

# Remediating Nursing Students' Learning of Medication Administration through safeMedicate



SCOPE Conference

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# Outline



- Student remediation is a VALUABLE PART OF LEARNING
- It allows the student to reflect on the PREPARATION that was done and how it affected their performance on the exam
- Remediation also has valuable teaching moments when reviewing specific questions and letting student to ponder their UNDERSTANDING of MATH and MEDICATION ADMINISTRATION
- SafeMedicate offers students the opportunity to PRACTICE EXAMS
- The same occurs after the exam: remediation with instructors often results in the student taking multiple practice exams to boost their BOOST THEIR CONFIDENCE and ensure they have fixed their previous mistakes
- Another strength of using the safeMedicate program is the EXTENSIVE DATABASE of questions
- Students can take MULTIPLE EXAMS and not experience the same questions over and over
- Other students fail to understand the specifics of this ONLINE SOFTWARE and submit incorrect answers.
- The BACKEND of the safeMedicate program gives many SPECIFIC DETAILS that facilitate remediation with students
- This allows for ACCURATE AND EFFICIENT remediation so that students can start administering medications in the clinical setting

# Remediation: definition

## ■ Merriam Webster

- *The act or process to correct or counteract*
- *The legal means to recover a right or to prevent or obtain redress for a wrong*

## ■ Cambridge English Dictionary

- *The process of removing dangerous or poisonous substances from the environment, or limiting the effect that they have on it*



# Remediation:

Student remediation is a VALUABLE PART OF LEARNING

Correcting students!?

Valuable??

