

King County Medic One Paramedic Medical Plans

Issued and approved by the Program Medical Director of King County Medic One

Revised and Updated September 2016

Medical Plans

The King County Medic One Paramedic Program strives to provide the best prehospital emergency care. Consistent with this approach, these plans should be read in accordance with Washington State RCW 18.71.200 et seq and WAC 246-976.001 et seq. The Medical Plans enable paramedics to provide critical therapies in advance of Medical Control Doctor contact, given that delay could jeopardize patient well-being and outcome. In other circumstances, paramedics are directed to provide treatment in consultation with the Medical Control Doctor.

If the Medical Control Doctor cannot be contacted in a timely manner such that patient's clinical condition may be compromised, paramedics may proceed with care based on best practice and training. Paramedics should contact the Medical Control Physician as soon as possible.

The Medical Control Doctor refers to the physician in the base station hospital emergency department whom the Medical Program Director has delegated in writing to be medical control as provided in WAC 246-976-920.

PLAN A--1: CARDIAC ARREST — ADULT

1. General

- A. Confirm cardiac arrest by absence of consciousness and pulse.
- B. Initiate cardiopulmonary resuscitation (CPR) with chest compressions (using the sequence “CAB”) or, if BLS personnel have initiated CPR, direct them to continue pending rhythm assessment. If not already applied by BLS, apply defibrillator pads with minimal interruption to CPR.

High-quality CPR is characterized by chest compressions that are at least 2 inches in depth, allow for full recoil (rebound of the chest), achieve a rate of 100-120 per minute, and minimize interruptions in compressions. High quality ventilations require only enough tidal volume to achieve chest rise, with each ventilation lasting only 1-1.5 seconds.

- C. A precordial thump may be given for an EMS-witnessed arrest when VF/VT is suspected and when a defibrillator is not immediately ready for use, but should not delay CPR and shock delivery.
- D. Determine cardiac rhythm using defibrillator pads. Paramedics shall transition to their own defibrillator when possible.
- E. Manual (rather than AED) defibrillation should be deployed by ALS providers whenever possible in an effort to limit CPR interruptions.
- F. The effect of ACLS interventions are maximized with good CPR so that ACLS care needs to be supported by ongoing CPR and defibrillation during resuscitation. Every effort should be made to limit CPR interruptions during IV access, airway management, rhythm assessment, defibrillation, and medication administration.

If endotracheal intubation cannot be achieved, additional options include continued bag-mask ventilation, I-Gel LMA, jet insufflation, and/or surgical cricothyrotomy.

Vascular access should be attempted peripherally. If this approach fails, central intravenous or intraosseous (IO) access is permitted. A flush (open IV) should be used after each drug administration. Drugs should be administered during the 2 minute period of CPR between rhythm analyses.

CPR and defibrillation should remain a priority as part of integrating ACLS interventions and care.

- G. Rhythm analysis should occur approximately every 2 minutes with intervening CPR.
- H. Whenever clinical circumstances allow, patients who are successfully resuscitated should have a 12-lead ECG performed.
- J. All treatment and time of treatment, including permission to cease efforts, shall be recorded on the EMS Medical Incident Report Form.

2. Specific Plans

- A. Plan A-1a — Ventricular Fibrillation or Pulseless Ventricular Tachycardia
- B. Plan A-1b — Asystole
- C. Plan A-1c — Pulseless Electrical Activity (PEA)
- D. Plan A-1d — Pediatric Cardiac Arrest

PLAN A — 1a**VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA**

1. If Ventricular Fibrillation (VF) or Pulseless Ventricular Tachycardia (VT) is the first rhythm identified, or if VF or VT recurs, and

Shocks have been delivered by EMTs:

If shocks have been delivered, paramedics may deliver or direct EMTs to provide additional shocks, or may have the option to direct ongoing CPR and expeditiously achieve vascular access and endotracheal intubation. Whenever possible, rhythm analysis and shock should be performed in the manual mode during paramedic care. CPR should be stopped only when assessing rhythm or delivering shocks.

No shocks have been delivered:

Deliver or direct EMTs to deliver shocks according to resuscitation protocols. The initial shock should be at the device-recommended specific energy for defibrillation. Escalating energies may be used for subsequent shocks. Shocks for VF or pulseless VT should be unsynchronized.

