Code Blue for Pharmacists: Procedures, Equipment, and RSI

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June 4 & 14, 2007

Objectives

- To elucidate the appropriate procedures/ conduct for the pharmacist to follow during a code blue emergency
- To identify the non-medication components of the crash cart
- To discuss the medications used during rapid sequence intubation (RSI)

Procedures

- Medication tray
- Syringe assembly
- Dispensing medications
- Preparing IVPB medications
- Code etiquette

Why Pharmacist Participation

- Use of medications is an inherent part of most code blue emergencies
- Preparation of intravenous medications comes under the purview of pharmacists
- It is a dynamic and interactive process of pharmaceutical care

Crash Cart Locations

- Determine location of crash cart on any unit(s) covering
- Replacement medication trays are kept in the central pharmacy manufacturing area
  - Replaced to ICU Pyxis machines
  - Replaced to CPD post-code when cart is cleaned and medications and instruments replaced
  - Replaced to RIM when crash cart in storage is pulled into service

HUH/HWH Crash Cart Components

Drawer 1:
Medications

Drawer 3:
Syringes
Needles

Drawer 5:
IV Fluids
Angiocaths

Drawer 6:
Gloves
Face masks

RIM Crash Cart Components

Drawer 3:
IV Fluids

Drawer 4:
Medications

Drawer 5:
Gloves
Syringes
Needles

Drawer 6
Gloves
Stethoscope

Attending a Code Blue

- Notification
  - Overhead PA system
  - Code blue pager
- Reach site of code
  - Take stairs when possible
  - Enter room/area and identify yourself to staff already in attendance

Pharmacist Procedures

- If the medication tray is still in the cart, remove it at an opportune time when the other drawers are not in use
- If medication tray is already being attended by a physician or nurse, offer to work with them or to handle the medications

Remove the Medication Tray

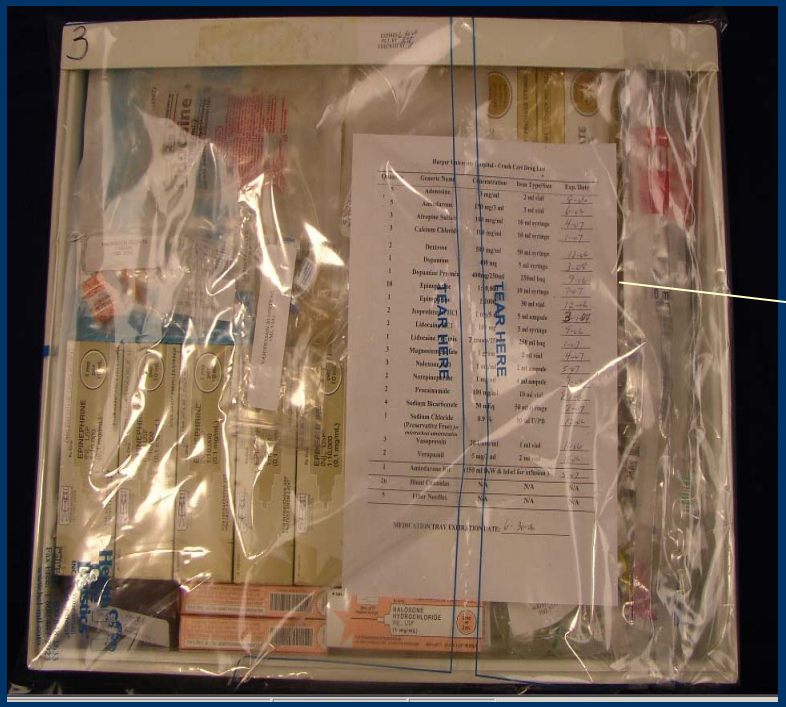
HUH/HWH Crash Cart

Medication Tray

RIM Crash Cart

Place Tray on Solid Surface

Medication Tray



Remove the plastic from the tray

Pharmacist Procedures

- Identify the physician calling the code
- Identify the nurse recording the events
- Locate the nurse or physician administering the medications
- Stand by the medication tray in sight of the physician running the code
- If possible, be in view of the ECG monitor