YES

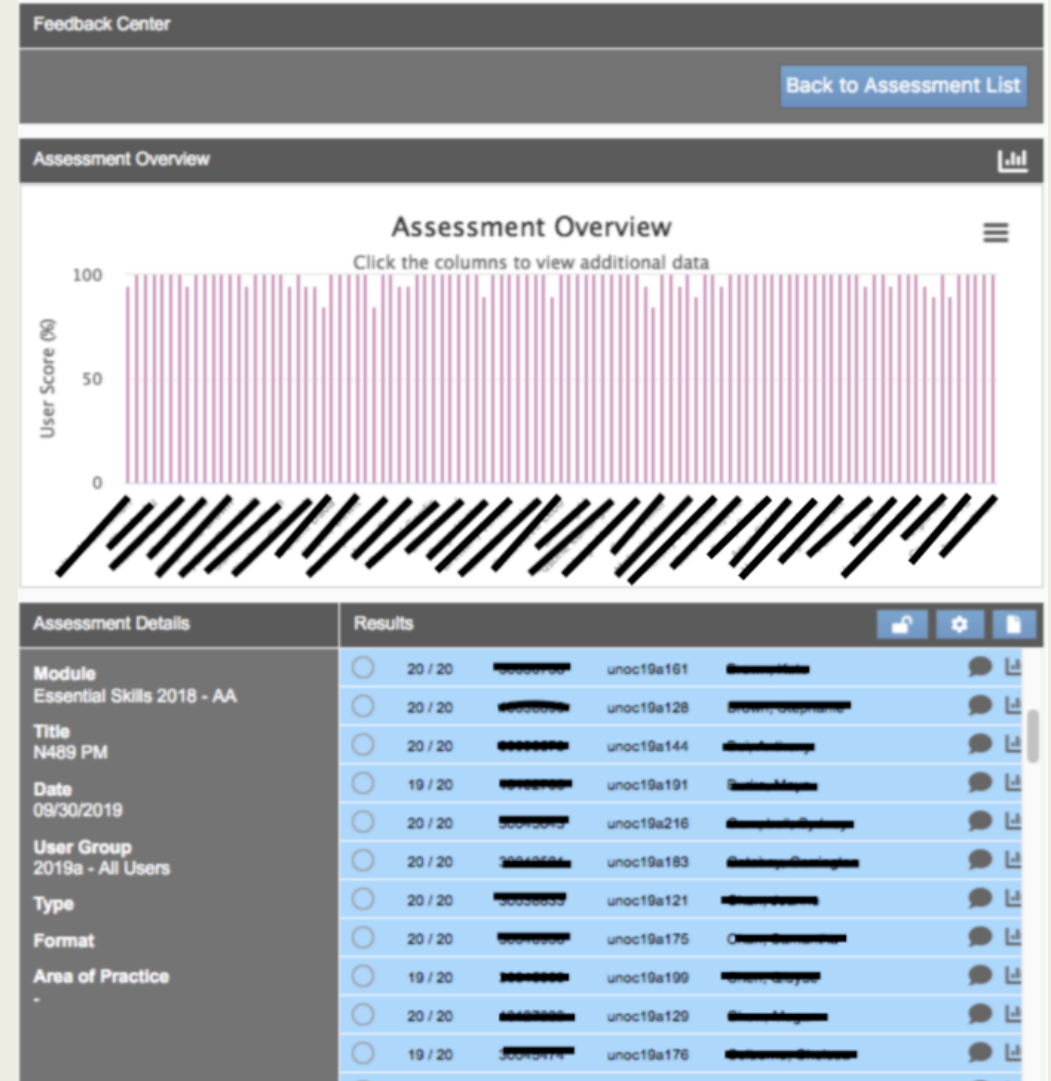


(Ens, 2018)

**Students** stated they want to held accountable for their learning about medications.

**Students** want to be asked questions about their knowledge of medications and how to administer them.

# Exam Results: cohort



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Home Insert Draw Page Layout Formulas Data Review View Tell me

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A1 STUDENT ID

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	STUDENT ID	USERNAME	FIRST NAME	LAST NAME	GROUP	DATE	A	CONCEPTUA	CALCULATIC	SAFETY CHE	TECHNICAL I	TOTAL	PERCENT SCORE	
2	10190014	unoc20a101	REF	ABDOUL		27 10/26/2020	-	0	0	38	20	58	82.9	
3	50072910	unoc20a102	SHAM	ARMED		15 10/26/2020	-	0	0	38	19	57	83.8	
4	50072910	unoc20a103	ARMED	ARMED		20 10/26/2020	-	0	0	50	20	70	100	
5	50000000	unoc20a104	ARMED	ARMED		23 10/26/2020	-	0	0	49	20	69	100	
6	10105551	unoc20a105	PROVINCES VAN	ARMED	Group 1	10/26/2020	-	0	0	40	20	60	85.7	
7	50000000	unoc20a106	ARMED	ARMED		27 10/26/2020	-	0	0	50	20	70	100	
8	50000000	unoc20a107	ARMED	ARMED		25 10/26/2020	-	0	0	49	20	69	100	
9	50000000	unoc20a108	ARMED	ARMED		12 10/26/2020	-	0	0	50	20	70	100	
10	10029110	unoc20a109	ARMED	ARMED		14 10/26/2020	-	0	0	40	20	60	87	

