Firefighter Pre-Hospital Care Program
Module 22

Obstetrical Emergencies
and
Neonatal Resuscitation

SUNNYBROOK - OSLER
CENTRE FOR PREHOSPITAL CARE

TORONTO
Firefighter Pre-Hospital Care Program
Module 22

At the end of the lesson and upon completion of the post test quiz, the participant will demonstrate an understanding of how to:

• prepare for an imminent delivery

• assess and determine if a mother will be delivering in the prehospital environment

• deliver a neonate(s) in the prehospital care environment

• care for the mother and newly born infant after delivery

• assess and care for a neonate in distress

• recognize and care for potential delivery complications
Firefighter Pre-Hospital Care Program
Module 22

Anatomy of a Pregnant Woman and the Stages of Labour
Placenta - disk shaped structure that allows nutrients, oxygen and many toxins to be passed between mother and fetus.

Uterus - the muscular organ where the fetus develops.

Cervix - contains a mucous plug that seals opening from outside environment.

Amniotic fluid - helps insulate and protect floating fetus.

Umbilical Cord – infant’s lifeline, connecting mother and infant through placenta.

Sacrum

Bowel

Vagina

Bladder

Pubic Symphysis – this bone sometimes is an obstacle to delivery of the shoulders.
Three Stages of Labor

First Stage

• begins with the onset of contractions and ends when the cervix is fully dilated

• with first pregnancy this stage may last an average of 16 hours

• Women who have already had babies can have a more rapid progression of labour
Three Stages of Labor

Second Stage

• begins when the cervix is fully dilated and ends when the neonate is born

• this stage is typically very short as the neonate passes through birth canal, contractions are usually closer together and last longer
Three Stages of Labor

Third Stage

• begins with the birth of the neonate and ends with the delivery of the placenta

• may take up to 30 minutes to occur
Firefighter Pre-Hospital Care Program
Module 22

Potential Emergencies
Before
Full Term
Preeclampsia

- Also known as pregnancy induced hypertension
- Can develop after the 20th week of gestation

Signs & symptoms may include:

- Headache
- Seeing spots
- Swelling in hands and feet
- Anxiety
- High blood pressure
Eclampsia

- Defined as seizures that result from severe hypertension

Prehospital treatment includes:

- Maintaining the airway
- Be prepared for vomiting
- Supplying supplemental oxygen
- When seizure is complete, lay the mother on her left side if possible
Supine Hypotensive Syndrome

- A complication due to compression of the pregnant uterus on the inferior vena cava when the mother is lying supine
- This will result in low blood pressure (hypotension)

Prehospital treatment includes:

- lay the mother on her left side or
- place 2” – 3” wedge under right pelvis
Ectopic Pregnancy

- Occurs once in every 200 pregnancies
- Pregnancy implants in a location outside of the uterus
- Leading cause of maternal death in the first trimester due to internal abdominal bleeding following rupture
- Should be considered for any female of child bearing age with severe lower abdominal pain and a missed menstrual period (the patient may not have even realized she was pregnant)
Placenta Abruptio

- Premature separation of the placenta from the uterus
- Occurs in the later stages of pregnancy
- Can sometimes occur after trauma in a pregnant patient

Signs and symptoms may include:

- Vaginal bleeding of bright red blood
- Severe abdominal pain
Placenta Previa

* The placenta develops over and covers the cervix
* Becomes an issue in the later stages of pregnancy
* Can occur spontaneously

Signs and symptoms may include:

- Vaginal bleeding of bright red blood
- No abdominal pain
Miscarriage

• Due to a complication or injury, delivery of the fetus or placenta before the 20th week

• Infection and bleeding are the most important complications

• Treat the mother for shock

• Offer supportive care to mother
Firefighter Pre-Hospital Care Program
Module 22

Assessment of your Pregnant Patient
Always Remember

• childbirth is natural

• in most cases, intervention is not required

• treating the mother will always benefit the baby
Evaluating the Mother

Part of your assessment should include:

- Your patient’s name
- Your patient’s age
  - this 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
Evaluating the Mother

• ‘Is this her first pregnancy?’
  - which will aid you in determining if a prehospital delivery is likely to occur

• ‘When did the labour begin?’

