



London Health Sciences Centre  
Southwest Ontario Regional Base Hospital Program



# ALS PCS v4.0 Refresher

App Update: 4.0 will be updated on July 16<sup>th</sup>, 2017 – update your app (Ontario Paramedic Clinical Guide)

## Medical Directives Summary of Changes

- Medical Cardiac Arrest
- ETCO<sub>2</sub> (if applicable)
- Neonatal Resuscitation
- ROSC
- Cardiac Ischemia
- Hypoglycemia
- Mod-Severe Allergic Reaction
- Adrenal Crisis
- Tracheostomy Suctioning

# MEDICAL CARDIAC ARREST

# Medical Cardiac Arrest Summary of Changes (PCP and ACP)

## Medical Cardiac Arrest Medical Directive

An Advanced Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

### Indications

Non-traumatic cardiac arrest.

### Conditions

CPR		Manual Defibrillation	
Age	N/A	Age	≥30 days
LOA	Altered	LOA	Altered
HR	N/A	HR	N/A
RR	N/A	RR	N/A
SBP	N/A	SBP	N/A
Other	Performed in 2 minute intervals	Other	VF OR pulseless VT

AED Defibrillation		Epinephrine	
Age	≥30 days	Age	≥30 days
LOA	Altered	LOA	Altered
HR	N/A	HR	N/A
RR	N/A	RR	N/A
SBP	N/A	SBP	N/A
Other	Defibrillation indicated Alternative to manual defibrillation	Other	Anaphylaxis suspected as causative event, IM route may be used

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

## MEDICAL CARDIAC ARREST MEDICAL DIRECTIVE

An Advanced Care Paramedic may provide the treatment prescribed in this Medical Directive if certified and authorized.

### INDICATIONS

Non-traumatic cardiac arrest

### CONDITIONS

CPR	Manual Defibrillation	AED Defibrillation
AGE: N/A	AGE: ≥30 days	AGE: ≥30 days
LOA: Altered	LOA: Altered	LOA: Altered
HR: N/A	HR: N/A	HR: N/A
RR: N/A	RR: N/A	RR: N/A
SBP: N/A	SBP: N/A	SBP: N/A
Other: Performed in 2 minute intervals	Other: VF or pulseless VT	Other: Shock indicated Alternative to manual defibrillation

Epinephrine	Amiodarone	Lidocaine
AGE: ≥30 days	AGE: ≥30 days	AGE: ≥10 years
LOA: Altered	LOA: Altered	LOA: Altered
HR: N/A	HR: N/A	HR: N/A
RR: N/A	RR: N/A	RR: N/A
SBP: N/A	SBP: N/A	SBP: N/A
Other: if anaphylaxis suspected as causative event, IM route may be used	Other: VF or pulseless VT	Other: VF or pulseless VT where amiodarone is not available

Advanced Life Support Paramedic Care Standards – Version 3.4  
ACP Core Medical Directives – Appendix 2

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**NEW**

**OLD**

No change to the beginning of the cardiac arrest management plan  
Service specific teaching – SAED vs. Manual

Look of the directive has changed, but application hasn't changed



# Medical Cardiac Arrest Summary of Changes (PCP and ACP)

Amiodarone		Lidocaine	
Age	≥30 days	Age	≥30 days
LOA	Altered	LOA	Altered
HR	N/A	HR	N/A
RR	N/A	RR	N/A
SBP	N/A	SBP	N/A
Other	VF OR pulseless VT	Other	VF OR pulseless VT where amiodarone is not available

0.9% NaCl Fluid Bolus	
Age	≥30 days
LOA	Altered
HR	N/A
RR	N/A
SBP	N/A
Other	PEA Any other rhythm where hypovolemia is suspected

Contraindications	
CPR	Obviously dead as per BLS PCS Meet conditions of <i>Do Not Resuscitate (DNR) Standard</i>
AED Defibrillation	Non-shockable rhythm
Manual Defibrillation	Rhythms other than VF or pulseless VT
Epinephrine	Allergy or sensitivity to epinephrine

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

0.9% NaCl Fluid Bolus	
AGE	N/A
LOA	Altered
HR	N/A
RR	N/A
SBP	N/A
Other	PEA Any other rhythm where hypovolemia is suspected

**CONTRAINDICATIONS**

CPR Obviously dead as per BLS Standards Meet conditions of DNR Standard	Manual Defibrillation Rhythms other than VF or pulseless VT	AED Defibrillation Non-shockable rhythm
Epinephrine Allergy or sensitivity to epinephrine	Amiodarone Allergy or sensitivity to amiodarone	Lidocaine Allergy or sensitivity to lidocaine Use / Availability of amiodarone
0.9% NaCl Fluid Bolus Fluid overload		

Advanced Life Support Patient Care Standards - Version 3.4  
ADP Core Intraosseous Directives - Appendix 2 2-2

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**NEW**

**OLD**

# Medical Cardiac Arrest Summary of Changes (PCP and ACP)

**Amiodarone**  
Allergy or sensitivity to amiodarone

**Lidocaine**  
Allergy or sensitivity to lidocaine  
Use/Availability of amiodarone

**0.9% NaCl Fluid Bolus**  
Fluid overload

**Treatment**

Consider CPR

Consider supraglottic airway insertion, where more than OPA/NPA and BVM required and without interrupting CPR

Consider Manual defibrillation

	Age	
	≥30 days to <8 years	≥8 years
Dose	1 defibrillation	1 defibrillation
Initial dose	2 J/kg	As per BII / manufacturer
Subsequent dose(s)	4 J/kg	As per BII / manufacturer
Dosing interval	2 min	2 min
Max. # of doses	NA	NA

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

**TREATMENT**

Consider CPR

Consider supraglottic airway insertion, where more than OPA/NPA and BVM required and without interrupting CPR

Consider Manual defibrillation:

	Age	
	230 days to <8 years	≥8 years
Dose	1 shock	1 shock
First dose	2 J/kg	As per BII / manufacturer
Subsequent and (min. doses)	4 J/kg	As per BII / manufacturer
Dosing interval	2 min	2 min
Max. # of doses	N/A	N/A

Consider AED defibrillation (alternative to manual defibrillation)

	Age		
	230 days to <8 years	8-17 years	≥18 years
Dose	With PEP manufacturer	Without PEP manufacturer	1 shock
	1 shock	1 shock	1 shock
Max. single dose	As per BII / manufacturer	As per BII / manufacturer	As per BII / manufacturer
Dosing interval	2 min	2 min	2 min
Max. # of doses	N/A	N/A	N/A

Advanced Life Support Pediatric Care Standards - Version 3.4  
ACP Core Medical Directives - Appendix 2

