

ISMP Perspectives on Standardization of Syringe Labels and Vial Colors

Ron Litman, D.O., M.L.

Institute for Safe Medication Practices

RLitman@ismp.org

[@DrRonLitman](#)



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ISMP National Medication Errors Reporting Program



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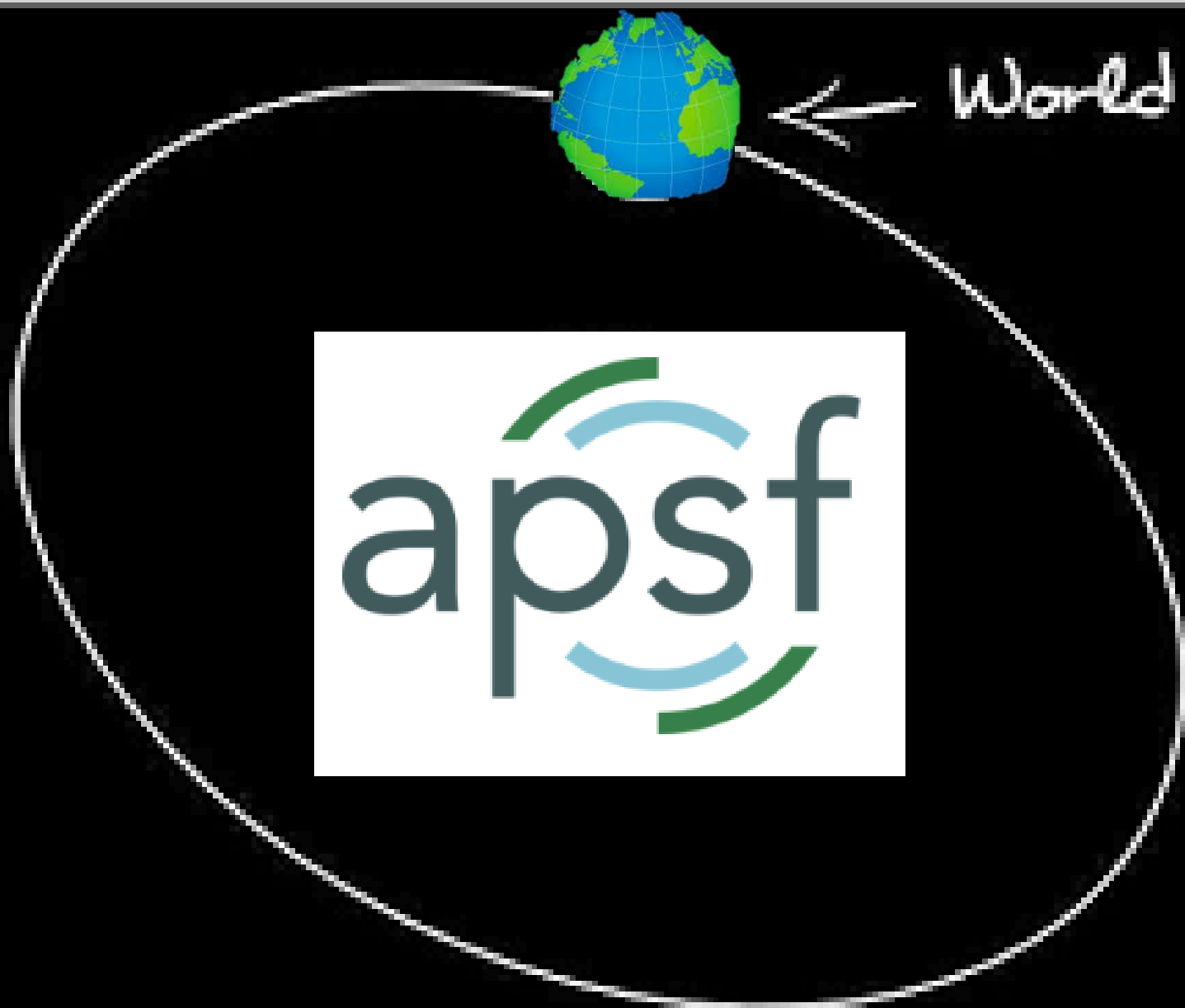
A Safer World by Preventing Medication Errors

For over 30 years, ISMP has been a global leader in patient safety as the first non-profit organization dedicated to the collaborative development, education, and advocacy of safe medication practices.

