To: New Hire RN/LPNs,

STHS is known as the premier healthcare system for cardiac care in Middle Tennessee. As a way to determine your skill level in arrhythmia recognition, we will be administering an arrhythmia challenge test to RNs and LPNs who will be working in specific areas. (**New graduate nurse will be exempt and assigned to a Basic Arrhythmia Class**).

Please note that ALL RNs/LPNs will also be required to take the Medication Administration Knowledge Assessment Test.

Those specific areas include:

Saint Thomas Hospital:
All **Contract Nurses** and all **FTE/PT/PRN Nurses** if they work in the following Units:

- Emergency Department
- Medical Imaging
- Cardiac Rehab
- All Bedded Units
- Dialysis
- Cath Lab
- Post Anesthesia Care Unit
- Endoscopy
- EP Lab/ Non-Invasive Cardiology

Baptist Hospital:
All **Contract Nurses** and all **FTE/PT/PRN Nurses** if they work in the following Units:

- Emergency Department
- Critical Care
- Post Anesthesia Care Unit
- 5 Kidd
- Holding Areas
- 7th Floor Comprehensive Surgery

Middle Tennessee Medical Center:
All **Contract Nurses** and all **FTE/PT/PRN Nurses** if they work in the following Units:

- Telemetry (4C)
- Post Anesthesia Care Unit
- Intensive Care Unit/Critical Care Unit
- Cath Lab
- Emergency Department

The test consists of recognition, measurement and treatment of 16 basic rhythm strips. You must attain a passing score of 80% and not miss a lethal rhythm to successfully pass. If you fail these goals, you will be required to attend a Basic Arrhythmia Class within the first month of employment. Your manager and/or educator will help you get signed up for a class if needed.
Below is the link to Study Material on the STHS Careers website that we would like for you to review before taking either the Medication Administration Knowledge Assessment Test or the Arrhythmia Recognition Challenge Test.

http://www.sthscareers.com/nursing-careers.php

Below you will find an additional website if you need to more review.

http://www.skillstat.com/

Directions for the Medication Administration Knowledge Assessment Test:

All new hire nurses will be assessed on their medication administration knowledge. This give us a baseline that will help us determine if the new hire nurse will need further instruction/tutoring in medication administration.

Attached is a study guide which you should print this and review before coming to take the test.

On the day that you go to Employee Health to have your health screening, you should also report to the Recruiting Department for new hire paperwork processing. During your time in the Recruiting Department, you will be given the Medication Administration Knowledge Assessment Test, the answer sheet and a calculator. You will be provided with a quiet place in which to take the test.

Medication Administration Knowledge Assessment Study Guide

PO Medications

To calculate the amount of medication to give, divide the doctor's order by the amount or concentration available:

Order reads: Prednisone 2.5 mg po q12h. Available medication is Prednisone 5 mg tablets

Doctor's Order	2.5 mg	~~2.5mg~~ 1/2 tablet = 2.5 mg
On hand	5 mg	~~5mg~~

2.5 ÷ 5 equals .5 or 1/2, so 1/2 of the tablet should be given.
Note: Tablets should be scored by the manufacturer if they are intended to be divided.

Order reads: Benadryl Elixir 25 mg po q4h prn Available solution is 12.5 mg in 5 ml.
This calculation is set up as a proportion:

Doctor's Order	25 mg	=	?ml
On hand	12.5 mg		5 ml

If 5 ml contains 12.5 mg, how many ml contains 25 mg? Cross multiply:
25 x 5 = 12.5 x ?
125 = 12.5 x ?
? = 10 because 12.5 x 10 = 125

Order reads Dilantin suspension 100 mg po q12h. Available medication is Dilantin 125 mg/30ml. This calculation is set up as a proportion:

Doctor's Order	100 mg	=	?ml
On hand	125 mg		30 ml

If 30 ml has 125 mg, how many ml has 100 mg? Solve by cross-multiplying the fractions:
100 x 30 = 3000
3000 = 125 mg (? ml)
3000 ÷ 125 is 24, so 24 ml = 125 mg.
Alternatively, you can calculate the number of mg in each ml:

$\frac{125}{30}$ = 4.17 mg/ml

Divide the desired amount by mg/ml: $\frac{100}{4.17}$ = 23.9 or 24 ml

Injectable medications

Order reads Demerol 100 mg IM q 4 h PRN pain
Stock solution is Demerol 50 mg per ml.

