

ANCHORAGE PIONEERS' HOME		P&P No: 04.02
Title: INR Monitoring		Approval: D. COTE
Key Words: Monitor, Test strip		
Team: Nursing, Supply	Effective Date: 11/03/10	Page: 1 of 7

PURPOSE

To describe the INR (international normalized ratio) monitoring of Alaska Pioneer Home (APH) residents who use oral anticoagulant medication to treat thrombosis. The INR measures the effectiveness of blood thinning medications, which inhibits the formation of blood clots.

POLICY

APH use the INRatio 2 monitoring system, a HemoSense product.

INR tests are ordered on a regular basis by the residents' physicians or health care providers.

The APH licensed nurses provide the scheduled INR tests for Level II and Level III residents.

The APH licensed nurses understand the testing process and perform the INR tests safely and accurately, while maintaining resident dignity and privacy.

The APH licensed nurses report the INR values obtained to the residents' physicians or health care providers.

The APH licensed nurses who perform the INRatio 2 test have read this policy and procedure, and have demonstrated their skill and understanding during a competency check.

The INR test is included in the State CLIA lab waiver which is maintained by the APH.

DEFINITIONS

Anticoagulant therapy is treatment with blood-thinning medications, like warfarin/Coumadin, to inhibit the formation of blood clots.

Hanging drop of blood forms after a finger stick and is large enough to hang from the resident's fingertip. Collecting a hanging drop ensures that an adequate sample is applied to the test strip.

INR (international normalized ratio) is a way to standardize prothrombin time test results from different labs and test methods. It is used to monitor the effectiveness of blood thinning medications. The INR normal range is 0.8-1.2.

PT (prothrombin time) is a blood test that measures how long it takes blood to clot. The PT reference range is 12-15 seconds; the PT will be longer in residents who take blood thinners.

Prolonged PT means that the blood is taking too long to form a clot. The resident's doctor may change the dosage of the anticoagulant medication.

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Thrombosis is the formation and presence of a clot of coagulated blood attached in a blood vessel. The thrombus causes loss of circulation to the area served by the vessel, and increases the risk of heart attack and stroke.

PROCEDURE**I. The INRatio 2 Monitoring System****A. Equipment/Assistance**

1. A new INRatio 2 monitoring system includes a monitor, lancets, power supply, and capillary tubes in a carrying case. Printed and CD user guides and a training video are included.
2. The INRatio 2 monitor is only used with INRatio test strips. The power supply included with the kit or four AA batteries are used as the power source.
3. The INRatio 2 monitor, test strips, OSHA compliant lancets, control solution, capillary tubes, and the AA batteries are dispensed from APH Supply.
4. For 24/7 technical service call 1-877-436-6444, option 2. Website information is available at service@hemosense.com

B. The INRatio 2 monitor

1. The monitor is 6" X 3", and weighs 9 ounces with batteries.
2. Operating temperature is 50°-95°F (10°-35°C).
3. The display screen shows the test results and other information.
4. The OK button below the screen turns the monitor ON and OFF, and accepts and stores display entries.
 - a. The up ▲ arrow and down ▼ arrow buttons above and below the OK button change information on the display and scroll between results in the monitor memory.
 - b. The set-up button, to the left of the OK button, puts the monitor in the set-up mode.
 - c. The M (memory) button, to the right of the OK button, puts the monitor in the memory mode.
5. The test strip guide at the bottom of the monitor indicates the test strip insertion site, to turn the monitor ON for testing.
6. The sample light indicates the site to apply the blood sample after the test strip is inserted.
7. On the back of the monitor are a battery door and a battery door release button. To replace the batteries:
 - a. Remove the battery door by pressing down on the battery door release.
 - b. Remove the old batteries and replace with four AA batteries.
 - c. Replace the battery door.

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C. Turning the monitor ON and OFF

1. There are two options for turning the monitor ON.
 - a. Press and hold the OK button until the monitor turns on, *or*
 - b. Insert a fresh test strip when ready to perform a test.
2. When the monitor is turned ON, a self test is automatically performed.
3. The monitor prepares for testing, then prompts to insert a test strip. If a test strip has been inserted, the strip code is confirmed.
4. When the monitor is turned ON, various tasks can be performed:
 - a. INR test.
 - b. Change settings in the set-up mode.
 - c. Review past results in the memory mode.
5. The monitor is turned OFF by pressing the OK button for two seconds.

D. Changing the monitor settings

1. Press and hold the OK button to turn the monitor ON.
2. Press the set-up button to enter the set-up mode.
3. Follow the steps in the *INRatio 2 User Guide* to set the date, time, display mode, and target range.
4. The date, time, display mode, and target range settings are stored in the monitor using battery power. If the batteries are removed or completely run down, the settings are lost within two hours.