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**NEW**

**OLD**

# Medical Cardiac Arrest Summary of Changes (PCP and ACP)

Consider AED defibrillation (alternative to manual defibrillation)			
	Age		Age
	≥30 days to <8 years		≥8 years
	With Pediatric Attenuator Cable	Without Pediatric Attenuator Cable	N/A
Dose	Pediatric	N/A	N/A
	1 defibrillation	1 defibrillation	1 defibrillation
Max. single dose	As per BH / manufacturer	As per BH / manufacturer	As per BH / manufacturer
Dosing interval	2 min	2 min	2 min
Max. # of doses	N/A	N/A	N/A

Consider epinephrine (if anaphylaxis is suspected as the causative event of the cardiac arrest)	
Route	IM
Concentration	1:1,000
Dose	0.01 mg/kg*
Max. single dose	0.5 mg
Dosing interval	NA
Max. # of doses	1

\*The epinephrine dose may be rounded to the nearest 0.05 mg

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

**Consider epinephrine:**

In the event anaphylaxis is suspected as the causative event of the cardiac arrest, a single dose of 0.01 mg/kg 1:1,000 solution, to a maximum of 0.5 mg IM, may be given prior to obtaining the IV/IO.

	Age		Age	
	230 days to <12 years		≥12 years	
	Route		Route	
	IV / IO / CVAD	ETT	IV / IO / CVAD	ETT
Solution	1:10,000	1:1,000	1:10,000	As per BH
Dose	0.01 mg/kg to a max of 0.5 mg		1 mg	2 mg
Min. single dose	0.1 mg	1 mg	1 mg	2 mg
Dosing interval	4 min.	4 min.	4 min.	4 min.
Max. # of doses	N/A	N/A	N/A	N/A

\*The epinephrine dose may be rounded to the nearest 0.05 mg.

**Consider amiodarone:**

	Age		Age	
	230 days to <12 years		≥12 years	
	Route		Route	
	IV / IO / CVAD	IV / IO / CVAD	IV / IO / CVAD	IV / IO / CVAD
Initial Dose	5 mg/kg	300 mg	300 mg	300 mg
Subst. initial dose	300 mg	300 mg	300 mg	300 mg
Repeat dose	5 mg/kg	150 mg	150 mg	150 mg
Subst. repeat dose	150 mg	150 mg	150 mg	150 mg
Dosing interval	4 min.	4 min.	4 min.	4 min.
Max. # of doses	2	2	2	2

Reference: OHS Support Patient Care Standards – version 3.4  
 ACP Care Update (October) – Appendix 1

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**NEW**

**OLD**

Anaphylaxis VSA – Consider Epi ASAP and early transport. Epi should not delay defibrillation.

For ACPs in cases of VSA Anaphylaxis:

Following the first rhythm interpretation, if resources permit, establish an IV and administer Epi 1:10000 IV as indicated for cardiac arrest. If there is a delay to IV access, administer Epi 1:1000 IM.

IFF Epi 1:10000 is administered IV, a subsequent dose of Epi 1:1000 IM is not required for anaphylaxis.

# Medical Cardiac Arrest Summary of Changes (ACP)

Consider epinephrine				
	Age		Age	
	≥30 days to <12 years		≥12 years	
	Route		Route	
	IV/IO CVAD	ETT	IV/IO CVAD	ETT
<b>Solution</b>	1:10,000	1:1,000	1:10,000	as per BH
<b>Dose</b>	0.01 mg/kg*	0.1 mg/kg to a max of 2 mg	1 mg	2 mg
<b>Min. single dose</b>	0.1 mg	1 mg	1 mg	2 mg
<b>Dosing interval</b>	4 min	4 min	4 min	4 min
<b>Max. # of doses</b>	N/A	N/A	N/A	N/A

\*The epinephrine dose may be rounded to the nearest 0.05 mg

Consider amiodarone		
	Age	
	≥30 days to <12 years	
	≥12 years	
	Route	
	IV/IO CVAD	IV/IO CVAD
<b>Initial dose</b>	5 mg/kg	300 mg
<b>Max. initial dose</b>	300 mg	300 mg
<b>Subsequent dose(s)</b>	5 mg/kg	150 mg
<b>Max. repeat dose</b>	150 mg	150 mg
<b>Dosing interval</b>	4 min	4 min
<b>Max. # of doses</b>	2	2

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Consider lidocaine: (if amiodarone not available)					
	Age		Age		Route
	230 days to 12 years		≥12 years		
	Route		Route		
	IV/IO CVAD	ETT	IV/IO CVAD	ETT	
<b>Dose</b>	1 mg/kg	2 mg/kg	1.5 mg/kg	3 mg/kg	
<b>Min. single dose</b>	N/A	N/A	N/A	N/A	
<b>Dosing interval</b>	4 min.	4 min.	4 min.	4 min.	
<b>Max. # of doses</b>	2	2	2	2	

Consider 0.9% NaCl fluid bolus:		
	Age	
	230 days to <12 years	
	≥12 years	
	Route	
	IV/IO CVAD	IV/IO CVAD
<b>Infusion</b>	20 mL/kg	20 mL/kg
<b>Infusion interval</b>	Immediate	Immediate
<b>Assess every</b>	100 ml	250 ml
<b>Max. volume</b>	30 mL/kg up to 2,000 ml	2,000 ml

Consider intubation: if the airway is not being adequately managed.

**MANDATORY PROVINCIAL PATCH POINT:**  
Patch to BHP following 3 rounds of epinephrine (or after 3<sup>rd</sup> analysis if no IV/IO/ETT access). If the BHP patch fails, transport to the closest appropriate receiving hospital following the 4<sup>th</sup> epinephrine administration (or 4<sup>th</sup> analysis if no IV/IO/ETT access).

Advanced Life Support Patient Care Standards - version 3.6  
ACP Core Medical Direction - Appendix 2

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**NEW**

**OLD**

## Medical Cardiac Arrest Summary of Changes (ACP)

Consider lidocaine (if amiodarone not available)				
	Age		Age	
	≥30 days to <12 years		≥12 years	
	Route		Route	
	IV/IO CVAD	EIT	IV/IO CVAD	EIT
<b>Dose</b>	1 mg/kg	2 mg/kg	1.5 mg/kg	3 mg/kg
<b>Min. single dose</b>	N/A	N/A	N/A	N/A
<b>Dosing interval</b>	4 min	4 min	4 min	4 min
<b>Max. # of doses</b>	2	2	2	2

Consider 0.9% NaCl fluid bolus		
	Age	
	≥30 days to <12 years	≥12 years
	Route	
	IV/IO CVAD	IV/IO CVAD
<b>Infusion</b>	20 ml/kg	20 ml/kg
<b>Infusion interval</b>	Immediate	Immediate
<b>Reassess every</b>	100 ml	250 ml
<b>Max. volume</b>	2,000 ml	2,000 ml

Consider intubation (if the airway is not being adequately managed)

**Mandatory Provincial Patch Point**

Patch to BHP following 3 rounds of epinephrine (or after 3<sup>rd</sup> analyses if no IV/IO ETT access). If the BHP patch fails, transport to the closest appropriate receiving hospital following the 4<sup>th</sup> epinephrine administration (or 4<sup>th</sup> analysis if no IV/IO ETT access).