2. If persistent or recurrent VF, establish vascular access and intubate. CPR and defibrillation should remain a priority as part of integrating ACLS interventions and care.

3. For persistent or recurrent VF, drugs should be administered as detailed below:

- A. If the preceding rhythm analysis identified a **pulseless non-shockable rhythm** (asystole or PEA), epinephrine should be administered during ongoing CPR without need for further rhythm confirmation. Continue CPR for approximately 2 minutes before the next rhythm analysis.
- B. If the preceding rhythm analysis resulted in **administration of a shock** (e.g. VT or VF), administer epinephrine or antiarrhythmic drugs during ongoing CPR, as specified below.

4. Neither epinephrine nor antiarrhythmic drugs are known to “chemically convert” VF, and are given to enhance the benefit from defibrillation. The effects of these drugs are maximized with good CPR so that drug therapy needs to be supported by ongoing CPR and defibrillation during resuscitation. In general, drug therapy should be separated by intervals of CPR and rhythm assessment (and if indicated defibrillation)

- A. Epinephrine (0.1 mg/ml) 0.5 to 1 mg IV push. Epinephrine may be administered via endotracheal tube if vascular access has not been established. Epinephrine can be repeated every 2 - 5 minutes while the patient remains in VF. These subsequent doses of epinephrine may be alternated between treatments with shock and antiarrhythmic medications (see below).
- B. First line anti-arrhythmic: Lidocaine, 1 to 1.5mg/kg IV push should be given when VF is refractory to shock. A second and third dose of lidocaine at 0.5 to 0.75 mg/kg may be administered subsequently in the course of resuscitation if the patient remains in refractory VF. The maximum cumulative dose of lidocaine is 3 mg/kg.
- C. Second line anti-arrhythmics: (use one or the other, but NOT both)
 - Amiodarone: initial dose 300 mg IV push with additional IV fluid flush. One subsequent dose of 150 mg after 3 to 5 minutes if indicated.
 - Procainamide: 100 mg slow push repeated every 2 minutes as indicated to a total dose of 500 mg.
- D. Magnesium may be considered for refractory VF with suspicion of torsades de pointes. Administer 2 g MgSO₄, diluted in D5W or LR to form 10 ml, IV push. Dosage may be repeated in 2 g doses up to a cumulative dose of 6 g.

- E. Sodium bicarbonate is recommended in special clinical conditions such as cardiac arrest associated with presumptive hyperkalemia (as may occur in dialysis patients), ketoacidosis, or overdose (tricyclic antidepressants, cocaine, diphenhydramine). Empirically, sodium bicarbonate may also be considered if VF persists and is unresponsive to conventional therapy. The dosage for sodium bicarbonate is 1mEq/kg as an IV bolus after shocks, intubation, epinephrine, and antiarrhythmic drug. Repeat doses at 0.5 mEq/kg may be considered at approximate 10 minute intervals.
- F. Post-resuscitation hypotension should be managed by fluid challenge with repeated LR boluses. Initiation of a levophed drip (4 - 8 mg in 250 ml of D5W) may be necessary and should be titrated to a systolic blood pressure of 80 – 100 mmHg. A systolic blood pressure of ≤ 60 should be supported with chest compressions.
- G. Medical Control Doctor contact is required regarding patient status regardless of outcome. Medical Control should also be contacted for any additional pharmacologic therapy.