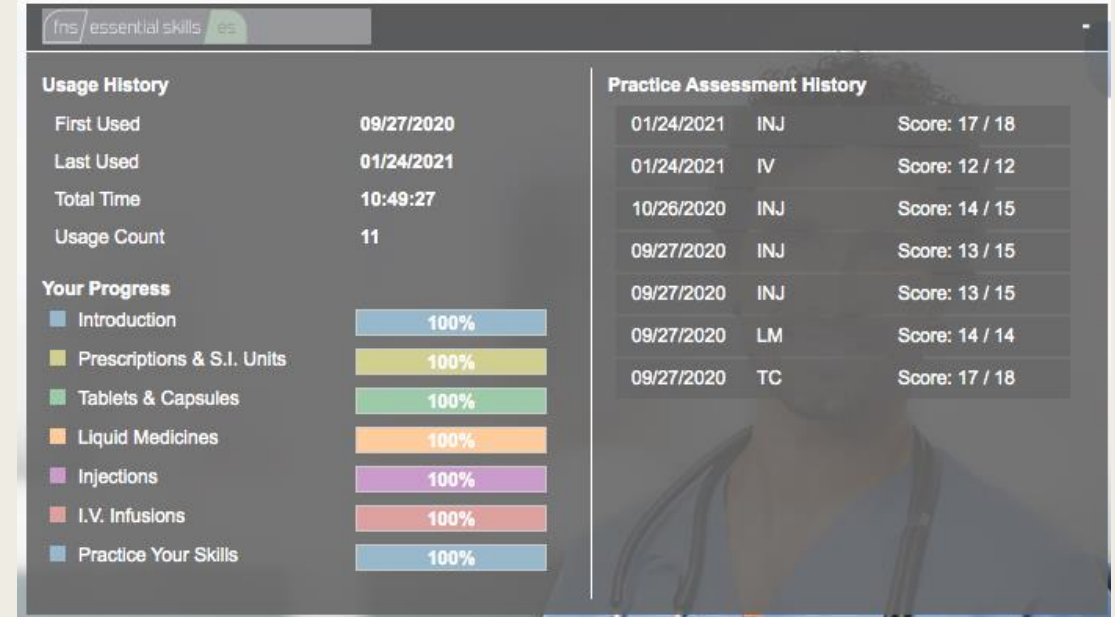
# Exam results: cohort

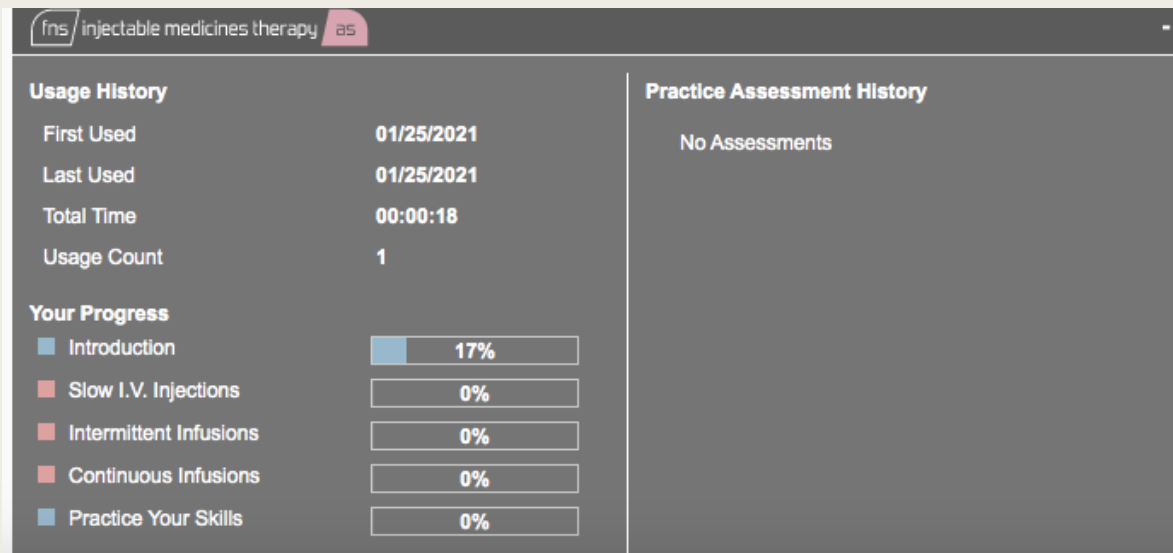


# STUDENT PREPARATION

☒ Modules reviewed

☒ Practice exams taken





# STUDENT PREPARATION

LACK OF





### CORRECT ANSWER

$$\frac{0.3 \text{ mg}}{0.1 \text{ mg}} \times 1 \text{ tab(s)} = 3 \text{ tab(s)}$$

Calculated Answer: 3  
No Rounding Required



### YOUR ANSWER

$$\frac{0.3 \text{ mg}}{0.1 \text{ mg}} \times 3 \text{ tab(s)} = 3 \text{ tab(s)}$$

The student's input of 3 is circled in red and marked with a red X, indicating it is incorrect. The final result of 3 tab(s) is marked with a green checkmark, indicating it is the correct answer.