Doctor's Order	100mg	2 / ~~100mg~~2 ml=100mg
On hand	50mg/ml	~~50mg~~/ml

Order reads Lasix 20 mg IV. Available solution is 40 mg/ml

Doctor's Order	20 mg	=	1 or 0. 5 ml = 20 mg
On hand	40 mg		2

Continuous IV Infusions

1. **To calculate drip rate for continuous infusions:**
   Order reads: D51/2 NS to infuse at 75ml/hr
   IV tubing flow rate is 10 gtts/ml (find this on the IV tubing package)

   $$\frac{\text{ml ordered X 10 gtts}}{\text{60 mins}}$$

   $$\frac{75 \text{ X } 10}{60} = 12.5 \text{ drops/min}$$

   Microdrip tubing rate is 60 gtts/min. 60's cancel out so the gtts/min is the same as the ml/hr

   $$\frac{75 \text{ X } 60}{60} = 75 \text{ gtts/min}$$

2. **mg/hr or units/hr** (morphine, diazepam, heparin)

   Example: Give heparin 2000 unit per hour

   - First find the concentration of the solution

     $$\frac{\text{mg (conc.)}}{\text{ml}} = \text{mg/hr} \qquad \frac{\text{unit (conc.)}}{\text{ml}} = \text{units/hr.}$$

     Heparin 25,000 unit/250 ml

     $$\frac{25{,}000}{250} = 100 \text{ unit/ml}$$

   - Then $\frac{\text{Doctor's order}}{\text{On hand}}$ $\frac{\text{2000 units}}{\text{100 units}} \text{ X } \frac{\text{? ml}}{\text{1/ml}} = 20 \text{ ml/hr}$

     Example: If the pump were set on 15 ml/hr what would the units delivered be?

     25,000 unit / 250 = 100 units/ml

- Then $\frac{15 \text{ ml}}{1 \text{ ml}} \times \frac{? \text{ unit}}{100 \text{ unit}} = 1500 \text{ unit/hr}$

3. mcg/min (nitroglycerin,norepinephrine, epinephrine)

- Must first change mg to mcg then divide by ml of solution to find the concentration of the solution then divide by 60 mins

$\frac{\text{mg (conc.)} \times 1000}{\text{ml}} = \text{mcg/ml} \div 60 = \text{mcg/min}$

Example: Nitroglycerin 50 mg/250 ml to infuse at 10 mcg/min

$\frac{50 \times 1000}{250} = 200 \text{ mcg/ml} \div 60 \text{ mins} = 3 \text{ mcg/min}$

$\frac{10 \text{ mcg}}{3 \text{ mcg}} \times \frac{? \text{ ml}}{1 \text{ ml}} = 3 \text{ ml/hr pump setting}$

Example: If the pump setting were 9 ml/hr of nitro what would your mcg/min deliver be?

$\frac{50 \times 1000}{250 \text{ ml}} \div 60 \text{ mins} = 3 \text{ mcg/min}$ $\qquad$ $\frac{9 \text{ ml}}{1 \text{ ml}} \times \frac{? \text{ mcg}}{3 \text{ mcg}} = 27 \text{ mcg/min}$

4. Mcg/kg/min: (Dopamine, dobutamine, nitroprusside)

- First find the change mg to mcg and find the concentration of the solution. Then divide by 60 mins then divide by patient's weight in kg.

$\frac{\text{Mg} \times 1000}{\text{Ml of solution}} \div 60 \div \text{kg} = \text{mcg/kg/min}$

Example: Dopamine 400 mg in 250 ml to infuse at 3 mcg/kg/min. Patient weight is 75 kg

$\frac{400 \times 1000}{250 \text{ ml}} \div 60 \div 75 = 0.35$ $\qquad$ $\frac{3 \text{ mcg}}{0.35 \text{ mcg}} \times \frac{? \text{ ml}}{1 \text{ ml}} = 8.5 \text{ ml/hr}$

Example: If the pump setting were 18 ml/hr, what would the mcg/kg/min delivered be?