PLAN A — 1b**ASYSTOLE**

1. Confirm asystole in three leads. Check monitor calibrations, cable and leads. If rhythm is unclear and possibly VF, treat as VF.
2. If confirmed asystole, continue CPR.
3. Establish IV access and intubate.
4. Administer epinephrine (0.1 mg/ml) 0.5 to 1 mg IV push, and repeat every 2 - 5 minutes for ongoing arrest.
5. Atropine is considered in symptomatic bradycardia but is not routinely recommended in asystolic arrest. However, atropine 1 mg IV push may be considered in circumstances where there is a suspicion of a primary bradyarrhythmia that may respond to the chronotropic effects of atropine. Treatment with CPR, airway management, and epinephrine should be prioritized.
6. Transcutaneous pacing is not routinely recommended in asystolic cardiac arrest. If transcutaneous pacing is considered, it should be initiated for a brief period to determine whether electrical capture and pulse can be achieved. Pacing should be continued only in those who achieve pulses with pacing. Otherwise CPR should be resumed.
7. Sodium bicarbonate is recommended in special clinical conditions such as cardiac arrest associated with presumptive hyperkalemia (as may occur in dialysis patients), ketoacidosis, or overdose (tricyclic antidepressants, cocaine, diphenhydramine). Empirically sodium bicarbonate may also be considered if asystole is unresponsive to conventional therapy. The dosage for sodium bicarbonate is 1mEq/kg as an IV bolus. Repeat doses at 0.5 mEq/kg may be considered at 10 minute intervals.
8. Post-resuscitation hypotension should be managed by fluid challenge with repeated LR boluses. Initiation of a levophed drip (4 - 8 mg in 250 ml of D5W) may be necessary and should be titrated to a systolic blood pressure of 80 – 100 mmHg. A systolic blood pressure of ≤ 60 should be supported with chest compressions.
9. Medical Control Doctor contact is required regarding patient status, regardless of outcome. Medical Control should also be contacted for any additional pharmacologic therapy.

PLAN A — 1c**PULSELESS ELECTRICAL ACTIVITY (PEA)**

1. Confirm the presence of organized ventricular electrical cardiac activity at a rate that could produce a pulse (e.g. 40-150 bpm).
2. Consider differential diagnosis of pulseless electrical activity including hypovolemia, metabolic acidosis, hypoxia, tension pneumothorax, cardiac tamponade, pulmonary embolus, myocardial damage, drug overdose, hyperkalemia and hypothermia, and direct treatment appropriately.
3. Establish IV access and intubate.
4. Administer epinephrine (0.1 mg/ml) 0.5 to 1 mg IV push, and repeat every 2 - 5 minutes for ongoing arrest.
5. Sodium bicarbonate is recommended in special clinical conditions such as cardiac arrest associated with presumptive hyperkalemia (as may occur in dialysis patients), ketoacidosis, or overdose (tricyclic antidepressants, cocaine, diphenhydramine). Empirically sodium bicarbonate may also be considered if PEA is unresponsive to conventional therapy. The dosage for sodium bicarbonate is 1mEq/kg as an IV bolus. Repeat doses of 0.5 mEq/kg may be considered at 10 minute intervals.
6. Atropine is considered in symptomatic bradycardia but is not routinely recommended in PEA arrest. However, atropine 1 mg IV push may be considered in circumstances where there is a suspicion of a primary bradyarrhythmia that may respond to the chronotropic effects of atropine. Treatment with CPR, airway management, and epinephrine should be prioritized.
7. Transcutaneous pacing is not routinely recommended in PEA cardiac arrest. If transcutaneous pacing is considered in a patient with a slow PEA rhythm, it should be initiated for a brief period to determine whether electrical capture and pulse can be achieved. Pacing should be continued only in those who achieve pulses with pacing. Otherwise CPR should be resumed.
8. Paramedics are authorized to perform additional procedures/treatments if the following are suspected:
 - A. Hypovolemia — 2 or more large bore IV lines of ringers/saline solution for fluid resuscitation.
 - B. Cardiac tamponade — pericardiocentesis
 - C. Tension pneumothorax — flutter valve placement
 - D. Hyperkalemia — sodium bicarbonate, calcium chloride
 - E. Drug overdoses — tricyclic antidepressant (TCA) (sodium bicarbonate), calcium channel blockers (calcium chloride), beta blocker overdose (glucagon)
9. Post-resuscitation hypotension should be managed by fluid challenge with repeated LR boluses. Initiation of a levophed drip (4 - 8 mg in 250 ml of D5W) may be necessary and should be titrated to a systolic blood pressure of 80 – 100 mmHg. A systolic blood pressure of ≤ 60 should be supported with chest compressions
10. Medical Control Doctor contact is required regarding patient status regardless of outcome. Medical Control should also be contacted for any additional pharmacologic therapy.

PLAN A — 1d**PEDIATRIC CARDIAC ARREST**

For pediatric cardiac arrest, the following modifications to the Plan A are indicated.