# Incorrect equation

The student fails to understand the specifics of this ONLINE SOFTWARE and submit incorrect answers.



# EXAM results displayed

QUESTION	DOMAIN	DIFFICULTY	CONCEPTUAL	CALCULATION	T. MEASUREMENT
1	■	■	✓	✓	✓
2	■	■	✓	✓	✓
3	■	■	✓	✓	✓
4	■	■	✓	✓	✓
5	■	■	✓	✓	✓
6	■	■	✓	✓	✓
7	■	■	✓	✓	✓
8	■	■	✓	✓	✓
9	■	■	✓	✓	✓
10	■	■	✓	✓	✓
11	■	■	✓	✓	✗
12	■	■	✓	✓	✗
13	■	■	✓	✓	✗
14	■	■	✓	✓	✗

## DOMAIN KEY

- Tablets & Capsules
- Liquid Medicines
- Injections
- I.V. Infusions

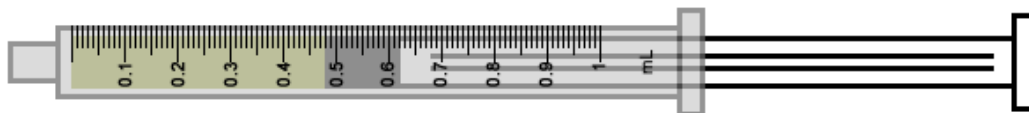
## DIFFICULTY KEY

- Unit Dose
- Sub Unit Dose
- Multiple Unit Dose
- Complex
- Conversion

### CORRECT ANSWER

$$\frac{4800 \text{ unit(s)}}{10000 \text{ unit(s)}} \times 1 \text{ mL} = 0.48 \text{ mL}$$

CALCULATED ANSWER  
0.48  
No Rounding Required

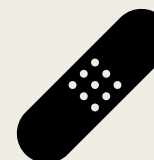


### YOUR ANSWER

$$\frac{4800 \text{ unit(s)}}{1000 \text{ unit(s)}} \times 1 \text{ mL} = 4.8 \text{ mL}$$

The input fields for 1000, 4.8, and the unit mL are circled in red, and red 'X' marks are placed next to the unit mL and the result 4.8.

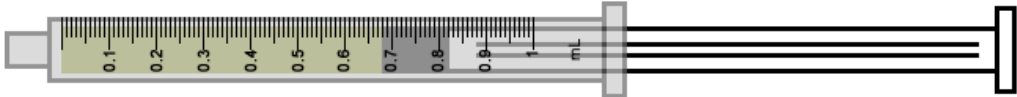
# INCORRECT SI UNITS



**CORRECT ANSWER**

$$\frac{5100 \text{ unit(s)}}{7500 \text{ unit(s)}} \times 1 \text{ mL} = 0.68 \text{ mL}$$

CALCULATED ANSWER: 0.68  
No Rounding Required



**YOUR ANSWER**

$$\frac{5100 \text{ unit(s)}}{7500 \text{ unit(s)}} \times 1 \text{ mL} = 0.68 \text{ unit(s)}$$

5100 / 7500 = 0.68

INCORRECT  
UNITS OF  
MEASUREMENT

DATE	TIME	VOLUME	APPROVED	DOSE	REMARKS	CHARTED BY
		250 mL		1000 mg		

WEIGHT: 56 KG

For this patient administer at 500 mcg/kg/hr


MEDICATION LABEL  
1000 mg Aminophylline  
in  
250 mL Sodium Chloride  
0.9%

Medication Datasheet  
Dose: 300 - 800 mcg/kg/hr  
Rate: Not to exceed 25 mg  
per min(s)