$\frac{18 \text{ ml}}{1 \text{ ml}} \times \frac{? \text{ mcg}}{0.35 \text{ mcg}} = 6.3 \text{ mcg/kg/min}$

Practice Calculations

Coumadin 7.5 mg ordered. Supply is 5 mg tablets. How many tablets should be given?

Codeine elixir 45mg po. Solution is 15 mg / 5 ml. How many ml will be given?

Phenobarbital 90 mg po. 30 mg tablets How many tablets will be given?

Morphine 10 mg IM. Stock solution is 15 mg/ml

Talwin 50 mg IM. Stock solution is 30 mg/ml

Bumex 0.75mg IV. Solution is 0.25 mg/ml

IV infusion calculations (First determine concentration, then infusion rate.)

Bretylium 2 Gm in 250 ml. Infuse at 4 mg/min

Dobutamine 500 mg in 250 ml. Infuse at 6 mcg/kg/min. Patient weight: 70 kg.

Esmolol 5 Gm in 500 ml. Infuse at 5 mg/min

Heparin 25,000 units in 250 ml. Infuse at 750 units/hour.

Practice Calculations – Answer Sheet

Coumadin 7.5 mg ordered. Supply is 5 mg tablets. How many tablets should be given?

Doctor's Order 7.5 mg ~~7.5mg~~ **Answer: 1 1/2 tablets = 7.5 mg**
On hand 5 mg ~~5mg~~ 7.5 ÷ 5 = 1.5

Codeine elixir 45mg po. Solution is 15 mg / 5 ml. How many ml will be given?

Doctor's Order 45 mg = ? ml **Answer: 15 ml**
On hand 15 mg 5 ml

Phenobarbital 90 mg po. 30 mg tablets How many tablets will be given?

Doctor's Order 90 mg **Answer: 3 tablets**
On hand 30 mg

Morphine 10 mg IM. Stock solution is 15 mg/ml

Doctor's Order 10 mg = ? ml **Answer: 0.67 ml**
On hand 15 mg 1 ml

Talwin 50 mg IM. Stock solution is 30 mg/ml

Doctor's Order 50 mg = ? ml **Answer: 1.67 ml**
On hand 30 mg 1 ml

Bumex 0.75mg IV. Solution is 0.25 mg/ml

Doctor's Order .75 mg = ? ml **Answer: 3 ml**
On hand .25 mg 1ml

IV infusion calculations

Bretylium 2 Gm in 250 ml to infuse at 4 mg/min. Change Gm to mg and hr to mins.

$\frac{2\text{ Gm} \times 1000}{250\text{ ml}} \div 60 = 0.13\text{ mg}$ $\frac{4\text{ mg}}{0.133\text{ mg}} \times \frac{?\text{ ml}}{1\text{ ml}} = 30\text{ ml/hr}$

Dobutamine 500 mg in 250 ml to infuse at 6 mcg/kg/min. Patient wt = 70 kg.

$\frac{500\text{ mg} \times 1000}{250\text{ ml}} \div 60 \div 70 = 0.48$ $\frac{6\text{ mcg}}{0.48\text{ mcg}} \times \frac{?\text{ ml}}{1\text{ ml}} = 12.5\text{ ml/hr}$

Esmolol 5 Gm in 500 ml to infuse at 5 mg/min

$\frac{5\text{ Gm} \times 1000}{500\text{ ml}} \div 60 = 0.167$ $\frac{5\text{ mg}}{0.167} \times \frac{?\text{ ml}}{1\text{ ml}} = 30\text{ ml/hr}$

Heparin 25,000 in 250 ml to infuse at 750 units/hr

$\frac{25{,}000\text{ units}}{250\text{ ml}} = 100\text{ units/ml}$ $\frac{750}{100} \times \frac{?\text{ ml}}{1\text{ ml}} = 7.5\text{ ml/hr}$