1. Refer to pediatric tape to determine patient's color category. Use the Medic One Pediatric Dosing Card to determine treatment dosing.
2. Dosage for Epinephrine: IV/IO dose: 0.01mg/kg (0.1 mg/ml; 0.1ml/kg) and repeat every 3-5 minutes during arrest. Administration of endotracheal epinephrine should be at the higher dose range of 0.1 mg/kg (1 mg/ml; 0.1 ml/kg) followed by 2 – 5 ml saline flush.
3. Dosage for lidocaine and magnesium is as follows:
 - A. Lidocaine 1 mg/kg IV/IO
 - B. Magnesium 50 mg/kg IV/IO to maximum of 2 g for torsade
4. Management of the airway should be facilitated via endotracheal intubation. If unable to intubate the patient, bag-valve mask ventilation, I-Gel LMA, or jet insufflation may be initiated. Surgical cricothyrotomy is contraindicated in pediatric patients less than 12 years of age. If intubation, bag-valve mask ventilation, I-Gel, and jet insufflation are unsuccessful contact the Medical Control Doctor should surgical cricothyrotomy be essential for patient resuscitation.
4. Intravenous access via peripheral, central, umbilical or intraosseous means are acceptable.
5. If VF or pulseless VT, shock initially at 2 – 4 joules/kg if the defibrillator allows this energy setting. Subsequent shocks may use 4 joules/kg and can be titrated to higher energies for recurrent or persistent VF/pulseless VT. Treat suspected acidosis, hypoxemia, hypovolemia, or hypothermia per Plan A.
6. Medical Control Doctor contact is required regarding patient status regardless of outcome. Medical Control should also be contacted for any additional pharmacologic therapy.

ADDITIONAL COMMENTS FOR PLAN A—1**Endotracheal administration of drugs in cardiac arrest**

- A. Lipid-soluble drugs (Lidocaine, Epinephrine, Atropine, Naloxone – “LEAN”) are absorbed via an endotracheal route. Drugs that are not lipid soluble (e.g. calcium and sodium bicarbonate) should NOT be given endotracheally. Drugs should be diluted in 5 ml of sterile water (or normal saline).
- B. Typically the endotracheal dose is at least 2 X the IV dose of lidocaine, atropine or naloxone, and up to 10 X the dose for epinephrine during cardiac arrest.
- C. Absorption of drugs given endotracheally occurs in the lungs (not the trachea.). Push the drug solution quickly down the tube, followed by several quick insufflations to create a rapidly absorbed aerosol.

Pediatric Cardiac Arrest:

1. Pediatric CPR. Begin CPR as “CAB” (same as in adults). Note however that the chest compression to ventilation ratio for 2 or more rescuers is 15:2 in children (30:2 for adults or if only a lone rescuer is present in children).
 - A. In children 1-8 yrs (absence of secondary sexual characteristics; usually <55 lbs), perform chest compressions at 100/min. Compress chest to ≥ 2 inches or 1/3 of chest depth at compression to ventilation ratio of 15:2. Following intubation, perform chest compressions at 100/min at a compression to ventilation ratio of 10:1 without interrupting chest compressions for ventilation.
 - B. In infants (1-12 months of age) compress chest at 100/min to 1½ inches or 1/3 of chest depth with compression to ventilation ratio of 15:2. Following intubation, perform chest compressions at 100/min at a chest compression to ventilation ratio of 10:1 without interruption in chest compression for ventilation.
 - C. In newborns (0-28 days), compress chest to 1/3 chest depth. Perform 90 compressions and 30 ventilations/minute (compression:ventilation ratio of 3:1), taking ½ second for each compression or ventilation. If cardiac arrest is suspected to be of cardiac etiology, may perform 15:2 CPR. Following intubation the same compression to ventilation ratio of 3:1 should continue, unless a cardiac cause for arrest is suspected, in which case the ratio should be 10:1.
2. Pediatric pad placement (up to age 8)
 - A. Place adult-sized defibrillator pads in the customary location (anterior-lateral), so long as each is not touching the other and are separated at their closest point by at least 2 ½ inches. If the size of the child’s chest is too small to permit such placement, place one defibrillator electrode on the middle of the back, and one on the middle of the chest (anterior-posterior). If the chest wall configuration doesn’t permit separating defibrillation pads by at least 2 ½ inches, consider using infant pads.



