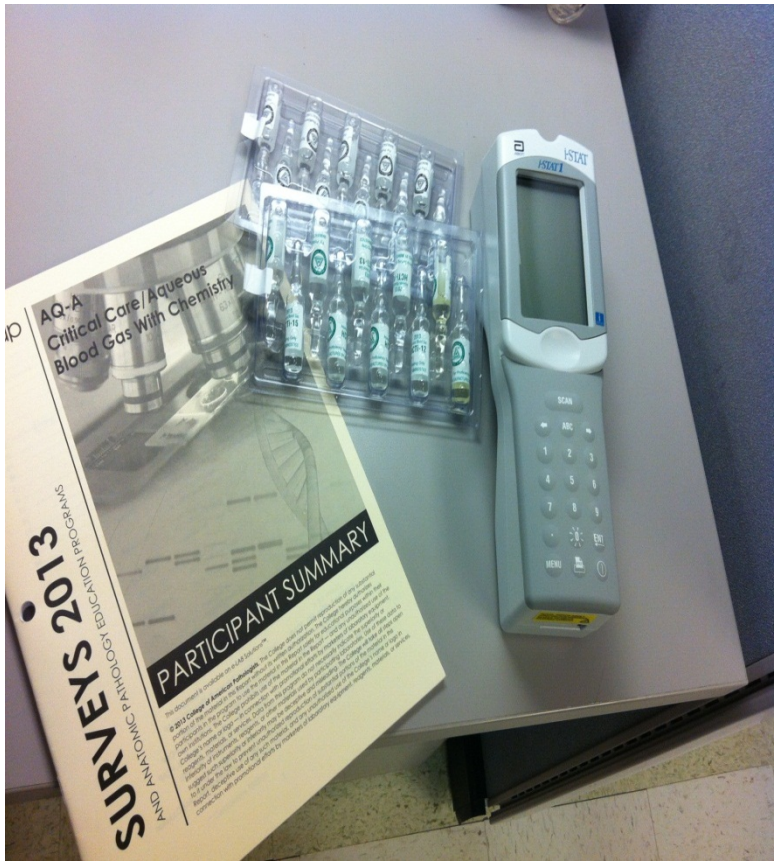
TESTING YOURSELF OR CO-WORKERS

- It is a work rule violation to test yourself or co-workers.

- Exception to this is an emergency, the person will need to go to the Emergency Room for assistance.

PROFICIENCY TESTING

- Proficiency Testing (PT) will be delivered 3 times per year.
- Each sample will need to be performed on all meters on your unit.
- Independently, run samples in **PROFICIENCY TESTING** mode, a POCT Staff member will be present to assist.
- Record the results on the form provided.
- Results will NEVER be compared amongst the departments.
- If an operator's performance results in an out-of-range PT, the POCT staff will observe, using the same specimen, to re-access their competency.



QUESTIONS

- For more information or if you have any questions, review the
- •iSTAT Blood Gas procedure manual or contact
- •the POCT Staff at
- •787-8359 or 706 830 1621

TRAINING COMPETENCY

Step One

• Print out the documentation showing you have passed the test.

Step Two

• Let your Unit POCT Trainer know you have completed this portion of your training and present him/her with documentation.

Step Three

• Demonstrate your performance of a i-STAT Arterial Blood Gas for your trainer. Have the training documented on your glucose competency sheet and have your Unit POCT Trainer submit a memorandum to the POCT Staff so your information can be updated in the system.

Step Four

Place all certificates and training records in your CAF Folder.

REFERENCES

- WHO Guidelines on Drawing Blood: Best Practices in Phlebotomy
- ABBOTT Point of Care
- College of American Pathologist

ARMY MEDICINE

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