

Creating a Simulated Pharmacy and Blood Bank



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UCLA

Simulation Center



Meet Our Team



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Disclosure(s)

- We have nothing to disclose.
- Commercial vendors mentioned in this presentation are merely used as examples. We do not receive any compensation from them.

Learning Objectives

- Create a needs assessment to tailor the simulated drug production to your needs.
- Demonstrate how to produce vials for use as simulated drugs with hands-on instruction.
- Find ways to implement this new tool into your simulation center.

Does your Simulation Center...

- Use expired drugs?
- Buy commercially available simulated drugs?
- Make your own?

The Problems



A Solution: DIY!



Get The Right Tools for the Job

Outside Diameter, or
O.D.



Borosilicate Vial



0.9% NaCl (Normal Saline)



Syringe



Table Salt

Get The Right Tools for the Job



Stopper



Flip-Off Cap



Flip-Off Cap Crimper

Step One: Filling and Sealing



Step Two: Capping



Wow, That Was Easy!



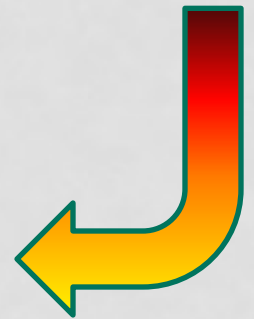
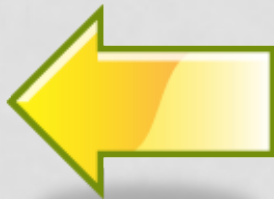
Step Three: Crimping



The Assembled Vial



Now You Get To Do It!



Step Four: Labeling

SIMULATED

**ADENOSINE
INJECTION**

6 mg/2 mL

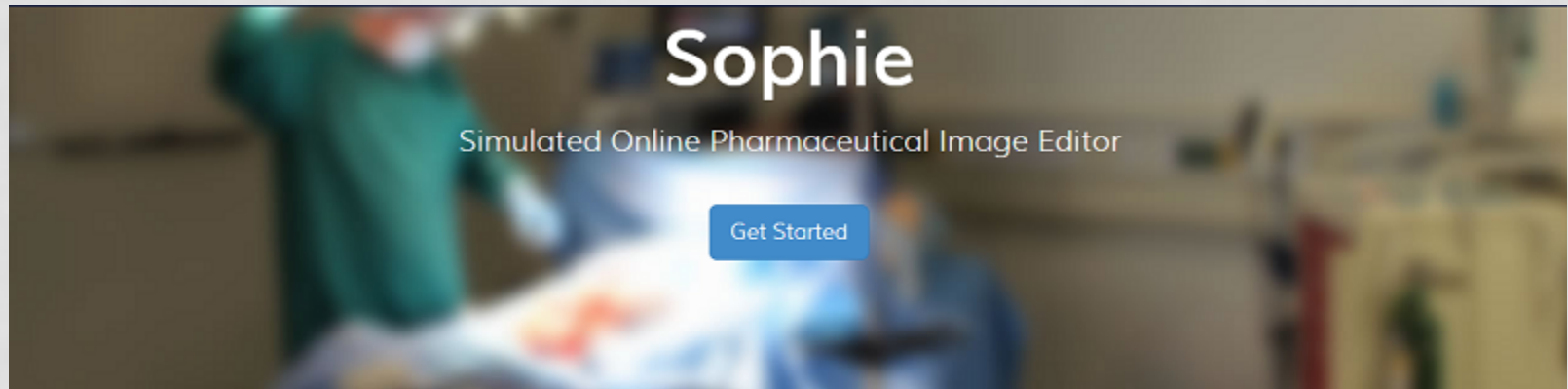
(3 mg/mL) 2 mL

WARNING

**Not for human
consumption or
medical use.**

Lot:

Meet SOPHIE



Looking for our IMSH 2014 presentation materials?