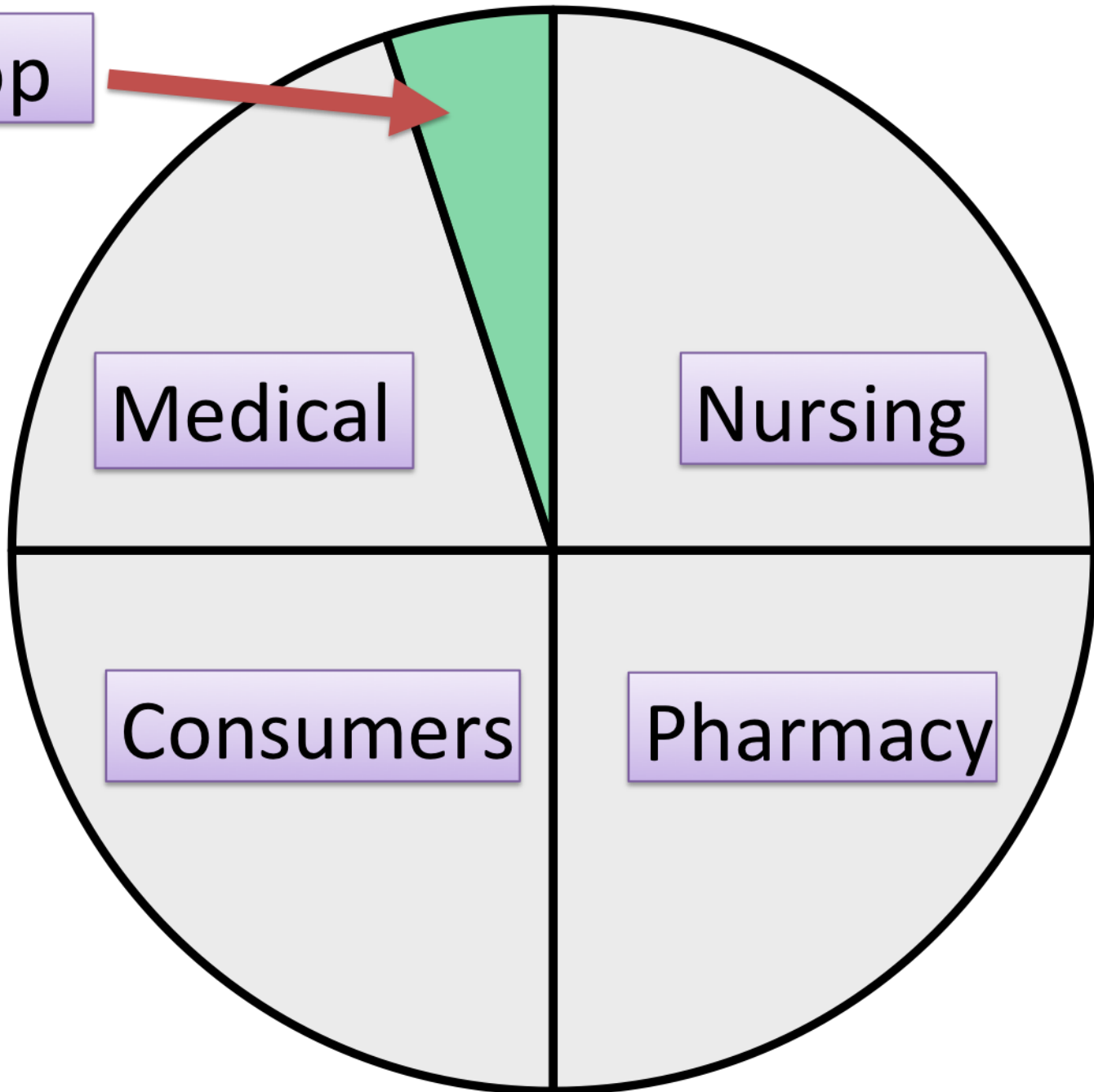
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Peri-op



