MEDICAL EMERGENCIES
IN THE DENTAL OFFICE
“Dentistry’s Perfect Storm”

- In a “Viewpoint” article by Dr. L. Sangrik in Dentistry Today (Sept. 2010), “4 factors are converging that, if left unaddressed, have the potential for disaster”
  1. Dental patients are becoming increasingly ill
  2. Baby-boomers are getting older
  3. Obesity is epidemic
  4. Seriously ill patients are increasingly able to enjoy a good quality of life (includes receiving dental care)
“Dentistry’s Perfect Storm”

“Six Links of Survival” are suggested for medical emergency preparedness

1. Dentist training
2. Staff/team training
3. Routine practice drills
4. A written protocol
5. Proper medications
6. Proper equipment
Medical Emergencies

- Of greatest concern to us are the cardiovascular and respiratory systems
- Be prepared for a worst-case scenario
- What is your responsibility?
Ready?
Scenario K

- A 53-year-old woman presents for a hygiene appointment
- She is a long-standing patient of the office and, while somewhat overweight, has a non-contributory medical history
Scenario K

- Approximately 20 minutes into the appointment, she begins to cough and excuses herself to the bathroom
- After 5 minutes, you search for the patient and find her slumped on the floor
- What do you do?
Risky business?

- How healthy are your patients?
- How do you know?
- What are you watching for?
30,608 Emergencies

- Syncope: 15,407
- Mild Allergy: 2,583
- Angina: 2,552
- Postural Hypotension: 2,475
- Seizure: 1,595
- Brochospasm (asthma): 1,392

The Big 12

- Syncope
- Angina
- Myocardial infarction
- Hypertension
- Hypotension
- Asthma
- COPD
- Hyperventilation
- Allergies
- Diabetic imbalances
- Epilepsy/seizure disorders
- Bleeding problems

Ref.: Sangrik, *Dentistry Today*, Sept. 2010
Who Is At Risk?

- Everyone, but not equally
- 90% of office emergencies are predictable in some way
Who Is At Risk?

- Patient risk factors
  - Medical history
    - Age
    - Existing disease(s)
    - Medications
    - Allergies
  - Psychological
    - Especially fear & anxiety
Who Is At Risk?

- **Medications:**
  - Anti-anginals
  - Anti-hypertensives
  - Diabetic medications
  - Corticosteroids
  - Coumadin
  - Oxygen
Who Is At Risk?

- Psychological Factors
  - Ask the patient
  - Ask the rest of the team
  - Acknowledge and treat dental anxiety
### Time of Emergency (%)

<table>
<thead>
<tr>
<th>Time State</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately before treatment</td>
<td>1.5</td>
</tr>
<tr>
<td>During or after LA administration</td>
<td>54.9</td>
</tr>
<tr>
<td>During treatment</td>
<td>22.0</td>
</tr>
<tr>
<td>After treatment</td>
<td>15.2</td>
</tr>
<tr>
<td>After going home</td>
<td>5.5</td>
</tr>
</tbody>
</table>

## Treatment During Emergency (%)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction</td>
<td>38.9</td>
</tr>
<tr>
<td>Pulp extirpation</td>
<td>26.9</td>
</tr>
<tr>
<td>Tooth preparation</td>
<td>7.3</td>
</tr>
<tr>
<td>Filling</td>
<td>2.3</td>
</tr>
<tr>
<td>Incision</td>
<td>1.7</td>
</tr>
<tr>
<td>Apicoectomy</td>
<td>0.7</td>
</tr>
<tr>
<td>Removal of fillings</td>
<td>0.7</td>
</tr>
<tr>
<td>Other tx &amp; unknown</td>
<td>21.3</td>
</tr>
</tbody>
</table>

Medical history

- With a thorough medical history and examination, you can decide how to safely proceed with treatment.
- A good history will also prepare you for any foreseeable emergency.
  - “An ounce of prevention…”
Obstructive Sleep Apnea