Syringe Preparation

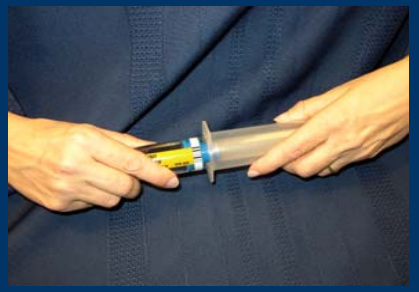
- At the start of the code open and assemble an epinephrine and an atropine syringe

- Replace each assembled syringed in its box to make quick identification easier
- Draw up 2-3 syringes with 20ml NS for flushing between doses of medications

To Assemble a Syringe

1. Open the syringe box from the side indicated
2. So that the two parts fall out into your hand, then

- Flip off the plastic end-caps and
- Attach the medication half to the plunger half with a push and a twist until resistance is met



Pharmacist Procedures

- Obtain IV solutions, syringes, and needles from the cart as necessary for requested medications
- Determine if IV medications will be administered by needle or blunt tip system; may need to exchange needles on syringes
- Stay focused on physician calling the code

Dispensing Medications

- Select correct medication requested by the physician calling the code
- Assemble the syringe (if not done in earlier step) or draw up medication requested; change to blunt tip system if required
- Step to bedside and loudly read name of medication and dose from syringe or vial as you hand it to the administering MD or RN

Dispensing Medications

- Reading name of dose of medication from syringe or vial
  - Ensures that the correct medication is being dispensed
  - Is a double check that the correct medication is handed to the administering physician or nurse

Dispensing Medications

- Return to stand by the medication tray
- Check with recording nurse that the correct time and medication were recorded
  - Try and use overhead clock in room to write administration times so everyone can follow the medication timing
- Draw up another syringe/vial/ampule of medication just used

Dispensing Medications

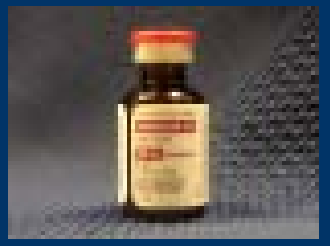
- Helpful hints
  - Back of the medication list found in the medication tray contains dosing basics
  - Keep track of empty boxes/vials/ampules as physician calling the code often asks how much of various medications were already used
    - Line up empty containers next to the medication tray as used
    - Keep track of timing between doses of epinephrine
    - The recording nurse can corroborate counts and timing

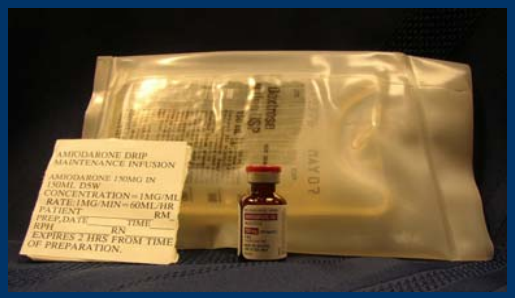
Plan Ahead

- If possible, check patient's chart for allergies, age, height, and weight
- Correct patient demographics make for more accurate calculation of doses or infusion rates if needed
- Any history of cocaine use?

Preparing Medications
Amiodarone

- Initial dose: 300 mg IVP qs to 20 ml with NS or D_5W; may repeat with 150 mg qs to 20 ml prn
  - Infuse each dose over 10 minutes
- Infusion dose: 150 mg in 150 ml D_5W; stable for 2 hours only
  - Infuse at 1 mg/minute = 60 ml/hour
- Kit with drug, label, and IV fluid in medication tray