#1

Expression of drug
concentrations on vials
and prefilled syringe
labels

USP <7> standard: 3 Rules

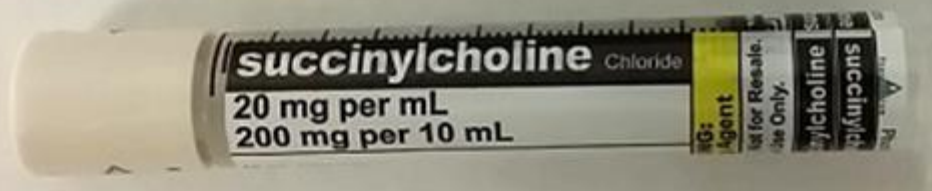
1. For containers < 1 mL: 12.5 mg/0.625 mL
2. For containers $= 1$ mL: 5 mg/mL (not 5 mg/1 mL)
3. For containers > 1 mL:

500 mg/10 mL
(50 mg/mL)

25,000 Units/5 mL
(5,000 Units/mL)

USP and FDA require this format
for all US injectables in vials



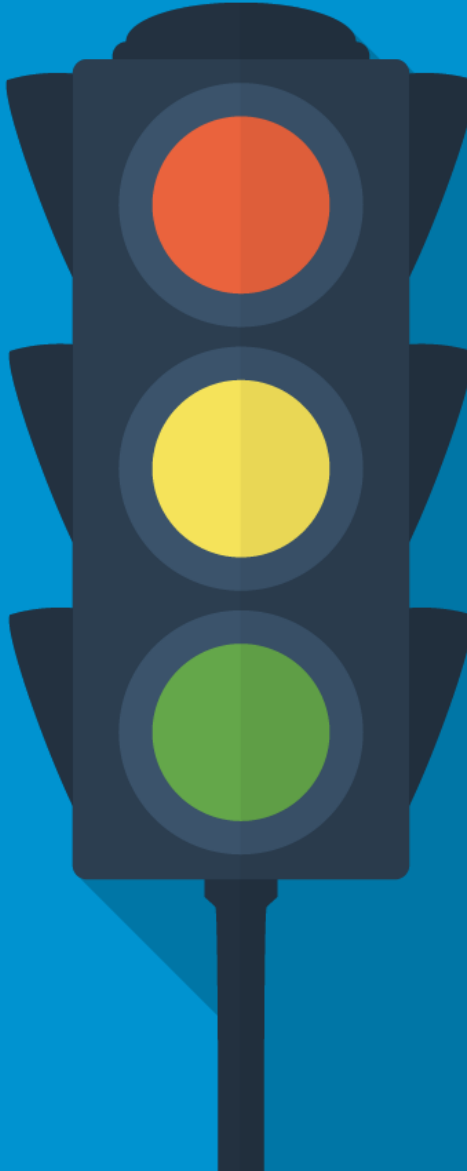




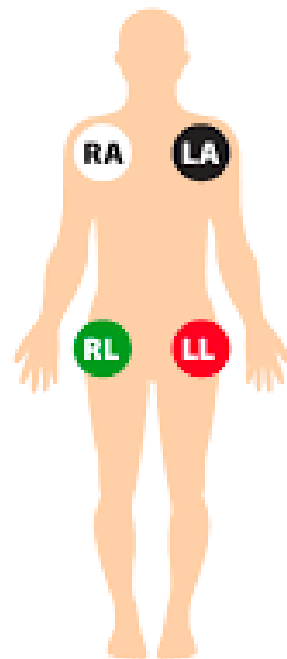
#2





Color-Coding

Colors Promote Safety

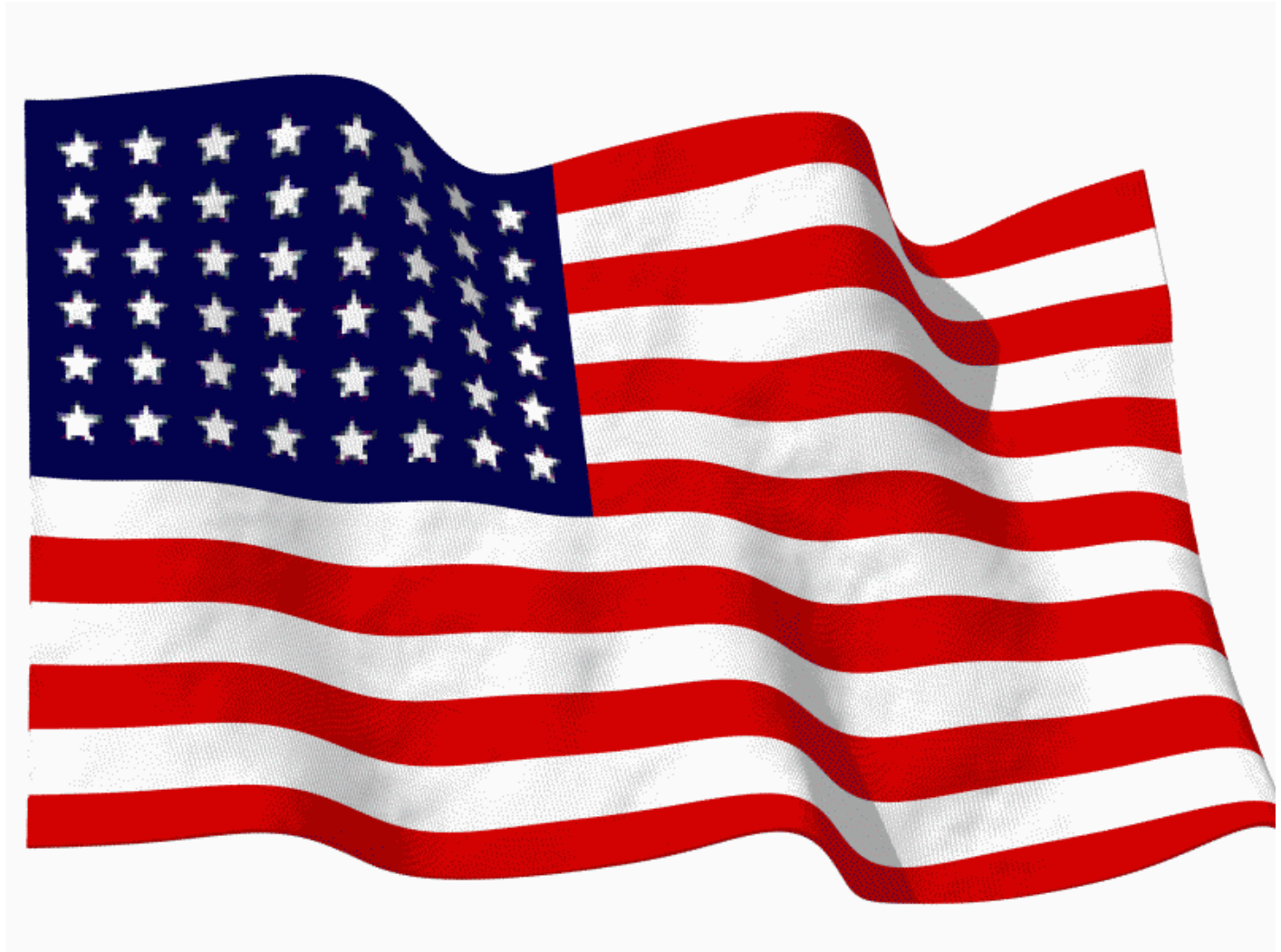


Colors Can Promote Standardization



-  Right Arm
-  Left Arm
-  Left Leg
-  Right Leg

Colors Associate with Good Feelings...