## Medical Cardiac Arrest Summary of Changes (PCP)

### Mandatory Provincial Patch Point

Patch to BHP for authorization, following the 3<sup>rd</sup> analysis, to consider Medical Termination of Resuscitation (TOR) (if applicable). If the BH patch fails, or the medical TOR does not apply, transport to the closest appropriate receiving hospital following ROSC or the 4<sup>th</sup> analysis.

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If transport is required, consider appropriate airway management (King LT/ETT vs. OPA).

## Medical Cardiac Arrest Summary of Changes (PCP and ACP)

### Clinical Considerations

Consider very early transport after the 1<sup>st</sup> analysis (and defibrillation if indicated) in the following settings: pregnancy presumed to be  $\geq 20$  weeks gestation (fundus above umbilicus, ensure manual displacement of uterus to left), hypothermia, airway obstruction, suspected pulmonary embolus, medication overdose/toxicology, or other known reversible cause of arrest not addressed.

Similarly, plan for extrication and transport for patients with refractory ventricular fibrillation and pediatric cardiac arrest (after 3 analyses), ensure quality CPR can be continued.

In cardiac arrest associated with opioid overdose, continue standard medical cardiac arrest directive. There is no clear role for routine administration of naloxone in confirmed cardiac arrest.

Follow the *Deceased Patient Standard* once TOR has been implemented.

The IV and IO routes of medication administration are preferred over the ETT route. However, ETT administration may be used if the IV/IO routes are delayed (e.g.  $\geq 5$  min).

If hyperkalemia is suspected as the causative event of the cardiac arrest, consider patching early for calcium gluconate.

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**NEW**

Key – early transport after first analysis – not first NSI

Email from Steph to Matt on the topic:

Hey Matt,

The PHCSs and I are looking for clarification regarding the clinical considerations within the Medical Cardiac Arrest Medical Directive.

“Consider very early transport after the 1<sup>st</sup> analysis (and defibrillation if indicated) in the following settings: pregnancy presumed to be  $\geq 20$  weeks gestation (fundus above umbilicus, ensure manual displacement of uterus to left), hypothermia, airway obstruction, suspected pulmonary embolus, medication overdose/toxicology, or other known reversible cause of arrest not addressed.

Similarly, plan for extrication and transport for patients with refractory ventricular fibrillation and pediatric cardiac arrest (after 3 analyses), ensure quality CPR can be continued.”

Does the 2<sup>nd</sup> paragraph assume pediatric cardiac arrest particularly with refractory VF OR all pediatric arrests?

Prepare to transport regardless of rhythm, so all peds arrests. PCPs - Do not meet TOR criteria; ACPs - plan to transport to hospital because 99% of the time, will not get a field pronouncement

IFF the 2<sup>nd</sup> paragraph assumes pediatric cardiac arrest with refractory VF only (and not all peds arrests), then can non-refractory VF pediatric cardiac arrests be included in the 1<sup>st</sup> paragraph in the “or other known reversible cause” category?

We have interpreted that the majority of peds cases fall under reversible causes, so can transport after one analysis. However, the directive allows for use of clinical judgment, case by case (stay on scene for peds VF, vs leave after one analysis in presumed sepsis related peds VSA)

Rational: In the ALS PCS 3.4, we were to leave following the first NSI in the ped population. Now it appears we are to stay for 3.

No hard set rule based on our interpretation, given 1<sup>st</sup> paragraph allows for transport after one analysis in reversible causes (majority of peds arrests), or stay for 3 analysis prior to transport (ex patient in VF who may benefit from defibrillation).



## The Airway Question

- In the ALS patient care standards it states that a Supraglottic Airway (King LT) is indicated when there is a "Need for ventilatory assistance OR airway control AND Other airway management is inadequate or ineffective."

### Question:

- In the "un-controlled" world of EMS would it not be more effective to use a King LT instead of an oral airway after the first round of CPR is complete? Is it acceptable to use the King LT on VSA patients when the oral airway provides sufficient airway support?

## The Airway Question

- **Answer:**

- Use your educated clinical judgment

- Ask MAC: Date: [13-Mar-2012](#)

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In wording for the use of the King LT/ETT, you are now able to use your educated clinical judgment to make the decision as to what method of airway management is best suited to you, your patient, and the situation. For example, if your patient initially meets the criteria for a Medical TOR (you think you're going down that pathway), and the OPA is providing adequate airway patency, then you are welcome to continue using it and not insert the King LT or ETT. Keep in mind, that if you're anticipating the transfer to the stretcher, trip down a flight of stairs, and the bumpy drive to the ED, then the King should be considered.

As for timing of King LT/ETT insertion; if you've decided that insertion is preferred or required, there is no hard and fast rule about when to do so. We have shared as a teaching point to make your first attempt following the first analysis as this allows both for pre-oxygenation (prior to the first analysis), and a second attempt should you need it (following the third analysis).

Bottom line: you're welcome to use either method, however, keep in mind the current and future management of the patient as the call progresses.

# END TIDAL CAPNOGRAPHY (ETCO<sub>2</sub>)

# ETCO2

## Confirm supraglottic airway placement

Method	Method
<i>Primary</i>	<i>Secondary</i>
ETCO <sub>2</sub> (Waveform capnography)	ETCO <sub>2</sub> (Non-waveform device)
	Auscultation
	Chest rise

### Clinical Considerations

An attempt at supraglottic airway insertion is defined as the insertion of the supraglottic airway into the mouth.

Confirmation of supraglottic airway must use ETCO<sub>2</sub> (Waveform capnography). If waveform capnography is not available or is not working, then at least 2 secondary methods must be used.

Note: Biggest change is the NEED for primary confirmation for King LT/ETT

Services carrying ETCO2 must use it for the above.

# ETCO<sub>2</sub>

Confirm orotracheal tube placement	
Method	Method
<i>Primary</i>	<i>Secondary</i>
ETCO <sub>2</sub> (Waveform capnography)	ETCO <sub>2</sub> (Non-waveform device)
	Visualization
	Auscultation
	Chest rise
	Esophageal detection device

## Clinical Considerations

An intubation attempt is defined as insertion of the laryngoscope blade into the mouth for the purposes of intubation.