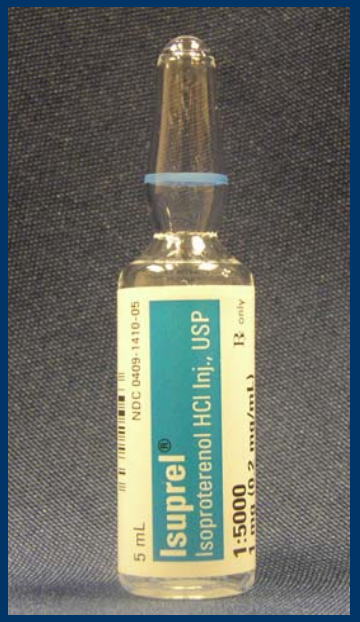


Preparing Medications Norepinephrine

- Dilute 4 mg in 250 ml D_5W or D_5NS (16 mcg/min)
- Avoid dilution with plain NS
- Infuse at 0.5-1 mcg/min and titrate up to 30 mcg/min to improve blood pressure
- Avoid giving in same line as alkaline solutions

Preparing Medications Isoproterenol

- Dilute 1 mg in 250 ml D_5W, LR, or NS (4 mcg/ml)
- Infuse at 2-10 mcg/min titrated to an adequate heart rate

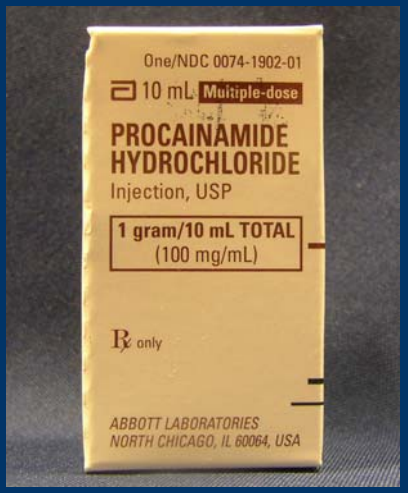


Preparing Medications Epinephrine

- For cardiac arrest, dilute 30 mg epinephrine (30 ml of 1:1000 solution) in 250 ml NS or D_5W to infuse at 100 ml/hr and titrate to response
- For bradycardia, dilute 1 mg of 1:1000 epinephrine in 500 ml NS and infuse at 1-5 ml/min (2-10 mcg/min)

Preparing Medications Procainamide

- Dilute 1 grams in 250 ml D_5W or NS (4 mg/ml)
- Maximum concentration 20 mg/ml
- Recurrent VF/VT: 20 mg/min up to 50 mg/min with maximum dose of 17 mg/kg
- Maintenance: 1-4 mg/min



Professional Conduct

- Always remain focused on the physician calling the code
- Watch and be aware of events going on around you
- Never leave a code that is underway without arranging for someone to handle medications and, if possible, letting the physician calling the code know

Professional Conduct

- Sometimes additional medications are needed; options to obtain them include:
  - Calling from room to have tubed or delivered to nursing unit, i.e., phenytoin IVPB; send RN, MD, or other pharmacist to pick up from tube
  - Having RN, MD, or other pharmacist go to front desk and call pharmacy
  - Having RN or other pharmacist obtain medication from Pyxis, i.e., flumazenil

Crash Cart Equipment

- Outside of cart
- Inside cart
  - Airway equipment
  - Breathing equipment
  - Circulation equipment
  - Miscellaneous

Monitor and Paddles

HWH

HUH/RIM

Suction Apparatus

HWH

HUH/RIM

Needle Boxes

HWH

HUH/RIM

Oxygen Canister

HWH

HUH/RIM

Airway Equipment

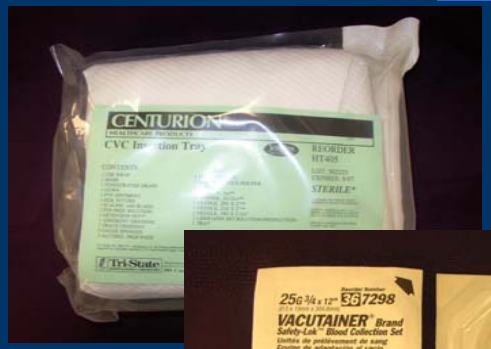
- Intubation equipment
- Endotracheal tubes
- CO_2 detector