**CORRECT ANSWER**

CALCULATED ANSWER: No Rounding Required → 7 mL/hr

SETTING THE PUMP




**YOUR ANSWER**

YOU INDICATED THAT THE PRESCRIBED DOSE, PATIENT & MEDICATION DETAILS ARE ACCURATE

THE PATIENT IDENTITY BRACELET WAS NOT CHECKED BEFORE ADMINISTRATION

SETTING THE PUMP



# CALCULATOR USAGE IDENTIFIES ERRORS:

NOT UTILIZED



QUESTION 12 - You answered this question INCORRECTLY

CONTINUE

<p>INPATIENT MEDICATION ORDER AND ADMINISTRATION RECORD</p> <p>WEIGHT <b>50</b> KG</p>	<table border="1"> <tr> <th>DATE</th> <th>TIME</th> <th>VOLUME</th> <th>DOSE</th> <th>APPROVED</th> <th>DATE</th> <th>INSTRUCTIONS</th> </tr> <tr> <td></td> <td></td> <td>125 mL</td> <td>125 mg</td> <td></td> <td></td> <td></td> </tr> </table>	DATE	TIME	VOLUME	DOSE	APPROVED	DATE	INSTRUCTIONS			125 mL	125 mg				<p>MEDICATION LABEL</p> <p>125 mg Diltiazem in 125 mL Pre-Prepared Solution for Infusion</p>	<p>Medication Datasheet</p> <p>Dose: 5 mg per hour Rate: -</p>
DATE	TIME	VOLUME	DOSE	APPROVED	DATE	INSTRUCTIONS											
		125 mL	125 mg														

CORRECT ANSWER

CALCULATED ANSWER

**5**

No Rounding Required → 5 mL/hr

SETTING THE PUMP



YOUR ANSWER

$$125 \times 5 = 625 \quad 625 \div 125 = 5 \quad 5 \times 125 = 625 \quad 625 \div 125 = 5$$

YOU INDICATED THAT THE PRESCRIBED DOSE, PATIENT & MEDICATION DETAILS ARE ACCURATE

THE PATIENT IDENTITY BRACELET WAS CHECKED BEFORE ADMINISTRATION



SETTING THE PUMP



CALCULATOR  
USAGE  
IDENTIFIES  
ERRORS



# Data entry Error

**YOUR ANSWER**

**CONFIRMING THE PRESCRIBED DOSE**

DOSE FORMULA	PATIENT WEIGHT	ANSWER
$\frac{5 \text{ mg}}{\text{kg}} \times 70 \text{ kg}$		350 mg

**CALCULATING THE RATE**

PREPARED	ANSWER
$\frac{250 \text{ mL}}{2 \text{ hr}}$	125 mL/hr

$250 / 2 = 125$

YOU INDICATED THAT THE PRESCRIBED DOSE, PATIENT & MEDICATION DETAILS ARE ACCURATE

THE PATIENT IDENTITY BRACELET WAS CHECKED BEFORE ADMINISTRATION

**SETTING THE PUMP**

Rate 125 mL/hr

Volume to be infused 250 mL

## **safeMedicate Rounding Rules Guidelines**

### **Using This Document**

This document outlines the rounding requirements for each of the safeMedicate modules.



## QUESTION 1 - You answered this question INCORRECTLY

[CONTINUE](#)