- This is a relative contraindication to outpatient sedation/anaesthesia

- OSA presents dangers peri- and postoperatively

- Prevalence is 9% in women and 24% in men
  - Of those diagnosed, only 10-20% are optimized
  - Polysomnography is the diagnostic gold standard
Obstructive Sleep Apnea

- Associated with cardiovascular disease and increased cardiovascular risk
  - Affects 50% of people with cardiovascular disease

- Perioperative care depends on good assessment and use of short-acting agents where possible

- Postoperative complications include apnea, bradypnea and desaturation
  - Hospital recommendation is to monitor for >60 min
Obstructive Sleep Apnea

- Assessment tools:
  - ASA checklist
  - STOP questionnaire
  - STOP-Bang questionnaire
STOP-Bang Questionnaire

- Snore
- Tiredness during the day
- Observed apnea
- Blood pressure
- BMI
- Age
- Neck circumference
- Gender

High risk if 3 or more "yes" answers are given
Medical History

- Vital Signs
  - Blood pressure
  - Heart rate
  - Respiratory rate
- Establish a baseline…in your office
Sphygmomanometers

- **Mercury manometer**
  - most accurate

- **Aneroid manometer**
  - less accurate
  - prone to decalibration

- **Automatic System**
  - accurate but different
Precautions for Accuracy

- Arms may differ 5-10 mmHg (left higher)
- Tight sleeve forming tourniquet
- Rest before measurement
- Cuff too small = elevated readings
- Cuff too big = decreased readings
Asthma Algorithm

Asthma attack!

Position patient comfortably

ABCs

Attack resolves

May finish appt.

Attack continues

Salbutamol puffs
2x100 mcg q 3 min.

Oxygen

Epinephrine injection
0.3-0.5 mg IM, IL or IV

Call 9-1-1

 +/- antihistamines & corticosteroids
Treating the Asthmatic Patient

1.

2.

3.

4.

5.
Emergency Drugs & Equipment
Emergency Drugs

- The RCDSO (the dental licensing board in Ontario) mandates the following drugs for medical emergency kits:
  - Oxygen
  - Epinephrine
  - Nitroglycerin
  - Diphenhydramine
  - Salbutamol
  - ASA
Oxygen

- Indicated for all medical emergencies
- Mechanism of action: C’mon!
- Dose: Some is good, lots is better!
  - Guideline for supplementation: 1 L of $O_2 = +4\%$ of $[O_2]$
Oxygen

- E cylinder
  - 660 L - good portable $\text{O}_2$ size
  - Provides $>30$ minutes* of supplemental $\text{O}_2$
    - Can estimate remaining time using the following equation:

\[
\text{Time remaining} = \frac{\text{Remaining pressure (psi)}}{200 \times \text{flow rate (L/min)}}
\]
Epinephrine

- Indicated in SCA, asthma and allergy/anaphylaxis
- Can be administered IL/IM/IV
Epinephrine

- Mechanism of action: $\alpha_1$ agonist (peripheral vasoconstriction), $\beta_1$ agonist (heart) and $\beta_2$ agonist (bronchodilation, vasodilation)
- Adult dose: 0.3-1.0 mg IM/IL/IV
  - Children’s dose: 0.01 mg/kg IM/IV
- Duration: 5-10 minutes
Activation instructions are to "press hard and hold" instead of "swing and jab firmly" for enhanced accuracy in site selection and reduced patient apprehension.
Epinephrine = 9-1-1
Nitroglycerin

- Indicated in angina and MI
- **Mechanism of action**: relaxes vascular smooth muscle in arteries and veins
  - ↓ venous return to the heart (↓ preload)
  - ↓ myocardial O₂ demand
  - ↓ BP
- **Dose**: 0.3-0.4 mg sublingual
Nitroglycerin

- Light- and oxygen-sensitive
- Store tablets in the dark, at room temp, tightly closed
  - Opened bottle has shelf life of 3 months
- Do not use if systolic < 90 mmHg or...
Sublingual Spray