Breathing Equipment

- Face mask
- Manual resuscitator
- Oxygen flowmeter

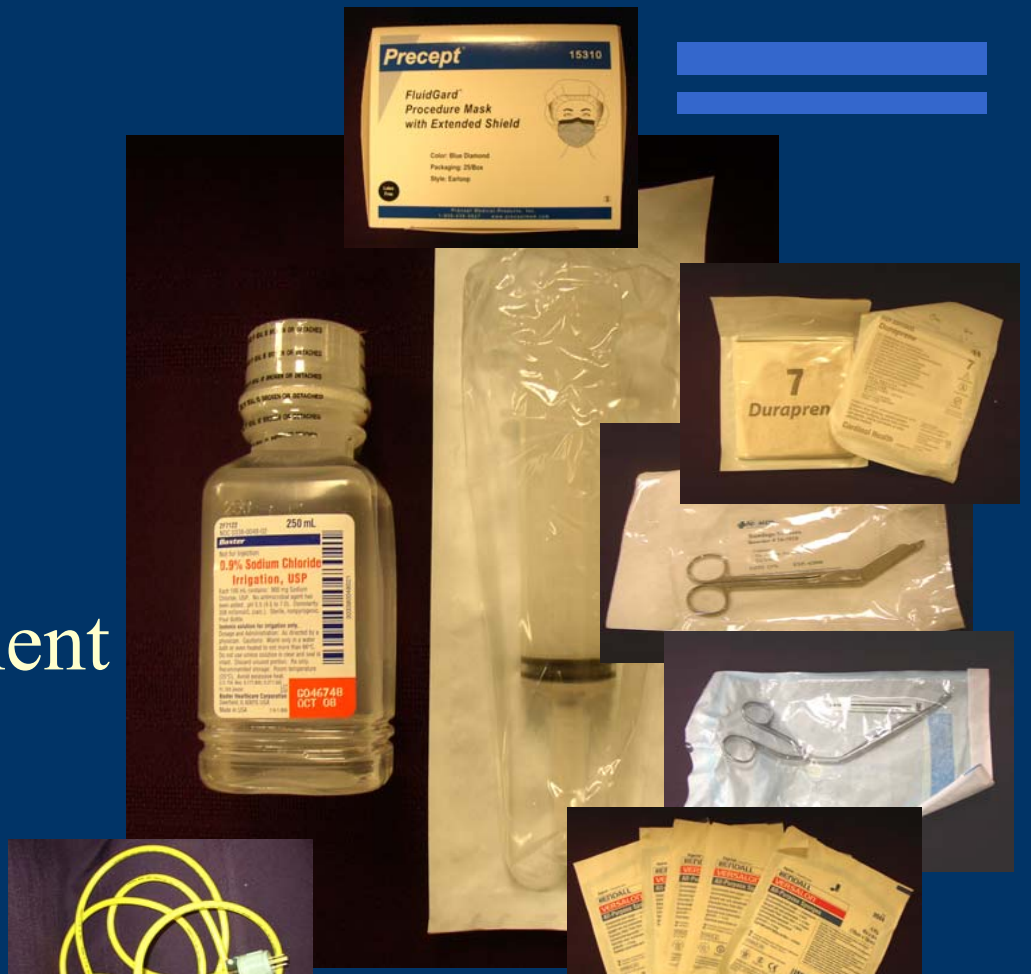
Circulation Equipment

- To insert a central line
- To start peripheral lines
- To test blood



Miscellaneous

- Face mask
- Gloves
- Scissors
- Hemostat
- Irrigation equipment
- Sponges
- Extension cord



Rapid Sequence Intubation (RSI)

- Definition
- Pre-medications
- Sedatives
- Neuromuscular blocking agents (NMBA)

Pre-medications

- L – Lidocaine: 1.5 mg/kg IVP over 30-60 seconds
- O – Opioid: Fentanyl 3 mcg/kg @ 1-2 mcg/kg/min
  IV analgesia if awake
- A – Atropine: 0.02 mg/kg IVP
  - Glycopyrrolate 0.1mg/kg IVP
- D – Defasciculation: 10% of paralyzing dose

Sedatives: Etomidate (Amidate®)