Confirmation of orotracheal intubation must use ETCO<sub>2</sub> (Waveform capnography). If waveform capnography is not available or not working then at least 3 secondary methods must be used. Additional secondary ETT placement confirmation devices may be authorized by the local medical director.

ETT placement must be reconfirmed immediately after every patient movement.

## ETCO<sub>2</sub> Changes Review (ACP only)

Confirm nasotracheal tube placement	
Method	Method
<i>Primary</i>	<i>Secondary</i>
ETCO <sub>2</sub> (Waveform capnography)	ETCO <sub>2</sub> (Non-waveform device)
	Auscultation
	Esophageal detection device
	Chest rise

### Clinical Considerations

A nasotracheal intubation attempt is defined as insertion of the nasotracheal tube into a nare.

Confirmation of nasotracheal placement must use ETCO<sub>2</sub> (Waveform capnography). If wave-form capnography not available or not working, then at least 2 secondary methods must be used. ETT placement must be reconfirmed immediately after every patient movement.

## ETCO<sub>2</sub> Changes Review (ACP only Service dependent)

### Consider cricothyrotomy tube placement

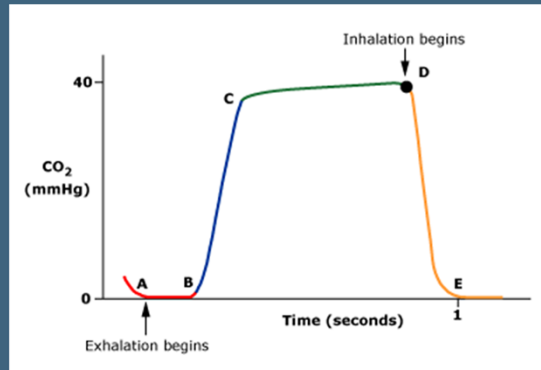
Method	Method
<i>Primary</i>	<i>Secondary</i>
ETCO <sub>2</sub> (Waveform capnography)	ETCO <sub>2</sub> (Non-waveform device)
	Auscultation
	Chest rise

### Clinical Considerations

Confirmation of cricothyrotomy must use ETCO<sub>2</sub> (Waveform capnography). If waveform capnography is not available or not working, then at least 2 secondary methods must be used. Additional secondary Cricothyrotomy tube placement confirmation devices may be authorized by the local medical director.

Cricothyrotomy tube placement must be reconfirmed immediately after every patient movement.

## ETCO<sub>2</sub> Changes Review



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Describe the inhalation/exhalation cycle

Phase A is the start of the respiratory baseline

Phase B is the end of the respiratory baseline and the exhalation begins

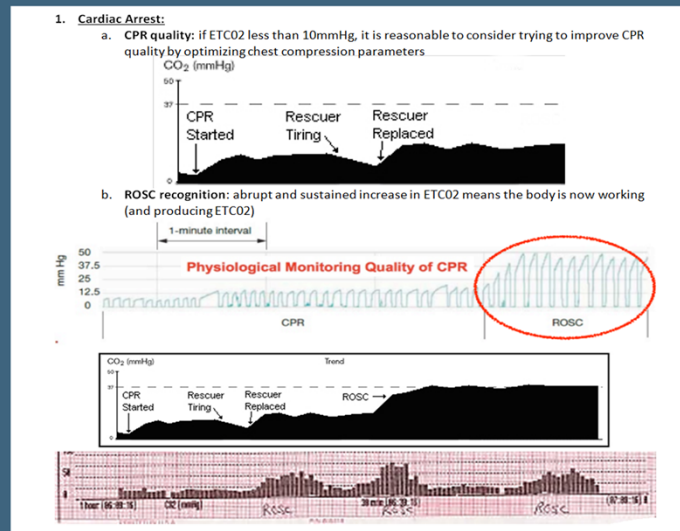
Phase C is the expiratory plateau (which means the end of the breathing out)

Phase D is the end of the exhalation phase and this is where the ETCO<sub>2</sub> value or number is measured from. The highest concentration of CO<sub>2</sub> is at this point.

Phase E is when the patient takes a breath in and there is a drop in the CO<sub>2</sub> as there is nothing being exhaled.



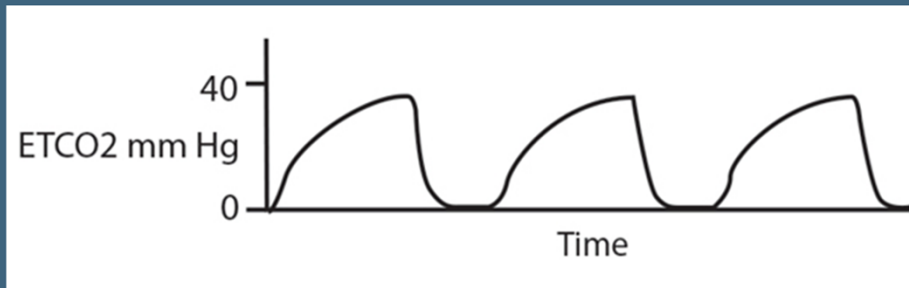
# ETCO2 Changes Review



Uses of ETCO<sub>2</sub> in the VSA pt

- positioning of ETT
- quality of CPR
- possible indicator of ROSC (with spike in ETCO<sub>2</sub>)
- possible factor associated with determining/granting TOR

## ETCO2 Changes Review



<http://lifeinthefastlane.com/cc/capnography-waveform-interpretation>

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Shark fin – evidence of bronchoconstriction

In regards to the Shark Fin presentation:

Phases A and B remain essentially unchanged.

Phase C has a more pronounced slope during the expiratory phase and this is caused from the air trapping and bronchospasm that is taking place which thereby inhibits CO<sub>2</sub> from being released more efficiently hence when they say that COPD'ers are retainers; that's why they are!

Phase D remains unchanged as well.

Phase E is when the patient takes a breath in and there is a drop in the CO<sub>2</sub> as there is nothing being exhaled.

ETCO<sub>2</sub>

In the DKA patient ETCO<sub>2</sub> varies directly with the patient's pH. So the farther out of usual range the ETCO<sub>2</sub> is, the sicker the patient.

In regards to Early recognition of Sepsis:

The initial stage of SIRS deals with vital signs assessment:

Heart rate greater than 90

Breathing rate greater than 20

Temp greater than 38 or less than 36

ETCO<sub>2</sub> less than 32

Sick patients breath faster and blow off more CO<sub>2</sub>; therefore less than normal values of 35-35 mmHg TORR. So the sick patient in the nursing home with a UTI on an antibiotic and tachycardia, with a low end tidal means sick patient. All patients can be monitored for their CO<sub>2</sub> and should be.