- Nitrolingual® pumpspray
  - 1-2 metered-doses (0.4 mg)
  - Given q 3-5 min (x 3)
  - Sprayed onto or under the tongue
  - 200 metered doses/bottle
  - Shelf life of 2-3 years
Diphenhydramine HCl

- Indicated to block histamine-mediated reactions (e.g. allergy, asthma)
- Available in many formulations
  - Injectable form: 1 ml vial with 50 mg (25 mg for kids)
  - Capsules are 25 or 50 mg
- Sedative and antiemetic actions are secondary
Diphenhydramine HCl

- **Mechanism:** H1-receptor site competition
- **Dose:** 50 mg po/IM/IV
  - Children’s dose = 1 mg/kg
- **Duration:** 4-6 hours
Salbutamol (Albuterol)

- Indicated in acute asthma attacks
- An inhaled bronchodilator
  - Addresses 1 key element of asthma attacks
- Trade name = Ventolin®
Salbutamol (Albuterol)

- **Mechanism:** Direct action to relax bronchial smooth muscle ($\beta$-2 agonist)
- **Dose:** 200 $\mu$g (2 puffs) q 3-5 min prn
  - **Children’s dose:** 100 $\mu$g q 3-5 min
  - **Puffer:** metered dose inhaler (MDI)
- **Duration:** 3-6 hours
Novo-Salmol®
Salbutamol Pressurized Inhalation BP

100 mcg
100 mcg/actuation

Bronchodilator

CAUTION

Contents under pressure. Do not place in hot water or near radiators, stoves or other sources of heat. Do not puncture or incinerate container or store at temperatures over 30 °C. Store at room temperature (15° - 30°C).

200 metered actuations, each containing 100 mcg Salbutamol BP per actuation.

novopharm®
AeroChamber
AeroChamber Max (for age < 3 years)
AS

- Indicated in cases of suspected myocardial infarction
  - Contraindicated in stroke
ASA

- Mechanism of action: inhibits platelet aggregation (clot formation)
  - Prevents ischemia → injury → infarction
  - Decreases overall mortality from acute MI
- Dose: 160-320 mg po*
  - CHEW, SWISH & SWALLOW
- Duration: ~3 days
ASA

- Can be given up to 24 hrs after MI onset

- Contraindications:
  - Allergy
  - History of significant gastric bleed
  - Asthma
Other Emergency Equipment

- Pen and paper
- Glucometer
Approaching Emergencies
Basic Principles

- Don’t hesitate to seek help
- KISS
- Once you are prepared for emergencies, there’s no reason to panic (not that we need a reason)
Overview

$P - A - B - C - D^4$
Change “A-B-C” to “C-A-B”
Chest compressions and early defibrillation.
Simplified Adult BLS

1. Unresponsive
   No breathing or no normal breathing (only gasping)

2. Activate emergency response

3. Get defibrillator

4. Start CPR

5. Check rhythm/shock if indicated
   Repeat every 2 minutes

Push Hard • Push Fast

© 2010 American Heart Association
Adult Cardiac Arrest

1. Shout for Help/Activate Emergency Response

2. Start CPR
   - Give Oxygen
   - Attach Defibrillator

3. Check Rhythm

4. If VF/VT Shock

5. Return of Spontaneous Circulation (ROSC)

6. Post-Cardiac Arrest Care

Additional Steps:
- Drug Therapy: IV/IO access, Epinephrine every 3-5 minutes, Amiodarone for refractory VF/VT
- Consider Advanced Airway: Quantitative waveform capnography
- Treat Reversible Causes

Monitor CPR Quality

Continuous CPR
CHECK:
Shake and Shout (check responsiveness)
Check for a pulse & for breathing

THEN DO:
If no pulse, start CPR and prepare AED
(Push hard, push fast)

CPR → cerebral and coronary perfusion
(provides 25% of cardiac output)
Airway & Breathing

CHECK:
Look, Listen & Feel

THEN DO:
If no response, head tilt & chin lift
If not breathing, give 2 breaths
Four D’s