- 0.2-0.4 mg/kg **IVP**
- Onset = 60 sec DOA = 5 min
- Myoclonus, adrenal suppression
- Lowers ICP → good for head injury patient
- No effect on hemodynamics→ ok if hypotensive
- No effect on ventilation

Sedatives: Midazolam (Versed®)

- 0.1- 0.3 mg/kg
- Onset = 1-2 min DOA = 10-20 min
- Tachycardia, respiratory depression, hypotension
- Amnesia

Sedatives: Propofol (Diprivan®)

- 1 – 2.5 mg/kg IVP
- Onset = 30 sec DOA = 1- 3 min
- Respiratory depression, hypotension, ↓ CO
- ↓ICP, ↓ cerebral oxygen demand, rapid awakening
- Found in ICU pyxis

Sedatives: Ketamine (Ketalar®)

- 1 – 2 mg/kg
- Onset = 30-60 sec DOA = 5-15 min
- HTN, ↑ICP, ↑ myocardial/cerebral oxygen demand, ↑ BP, ↑ HR
- Bronchodilator
- Found in ED pyxis

Neuromuscular Blocking Agents

NMB	Dose (70 kg)	Onset	Duration	Side Effects	Notes
Succinylcholine (Anectine®)	1-1.5 mg/kg (70-100 mg)	<1 min	6-10 min	↑ ICP, IOP, K+ HTN, myalgia, fasciculations, malignant hyperthemia, tachy/bradyrythmias	Quickest onset
Pancuronium (Pavulon ®)	0.1-0.15 mg/kg (7-10 mg)	2-3 min	60-90min	Hepatic elimination	↑ HR, BP, histamine release
Vecuronium (Norcuron ®)	0.1 – 0.15 mg/kg (7-10 mg)	2-3 min	30-45 min	Renal/Bile elimination	No hemodynamic effect
Rocuronium (Zemuron ®)	1 mg/kg (70 mg)	1-2 min	10-40 min		Used in renal and hepatic failure
Cisatracurium (Nimbex ®)	0.15-0.2 mg/kg (10.5 – 14 mg)	~ 2 min	30 – 90 min		Reserved for use in renal failure (CrCl < 30 ml/min)

NMBA

- Used to manage ventilation, ICP, spasms and decreased oxygen consumption
- Not first line
- Before NMBA, medicate with sedation and analgesia

Summary

- RSI can involve pretreatment (“LOAD”), sedation and paralyzing the patient
- Sedate before paralyze
- NMBAs are used for muscle relaxation
- NMBAs should be selected based on PMH, DOA, renal & liver function

Concept Maps

- A method of organizing information
- Code blue concept map found on Harper Hospital webpage: Click on Code Blue