You can find all of the information that was presented during our workshop *How to Supply Your Drug Habit* at the International Meeting on Simulation in Healthcare (IMSH) 2014 on January, 25, 2014 by using the link below

[View materials](#)



No Photoshop skills required

With Sophie, designing drug labels for your simulated pharmacy is easy. Once you input your customizable dimensions, all you have to do is click an area to edit. Yep, font sizes, colors, background colors, alignment; it's all there.

Create Your Own Label

- Use preset templates or create your own custom label

Sophie My Collection Community

Create Label Settings

Label name

Adenosine

This is how your label will appear in My Collection

Label Size

Preset Size Custom Size

Label Dimensions (cm)

4.5 x 2

[Start Over](#) [Next](#)

Vial - 2mL

Vials

- Vial - 2mL
- Vial - 5mL
- Vial - 10mL
- Vial - 20mL
- Vial - 50mL

Ampules

- Ampule - 1mL

Syringes

- Syringe - 3mL
- Syringe - 5mL
- Syringe - 10mL

UCLA Simulation Center
700 Westwood Plaza
Suite A222
Los Angeles, CA 90095

Design Your Label

Sophie

My Collection

Community

Create Label Design

Design and Customize

All text and colors are customizable. Just click a section to edit.

SIMULATED

Adenosine

WARNING
Not for human
consumption or
medical use.

6 mg/2 mL

Lot:

3 mg/mL

2mL

Start Over

Back

Save and Continue

Share Your Label

Sophie

My Collection

Community

 CSoto ▾

Community Labels

These labels have been shared by your colleagues with the community and are available for your use.

You can **bookmark** one and save it to your collection or **duplicate** it and make your own edits. Feel free to share your own designs and give back!




Adenosine Injection

5 cm x 2 cm

Created 06/12/2014

Updated 59 minutes ago

 Bookmark

Making Blood Bags



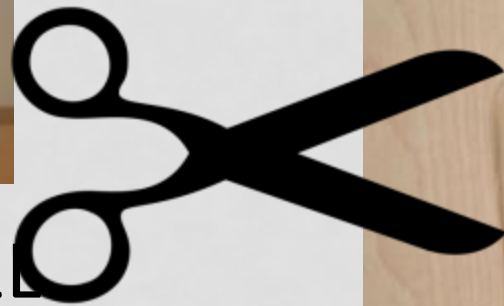
What do you fill it with?

- Red food coloring and water
- Red water-soluble hand paint
- Commercial simulated blood
- Your own mixture

Step One: Making the Filling Apparatus



- Snip the top-most front layer of the bag to allow it to be filled



- Hang an empty 1L bag by an endotracheal tube stylet



Step Two: Attaching the Blood Bag



- Spike the 1L bag with the blood bag



Step Three: Filling the Bag

- Use a measuring cup to fill the 1L bag to 250 mL and gravity will do the work



Step Four: Clamping the Bag

- Clamp the tubing with a hemostat and separate the blood bag from the filling apparatus



The Sealer

- We use an impulse bag sealer to seal the tubing

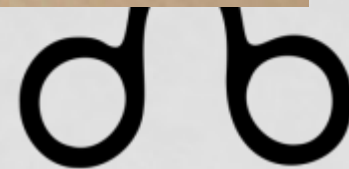


Step Five: Sealing

- Placing the tubing in a serpentine configuration saves time



Step Six: Finishing



What else can you make this way?

- Fresh Frozen Plasma
- Cryoprecipitate
- Platelets

What Does Your Center Need?

- Common/Crash Cart Meds
- Medications for Rare Conditions
(Dantrolene for Malignant
Hyperthermia, Blood Factors, etc.)

Needs Assessment

- Do you see a need for simulated medications to enhance realism and learning during the scenarios?
- Are there any injectable drugs you would like specifically created for your simulations?
Concentration and volume?
- Do you have any suggestions for injectable drugs that may be useful for simulation, in general? Concentration and volume?