...and Bad Feelings



| DRUG CLASS ^A | | EXAMPLES | PANTONE COLOR (unearned) | LABEL EXAMPLES |
|-------------------------|---------------------------------------|--|--|---|
| 1 | Induction Agents | Etomidate, Ketamine, Methohexital, Propofol, Thiамylal, Thiopental | YELLOW | <div>PROPOfol _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 2 | Benzodiazepines | Diazepam, Midazolam | ORANGE 151 | <div>MIDAZolam _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 3 | Benzodiazepine Receptor Antagonist | Flumazenil | ORANGE 151 AND WHITE DIAGONAL STRIPES | <div>FLUMAZenil _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 4a | Muscle Relaxants (Depolarizer) | Succinylcholine ^B | FLUORESCENT RED 805 | <div>SUCCINYlcholine _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 4b | (Non-Depolarizer] | Atracurium, Cisatracurium, Mivacurium, Pancuronium, Rocuronium, Vecuronium | FLUORESCENT RED 805 | <div>ROCURonium _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 5 | Relaxant Antagonist (Non-Depolarizer) | Endrophonium, Neostigmine, Pyridostigmine | FLUORESCENT RED 805 AND WHITE DIAGONAL STRIPES | <div>NEOstigmine _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 6 | Narcotics | Alfentanil, Fentanyl, Hydromorphone, Meperidine, Morphine, Sufentanil, Remifentanil | BLUE 297 | <div>FENTanyl _____ mcg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 7 | Narcotic Antagonists | Levallorphan, Naloxone | BLUE 297 AND WHITE DIAGONAL STRIPES | <div>NARcan _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 8 | Major Tranquillizers | Chlorpromazine, Droperidol | SALMON 156 | <div>DROperidol _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 9a | Vasopressors | Ephedrine, Norepinephrine, Phenylephrine | VIOLET 256 | <div>EPHEDrine _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 9b | Vasopressors | Epinephrine ^B | VIOLET 256 | <div>EPINEPHrine _____ mcg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 10 | Hypotensive Agents | Hydralazine, Nitroglycerine, Nitroprusside, Phentolamine, Trimethaphan | VIOLET 256 AND WHITE DIAGONAL STRIPES | <div>NITROglycerine _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 11 | Local Anesthetics | Bupivacaine, Chloroprocaine, Lidocaine, Mepivacaine, Procaine, Ropivacaine, Tetracaine | GRAY 401 | <div>LIDOcaine _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 12 | Anticholinergic Agents | Atropine, Glycopyrrolate, Scopolamine | GREEN 367 | <div>GLYCOpyrrolate _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |
| 13 | Beta Blockers | Esmolol, ^B Labetolol, ^B Metoprolol ^B | COPPER 876U | <div>LABETalol _____ mg/mL</div> <div>Date _____ Time _____ Int _____</div> |

ASTM

Should anesthesia syringe labels be color-coded?

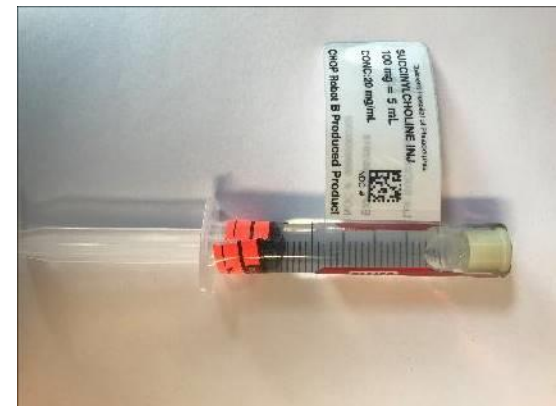
Self-prepared



Should anesthesia syringe labels be color-coded?