Pharmacist's Guide to Code Blue Emergencies

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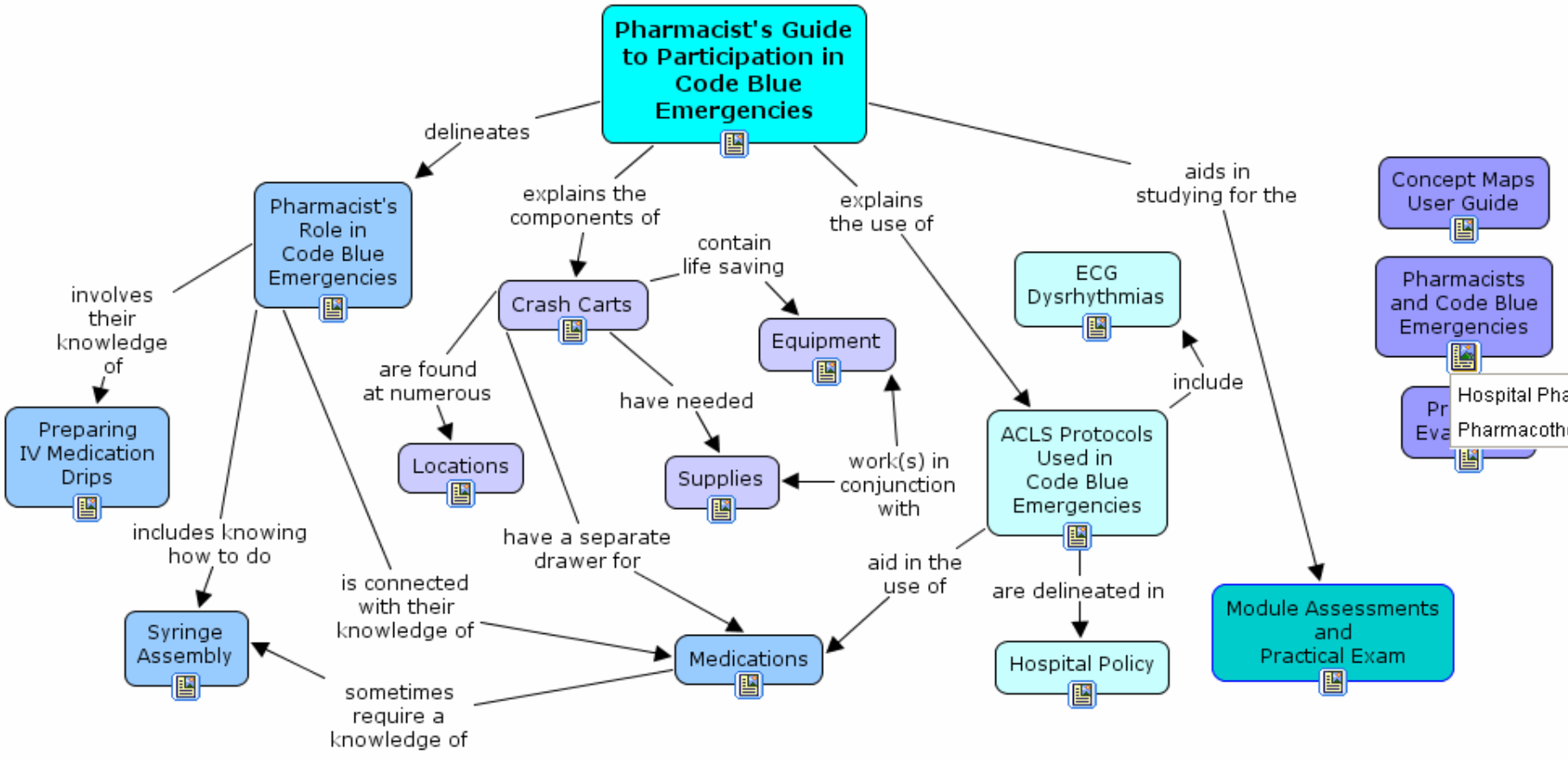
MULTIMEDIA STUDY GUIDE FOR PHARMACISTS