CHECK:
Differential Diagnosis

THEN DO:
Drugs or Defibrillation
Disposition
Differential Diagnosis

- How did we get here? Where is here?
- Assess the patient
  - How sick are they?
  - How sick were they?
- What is the medical history?
  - Baseline vital signs?
Defibrillation

- Surviving SCA outside hospital <8% (with CPR)
- Survival ↓ 10% every minute defibrillation is delayed
- Immediate shock: survival 49-85% with biphasic defibrillators
Drugs

- Choice is based on the situation
- Know the 6 RCDSO-mandated drugs well
  - Know others as they pertain to your practice
Disposition

- “When in doubt, ship them out!”
  - Activate EMS if you are unsure or if symptoms persist
- If the symptoms resolve and you’re unsure of what to do
  - Family MD?
  - Neighbouring MD’s near your office?
- If discharging to home, make sure they can get there
As soon as possible after an emergency, meet with your team to:

- Debrief and review
- Gather suggestions to better the team’s response for the next time
Simplified ACLS Algorithm

Adult Cardiac Arrest

Shout for Help/Activate Emergency Response

Start CPR
- Give Oxygen
- Attach Defibrillator

2 minutes

Check Rhythm

If VF/VT
- Shock

Drug Therapy
- IV/IO access
- Epinephrine every 3-5 minutes
- Amiodarone for refractory VF/VT

Consider Advanced Airway
- Quantitative waveform capnography

Treat Reversible Causes

Monitor CPR Quality

Return of Spontaneous Circulation (ROSC)

Post-Cardiac Arrest Care
3 categories for chest pain:

1. Known angina, typical presentation
2. Known angina, more pronounced presentation
3. No previous angina (unstable)
Cardiac Pain

Presentation

- Typically atypical
- “Chest pain” with MI
  - Pressure = 50%
  - Burning = 25%
  - SOB = 10%
  - Epigastric = 10%
“MONA greets all chest pain”
Initial Management

- PABC
- Monitor, $O_2^*$, vital signs, ECG (12- or 15-lead), IV*
- Brief history of incident
  - Patient signs and symptoms
- D
- MONA or POACH?
Chest Pain
Diagnosis

- Acute Coronary Syndrome/angina/MI
- Aortic Dissection
- Pulmonary Embolism
- Acute Pericarditis +/- tamponade
- Pneumothorax
- Esophageal Rupture
Chest Pain

Diagnosis

- 2-4% of AMI missed in the hospital
  - Common source of lawsuits vs. emergency departments and MD’s
- Have a low threshold to seeking help
Acute Coronary Syndromes
Chest Pain

Risk Factors

- History of HTN, angina, MI, stroke, diabetes, high cholesterol
- Age
- Sex
- Race
- Family history*
- Smoking
Myocardial Infarction

- Deficient coronary blood to heart → tissue necrosis
- 90% of MIs are due to CAD
- Little or no relief from nitroglycerin
- \( \frac{1}{3} \) die before reaching hospital
- Know the risk factors
The Impact of Cardiovascular Disease

- The Heart and Stroke Foundation of Ontario estimates 45,000 cardiac arrests in Canada each year.
  - The overall survival rate for out-of-hospital cardiac arrest is ~5%.
“MONA greets all chest pain”
<table>
<thead>
<tr>
<th>Commafortable position</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC’s</td>
</tr>
<tr>
<td>D (monitor)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxygen + NTG + Morphine (analgesic) + ASA</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-6 L/min</td>
</tr>
<tr>
<td>0.3-0.4 mg q 3 min</td>
</tr>
<tr>
<td>2-5 mg IM</td>
</tr>
<tr>
<td>325 mg</td>
</tr>
</tbody>
</table>
Initial Treatment

- Morphine
  - Used if pain persists despite NTG
  - Contraindications:
    - Hypotension
    - RV dysfunction
  - Not life-saving (symptom relief)
Initial Treatment

- Oxygen
  - Target $\text{SpO}_2 > 94\%$
  - *Not life-saving (symptom relief)*
Initial Treatment