In-house Pharmacy



Should anesthesia syringe labels be color-coded?



**503b
Outsourcer**



Should anesthesia syringe labels be color-coded?

Manufacturer



Normal

Deuteranope

Propofol

.....mg ml⁻¹.

Propofol

.....mg ml⁻¹.

Vecuronium

.....mg ml⁻¹.

Vecuronium

.....mg ml⁻¹.

Morphine

.....mg ml⁻¹.

Morphine

.....mg ml⁻¹.

Ephedrine

.....mg ml⁻¹.

Ephedrine

.....mg ml⁻¹.

Atropine

.....µg ml⁻¹.

Atropine

.....µg ml⁻¹.

Ondansetron

.....mg ml⁻¹.

Ondansetron

.....mg ml⁻¹.

Diazepam

.....mg ml⁻¹.

Diazepam

.....mg ml⁻¹.

Lidocaine

.....%.

Lidocaine

.....%.

Neostigmine

.....µg ml⁻¹.

Neostigmine

.....µg ml⁻¹.

Naloxone

.....µg ml⁻¹.

Naloxone

.....µg ml⁻¹.

Labetalol

.....mg ml⁻¹.

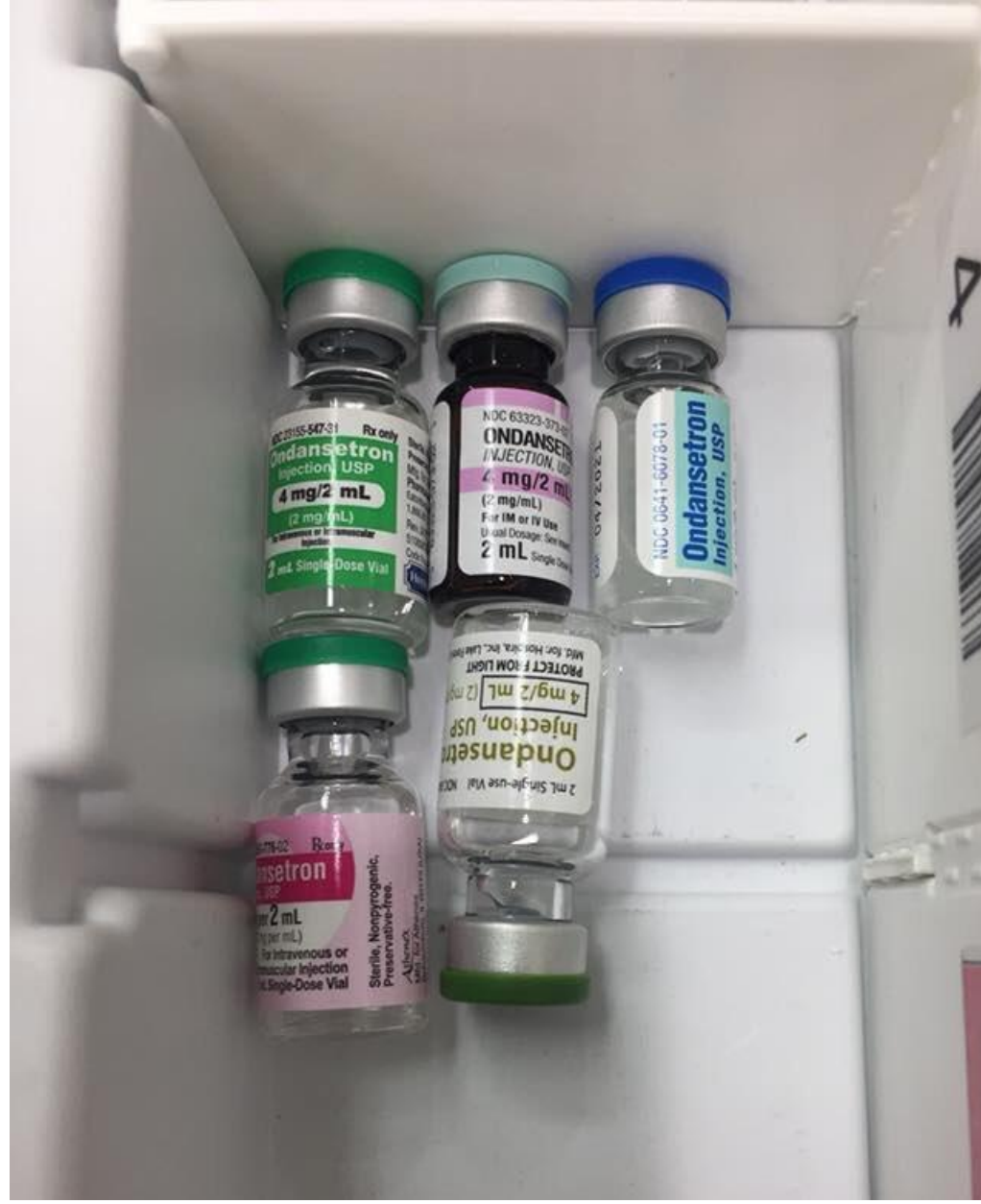
Labetalol

.....mg ml⁻¹.

Color blindness

Thomas, Mollon,
BJA, In press, 2018





What's Better than Color-Coding?







**WARNING!
PATIENT ALLERGIC
TO MORPHINE**



#3

Other forms of Unsafe Labeling



PF-Succinylcholine

Rx Only

Chloride Injection, USP

NDC: 69374-919-10 200mg/10mL (20mg/mL)

WARNING: PARALYTIC AGENT

Each 1mL contains:
Succinylcholine Chloride Dihydrate,
USP 20mg (as anhydrous);
Sodium Chloride, USP 5mg;
In Water for Injection, USP q.s.;
pH adjustment: HCl/NaOH

EXP:
LOT:
Compounded:

Store: 20°C - 25°C. Protect from Light