PLAN A — 2

SHOCK SECONDARY TO TRAUMA REQUIRING IMMEDIATE VOLUME REPLACEMENT

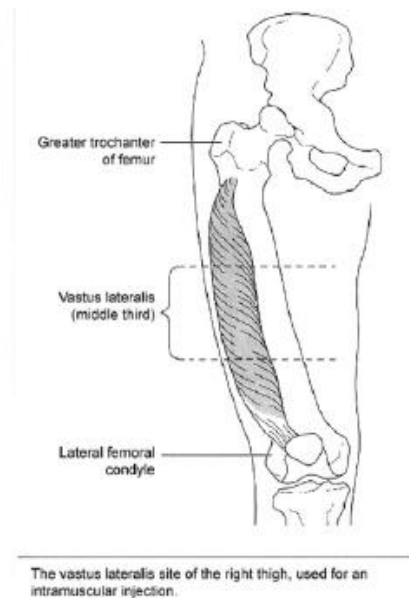
1. Employ necessary immediate first aid measures (e.g. control of hemorrhage).
2. Establish one and when possible two or more large bore intravenous lines.
3. Begin rapid infusion of one or more liters of LR using pressure infusion bags (if available).
4. Consult Harborview Trauma Doctor in all trauma cases where a Level 1 Trauma Facility is indicated. In all other cases, consult the Medical Control Doctor. Transport patient as soon as possible to the appropriate medical facility.
5. Urgent intubation may be performed prior to Medical Control Doctor contact if in the paramedic's opinion any delay could compromise patient outcome. See Plan I.

PLAN B

1. Consult Medical Control Doctor after briefly obtaining history and performing directed physical examination prior to administering any therapy that exceeds routine first aid procedures.
2. Paramedics are authorized to initiate an infusion of intravenous fluids prior to contact with the Medical Control Doctor in all potentially life-threatening situations.
3. In patients with chest pain that the paramedic recognizes as being consistent with ischemic cardiac pain, the paramedic should consider obtaining an ECG, initiating an intravenous line, administering nitroglycerin spray and aspirin 325 mg. prior to Medical Control Doctor contact. When administering nitroglycerin, consider the patient's history, location of MI if present, vital signs, and the number and effectiveness of any self-administered nitroglycerin. Nitroglycerin should typically be avoided in hypotensive patients and patients with inferior ST segment elevation and evidence of right-sided infarction.
4. Emergency intubation may be performed prior to Medical Control Doctor contact if, in the paramedic's opinion, any delay could compromise patient outcome. See Plan I.

PLAN D**EXCITED DELIRIUM, SEVERE AGITATION IN ADULTS**

1. Plan D will be implemented in instances where an adult is severely agitated and/or combative, whose restraint requires 2 or more persons, and is otherwise not accessible for medical evaluation or care.
2. Administer 5 mg/kg ketamine IM in lateral thigh muscle (vastus lateralis - see figure below). May repeat as 2.5 mg/kg IM in 5 minutes if needed.



3. Measure blood glucose and establish vascular access.
4. Apply nasal cannula oxygen and monitor oximetry and end tidal CO₂.
5. Contact medical control for permission for additional ketamine or other sedation if needed.
6. Examine, assess and treat medical condition as indicated.

PLAN H

PATIENTS WITH PRESUMED HYPOGLYCEMIA

1. If the patient has a history of diabetes, or is exhibiting an altered level of consciousness, blood sugar should be measured prior to contact with the Medical Control Doctor.
2. If the blood glucose reading is less than 80, the paramedic should proceed with IV administration of D50W (25 - 50 grams of Dextrose). If venous access cannot be obtained, the paramedic may administer 1 mg glucagon IM. The Medical Control Doctor shall be contacted after medication administration with the results.
3. See "Treat and Leave" guidelines for information on leaving patients at home. Document the glucose level and patient status after therapy.