# NEONATAL RESUSCITATION

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# Neonatal Resuscitation Summary of Changes (PCP and ACP)

## Neonatal Resuscitation Medical Directive

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

### Indications

Neonatal patient.

### Conditions

Resuscitation	
Age	<30 days of age
LOA	N/A
HR	N/A
RR	N/A
SBP	N/A
Other	N/A

### Contraindications

Resuscitation	
	N/A

## NEONATAL RESUSCITATION MEDICAL DIRECTIVE

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if certified and authorized.

### INDICATIONS

Severe cardio-respiratory distress

### CONDITIONS

#### Resuscitation

AGE: newborn or <30 days of age

LOA: N/A

HR: N/A

RR: N/A

SBP: N/A

Other: Less than full term, or meconium, or poor APGAR score

### CONTRAINDICATIONS

#### Resuscitation

Clear of meconium

Breathing or crying

Good muscle tone

Pink in colour

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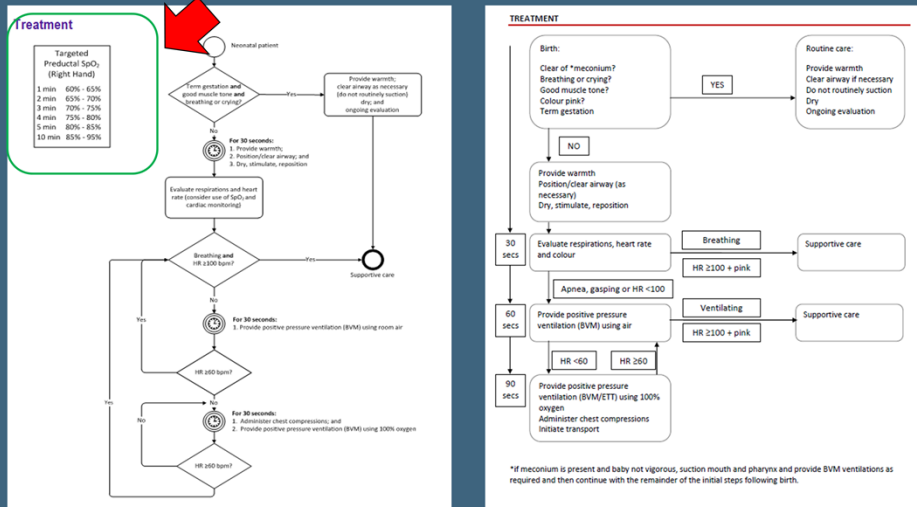
**NEW**

**OLD**

### Wording change

- Indications
- Conditions
- Contraindications removed

# Neonatal Resuscitation Summary of Changes (PCP and ACP)



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Wording changes: No longer evaluate colour

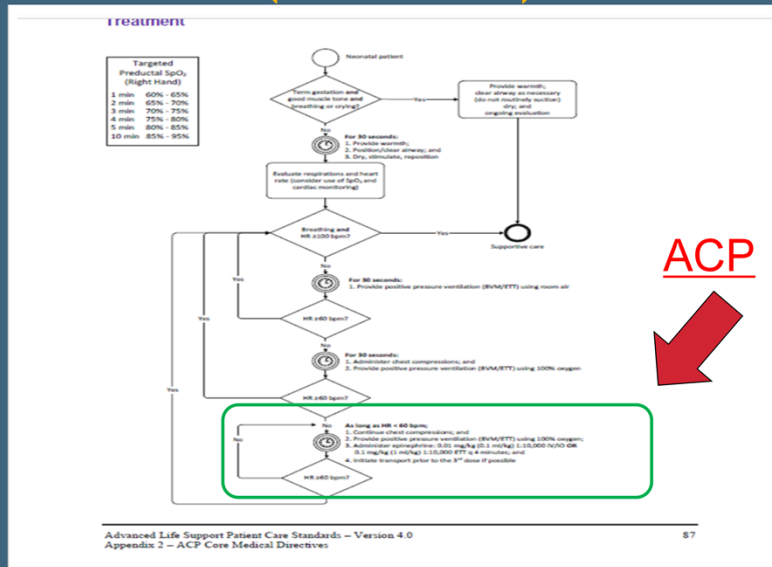
Algorithm format change

Same treatment with the addition of cardiac and spO<sub>2</sub> monitoring – only applicable to newborn (JUST been born).

Newly born – start at the top

Neonate – start at 2<sup>nd</sup> box (skip the first 30s)

# Neonatal Resuscitation Summary of Changes (PCP and ACP)



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Main Focus is to initiate transport prior to the 3<sup>rd</sup> dose if possible

## Neonatal Resuscitation Summary of Changes (PCP and ACP)

### Clinical Considerations

If neonatal resuscitation is required, initiate cardiac monitoring and pulse oximetry monitoring.



## Neonatal Resuscitation Recap

- Less 'wordy'
  - i.e. indications: Neonatal (<30d) patient
- Algorithm format change
- Same assessment with the exception of:
  - Evaluation of colour
- Addition of cardiac monitor and SpO<sub>2</sub> during resuscitation



# RETURN OF SPONTANEOUS CIRCULATION (ROSC)

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# ROSC Summary of Changes (PCP and ACP)

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

## Return of Spontaneous Circulation (ROSC) Medical Directive

An Advanced Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

**Indications**  
Patient with return of spontaneous circulation (ROSC) after the resuscitation was initiated.

**Conditions**

0.9% NaCl Fluid Bolus	Dopamine
Age: N/A	Age: <u>≥ 8 years</u>
LOA: N/A	LOA: N/A
HR: N/A	HR: N/A
RR: N/A	RR: N/A
SBP: Hypotension	SBP: Hypotension
Other: Clear endotracheal in place	Other: N/A

**Contraindications**

0.9% NaCl Fluid Bolus	Dopamine
Fluid overload	Allergy or sensitivity to dopamine
SBP < 90 mmHg	Tachyarrhythmias excluding sinus tachycardia
	Mechanical shock states
	Hypovolemia
	Pharmacocystosis

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Appendix 2 - ACP Case Medical Directives 39

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

## RETURN OF SPONTANEOUS CIRCULATION (ROSC) MEDICAL DIRECTIVE

An Advanced Care Paramedic may provide the treatment prescribed in this Medical Directive if certified and authorized.