Hospital/Office Use Only

This is a compounded drug
for intravenous use only.



N008 outsourcing facility
4500 12th St. Extension
West Columbia, SC 29172
1-844-224-2225
Not for resale

Adverse Event Reporting:
www.fda.gov/medwatch or 1-800-FDA-1088
CIC010 Rev 12-19-17

PF-Succinylcholine

Phenylephrine HCl

Rx Only

Injection, USP **Warning: Contains Sulfites**

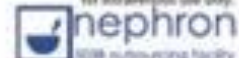
NDC: 69374-957-10 1mg/10mL (100mcg/mL)

Each 1mL contains:
Phenylephrine HCl, USP 1mg;
Sodium Chloride, USP 4mg;
Sodium Citrate Dihydrate, USP 0.22mg;
Citric Acid Monohydrate, USP 0.01mg;
Sodium Metabisulfite, USP 0.02mg
In Water for Injection, USP q.s.;
pH adjustment: HCl/NaOH

Store: 20°C - 25°C. Protect from Light

Hospital/Office Use Only

This is a compounded drug
for intravenous use only.



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Adverse Event Reporting:

www.fda.gov/medwatch or 1-800-FDA-1088
CIC014 Rev 12-29-17

EXP:
LOT:

Compounded:

3 69374 95710 6

Phenylephrine HCl

Beware of different concentrations!



ISMP Conclusions

1. Labels should conform to USP 7: show total dose per entire syringe first
2. Color coding is not reliable or feasible, especially outside the OR
3. Bar-coding is the most feasible solution now

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