PATIENT MEDICATION ORDER AND ADMINISTRATION RECORD

WEIGHT: 67 KG

DATE: \_\_\_\_\_

PRESCRIBER'S SIGNATURE: \_\_\_\_\_

DOSE: 90 mg

MEDICATION ORDER

MEDICATION LABEL

90 mg Pamidronate  
in  
1000 mL Sodium  
Chloride 0.9%

Medication Datasheet

Dose: 60 mg - 90 mg  
Rate: Administer 60 mg - 90 mg over 24 hours

## CORRECT ANSWER

CALCULATED ANSWER

41.666667

Answer Requires Rounding



41.7 mL/hr

## SETTING THE PUMP



## YOUR ANSWER

1000 / 24 = 41.66666666666667



YOU INDICATED THAT THE PRESCRIBED DOSE, PATIENT &amp; MEDICATION DETAILS ARE ACCURATE

X



THE PATIENT IDENTITY BRACELET WAS NOT CHECKED BEFORE ADMINISTRATION

X

## SETTING THE PUMP



# ROUNDING ERRORS

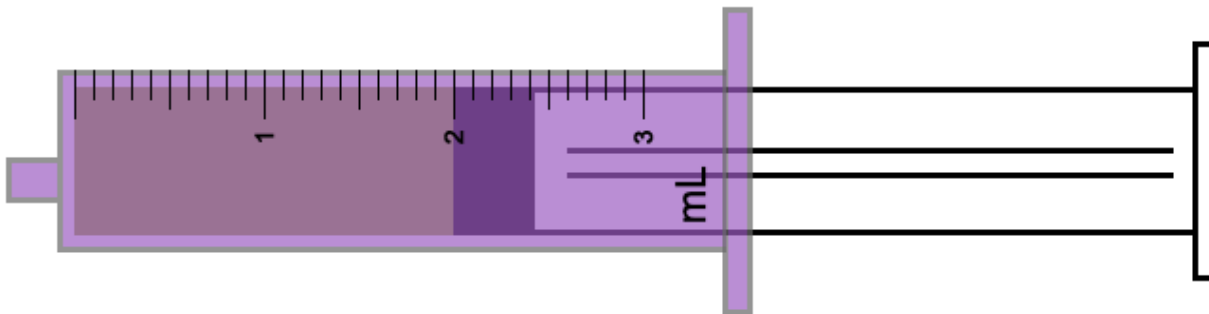


## Incorrect syringe measurement

Wrong end of stopper  
used for measurement

$$\frac{125 \text{ mg}}{250 \text{ mg}} \times 5 \text{ mL} = 2.5 \text{ mL}$$

$$125 / 250 \times 5 = 2.5$$



**X**

# Incorrect syringe measurement



QUESTION 4 - You answered this question INCORRECTLY

CONTINUE



Bodyweight: 50.6 lbs  
Age: 7 years

Child Specific Age Group

Drug Name

Clindamycin Injection

Dose

7.5 mg/kg, every 6 hours

Maximum Dose

40 mg/kg/day in 4 divided doses,  
every 6 hours

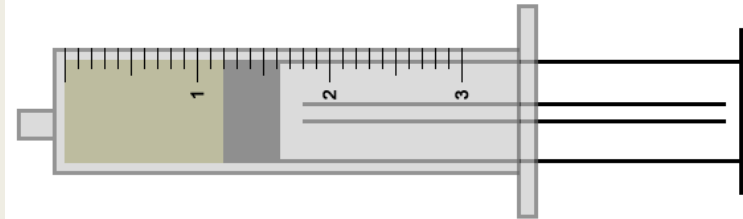
ROUTINELY SCHEDULED MEDICATIONS		DOSE
DOSE	172.5 mg	06.00
		12.00
		18.00
		24.00

Clindamycin Injection  
150 mg in 1 mL

CORRECT ANSWER

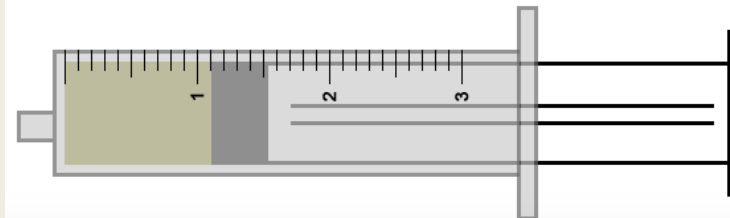
CALCULATED ANSWER  
1.15

= → 1.2 mL

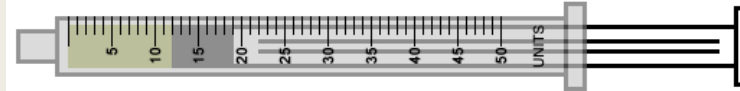


YOUR ANSWER

The user appropriately indicated that the ordered dose was accurate.

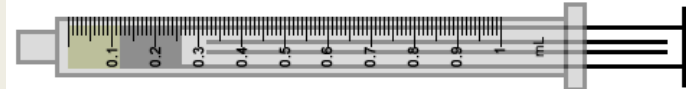


# Incorrect needle selection



YOUR ANSWER

  $12 / 100 = 0.12$



**X**

An insulin syringe must always be used to draw up and measure insulin.

