



## CHECKLIST Emergency Medical Kits

This document contains two Emergency Medical Kits (“EMK”) checklists:

- Checklist #1 applies to all registrants;
- Checklist #2 applies to registrants who hold certification in *Prescriptive Authority*.
- Attached to this document as Schedule “A” is the pharmacology of required medications.

The purpose of EMKs is to enable registrants to respond to a range of emergency medical conditions which may occur in the office. The College of Naturopathic Physicians of British Columbia recommends that all registrants maintain an EMK within their clinic.

\*Reminder: All registrants who hold certifications are required to maintain current qualifications in ACLS or NCLS; all other registrants are required to maintain current qualifications in CPR

<b>Basic and Advanced EMKs</b>
All contents of EMK should be:
- Organized (kept in date order)
- Available for immediate use
- Regularly checked to ensure not expired

<b>Basic EMK</b>	<b>Checklist #1</b>
- For <u>all</u> clinics and places of practice	
- Aspirin (heart attack/stroke)	
- Diphenhydramine for oral administration, both as tablets and syrup (non-prescription, e.g. Benadryl)	
- Epi-Pen (no prescription required)	
- Glucose tablets, or equivalent (50% Dextrose/other hypoglycemic remedies, e.g. juice)	
- Glucometer	
- Oxygen, any grade, with attachments for inhalation via mask or cannula	
- Smelling salts	
- Surgical gloves	
<b>Advanced EMK</b>	<b>Checklist #2</b>
- Additional requirements for registrants certified in <i>Prescriptive Authority</i>	
- Epinephrine and its salts for injection (1:1,000); syringes for administration	
- Diphenhydramine for injection (either as an Epi-Pen or epinephrine ampoules)	
- Nitroglycerin (immediate release sublingual tablets or sprays)	
- Salbutamol (metered dose inhaler)	
<b>Other *not required*</b>	
- AED / Defibrillator	



## Schedule A

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### Autonomic Nervous System

- 2 Divisions
  - o Sympathetic
  - o Parasympathetic
- ANS + endocrine system controls the internal environment
  - o Adjust internal organ function to the changing needs of the organism
  - o Neural control permits quick adaptation
  - o Endocrine system provides for long-term regulation of functional states
  - o Operates largely beyond voluntary control
  - o Functions autonomously
  - o Central components: hypothalamus, brain stem & spinal cord
- Sympathetic Division:
  - o Purpose:
    - Perceive external states
    - Target appropriate body movement.
      - E.g. the means by which the body achieves the state of maximal work capacity required for flight or fight situations.
  - o Vigorous skeletal muscle activity
  - o Adequate supply of oxygen, nutrients and blood flow to skeletal muscles
  - o Cardiac rate and contractility enhanced
  - o Narrowing of splanchnic blood vessels diverts blood flow to skeletal muscles
  - o Propulsions of intestinal contents is slowed: peristalsis diminishes and sphincter tone increases: digestion is dispensable & counterproductive to escape
  - o Bronchi are dilated: increase tidal volume & alveolar O<sub>2</sub> uptake
  - o Sweat gland activity increased

## Diphenhydramine e.g. 'Benadryl®' (Pharmacology)

- Pharmacology:
  - o Type 1 antihistamine (H1)
  - o Direct binding to histamine receptors via competitive inhibition
- Availability:
  - o Tablets: 25mg, 50 mg
  - o Oral syrup: 6.25 mg/5mL
  - o Chewable tablets: 12.5 mg
  - o Parenteral: 50 mg/mL
  - o Cream 2% w/w
- Dosing: Maximum 4 doses/day
  - o Oral    adult:                    25 to 50 mg q6 to 8hr
  - child (6 to 12):       6.25 to 12.5 (5 to 10mL)
  - infant (2 to 5):       6.25 (5mL)
  - pediatric (<2):       3.125mg (2.5mL)
  - o IM:     0.5-1ml q6 to 8hr
- Precautions:
  - o CNS depressant: avoid other depressants, like alcohol or sedatives
  - o Atropine like effect: use caution in asthma, increased intraocular pressure, hyperthyroidism, cardiovascular disease or hypertension
- Side Effects:
  - o Drowsiness
  - o Dizziness
  - o Dry mouth
  - o Nausea
  - o Nervousness
- Warnings:
  - o Narrow angle glaucoma
  - o Stenosing peptic ulcer
  - o Pyloroduodenal obstruction
  - o Symptomatic prostatic hypertrophy
  - o Bladder neck obstruction
  - o Topical: do not use on chicken pox, measles, or extensive areas of skin
  - o Infants and children:
    - Over dosage may cause hallucinations, convulsions and death
    - May produce sedation or excitation

## Epinephrine e.g. 'Adrenalin®' (Pharmacology)

- Pharmacology
  - o Secreted at the second neuron of the sympathetic NS
  - o This neuron branches out and each branch makes contact with several cells
- Effects of Sympathetic Stimulation
  - o CNS - increase drive, increase alertness
  - o Eyes - pupil dilation
  - o Saliva - little, viscous