• How far apart are the contractions?’
  - these are timed from the start of the first contraction to the start of the second contraction

• ‘Has her water broken?’
  - the uterus will hold 500 to 1,000 mL of amniotic fluid
Evaluating the Mother

• ‘Was there a bloody show?’
  - when the cervix dilates and the mucus plug is discharged, a small amount of blood may appear at the vagina when labour begins

• ‘Did mother receive prenatal care and are there any known complications?’
  - this will assist you in determining your patient care plan

• ‘Multiple babies expected?’
  - this will determine if extra assistance is required
Evaluating the Mother

- if the mother has an urge to push
  assess for crowning
  - crowning is when the perineum begins to bulge significantly and the top of the infant's head begins to appear at the vaginal opening

- obtain a complete set of vital signs
When to Consider a Prehospital Delivery

Delivery can be expected within a few minutes when:

- the contractions are less than 3 minutes apart
- a presenting part of the infant is visible in the birth canal
- EMS is not available or delayed
Firefighter Pre-Hospital Care Program
Module 22

Preparing for a Prehospital Delivery
Preparing for Delivery

- Be calm and reassuring while protecting the mother's modesty

- Prepare for delivery in a warm, private location

- Use proper Personal Protective Equipment (PPE) including safety glasses, gloves, N95 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

- Do not wear contaminated clothing, such as bunker gear, while assisting in delivering the infant

- Prepare OB kit
Obstetrical ( OB ) Kit

- Surgical scissors or a scalpel
- Umbilical cord clamps
- Bulb suction
- Disposable towels
- 4” x 4” gauze sponges
- Sterile gloves
- Incontinence pad
- Sanitary napkins
- Infant blanket
- Plastic bags
- Twist ties
- Clamps
- Alcohol wipes
- Surgical drapes
Positioning for Delivery

- Place sheets or clean towels under the mother
- Elevate the mother's hips and support her head with one or two pillows
- Place sheets and towels from OB Kit to make a clean delivery field
- Place one sheet under her buttocks, one draped over her abdomen and the third draped over her thighs
Assisting with Normal Delivery

- Allow the mother to push the head out
- Support the neonate’s head as it emerges by placing your gloved hand over its bony parts
- Gently feel around the neck to ensure the cord is not wrapped around it (it can usually be gently slipped over the head to release the neck – don’t pull if there’s resistance)
Assisting with Normal Delivery

- After delivery of the head suction fluid from the mouth first, then the nostrils
- Be sure to squeeze the bulb suction prior to inserting into the neonate's mouth or nose
Assisting with Normal Delivery

• Once the head is delivered, the upper shoulder will be visible

• Gently guide the head down slightly, if needed, to assist the upper shoulder to deliver
Assisting with Normal Delivery

- Support the head and upper body as the shoulders fully deliver.

- If required, you may need to gently guide the head upwards in order to deliver the lower shoulders.
Assisting with Normal Delivery

- Once the body is delivered, handle the neonate firmly, but gently
- Remember, the neonate will be very slippery
- Ensure the neonate’s neck is in the neutral position in order to keep the airway open
Assisting with Normal Delivery

- Ensure the neonate is kept level with the vagina until the cord is clamped and cut.

- You may dry and assess the neonate at this level until the cord stops pulsating and the umbilical clamps are applied.
Clamping and Cutting the Umbilical Cord

- Once umbilical cord pulsation ceases, approximately 30 – 60 seconds after delivery, apply umbilical cord clamps.

- Place the first clamp approximately 7” from the infant and the second clamp approximately 3” above the first clamp.

- Cut the umbilical cord between the two clamps.

Note: If you only have one umbilical cord clamp, **DO NOT** cut the cord unless resuscitation is required.
For legal purposes, it is important to note the delivery time of the neonate(s).