Simulated Drugs Currently Available at UCLA

Adenosine	Etomidate	Metoclopramide
Alprostadil	Famotidine	Metoprolol
Amiodarone	Fentanyl	Midazolam
Atropine	Flumazenil	Naloxone
Calcium Chloride	Furosemide	Neostigmine
Carboprost	Glucagon	Nitroglycerin
Dantrolene	Glycopyrrolate	Norepinephrine
Dexamethasone	Heparin	Ondansetron
Dextrose 50%	Hydralazine	Oxytocin
Digoxin	Hydromorphone	Phenylephrine
Digoxin Immune Fab	Insulin	Procainamide
Diltiazem	Intravenous Lipid	Propofol
Diphenhydramine	Labetalol	Rocuronium
Dopamine	Lidocaine	Sodium Bicarbonate
Ephedrine	Magnesium Sulfate	Succinylcholine
Epinephrine	Methylergonovine	Vasopressin
Esmolol	Methylprednisolone	Verapamil

Cost Analysis

The true cost of a simulated drug vial was derived from:

- **Material costs** were calculated by adding the price per unit for the vial, stopper, flip-off cap, contents and labels.
- **Labor costs** were calculated for a worker making \$25/hr and one making \$14/hr. A total of 26 hours were allotted for the production of 500 vials.

Total Cost Per Vial Made

Vial	Total Material Cost	Total Tech Labor	Total Non-Tech Labor
2 mL	\$0.52	\$1.04	\$0.73
5 mL	\$0.76	\$1.04	\$0.73
10 mL	\$0.81	\$1.04	\$0.73
20 mL	\$0.97	\$1.04	\$0.73

Vial	Commercial Cost	Tech Vial Cost	Non-Tech Vial Cost
2 mL	\$1.38	\$1.56	\$1.25
5 mL	\$1.50	\$1.80	\$1.49
10 mL	\$1.77	\$1.85	\$1.54
20 mL	\$2.09	\$2.01	\$1.70

Total Yearly Cost Using In-House Simulated Drugs Versus Commercial Drugs for Anesthesia Residents

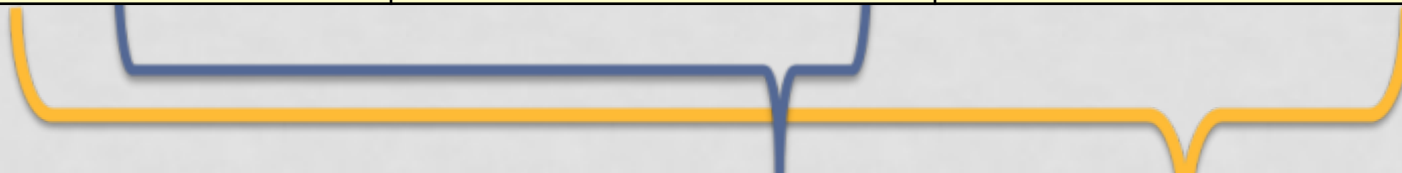
Vial Type	Vials Assembled	Commercial Cost	Tech Made	Non-Tech Made
2 mL	200	\$276.00	\$312.00	\$250.00
5 mL	100	\$150.00	\$180.00	\$149.00
10 mL	150	\$265.50	\$277.50	\$231.00
20 mL	50	\$104.50	\$100.50	\$85.00
Total	500	\$796.00	\$870.00	\$715.00

Assumption: A year's worth of simulated drug for Anesthesia residents is based upon 3 vials of simulated drug used during each simulation, 3 simulations per week for 48 weeks. This equals 432 vials with 68 vials as a buffer in case more are needed throughout the year.

Total Cost Per Blood Bag

Total Material Cost	Total Tech Labor	Total Non-Tech Labor
\$9.55	\$3.20	2.24

Commercial Cost	Tech Vial Cost	Non-Tech Vial Cost
\$16.95	\$12.75	11.79



Item Lists

Please visit:

<https://www.sim.ucla.edu/sophie/imsh>

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How to Reach Us

UCLA

Simulation Center

ANY QUESTIONS OR COMMENTS REGARDING THE MATERIAL
PRESENTED CAN BE DIRECTED TO THE TEAM AT:

E-MAIL: SIM@MEDNET.UCLA.EDU

VISIT OUR WEBSITE AT: WWW.SIM.UCLA.EDU

THANK YOU FOR ATTENDING