- Nitroglycerin
  - 0.4 mg SL q 5 min x 3 doses
  - Contraindications:
    - Hypotension
    - Inferior MI with RV dysfunction
    - Viagra/Adcirca or Levitra = 24 h
    - Cialis = 72 h
  - Not life-saving (symptom relief)
Initial Treatment

- **asa (Aspirin)**
  - 160 mg* chew-swish-swallow
  - 23% mortality reduction in AMI!
  - Contraindicated if allergy or active GI bleed
“MONA” can be a bad girl
“POACH”

- MONA is sometimes bad
  - In right-sided MI, anything that lowers BP is harmful
    - Morphine and NTG?
    - Oxygen may not be necessary
  - Need a 12- or 15-lead ECG to determine the location of the MI
- MONA is out, POACH(?) is in
“POACH”

- P = phone hospital/cardiology
- O = oxygen
- A = asa
- C = clopidogrel (Plavix)
- H = heparin
Assess ECG Findings

Classify patients with ACS within 10 minutes of arrival

- **ST elevation or new or presumably new LBBB:** strongly suspicious for injury
  - **ST-elevation AMI**

- **ST depression or dynamic T-wave inversion:** strongly suspicious for ischemia
  - **High-risk unstable angina/non-ST-elevation AMI**

- **Nondiagnostic ECG:** absence of changes in ST segment or T waves
  - **Intermediate/low-risk unstable angina**

**REPERFUSION**
ECG findings for infarction and ischemia

ST-elevation

ST-depression
Recognition of STEMI

- ST elevation > 1 mm
- 2 contiguous leads
**ST-Elevation MI (STEMI)**

- Most important from ACLS perspective
- Indicates complete occlusion of coronary artery

**Goals:**

1. Early **reperfusion** to restore blood flow
   - Time = myocardium
2. Monitor for and treat arrhythmias
Reperfusion: PCI

- "Plumber"
- Angioplasty + stenting
- Time goal = 90 mins

Disadvantages:
- Requires cath lab
- Operator-dependent
Pathophysiology of ACS

Early plaque formation

Significant plaque formation

Plaque rupture/thrombus

Unstable angina/non-Q-wave infarction

Q-wave infarction

Resolution/stable angina
Automated External Defibrillators

- Early defibrillation is one of the keys to surviving cardiac arrest in adults
  - Published survival rates of up to 85%
- The common early dysrhythmia in adult SCA is ventricular fibrillation
  - Lethal but treatable
How AEDs Work

- A computerized defibrillator that can:
  - Recognize ventricular fibrillation
    - “Matches” pre-programmed criteria for a shockable rhythm
  - Advise the user whether the rhythm should be shocked
AEDs and the Law

- The Good Samaritan Act (2001)
  - For health care professionals as defined by the *Regulated Health Professions Act, 1991*
  - Protection from liability after the performance of CPR or other first aid “unless...the damages were caused by the gross negligence...”
  - Applies if you are outside of a hospital (or healthcare facility) and your actions are voluntary
AEDs and the Law

- The Chase McEachern Act (2007)
  - The user and the owner of the defibrillator has protection from civil liability (damages) if the actions are in good faith and without reckless endangerment
  - The AED must be kept in good working order
  - Covers CPR also
  - Does not apply in healthcare facilities (like our offices)
Anaphylaxis

- Almost always occurs within minutes
  - “Faster is worser”
- 96% of fatalities within 1 hour
- May occur or recur (5%) in 1-72 hours
- Involves CV and/or respiratory system
  - Definition applies to multi-organ involvement and cardiovascular compromise
## Progression of Anaphylaxis

<table>
<thead>
<tr>
<th>Skin (itching, rash, flushing)</th>
<th>Eyes, nose, GI tract (exocrine glands, cramps)</th>
<th>Respiratory system (bronchospasm)</th>
<th>Cardiovascular system (CV collapse, cardiac arrest)</th>
</tr>
</thead>
</table>

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↓

↓
Allergy

- Patient with allergy histories are more likely to have allergic response to dental drugs
- Penicillin allergy is most common medication allergy
  - Approx. 1 in 10,000 doses
Histamine-release treatments

