Professional Development & Training

Firefighter Prehospital Care Program

Maintenance Module 4
Upon successful completion of the Firefighter Prehospital Care Maintenance Module 4 Program, on line knowledge evaluation and in-class practical session, the firefighter will:

• Review the age parameters of all pediatric patients
• Review the components of a labour and delivery kit
• Review the steps in assisting with a non-complicated baby delivery
• Review the Heart & Stroke Foundation guidelines for Pediatric Foreign Body Airway Obstruction, CPR and Neonatal Resuscitation
When Prehospital Resuscitative Care is required and provided by a firefighter, the following age parameters will be considered:

A neonate is from 0 to 24 hours of age where 0 is defined as the time of delivery when delivered outside of the hospital environment or from the time of discharge from hospital.

An infant is from 24 hours to 1 year of age and a child is from the age of one to puberty. In accordance to the Heart & Stroke Foundation of Canada, puberty is when a male patient develops body hair and a female patient develops breast tissue.
The guidelines of the Heart and Stroke Foundation of Canada indicated that the recommended way to compress on the chest of a/an:

- Neonate is with the encircling technique
- Infant is with the encircling technique or the ring and middle finger
- Child is with the heel of one hand

The key term above is **recommended**. As a rescuer, if you find that your infant patient is larger and you are having difficulty compressing the chest the required $\frac{1}{2}$ the chest diameter, switch to using one hand. Additionally, if you find that your child patient is larger, it is permissible to use the heel of two hands to compress the chest the required depth of 2".
Components of a Labour Delivery (Obstetrics) Kit
OB Pad
( to be provided to the mother for her use after delivery of baby )

Sterile Disposable Gloves
( for use by firefighter delivering the baby )

Baby Blanket
( used for keeping baby warm after they have been cleaned )

OB Pad
( to be provided to the mother for her use after delivery of baby )

Plastic Bag with Twist Ties
( used for storage of the placenta )

Scissor
( used for cutting umbilical cord )
Obstetrical (OB) Kit

- Absorbent Towel
  - Used for cleaning baby, creating working area, etc.

- Bulb Suction Aspirator
  - Used for suctioning neonate’s mouth and nose

- Gauze
  - Used for cleaning baby

- Umbilical Cord Clamps
  - Used for clamping umbilical cord

- Forcep
  - May be used to clip/hold sheets in place
Contents of the unopened, undamaged Obstetrical Kit are sterile. Be sure to check package expiry date and package integrity at the start of your shift.
Labour Delivery Review / Non Eventful Delivery
Remember that childbirth is natural. In most cases, intervention is not required and treating the mother will always benefit the baby.

Part of your assessment should include:

- Your patient’s name
- Your patient’s age which could help determine if delivery or fetal complications may occur
- The baby’s due date which will assist you in determining if the neonate is premature or overdue
- Is this her first pregnancy? (labour is sometimes slower in first pregnancies. This will help you in determine if a delivery at scene is more likely to occur)
• Ask the mother when her labour begins and how far apart are the contractions. Contractions can be timed from the start of the first contraction to the start of the second contraction.
• Has her water broken and if so, was there a bloody show?
• Did she receive prenatal care and if so, are there any known complications?
• Are multiple babies expected? This will determine if extra assistance is required.
Delivery can be expected within a few minutes when the contractions are less than 3 minutes apart or a presenting part of the infant is visible in the birth canal.

You will need consider setting up the labour/delivery kit for a delivery at the scene if EMS is delayed, if contractions are frequent, or if a presenting part of the infant is already visible.
Be calm and reassuring while protecting the mother’s modesty and prepare for delivery in a warm, private location.

Use proper Personal Protective Equipment (PPE) including safety glasses, nitrile disposable gloves for the firefighter supporting the mother and sterile disposable gloves for the firefighter delivering the baby, N95 mask and disposable gowns in order to protect yourself, the baby and the mother from exposure to body fluids. There is a high potential of exposure because of body fluids released during childbirth.