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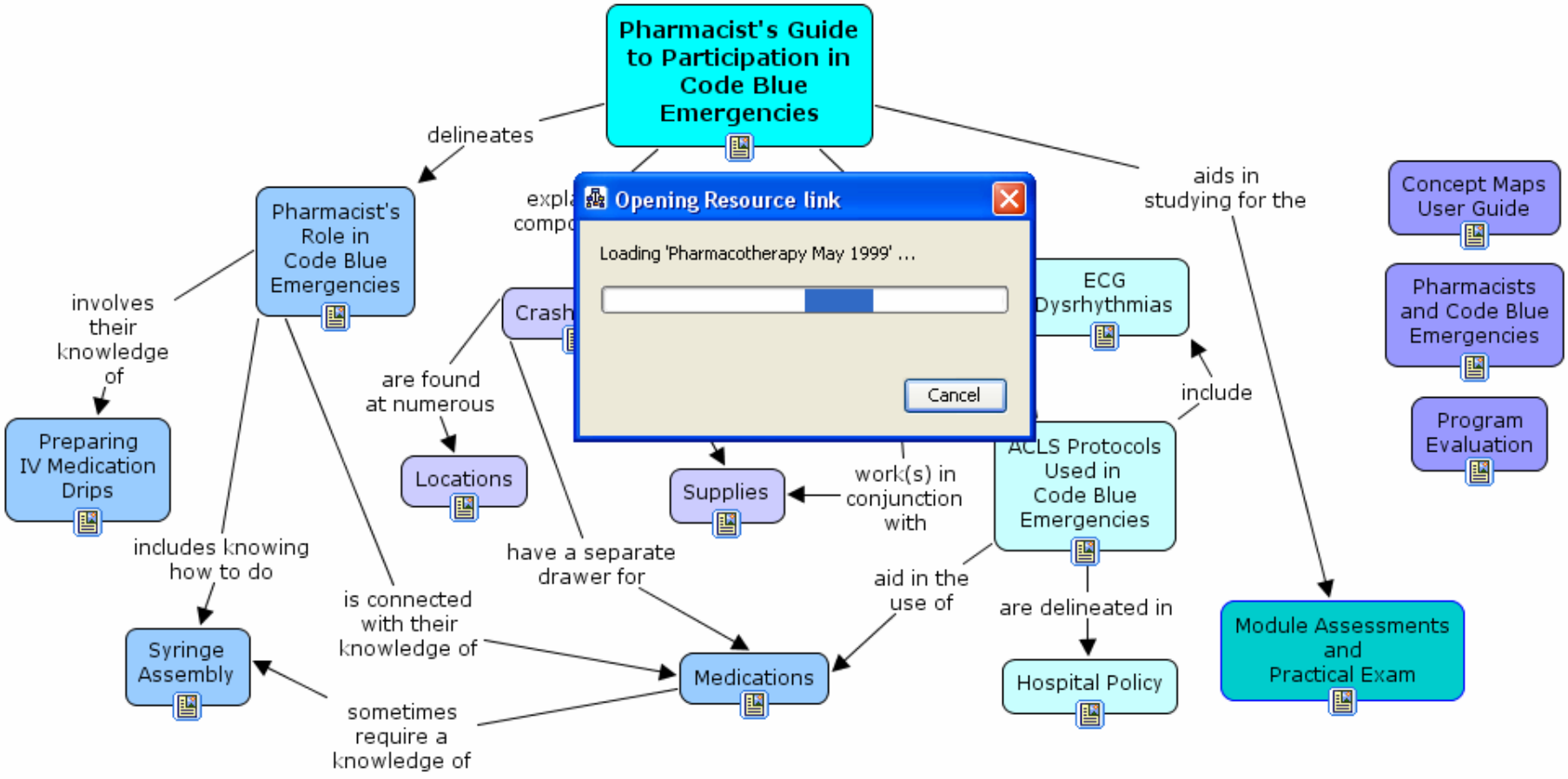

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SPECIAL ARTICLE

Clinical Pharmacy Services and Hospital Mortality Rates

C. A. Bond, Pharm.D., FASHP, FCCP, Cynthia L. Raehl, Pharm.D., FASHP, and Todd Franke, Ph.D.

We evaluated the associations between clinical pharmacy services and mortality rates in 1029 United States hospitals. A data base was constructed from Medicare mortality rates from the Health Care Financing Administration and the National Clinical Pharmacy Services data base. A multivariate regression analysis, controlling for severity of illness, was employed to determine the associations. Four clinical pharmacy services were associated with lower mortality rates: clinical research ($p<0.0001$), drug information ($p=0.043$), drug admission histories ($p=0.005$), and participation on a cardiopulmonary resuscitation (CPR) team ($p=0.039$). The actual number of deaths (lower) associated with the presence of these four services were clinical research 21,125 deaths in 108 hospitals, drug information 10,463 deaths in 237 hospitals, drug admission histories 3843 deaths in 30 hospitals, and CPR

Summary

- Always remain calm and in control
- Note that each code you attend will be a different scenario; be alert and pay attention
- Remember that participation in code blue emergencies becomes more comfortable with each time you do it

Supplemental Reading

- Evaluating a training program for pharmacist code blue response. *Hospital Pharmacy* 2005; 40(1): 49-53, 60
- Rapid sequence intubation in the emergency department. *J Emerg Med* 1995; 13: 705–10