**INDICATIONS**  
Patient with return of spontaneous circulation (ROSC) after the resuscitation was initiated.

**CONDITIONS**

0.9% NaCl Fluid Bolus	Dopamine	Therapeutic hypothermia
AGE: N/A	AGE: ≥ 18 years	AGE: males ≥ 18 years females ≥ 16 years
LOA: N/A	LOA: N/A	LOA: None
HR: N/A	HR: N/A	HR: N/A
RR: N/A	RR: N/A	RR: N/A
SBP: Hypotension	SBP: Hypotension	SBP: < 90 mmHg
Other: Chest resuscitation in place	Other: N/A	Other: None

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ACP Case Medical Directives - Appendix 2 3-17

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**NEW**

**OLD**

Dopamine  $\geq 8y$

# ROSC Summary of Changes (PCP and ACP)

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

**Treatment**

Consider optimizing ventilation and oxygenation

Titrate oxygenation to 94-97%

Avoid hyperventilation and target ETCO<sub>2</sub> to 30-40 mmHg with continuous waveform capnography (if available)

Consider 0.9% NaCl fluid bolus

	Age	Age
	<12 years	≥12 years
Route	Route	Route
IV/IO/IVAD	IV/IO/IVAD	IV/IO/IVAD
Infusion	10 ml/kg	10 ml/kg
Infusion interval	Immediate	Immediate
Reassess every	100 ml	250 ml
Max. volume	1,000 ml	1,000 ml

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Appendix 2 - ACP Care Medical Directives 90

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

**CONTRAINDICATIONS**

0.9% NaCl fluid bolus	Dopamine	Therapeutic hypothermia
Fluid overload SBP <90 mmHg	Allergy or sensitivity to dopamine Tachyarrhythmias excluding sinus tachycardia Mechanical check valves Hypotension Phaeochromocytoma	Relative cardiac arrest (e.g., ventricular fibrillation) Septic shock Infection (except at cause of arrest) Hypotension Known coagulopathy (medical history or medications)

**TREATMENT**

Consider rapid transport

Consider optimizing ventilation and oxygenation:

Titrate oxygenation 94%

Avoid hyperventilation and target an ETCO<sub>2</sub> of 33-40 mmHg with continuous waveform capnography (if available)

Advanced Life Support Patient Care Standards - Version 3.4  
ACP Care Medical Directives - Appendix 2 2-18

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**NEW**

**OLD**

NEW – target SPO<sub>2</sub>/ETCO<sub>2</sub>

Normal ETCO<sub>2</sub> is 35-45, but our target is 30-40 (hyperventilation)

# ROSC Summary of Changes (ACP)

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

Consider dopamine:

Age	Route
<3 years	IV
3-17 years	IV
18 years and older	IV

Initial infusion rate: 5 mcg/kg/min

Titration increment: 5 mcg/kg/min

Titration interval: 5 min

Max. infusion rate: 20 mcg/kg/min

NOTE: Titrate dopamine to achieve a SBP of 200 to >110 mmHg. If discontinuing dopamine electrolyte, do so gradually over 5-10 minutes.

Consider 12-lead ECG acquisition and interpretation

Clinical Considerations

Consider isotating transport in parallel with the above treatment.

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Appendix 2 - ACP Core Medical Directives 81

Emergency Health Services Branch, Ontario Ministry of Health and Long-Term Care

Consider 0.9% NaCl fluid bolus:

Age	Route
<22 years	IV
22 years	IV

Initial infusion rate: 5 mcg/kg/min

Titration increment: 5 mcg/kg/min

Titration interval: 5 min

Max. infusion rate: 20 mcg/kg/min

NOTE: Titrate dopamine to achieve a systolic BP of 90-110 mmHg. If discontinuing dopamine electrolyte, do so gradually over 5-10 minutes.

Consider 12-lead ECG acquisition

Consider therapeutic hypothermia (if available)

**CLINICAL CONSIDERATIONS**

The application of therapeutic hypothermia should not detract from rapid transport, optimizing ventilation and oxygenation or the management of a re-arrest.

Advanced Life Support Patient Care Standards - Version 4.0  
ACP Core Medical Directives - Appendix 2 2-19

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**NEW**

**OLD**

Note: Single strength dopamine

## ROSC Summary of Changes (ACP)

- **Question:** Within the ROSC Medical Directive, the ONLY route identified for the administration of a fluid dopamine is via IV. Can we administer dopamine via IO or CVAD?
- **Answer:** Maybe...
- Ask MAC: Date: [15-Feb-2012](#)

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Answer:

IO and CVAD are not identified as routes of administration for dopamine within the medical directive. There is concern that extravasation may lead to tissue destruction, however the same concern exists for IV administration. For this reason, should you feel administration of dopamine via IO or CVAD is appropriate for the patient, a patch to the BHP is required.

## ROSC Summary of Changes (ACP)

### Single Strength Dopamine Dosing Chart

DOPAMINE INFUSION RATE (ml/hr or drops/min with a microdrip set)  
[Using an 800 mcg/ml ('single strength') solution]

Weight (kg)	Drip Rate (drops/min)				
	2 (mcg/kg/minute)	5 (mcg/kg/minute)	10 (mcg/kg/minute)	15 (mcg/kg/minute)	20 (mcg/kg/minute)
5	1	2	4	6	8
10	2	4	8	11	15
15	2	6	11	17	23
20	3	8	15	23	30
25	4	9	19	28	38
30	5	11	23	34	45
35	5	13	26	39	53
40	6	15	30	45	60
45	7	17	34	51	68
50	8	19	38	56	75
55	8	21	41	62	83
60	9	23	45	68	90
65	10	24	49	73	98
70	11	26	53	79	105
75	11	28	56	84	113
80	12	30	60	90	120
85	13	32	64	96	128
90	14	34	68	101	135
95	14	36	71	107	143
100	15	38	75	113	150
105	16	39	79	118	158
110	17	41	83	124	165
115	17	43	86	129	173
120	18	45	90	135	180

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**NEW**

As per the equipment standards this is changing to 800mcg,

# Cardiac Ischemia



# Cardiac Ischemia Summary of Changes (PCP & ACP)

### Cardiac Ischemia Medical Directive

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

**Indications**  
Suspected cardiac ischemia.

**Conditions**

ASA	Nitroglycerin
Age: $\geq 18$ years	Age: $\geq 18$ years
LOA: Unaltered	LOA: Unaltered
HR: N/A	HR: 60-159 bpm
RR: N/A	RR: N/A
SBP: N/A	SBP: Normotension
Other: Able to chew and swallow	Other: Prior history of nitroglycerin use OR IV access obtained

**Contraindications**

ASA	Nitroglycerin
Allergy or sensitivity to ASA or NSAIDs	Allergy or sensitivity to nitrates
If asthmatic, no prior use of ASA	Phosphodiesterase inhibitor use within the previous 48 hours
Current active bleeding	SBP drops by one-third or more of its initial value after nitroglycerin is administered
CVA or TBI in the previous 24 hours	12-lead ECG compatible with Right Ventricular MI

### CARDIAC ISCHEMIA MEDICAL DIRECTIVE

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if certified and authorized.