Avoid wearing contaminated clothing such as bunker gear while assisting in delivering the infant as the newborn has limited immunity to illness.

If for any reason you **DO NOT** have the above noted PPE, you may wear clean bunker gear in order to protect yourself.
In order to ensure the working area for the delivery is as clean as possible, place sheets or clean towels under the mother. Elevate the mothers hips and support her head with one or two pillows.

If you have sufficient sheets available in the obstetrics kit, place one sheet under the mothers buttocks, one draped over her abdomen and the third draped over her thighs. You may use the forceps found in the obstetrics kit in order to attach sheets together or hold sheets up in order to maintain privacy.
Allow the mother to push the head out and support the neonate’s head as it emerges by placing your gloved hand over the head.

Gently slide your finger around the neck to ensure the cord is not wrapped around it. If the umbilical cord is around the baby’s neck, it can usually be gently slipped over the head to release it – don’t pull if there’s resistance.

After the head has been delivered you may suction fluid from the mouth first, then the nostrils. Stimulation around the nostrils may cause the baby to gasp, so be sure you have first suctioned any liquids from the mouth.
Once the head is delivered, the rest of the delivery is usually quick. When the upper shoulder is visible, gently guide the head down slightly if needed in order to assist delivery.

Once the body is completely delivered be sure to handle the neonate firmly, but gently. Ensure the neonate’s neck is in a neutral position in order to keep the airway open. Remember: the neonate will be slippery.

Ensure the neonate is kept level with the vaginal opening until the umbilical cord has stopped pulsating and has been clamped.
Once umbilical cord pulsation ceases, approximately 30 – 60 seconds after delivery, apply the first umbilical cord clamps approximately 7” from the neonate and the second clamp approximately 3” above the first clamp. Leaving the clamps in this position will allow for resuscitative care in the field and further assessment within the hospital.

Cut the umbilical cord between the two clamps. If for any reason, only one umbilical cord clamp is available, **DO NOT** cut the umbilical cord unless resuscitation of mom or the neonate is required.
For legal purposes, it is important to note the delivery time of the neonate(s).

Begin your assessment and care of the neonate based on the pediatric inverted triangle. Each coloured step within the triangle utilizes 30 seconds of care prior to moving on to the next required step.

While drying the neonate, be sure to use a vigorous motion for at least 30 seconds in order to aid in stimulating the neonate. Most newborns do not require intervention beyond this step.
The APGAR score is a simple assessment of how a neonate is doing at birth, which helps determine whether the neonate is ready to meet the world without additional medical assistance.

A firefighter should do and document this quick evaluation by adding all the scores for appearance, pulse, grimace, activity, and respirations at one minute and five minutes after the neonate is born.

<table>
<thead>
<tr>
<th>Sign</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Blue/pale overall</td>
<td>Body pink, limbs blue</td>
<td>Pink overall</td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td>Absent</td>
<td>&lt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td><strong>Grimace</strong>*</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough or sneeze</td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td>Limp</td>
<td>Some flexion of extremities</td>
<td>Active motion</td>
</tr>
<tr>
<td><strong>Resp. effort</strong></td>
<td>Absent</td>
<td>Slow, irregular</td>
<td>Good, crying</td>
</tr>
</tbody>
</table>
After delivery of the neonate, the mother will be bleeding. Place the OB Pad (sanitary napkin) found in the obstetrical kit over the vaginal opening. Don’t be alarmed if the post delivery bleeding soaks through both napkins.

In order to assist with bleeding control have the mothers partner, your partner or yourself massage the fundus of the uterus in order to stimulate uterine contractions. The uterus will be easy to feel in her abdomen after delivery. You may also encourage, but not force the mother to breast feed the neonate as this will release a hormone that also promotes uterine contractions and controls bleeding.
The placenta is attached to the end of the umbilical cord and is approximately 7” in diameter and 1” thick. The placenta will deliver anywhere from a few minutes or as long as 30 minutes after the birth of the neonate.