E. Quality control (QC)

1. QC ensures that the test is being performed correctly and that the monitor and test strips are working together properly.
2. A low and high control test is performed automatically by the monitor each time a test is performed.
3. If either or both controls are out of range, a flashing caution symbol and a *LO QC1*, *LO QC2*, *HI QC1*, or *HI QC2* appear.
4. If the caution appears, check the test strip expiration date, appearance of the strip, and the storage conditions.
5. Call Technical Support for assistance, 1-877-436-6444, option 2.

II. Performing an INRatio 2 Test

A. Test steps

1. Always place the monitor on a flat surface that is free of vibration while the test is performed. Do not hold the monitor in the hand.
2. Wash hands and apply disposable gloves before obtaining blood sample.

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3. Press and hold the OK button or insert a fresh test strip to turn the monitor ON.
 - a. Remove a fresh test strip from its foil pouch.
 - b. Insert the strip into the test strip guide so the clear end with the vertical contact bars goes in first.
 - c. The word *INRatio* is visible on the blue end of the strip.
 - d. The sample well in the strip lines up with the green light on the test strip guide.
4. Match the code on the monitor display with the code on the strip container.
 - a. If the code does not match, use the ▲ and ▼ buttons to change the code digits.
5. Wait for the monitor to warm up.
6. The monitor will prompt to apply a blood sample when it is ready to perform a test.
7. Obtain a finger stick sample of fresh, whole, capillary blood.
 - a. Clean the area with 70% isopropyl alcohol and *dry thoroughly* with gauze.
 - b. Puncture the side of a middle fingertip with an OSHA compliant lancet.
 - c. Apply gentle, continuous pressure until a large, hanging drop of blood forms.
8. Apply the blood sample to the sample well on the test strip directly over the green light.
 - a. *Do not* move the monitor as the sample is applied.
 - b. Wait for the monitor to beep, a signal that the sample is being processed.
 - c. If the monitor does not beep, it means that not enough blood was applied. *Do not* add more blood to the strip. Remove the strip and start the test again with a fresh strip.
 - d. Test strips are for single use only. *Do not* reuse or reapply blood to them.
 - e. The blood sample must be applied to the test strip *immediately* after collection or the blood begins to clot.
9. The test result appears on the monitor display with the date and time.
10. The test result, date, and time are automatically stored in the monitor memory.
11. Turn the monitor OFF when the test is completed.
12. Dispose all used materials into a puncture proof container. Remove gloves and wash hands.
13. Document INR value on the Hemosense PT/INR form.
 - a. Complete the resident, physician, and anticoagulant medication information on the form.
 - b. If the INR value is within the therapeutic range, fax the results to the physician.
 - c. If the INR value is 4.0 or higher, the warfarin dosage is held until the physician's order is received.

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14. Fax the Hemosense PT/INR form to APH Pharmacy.
15. Place a copy of the Hemosense PT/INR form in the resident's chart.

B. Suggested INR therapeutic values for the following indications:

1. Post-surgical Prophylaxis of venous thromboembolism (high-risk surgery)
 - a. INR 2.0-3.0
2. Treatment of venous thrombosis
 - a. INR 2.0-3.0
3. Treatment of pulmonary embolism
 - a. INR 2.0-3.0
4. Secondary Prevention
 - a. Tissue heart valves, INR 2.0-3.0
 - b. Acute myocardial infarction (to prevent systemic embolism), INR 3.0-4.0
 - c. Valvular heart disease, INR 2.0-3.0
 - d. Atrial Fibrillation, INR 2.0-3.0
5. Mechanical prosthetic valves (high risk)
 - a. INR 2.5-3.5
6. Myocardial infarction (prevention of recurrence)
 - a. INR 1.3-1.8
7. Note:
 - a. The INR is intended for use only for monitoring the degree of anticoagulation in patients receiving oral coumarin derivatives; most commonly Coumadin (warfarin).
 - b. If the INR value is less than 1.0 (no warfarin effect), or 4.0 or higher (increased risk of bleeding), fax the results *and* contact the resident's physician immediately (within the hour). *Do not* leave a phone message; talk with the physician or a health care provider.

C. Capillary tubes

1. Capillary tubes are used to collect blood samples from residents who are unable to hold a finger over the sample well, due to tremors or incapacitation.
2. An air vent is positioned on the sidewall of the tube to provide automatic air venting and sample volume control.
3. A fill line on the tube indicates total sample collected.
4. *Do not* squeeze the tube while sampling.
5. Sample collection steps:
 - a. Wash hands and apply disposable gloves before obtaining blood sample.
 - b. Hold the tube horizontally, and touch the tip of the tube to the blood drop.
 - c. Capillary action will automatically draw the blood to the fill line and stop.
 - d. Align the tip of the tube with the sample well of the test strip and squeeze the bulb to expel the sample.