<b>SUBJECT/TITLE:</b> Medication Calculation Policy for the Undergraduate Nursing Program (Calgary Campus and Medicine Hat College Site)		<b>PAGE:</b> 1 of 1
<b>RELATED POLICY:</b> Student Learning Plan and Process Guidelines for Undergraduate Nursing Practice Courses	<b>DATE ESTABLISHED:</b> March 24, 2004	
<b>AUTHORIZATION:</b> Practice Policy and Procedure Committee Undergraduate Programs Committee Nursing Council	<b>DATE LAST REVIEWED:</b> November 27, 2019 (No Revisions) October 22, 2018 December 12, 2018	

#### PURPOSE

The purpose of this policy is to ensure that nursing students are able to demonstrate basic math competence.

#### POLICY

Math tests may be implemented for any/all nursing practice courses. Compulsory preparatory learning activities will be implemented prior to mandatory testing.

Mastery of 90% will need to be achieved within a specified timeframe, as stated in the course outline, prior to completion of the practice course. Students will have two opportunities to achieve 90% on any given math test. Students who do not achieve 90% after the second try will be required to meet with the Nursing Practice Course Coordinator to collaboratively develop a Learning Plan. The student will be granted a third and final attempt. Failure to achieve 90% on the final attempt will result in failure of the practice course.



**UNIVERSITY OF  
CALGARY**

Faculty of Nursing  
medication policy





Advanced Skills - ADA

Title: **repeat IV exam**

Date: **02/01/2018 12:30**

Users: **2017 (A)** Group: **499 AM**

Type: **ADA - Summative**

Scheduled By: **TWYLA ENS**

# Program Lead

in administering the  
program



Confident in the  
safeMedicate program to:

- easily identify what the common errors of students are
- Identify common technical issues that students encounter
- Identify errors with using the program for summative assessments

# Patient safety


INPATIENT MEDICATION ORDER AND ADMINISTRATION RECORD		DATE		TIME		VOLUME		DOSE		MEDICATION LABEL		Medication Datasheet	
WEIGHT 56 KG						250 mL		1000 mg		1000 mg Aminophylline in 250 mL Sodium Chloride 0.9%		Dose: 300 - 800 mcg/kg/hr Rate: Not to exceed 25 mg per min(s)	