- Bronchi – dilation
- Heart - increase rate, increase force, increase BP
- Skin – perspiration
- Fat Tissue - lipolysis, fatty acid liberation
- Liver - glycogenolysis, glucose release
- GI Tract -decrease peristalsis, increase sphincter tone, decrease blood flow
- Bladder - increase sphincter tone, decrease detrusor muscle
- Skeletal Muscle - increase blood flow, increase glycogenolysis
- Adrenoreceptor Subtypes (4)
  - Alpha1, Alpha2, Beta1, Beta2
    - Agonists mimic the effect of naturally occurring catecholamines
    - Different adrenoreceptors are distributed according to region and tissue
    - Norepinephrine acts at alpha & beta receptors
    - *'Most potent alpha receptor activator'*
- Uses:
  - Respiratory distress from bronchospasm
  - Anaphylaxis or severe allergic reaction (angioedema, urticaria)
  - Prolong the action of infiltration anesthetics
  - Cardiac effect may be useful in restoring normal cardiac rhythm esp. ventricular fibrillation or pulseless ventricular tachycardia 7
- Availability:
  - 'Epi Pen' 2mL of 1:1000 solution, delivers 0.3mg per injection
  - 'Epi Pen JR' 2mL of 1:2000 solution, delivers 0.15mg per injection
  - Parenteral solution: 1:1000 (1mg/mL) in isotonic saline 1m; ampoules or 30mL multi-dose vials
  - Topical solution: 1:1000, 30mL
- Dosing:
  - IM or sc: 0.2 to 2mL of 1:1000 solution (sc is preferred; avoid buttock)
  - Cardiac arrest: slow IV (0.5-1mg diluted to 10mL in 0.9% NaCl given q10min) alternating with electroshock (with CPR)
  - Pediatric bronchial asthma: 0.01mL/kg (max 0.5mL) q4hr prn
- Side Effects:
  - Transient and minor at therapeutic dosages:
    - anxiety
    - headache
    - fear & palpitation
  - Repeated injections at the same site can cause tissue necrosis
- Contraindications:
  - Narrow angle glaucoma
  - With local anesthetic use in certain areas: toes, fingers (increased tissue sloughing)
  - Labour: may delay second stage
  - Cardiac dilatation
  - Coronary insufficiency

- Warnings:
  - o Degenerative heart disease
  - o Over-dosage or IV administration: sharp rise in BP may cause cerebrovascular hemorrhage
  - o Fatalities may result from pulmonary edema caused by the peripheral constriction & cardiac stimulation

[Rapidly acting vasodilators such as nitrates or alpha-blockers may counteract this]

- ➔ None of the above should deter the use of adrenaline for the treatment of serious allergic shock or other emergency situations

Precautions:

- o Protect from light exposure
- o Do not inject if solution appearance is changed:
  - Pink, darker than slightly yellow or precipitated
- o Readily destroyed by alkalis & oxidizing agents (O<sub>2</sub>, Cl, Br, I, permanganates, chromates, nitrites, salts of easily reducible metals such as iron)

### Histamine (Pharmacology)

- Pharmacology:
  - o 'Biogenic amine'
  - o Stored in basophils and tissue mast cells
  - o Role in inflammatory and allergic reactions
- Tissue effects:
  - o Bronchoconstriction
  - o Increased intestinal peristalsis
  - o Dilation & increased permeability of capillaries
  - o Gastric mucosa: (+) parietal cell acid secretion (H<sub>2</sub>)
  - o CNS: neuromodulator
- Most histamine antagonists also block other receptors
- H<sub>1</sub> histamine antagonists:
  - o Symptomatic relief of allergies (e.g. Benadryl)
  - o Antiemetic (e.g. Gravol)
  - o OTC sedative (e.g. Sominex, Nytol)

H<sub>1</sub> Antihistamine Side Effects (1<sup>st</sup> Generation):

- Sedation
- Impaired muscle coordination
- Anticholinergics effects:
  - o Dry mouth
  - o Constipation
  - o Urinary retention
- 2<sup>nd</sup> generation agents are generally void of these side effects but are considered optimal for stat use during anaphylaxis