Itching
Hives
Rash

⇒ Benadryl

Bronchospasm
Vasodilation

⇒ Epinephrine
Anaphylaxis Algorithm

ABC’s

D

Supine if unconscious

O₂

Epinephrine

0.5 mg IL or IM
0.3 mg IV
0.01 mg/kg children

9-1-1

Antihistamine & Corticosteroid

May need to administer epinephrine earlier
Stroke

- A sudden loss of brain function
  - Caused by interruption of blood flow to the brain (ischemic) or the rupture of blood vessels in the brain (hemorrhagic)
  - 80-85% of strokes are ischemic
  - Overall 15% die, 10% recover completely
- Cerebrovascular accidents are the 3rd leading cause of death in North America
Stroke

- Warning signs:
  - Weakness
  - Trouble speaking
  - Vision problems
  - Headache
  - Dizziness
Stroke

- Treatment in dental offices is palliative
  - Assess, activate EMS and support the victim
- Fibrinolytic therapy is done in-hospital
  - tPA is used within 3 hours of symptoms
- 15% of stroke victims die, 10% recover completely
Diabetes Mellitus

- Hypo- and hyperglycaemia each present very real and very different dangers
  - Hypoglycemia is fast-onset and fairly easy to treat
  - Hyperglycaemia is slow-onset and dangerous when symptomatic
Diabetes Mellitus

Definition

- A disease caused by insulin deficiency
  - Affects 2-5% of the population
- Characterized by hyperglycemia, polyphagia, polyuria, and polydipsia
- There is an overall excess of glucose extracellularly, and a glucose deficiency intracellularly
Blood Sugar Algorithm

Patient distress

ABC's & oxygen

Glucometer present
- Take BS and treat appropriately

No glucometer
- Conscious
  - Get best possible history
  - Give glucose

- Unconscious
  - Give glucose*
  - and call 911
Benzodiazepine Rescue
Triazolam Titration

- There are some groups who believe that oral sedatives can be safely titrated to give moderate conscious sedation
  - \( t_{\text{\(1/2\)elim}} = 2.5 \text{ hours} \)
- The most recognizable group is DOCS Education
  - Founded by Drs. M. Silverman and A. Feck in 1999 in Seattle
  - Claim to have instructed 17,000 dentists and served 2,000,000 patients
Concerns:

- Underestimating the potency of the suggested route of administration
- Maximum dose = 2 mg
  - Maximum dose allowed in Ontario = 0.5 mg
- Very lengthy appointments are encouraged
- Abuse of the dosing protocols
Triazolam Sedation

- A study by Jackson et al. examined the pharmacokinetics and sedative effects of incremental sublingual dosing
  - Gave 0.25 mg of triazolam sublingually
  - Additional 0.5 mg 60 minutes later
  - Additional 0.25 mg 90 minutes after the initial dose
  - Sedation, vital signs and blood levels were measured every 30 minutes

Jackson’s findings included:

- Increasing blood levels throughout measuring period
  - No maximum was found
- Increasing sedation scores throughout
  - No maximum was found
If you don’t have an IV, the following routes of administration have been suggested:

- Intramuscular
- Submucosal/Sublingual/Intralingual
- Intranasal
Other suggested BZD reversal agents:
- Gatorade
- Yogourt
- Caffeine
The Office Plan
The Office Plan

- All office staff should be current in BLS training
- A written, reviewed and practiced emergency protocol should be in place
  - Reviews should include specific individual responsibilities in a worst-case scenario
- Who does what?
Emergency Baggies plus $O_2$

- Allergy/Anaphylaxis
- Asthma
- Chest Pain/MI
- Hypo/Hyperglycemia
Emergency Baggies
Allergy/Anaphylaxis

- **Antihistamine**
  - Chlorpheniramine 10 mg
  - Diphenhydramine 50 mg
    - Children = 1 mg/kg

- **Corticosteroid**
  - Hydrocortisone IV 100 mg (x1)