For this patient administer at 500 mcg/kg/hr

**CORRECT ANSWER**

CALCULATED ANSWER  
No Rounding Required → 7 mL/hr

SETTING THE PUMP




**YOUR ANSWER**

YOU INDICATED THAT THE PRESCRIBED DOSE, PATIENT & MEDICATION DETAILS ARE ACCURATE

THE PATIENT IDENTITY BRACELET WAS NOT CHECKED BEFORE ADMINISTRATION

SETTING THE PUMP



**X**

**X**

Identifies negligent rights of medication administration

10 Rights of Medication Administration (Potter, 2018)

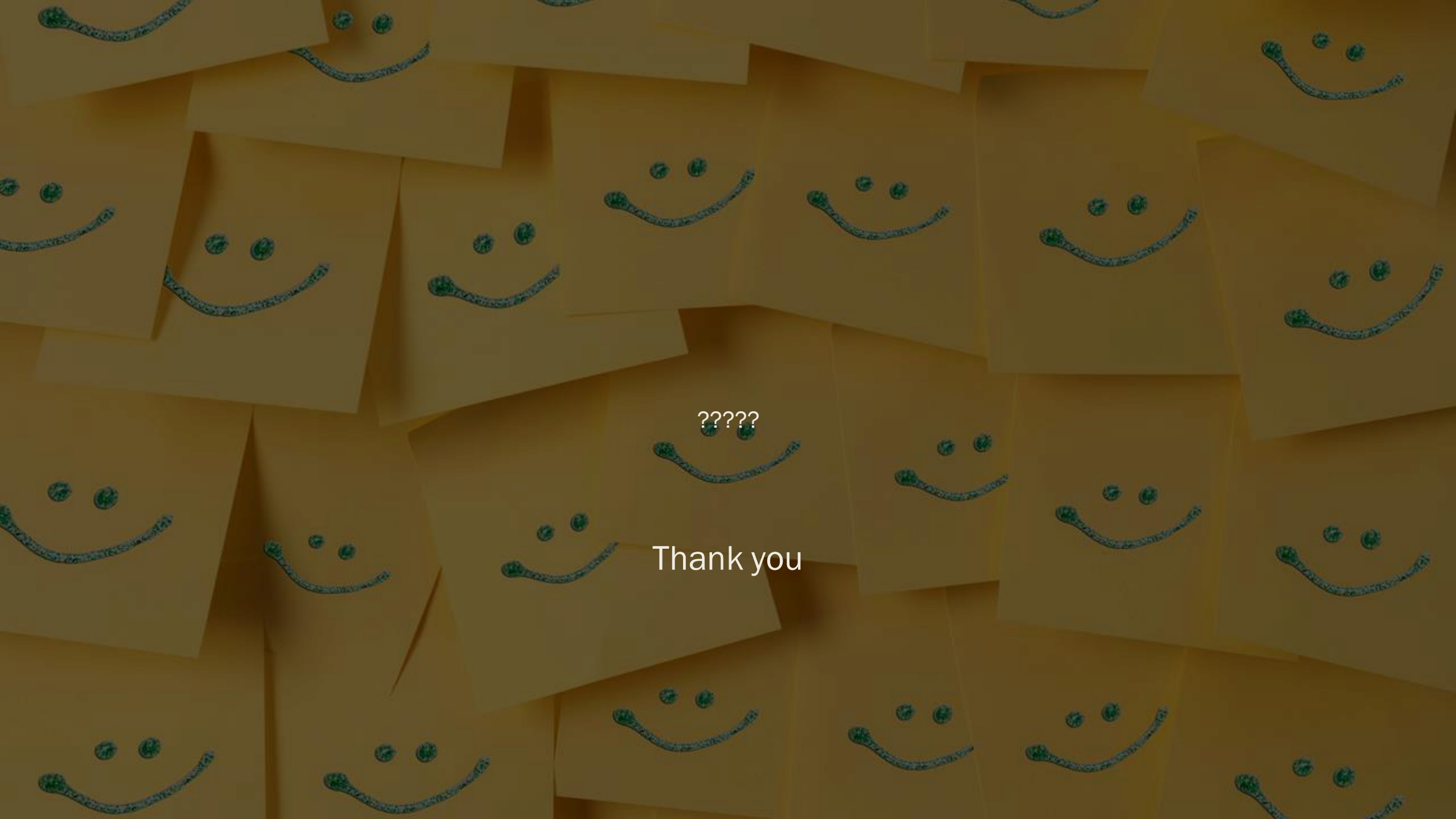
Students fail to check the ID bands on pts as the further they *progress* in the program (Schneidereith, 2020)





# REFERENCES

- Ens, T., Hnatyshyn, T., Kirkpatrick, M., Estefan, A. (April 2018). Teaching students to administer medications: Collaborative supports are critical. *Nursing Education Research Conference: National League for Nursing*. Washington, D.C.
- Potter, P. A., Perry, A. G., Stockert, P. A., Hall, A., Astle, B. J., & Duggleby, W. (2018). *Canadian Fundamentals of Nursing-E-Book*. Elsevier Health Sciences.
- Schneidereith, T. A. (2014). Using simulations to identify nursing student behaviors: A longitudinal study of medication administration. *Journal of Nursing Education*, 53(2), 89-92.

The background consists of a dense, overlapping pattern of yellow sticky notes. Each sticky note features a simple smiley face drawn in blue ink, consisting of two dots for eyes and a curved line for a mouth. The sticky notes are arranged in a way that they appear to be stuck to a surface, with some overlapping others.

?????

Thank you