## Nitroglycerin (Pharmacology)

- Pharmacology:
  - Ester of nitric acid & polyvalent alcohol (glyceryl trinitrate)
  - Organic nitrates are pro-drugs
  - Denitration liberates nitric oxide (endothelium derived relaxing factor)
  - Relaxes vascular beds, venous > arterial
  - Therapeutic hemodynamic consequences:
    - Decrease preload (venous return, ventricular volume)
    - Decrease afterload (arterial)
    - Decrease cardiac work
    - Increase O<sub>2</sub> balance
    - Prevents spasm of larger coronary arteries
- Availability:
  - Sublingual tablets: 0.3, 0.6 mg
  - Sprays: 0.4mg per spray
  - Transdermal patch: 0.2, 0.3, 0.4, 0.6, 0.8 mg
  - ISDN: 10mg, 30mg
  - ISMN: 60 mg
- Dosing
  - 1 or 2 doses sublingually stat; if chest pain continues, repeat every 5 minutes to a maximum of 3 doses
  - If chest pain continues, go to the Emergency Room or call 911
  - Prophylaxis: 1 dose taken 5 to 10 minutes prior to strenuous activity
- Uses:
  - Acute symptomatic relief of angina pectoris
  - Continuous use causes loss of efficacy which can be avoided if a daily 'nitrate free' period is maintained (for patch use)
  - Efficacy is restored with a 12hr nitrate-free period
- Side Effects:
  - Headache from cerebral vessel dilatation
  - Excessive dosages:
    - Hypotension
    - Reflex tachycardia
    - Circulatory collapse
- Nitro-lingual pump spray
  - Hold upright. Do not shake
  - 'Prime' prior to first use (3 sprays)
  - 'Re-prime' if not used within 14 days (1 spray)
  - Angina attack: 1 or 2 sprays on or under the tongue. Do not inhale.
  - Dosage may be repeated at 5 or 10 minute intervals
- Nitrostat Tablets
  - Dissolve tablets sublingually or in buccal pouch
  - Repeat dose every 5 minutes (max 3 doses)
  - Repeated opening of container will diminish the efficacy of tablets
  - Discard cotton

- keep in original container, protected from light
  - Once opened, the bottle must be replaced after ~3-6 months (depends on manufacturer)
    - Stinging/tingling when tablet placed under the tongue does not indicate tablet potency
- Contraindication/Precautions:
  - Early MI: long-acting forms (causes XS hypotension)
  - Hypotension
  - Uncorrected hypovolemia (may precipitate shock)
  - Head trauma (increases intracranial pressure)
  - Keep away from heat
- Drug interactions:
  - Alcohol: additive hypotensive effect
  - Ergot alkaloids: negative effect
  - Heparin: heparin resistance. Monitor INR
  - Hypotensive agents
  - Salicylates: ASA > 500 mg may decrease Nitrate metabolism, increasing side effects
  - Sildenafil (Viagra®): concurrent use may cause severe hypotension, loss of consciousness, heart attack or death

### Oxygen (Pharmacology)

- Availability:
  - Medical O2: 99.9%
  - Technical: 95-98%
- Use: assist breathing to increase O2 saturation of hemoglobin
- High Flow (> 10L/min)
  - All short of breath patients
    - Hypoxia
    - Artificial respiration or CPR being performed
  - Unconscious/reduced consciousness (GCS<13)
  - Shock of all kinds
    - Hypovolemia
    - Anaphylactic
    - Septic
    - Neurogenic
- Low Flow
  - Emphysema (nasal cannula)
  - Try successive flow rates x 2 min each
  - Talk to the patient
  - 'What would you normally do?'
- Side Effects:
  - Drowsiness from excess flow rate
  - Flow rate 6L = ambient air
  - Flow rates <6L 'hypoxic'

- Contraindications:
  - o Hyperventilation
  - o Emphysema: CO<sub>2</sub> does NOT trigger next breath

### Salbutamol Metered Dose Inhaler (Pharmacology)

- Pharmacology:
  - o Beta2 sympathomimetic
    - Site of action: bronchial smooth muscle (dilatation)
    - Measurable decrease in airway resistance (onset) 5 to 15 minutes after inhalation
    - Maximum effect: 60 to 90 minutes
    - Duration of action: 3 to 6 hours
  - o Uses:
    - Intended for management of acute asthmatic attacks
    - Not intended for prophylaxis or long-term disease stabilization steroid (inhaled/oral) +/- mast cell stabilizer
    - Use > 3x/week indicates disease is not adequately controlled
  - o Availability: 100µg/puff
  - o Dosing: 1-2 puffs q4-6hr
    - Max 8 puffs/24hr
    - Child: max 4 puffs daily
- ➔ It is recommended to test spray salbutamol inhalation aerosol into the air 4 times before using any canister for the first time and in cases where the aerosol has not been used for more than 4 weeks
  - o Side Effects:
    - Heart: increase rate, increase force, increase BP
    - Most common is nervousness and tremor; headache, tachycardia, palpitations, transient muscle cramps, insomnia, weakness, dizziness and sweating
    - Paradoxical bronchoconstriction
  - o Warnings:
    - Beta blocking drugs, esp. non cardio-selective, should be avoided (i.e., propranolol)
  - o Drug Interactions:
    - Use extreme care with MAO inhibitors & tricyclic antidepressants (potentiate cardiovascular effects)

### Smelling Salts (Pharmacology)

- Aromatic liquid of ammonium carbonate
- Reflex respiratory stimulant for the treatment of 'hysterical' syncope
- No longer used by paramedics
- Replaced by oxygen

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