- **Epinephrine**
  - 1:1000 ampoule & syringe or Epi-Pen 0.3-0.5 mg (x2)
    - Children = 0.01 mg/kg
Emergency Baggies

Asthma

- Salbutamol (x1)
  - plus AeroChamber
    - Children = 1 puff

- Epinephrine
  - 1:1000 ampoule & syringe or Epi-Pen 0.3-0.5 mg (x2)

- Antihistamine
  - Diphenhydramine 50 mg (x2)
Emergency Baggies
Chest Pain/MI

- Nitroglycerin spray (x1)
- ASA 160-325 mg
  - Children’s tablets = 80 mg
- Demerol 25-50 mg IM/IV
Emergency Baggies
Hypo/Hyperglycemia

- Glucometer
- Icing sugar and/or juice box
- Glucagon 1 mg IM
## Emergency Drug Kit

<table>
<thead>
<tr>
<th>DRUG</th>
<th>USE</th>
<th>ADULT DOSE</th>
<th>CHILD DOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>Most emergencies</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>Anaphylaxis, Asthma, Cardiac Arrest</td>
<td>0.5 mg im, 0.5 mg im, 1 mg iv</td>
<td>0.01mg/kg</td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td>Angina, MI</td>
<td>0.3-0.6mg tablet, 0.4 mg spray</td>
<td>N/A</td>
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## Emergency Drug Kit

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<tbody>
<tr>
<td><strong>Salbutamol</strong></td>
<td>Asthma</td>
<td>2 puffs 100μg/puff</td>
<td>1 puff</td>
</tr>
<tr>
<td><strong>Diphenhydramine</strong></td>
<td>Allergic reaction</td>
<td>50 mg iv/im</td>
<td>1 mg/kg</td>
</tr>
<tr>
<td><strong>Chlorpheniramine</strong></td>
<td></td>
<td>10 mg iv/im</td>
<td></td>
</tr>
<tr>
<td><strong>ASA</strong></td>
<td>MI thrombolytic</td>
<td>160-325 mg</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## Other Kit Considerations

<table>
<thead>
<tr>
<th>DRUG</th>
<th>USE</th>
<th>ADULT DOSE</th>
<th>CHILD DOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>MI Analgesia</td>
<td>2-5mg im/iv q 5-15 min</td>
<td>N/A</td>
</tr>
<tr>
<td>Glucose</td>
<td>Hypoglycemia</td>
<td>Orange juice Soda Icing sugar</td>
<td>Orange juice Soda Icing sugar</td>
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<tr>
<td>Diazepam</td>
<td>Status epilepticus</td>
<td>5mg iv q 5 min 5mg im q min</td>
<td>0.3 mg/kg iv ?</td>
</tr>
<tr>
<td>Midazolam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>Cost</td>
<td>Shelf Life</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
<td>------------</td>
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</tr>
<tr>
<td>Epi ampoule</td>
<td>$4.29</td>
<td>1 year</td>
<td></td>
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<td>Epi-Pen®</td>
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<tr>
<td>Nitrostat® tabs</td>
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<td>6 mos.*</td>
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<td>Nitrolingual® spray</td>
<td>$24/200 dose bottle</td>
<td>2 years</td>
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<tr>
<td>Benadryl® vial</td>
<td>$5.62/vial</td>
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<td>Ventolin® inhaler</td>
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<td>1 year</td>
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<tr>
<td>ASA</td>
<td>$3.99/24 tablets</td>
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THINKING, FAST AND SLOW
DANIEL KAHNEMAN

Outliers
MALCOLM GLADWELL

THE CHECKLIST MANIFESTO
ATUL GAWANDE
The books, *Crisis Management in Anesthesia* (David Gaba et al.), *Outliers* (Malcolm Gladwell), *Thinking Fast and Slow* (Daniel Kahneman), and *The Checklist Manifesto* (Atul Gawande) all offer good advice/insight for emergency situations:

- Prevention is best
- Algorithms work
- Preparation is key
- Very few disasters are because of a single factor
That's all Folks!