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- e. If the sample won't expel, hold the tube vertically and slide a finger over the vent hole. Align the tip with the sample well and squeeze the bulb.
- f. Discard capillary tube in puncture proof container.
- g. Remove gloves and wash hands.

III. Critical Values and Interferences**A. INR values**

1. INR critical values
 - a. Less than 1.0 (no warfarin effect)
 - b. 4.0 or higher (increased risk of bleeding)
2. Variables that affect the INR value:
 - a. Medications
 - b. Diet

IV. Reviewing Past Results in the Monitor Memory**A. Steps to review past results**

1. The monitor memory will store up to 120 results in the order in which the tests were taken, beginning with the most recent result.
 - a. The latest 60 results are available for on-screen review.
2. Press the memory button to view the most recent result on the display.
3. Use the ▲ and ▼ buttons to scroll forward and backward through the previous results.
4. Press the OK button to exit the memory mode.

B. Clearing memory

1. Clear the monitor memory of previous test results to make room for new results.
2. Steps to clear the monitor memory:
 - a. Press the memory button.
 - b. Press and hold the memory button for two seconds.
 - c. Press and hold the set-up button for two seconds.
 - d. When a "0" appears, the memory is successfully cleared.

V. Care and Cleaning of the INRatio 2 Monitor**A. Clean the outside of the monitor with a clean damp cloth.**

1. An INRatio meter is used by multiple residents. Eliminate cross contamination by disinfecting the meter between resident uses.
2. Wash hands and apply gloves before cleaning the monitor.

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3. A mild detergent or disinfectant is used, such as QUAT, a 5% bleach solution, or 70% isopropyl alcohol.
 4. Clean the area around the test strip guide with a swab or pad that has been dampened with QUAT, alcohol, or 5% bleach.
 5. Remove gloves and wash hands when the cleaning is complete.
- B.** *Do not* allow any liquid to spill on the monitor.
1. If this occurs, unplug the monitor and call Technical Support immediately.
- C.** The monitor battery is replaced as soon as possible when the low battery symbol appears with the flashing caution symbol.
- D.** The monitor is a delicate instrument and is handled with care.
- E.** The monitor is transported in a carrying case or secure container.
- F.** Do not store the monitor below minus 4°F or above 158°F (-20°/70°C).

HISTORY OF REVISIONS

New: 11/03/10.

Revised:

Reviewed:

ATTACHMENTS

INR Training Certificate attach

INR med diet attach

INR Hemosense results attach

INRATIO TRAINING CERTIFICATE for ALASKA PIONEER HOME

UNDERSTANDING THE SYSTEM:

- Meter description
- Strip description
- Meter operating conditions
- Strip storage conditions
- Safety
- Cleaning the meter

MAIN MENU:

- Menu functions

PERFORMING A TEST:

- Preparing to do a test
- Performing a finger stick
- Applying a finger stick sample
- Applying a sample using a capillary tube
- Communicating the INR values

TROUBLE SHOOTING:

- Obtaining supplies
- Control tests
- Error messages
- Abnormal results
- Calling for assistance

Print name of APH Nurse

Signature of APH Nurse

Date

Print name of Trainer

Signature of Trainer

Date

Drug interactions with warfarin/Coumadin, an anticoagulant

Medications that increase warfarin effect:

- Alcohol with concomitant liver disease
- Amiodarone
- Cimetidine
- Clofibrate
- Cotrimoxazole
- Erythromycin
- Fluconazole
- Isoniazide
- Metronidazole
- Miconazole
- Omeprazole
- Phenylbutazone
- Piroxicam
- Propafenone
- Propanolol
- Sulfinpyrazone

Medications that decrease warfarin/Coumadin effect:

- Barbiturates
- Carbamazepine
- Chlorodiazepoxide
- Cholestyramine
- Griseofulvin
- Nafcillin
- Rifampin
- Sucralfate

Dietary interaction with warfarin/Coumadin:

To promote the effectiveness of warfarin, the resident maintains a consistent dietary vitamin K intake. Sudden increases in vitamin K intake may decrease the effect of warfarin/Coumadin.

Foods high in vitamin K include green leafy vegetables such as kale, spinach, turnip greens, collards, Swiss chard, parsley, and mustard greens.

HEMOSENSE INR RESULTS

Resident name _____

Date of Birth _____

Location _____

Test date _____

Physician name _____

Physician fax # _____

Physician phone # _____

Test Results

INR GREATER THAN 4 IS CRITICAL VALUE.
NURSE HOLDS WARFARIN AND CONTACTS
PHYSICIAN IMMEDIATELY.

Current anti-coagulant prescription:

Medication name	Dose	Route	Frequency
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Please review and fax to Pharmacy (907) 343-7270.

New order: _____

Date of next INR _____

Physician signature _____