Once the placenta delivers, wrap it and the cord in a towel, place them the plastic bag found within the obstetrical kit and send to the hospital with the patient so it can be examined.

Never pull on the end of the umbilical cord as this may tear the cord, the placenta or both and cause serious, life threatening bleeding for the mother.
Pediatric CPR for the Health Care Provider
The following approach to Pediatric CPR will reflect that you are responding as professional prehospital care provider with an equally trained partner, access to medical oxygen, a bag valve mask and an automated external defibrillator.

Additionally, **ALL PEDIATRIC PATIENTS** are **NOT PERMITTED** to be enrolled or considered for any ongoing medical research (i.e. ROC). Therefore, you should never perform CCC CPR on a neonate, infant, or child.
As in all patient care calls, but most importantly in pediatric calls, remember to always start with a doorway assessment involving the Pediatric Triangle.

As you enter a location where a sick or injured pediatric patient is located, quickly visualize the:

- appearance of the pediatric patient
- work of breathing
- circulation to the skin
Once you and your partner have entered the location of the pediatric patient, establish unresponsiveness, assess for respiratory effort and assess a carotid pulse. This assessment should take no longer than 10 seconds.

If you find the patient to be showing no signs of life, not breathing and have no palpable carotid pulse begin high quality chest compressions and compress $\frac{1}{2}$ the depth of the chest.

Be sure to advise your partner of the patient status.
During the first minute or until your partner has the AED attached of a pediatric cardiac arrest call, you will be performing high quality chest compressions at a rate of 100 compressions per minute only.

Your partner’s responsibility will be to apply the AED pads onto the patient ensuring that there is at least 1 inch between the pads when they are placed on the chest.

If the pads are closer than one inch the pads will be need to be placed in the anterior/posterior position. You may also need to remove the accelerometer from the pads.
Once the AED pads are attached to the patient and your partner is ready with the airway management equipment, you may switch over to the two rescuer CPR rate of 15 compressions to 2 ventilations. CPR compression rate continues at 100 compressions per minute and it should take approximately 9 seconds to perform 15 compressions.

Compress the chest $\frac{1}{2}$ the depth of the chest or at least 1$\frac{1}{2}$ inches for a patient under one year of age and up to 2 inches for a patient between one and puberty.

Be sure to minimize interruptions in compressions to less than ten seconds between the last compression of one cycle and the first compression of next cycle.
Correct positioning of the airway is critical when managing a pediatric patient. Always position the airway in a neutral sniffing position as it will prevent the trachea from kinking and maintain a proper alignment should you have to immobilize the spine.

The sniffing position can be determined by an imaginary line through the middle of the child’s ear to the top of their clavicle and can be maintained by placing padding (approx. 1 inch thick) under the shoulders and upper torso.
Oropharyngeal airways (OPA) should only be used in pediatric patients who are unresponsive with no gag reflex. In addition, **DO NOT** use an OPA in a pediatric patient who may have ingested a caustic or petroleum based product as it may induce vomiting.

Sizing an OPA is similar to an adult patient, from the corner of the mouth to the earlobe. When inserting use a tongue depressor to lift the tongue *up and away from* the airway, insert the airway as it would rest within the oropharynx and until flange rests against lips.

Take care to avoid injuring the hard palate as you insert the OPA as rough insertion can cause bleeding.
Pediatric Choking for the Health Care Provider
More than 90% of pediatric deaths due to foreign body airway obstructions (FBAO) occur in children less than 5 years of age. Infants and small children are at higher risk of choking because they often insert objects into their mouths.

Liquids are the most common cause of choking in infants whereas balloons, small objects and foods such as hot dogs, grapes and round candies are the most common cause in children.

Signs of a choking pediatric patient include a sudden onset of respiratory distress, coughing, gagging, stridor or wheezing.
If the Foreign Body Airway Obstruction is mild, demonstrated when the infant patient has a strong, forceful, and noisy cough, **DO NOT INTERFERE**.

If the Foreign Body Airway Obstruction is severe, demonstrated when the infant is unable to make a sound, hold the infant facedown while supporting head and deliver five back blows (slaps) followed by five chest compressions.