**INDICATIONS**  
Suspected cardiac ischemia.

**CONDITIONS**

ASA	Nitroglycerin
AGE: $\geq 18$ years	AGE: $\geq 18$ years
LOA: Unaltered	LOA: Unaltered
HR: N/A	HR: 60-159/min
RR: N/A	RR: N/A
SBP: N/A	SBP: Normotension
Other: Able to chew and swallow	Other: Prior history of nitroglycerin use OR IV access obtained

**CONTRAINDICATIONS**

ASA	Nitroglycerin
Allergy or sensitivity to ASA or NSAIDs	Allergy or sensitivity to nitrates
If asthmatic, no prior use of ASA	Phosphodiesterase inhibitor use within the previous 48 hours
Current active bleeding	SBP drops by one-third or more of its initial value after nitroglycerin is administered
CVA or TBI in the previous 24 hours	12-lead ECG compatible with Right Ventricular Infarct

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**NEW**

**OLD**

Indication, Conditions and Contraindications: wording remains the same.

However, now medics will be REQUIRED to rule out a RVMI prior to administering NTG.

# Cardiac Ischemia Summary of Changes (PCP & ACP)

**Treatment**

Consider ASA	
	Route
	PO
Dose	160-320 mg
Max. single dose	160 mg
Dosing interval	N/A
Max. # of doses	1

**Consider 12-lead ECG acquisition and interpretation for STEMI**

Consider nitroglycerin		STEMI	
	No	Yes	
	SBP	SBP	
	≥100 mmHg	≥100 mmHg	
	Route	Route	
	SL	SL	
Dose	0.3 mg OR 0.4 mg	0.3 mg OR 0.4 mg	
Max. single dose	0.4 mg	0.4 mg	
Dosing interval	5 min	5 min	
Max. # of doses	6	3	

**Clinical Considerations**  
Suspect a Right Ventricular MI in all inferior STEMI and perform 11-lead ECG to confirm (ST-elevation ≥1mm in V4R). Do not administer nitroglycerin to a patient with Right Ventricular STEMI.

**TREATMENT**

Consider ASA:	
	Route
	PO
Dose	160-320 mg
Max. single dose	160 mg
Dosing interval	N/A
Max. # of doses	1

Consider 12-lead ECG acquisition

Emergency Health Services Branch, Ontario Ministry of Health and Long Term Care

Consider nitroglycerin:		SBP
		≥100 mmHg
	Route	
	SL	
Dose	0.3 or 0.4 mg	
Max. single dose	0.4 mg	
Dosing interval	5 min	
Max. # of doses	3	

**CLINICAL CONSIDERATIONS**

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**NEW**

**OLD**

Yes – start performing a modified 12 Lead

Max 3 NTG for STEMI+

# Cardiac Ischemia Summary of Changes (ACP)

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**NEW**

**OLD**

Rational for LESS morphine:

## Ischemic CP

Morphine was previously a class I recommendation, but is now bumped down to class II (conflicting evidence). Therefore decision made to be more selective with who gets morphine.

MAC Summary: Platelets inhibition is an integral part of STEMI therapy and high-risk ACS patients. Suboptimal platelet inhibition early after primary stent implantation for STEMI is associated with thrombotic complications, including stent thrombosis. (13) Thus, given the evidence of reduced platelet inhibition with concomitant morphine administration, and in the absence of data that may support a potential clinical benefit of morphine in ACS, more caution should be used regarding morphine administration, and a selective rather than routine morphine use seems to be reasonable. Morphine administration might be reserved for ACS patients presenting with persistent severe chest pain. Severe chest pain has been previously defined as a self-reported numeric rating scale  $\geq 7$ , based on a scale from 0 to 10 as described in cancer patients treated with Morphine.

MAC Recommendation: Morphine use in ACS patients be restricted to those with severe pain ( $\geq 7$ ), after other anti-ischemic therapies have been started.

## Cardiac Ischemia Summary of Changes (PCP and ACP)

- A 68 year old male is complaining of ischemic-type chest discomfort. He has been instructed by the 911 call taker to take his own ASA.

*• Do you administer more?*

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Ontario Central Ambulance Communications Centres have begun directing patients with chest pain, who already take aminosalicylic acid (ASA) to chew their own ASA (160-325 mg). ASA has demonstrated benefit to outcomes in patient suffering myocardial ischemia or infarction. As ASA takes time to be absorbed, dispatch-directed early administration has potential benefits, is recommended as the standard of care in the Heart and Stroke Foundation of Ontario Advanced Cardiac Life Support Guidelines 2015, and poses minimal risk to the patients.

ASA is a safe medication with a wide therapeutic index (the effective dose without side effects can be from 80 to 1500 mg). The additional dose provided by paramedics will not exceed the therapeutic dose, and there is a chance the patient did not have or did not take the correct dose suggested by the ambulance communications officer. Therefore, paramedics should continue to follow their Ischemic Chest Pain Medical Directive without modification when patients have already taken ASA prior to paramedic arrival.

# Hypoglycemia

## Hypoglycemia Changes Review (PCP and ACP)

Consider dextrose (if available and authorized)		
Age		
	≥2 years	
Route		
	IV	
Concentration		
	D10W	D50W
Dose	0.2 g/kg (2 ml/kg)	0.5 g/kg (1 ml/kg)
Max. single dose	10 g (100 ml)	25 g (50 ml)
Dosing interval	10 min	10 min
Max. # of doses	2	2



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Should service carry D10W; otherwise no change

NO titration to effect with D10 or D50

## Hypoglycemia Changes Review (ACP only)

Consider dextrose (D10W pre-mixed)

	Age	Age
	<30 days	≥30 days
	Concentration	Concentration
	D10W	D10W
	Route	Route
	IV	IV
Dose	0.2 g/kg (2 ml/kg)	0.2 g/kg (2ml/kg)
Max. single dose	5 g (50 ml)	10g (100 ml)
Dosing interval	10 min	10 min
Max. # of doses	2	2

## Hypoglycemia Changes Review (ACP only)

Consider dextrose (D50W diluted as required if not using D10W)

	Age	Age	Age
	<30 days	≥30 days to <2 years	≥2 years
	Concentration	Concentration	Concentration
	D10W	D25W	D50W
	Route	Route	Route
	IV	IV	IV
Dose	0.2 g/kg (2 ml/kg)	0.5 g/kg (2 ml/kg)	0.5 g/kg (1 ml/kg)
Max. single dose	5 g (50 ml)	10 g (40 ml)	25 g (50 ml)
Dosing interval	10 min	10 min	10 min
Max. # of doses	2	2	2



# MODERATE TO SEVERE ALLERGIC REACTION

# Moderate to Severe Allergic Reaction Summary of Changes (PCP and ACP)

## Moderate to Severe Allergic Reaction Medical Directive

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

### Indications

- Exposure to a probable allergen AND
- Signs and/or symptoms of a moderate to severe allergic reaction (including anaphylaxis).