PLAN I**INTUBATION STANDING ORDERS**

1. Emergency intubations may be performed prior to Medical Control Doctor contact if in the paramedic's opinion a delay could compromise patient outcome. The following medications and procedures may be used (adult doses listed; use corresponding pediatric doses):

1. Premedicate, sedate, or induce anesthesia as needed. All, some, or none of the following agents may be needed depending on the patient's neurological, hemodynamic, or intravascular volume status:
 1. Morphine (2 mg increments)
 2. Versed (1 – 2 mg increments)
 3. Atropine (0.02 mg/kg -- pediatric dosage)
 4. Etomidate (0.2 to 0.3 mg/kg) (Lower dose of the range should be considered for elderly, hypotensive, or hypovolemic patients.)
- b. Paralyze with succinylcholine (1 – 1.5 mg/kg)
- c. Continue paralysis as clinically needed with rocuronium (~0.5 mg/kg) once the airway has been secured. A lower dose may be used in patients with evolving presentations for whom repeated clinical exam may be required.
- d. Continue sedation and pain management with benzodiazepine and morphine as needed

2. If endotracheal intubation cannot be accomplished in the standard manner, any of the following may be used:

1. Bag valve mask ventilation
2. I-Gel LMA
- c. Jet insufflation
- d. Cricothyrotomy

3. Contact the Medical Control Doctor as soon as possible after intubation.

PLAN M

MCI STANDING ORDERS FROM KC MCI PLAN

1. The MCI Standing Medical Orders are to be used during a Mass Casualty Incident. It is understood that communication may be difficult or impossible, and online medical control may not be possible.
2. Authorization for paramedics to act pursuant to these MCI Standing Medical Orders is in effect while on or off duty.
3. Standard of care shall apply when operating during an MCI. Whenever possible Harborview shall serve as the Disaster Medical Control Center (DMCC). Overlake Medical Center shall serve as the back-up DMCC.
4. No permission is required to “cease efforts”.
5. If the DMCC cannot be activated, the Medical Group Supervisor or Transport Officer shall notify receiving hospitals of the number of patients that the hospital is receiving, and their triage color.

PLAN O

ORGANOPHOSPHATE POISONING STANDING ORDERS

Organophosphate Standing Medical Orders are in effect when exposure to a nerve agent (from a terrorist act, industrial or agricultural poisoning) is suspected and the signs and symptoms of nerve agent poisoning are present. These signs/symptoms may include unexplained runny nose, tightness of chest with difficulty breathing, pinpoint pupils, blurred vision, drooling, excessive sweating, nausea, vomiting, abdominal cramps, involuntarily urination or defecation, jerking, twitching, staggering, headache, drowsiness, coma, convulsions, apnea. Remember: S.L.U.D.G.E. (salivation, lacrimation, urination, defecation, GI distress, emesis)

1. Immediately administer atropine as a 2 mg dose IM into the thigh muscle.
2. Provide respiratory support to include bag mask ventilation or endotracheal intubation as required.
3. Anticipate large quantities of secretion and remove by suction device(s).
4. Anticipate that additional doses of atropine may be required, titrating to patient's condition.
5. Contact should be made with the Medical Control Doctor.

PLAN S**STANDING ORDERS FOR PATIENTS WITH ONGOING SEIZURES (status epilepticus)**

Adults (be sure to check blood glucose and treat if < 60 mg/dl)

Initial therapy

- *Midazolam*:
10 mg IM or Intranasal (5 mg in each nostril)
- OR
- 10 mg IV or IO (administer over 2 minutes or until seizure ends)

2nd Round

Dosages may be repeated in 5 minutes if seizures persist.

If failed two doses of benzodiazepines, then give:

- *Phenobarbital*: 260 mg IV or IO

Pediatrics (be sure to check blood sugar and treat if < 60 mg/dl)

Initial therapy

- *Midazolam*
0.2 mg/kg IM or Intranasal up to 10mg
- OR
- 0.1 mg/kg IV or IO up to 10mg (administer over 2 minutes or until seizure ends)

2nd round

Dosages may be repeated in 5 minutes if seizures persist.

If failed two doses of benzodiazepines, then give:

- *Phenobarbital*: 20 mg/kg IV or IO up to 260 mg

PLAN W

AIR AND WILDERNESS OPERATIONS

Plan W

1. Plan W shall be implemented when King County Medic One Paramedics are caring for patients in remote areas of operation where online medical control cannot be established.
2. The program medical director or his designee will be notified and briefed before an air or wilderness operation, in the event that online medical control cannot be established while on scene.
3. Standard of care shall apply when operating without online medical direction.
4. No permission required to “cease efforts”.