Repeat sequence until object is cleared or the infant becomes unresponsive.
If the Foreign Body Airway Obstruction is mild, demonstrated when the child patient has a strong forceful cough, **DO NOT INTERFERE**.

If the Foreign Body Airway Obstruction is severe, demonstrated when the child is unable to forcefully cough, has an increase in respiratory difficulty and stridor, or is unable to make a sound, kneel down behind the child and perform repeated abdominal thrusts.

Repeat sequence until object is cleared or the child becomes unresponsive.
If your pediatric choking patient becomes unresponsive, carefully lower them and place them on a firm flat surface.

Update your partner on the change in patient status so that they can turn on the AED and begin getting the airway equipment ready.

Open the airway using the head tilt-chin lift method and visualize the airway.

**If you see an object**, remove it with the suction unit or a finger sweep procedure. Reassess the patient’s A,B,C’s and continue with appropriate patient care based your findings and your medical directives.
If you do not see an object, immediately perform 15 chest compressions. After the chest compressions are complete, visualize the airway and if you see an object, remove it and administer two ventilations.

If after 15 chest compressions you do not see the obstruction, do not attempt to ventilate and continue with chest compressions. After every set of chest compressions, visualize the airway for the obstruction.

After every two minutes of chest compressions (10 sets of compressions and checking the airway) reassess the patients A,B,C’s. If the patient goes pulseless, attach the AED and continue with your medical directives.

Always remember to visualize the airway for the obstruction after every set of chest compressions and prior to ventilating the choking unresponsive patient.
Neonatal Resuscitation
Anticipation, adequate preparation, accurate evaluation and prompt initiation of prehospital care are important factors in a Neonatal Resuscitation.

The Neonatal Resuscitation Flowchart will assist you in that providing care in an appropriate and timely manner.
It is important to remember that all levels of care are comprised of 30 second time frames and all assessments are comprised of 10 second time frames.
Neonates **DO NOT** handle cold temperatures well. While drying the neonate from head to toe, use a vigorous motion for at least 30 seconds in order to aid in stimulating the neonate.

In your scene preparation you can stack four clean towels on each other. Place the neonate on the towels and after drying the infant, remove the first wet towel. The next towel can be used to keep the neonate warm and if required the remaining towels can be used to help maintain a neutral open airway.
Unlike adults, neonates who have difficulty will usually go into respiratory arrest first. It is essential to ventilate the neonate well with the proper equipment and to position the neonate with the head slightly lower than the abdomen in order to promote continual drainage of remaining amniotic fluid.

If required, continue to suction the oropharynx (mouth) first and nasopharynx (nose) second. Remember to squeeze the bulb suction prior to inserting into the neonate’s mouth or nose.
The ventilation rate for a neonate is 1 breath every 3 seconds.

If you are required to ventilate a neonate that has an ineffective gasp, apneic or has a pulse rate between 60 – 100 bpm, ventilate with room air only for the first 30 seconds of care. Oxygen can be attached to the BVM for ventilations after the first set.

When ventilating a neonate, ensure you use a pediatric BVM with a properly sized face mask and ensure the Pressure Limiting Valve (PLV) is in the open position. The PLV valve will activate when 35cm of pressure is achieved and is designed to prevent over inflation of the chest.
While using the “C” and “E” maneuver to maintain a seal, the rescuer at the head will maintain an open airway with a head tilt/chin lift maneuver so that the neonate is in the sniffing position.
Chest compressions are needed for a neonate who is pulseless or has a heart rate below 60. The compression / ventilation ratio for a neonate is 3:1 and compression depth is one third the depth of the chest.

Visualize the landmark for compressions which is just below the nipple line on the middle third of the sternum. For two rescuers, wrap your hands around the neonates body (encircling technique), with your thumbs resting at the landmark position. For a single rescuer, use your index and middle finger to perform compressions.
For all questions pertaining to this module, contact your E.M.S. Command Coordinator.