### Conditions

Epinephrine	
Age	N/A
Weight	N/A
LOA	N/A
HR	N/A
RR	N/A
SBP	N/A
Other	For anaphylaxis only

Diphenhydramine	
Age	N/A
Weight	≥25 kg
LOA	N/A
HR	N/A
RR	N/A
SBP	N/A
Other	N/A

### Contraindications

Epinephrine	
Allergy or sensitivity to epinephrine	

Diphenhydramine	
Allergy or sensitivity to diphenhydramine	

No changes

## Moderate to Severe Allergic Reaction Summary of Changes (PCP and ACP)

Treatment		
<b>Consider epinephrine</b>		
	<b>Route</b>	
	IM	
	<b>Concentration</b>	
	1:1,000	
<b>Dose</b>	0.01 mg/kg*	
<b>Max. single dose</b>	0.5 mg	
<b>Dosing interval</b>	Minimum 5 min	
<b>Max. # of doses</b>	2	
*The epinephrine dose may be rounded to the nearest 0.05 mg		
<b>Consider diphenhydramine (if authorized)</b>		
	<b>Weight</b>	<b>Weight</b>
	≥25 kg to <50 kg	≥50 kg
	<b>Route</b>	<b>Route</b>
	IV	IV
	IM	IM
<b>Dose</b>	25 mg	50 mg
<b>Max. single dose</b>	25 mg	50 mg
<b>Dosing interval</b>	N/A	N/A
<b>Max. # of doses</b>	1	1
<b>Clinical Considerations</b>		
Epinephrine should be the first medication administered in anaphylaxis.		
IV administration of diphenhydramine applies only to PCPs authorized for PCP Autonomous IV.		

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Change: max # doses 2; minimum 5 minute interval

## Moderate to Severe Allergic Reaction Summary of Changes

2 doses Epi



Minimum 5 min dosing interval



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When appropriate, follow up with Benadryl

Do not give Benadryl and Graval together

## Suspected Adrenal Crisis Medical Directive

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

### Indications

A patient with primary adrenal failure who is experiencing clinical signs of an adrenal crisis.

### Conditions

	Hydrocortisone
Age	N/A
LOA	N/A
HR	N/A
RR	N/A
SBP	N/A

**Other** Paramedics are presented with a vial of hydrocortisone for the identified patient **AND**  
Age-related hypoglycemia **OR**  
GI symptoms (vomiting, diarrhea, abdominal pain) **OR**  
Syncope **OR**  
Temperature  $\geq 38^{\circ}\text{C}$  or suspected/history of fever **OR**  
Altered level of awareness **OR**  
Age-related tachycardia **OR**  
Age-related hypotension

PCP and ACP same directive?

What's the "give early" rationale all about?

Early = less crisis-y (main goal to decrease hypotension)

## Contraindications

### Hydrocortisone

Allergy or sensitivity to hydrocortisone

## Treatment

Consider hydrocortisone

	Route
	IM
Dose	2 mg/kg*
Max. single dose	100 mg
Dosing interval	N/A
Max. # of doses	1

\*Dose should be rounded to the nearest 10 mg

## Clinical Considerations

All patients must be transported.

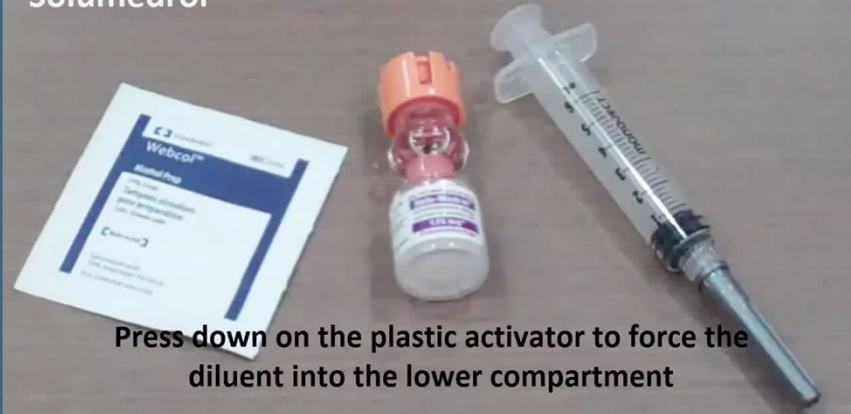
A patient with primary adrenal failure who presents with hypotension should receive hydrocortisone. However, "hypotension" is not a condition that must be present for the patient to receive hydrocortisone.

What's the dosing?

Why "must" patients be transported? – significant follow up required in ED

What do you do in hospital for these folks?

## Solumedrol



Press down on the plastic activator to force the diluent into the lower compartment

## How to Reconstitute Solumedrol

Link: <https://www.youtube.com/watch?v=Ds4toBQt7Ms>

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That's a hyperlink to 51 sec video

How do we give it?

Onset, effects and duration?

# ENDOTRACHEAL AND TRACHEOSTOMY SUCTIONING

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# Endotracheal and Tracheostomy Suctioning

## Endotracheal and Tracheostomy Suctioning Medical Directive

A Primary Care Paramedic may provide the treatment prescribed in this Medical Directive if authorized.

### Indications

Patient with endotracheal or tracheostomy tube;

AND

Airway obstruction or increased secretions.

### Conditions

	Suctioning
Age	N/A
LOA	N/A
HR	N/A
RR	N/A
SBP	N/A
Other	N/A

### Contraindications

	Suctioning
	N/A

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NEW

Important = PPE (mask/goggles/splash guard/gown)

## Endotracheal and Tracheostomy Suctioning

### Treatment

Consider suctioning			
	Infant	Child	Adult
Dose	suction at 60-100 mmHg	suction at 100-120 mmHg	suction at 100-150 mmHg
Max. single dose	N/A	N/A	N/A
Dosing interval	1 minute	1 minute	1 minute
Max. # of doses	5	5	5

### Clinical Considerations

Pre-oxygenate with 100% oxygen.

In an alert patient, whenever possible, have patient cough to clear airway prior to suctioning.

Do not exceed 10 seconds of suctioning.

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Start suctioning pressures low and increase as needed

NEW – max 5 # of doses

Reminder: Ventilate/oxygenate during the 1 min interval between suctioning attempts

# Advanced Life Support Patient Care Standards

Version 4.0  
Comes into force July 17, 2017



Emergency Health Services Branch  
Ministry of Health and Long-Term Care