Begin newborn assessment and care based on the pediatric inverted triangle.

Conduct an APGAR assessment and note the score.

Prepare for delivery of the placenta.
Tactile Stimulation

- 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.

- Once the baby is dry and breathing, wrap them to prevent heat loss.
**APGAR Score**  
( conducted at 1 & 5 minutes post-delivery )

<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>

* response to insertion of suction catheter in the nose
Post Delivery Care of Mother

• Place sanitary napkin over vaginal opening. Don’t be alarmed if mother soaks through 3 napkins
• Have mother lower legs and keep them together, and elevate feet
• Reassess mothers A, B, C’s
• Massage the fundus of the uterus to stimulate uterine contractions and control bleeding
  • Encourage, but don’t force, breast feeding as this will also promote uterine contractions and help control bleeding
• Prepare for delivery of the placenta
Delivery of Placenta

- Placenta is attached to the end of the umbilical cord and is approximately 7” in diameter and 1” thick

- It should deliver within a few minutes after birth or it may take as long as 30 minutes

- Once the placenta delivers, wrap it and the cord in a towel, place them in a plastic bag 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
Firefighter Pre-Hospital Care Program
Module 22

Potential Emergencies During Delivery
Unruptured Amniotic Sac

- Will appear as a bulging, fluid filled sac emerging from the vagina

- If the neonate is crowning and the amniotic sac is unruptured, the baby might be stuck and deprived of oxygen

- You must break the sac to allow the delivery to proceed

- Puncture the sac with an item that will not harm the infant (suggestions: try pinching it and tearing it with your fingers, or making a tiny nick in the membrane with scissors)

Once the sac is ruptured, gently push it away from the infant
Umbilical Cord Around the Neck

- Also known as a nuchal cord
- Use your index finger of your other hand to remove the cord from around the neonate’s neck by gently slipping it over the neonate’s head
- If you are unable to remove the cord, you must then clamp the cord with umbilical clamps at least 2” apart and cut the cord between the clamps
Breech Presentation

- Is when the buttocks come out first

- Breech deliveries are usually slow, giving EMS time to get the mother to hospital

- If delivery has begun, support the neonate as it comes out

- Allow the buttocks and legs to deliver spontaneously

- Allow the legs of the neonate to dangle on either side of your arm while you support the chest and trunk
Breech Delivery

- After the delivery of the rest of the body, the neonate’s head is almost always facedown and should be allowed to deliver normally (but it may become stuck)
- It’s important to keep the infant’s airway open if the head is stuck
- Make a “V” with your gloved fingers, then place them into the vagina to prevent the walls of the vagina from compressing neonate’s airway
Limb Presentations

• This is a very rare occurrence

• This is a true emergency that requires immediate transport by EMS

• Do Not attempt to push the limb back in and Do Not pull on it

• Cover the protruding limb with a sterile dressing

• Have mother lay on her back, head down and pelvis elevated

• Administer oxygen to mother in order to assist both mother and fetus
Prolapsed Cord

- Is a very rare and dangerous occurrence as the neonate’s head may compress the umbilical cord

- **Do Not** attempt to push the cord back into the vagina

- Place mother in Trendelenburg position with her pelvis elevated higher than her head. This will keep the weight of the neonate off the prolapsed cord
Prolapsed Cord

- Alternatively, have mother kneeling, bent forward, facedown and in the knee-chest position

- Wrap the exposed umbilical cord with a sterile dressing, moistened with saline

- Administer oxygen to mother in order to assist both mother and fetus
Firefighter Pre-Hospital Care Program
Recruit Presentation

Potential Emergencies After Delivery
Fetal Demise

• Occurs when the neonate has dies in the uterus prior to labour

• This is a very emotional situation for family and providers

• These neonates may be born with skin blisters, skin sloughing, and dark discoloration

• Do not attempt to resuscitate an obviously dead neonate
Meconium Aspiration

- Meconium is a dark green material found in the amniotic fluid
- Can be either thick or thin
- If the neonate aspirates thick meconium, suction mouth then nose immediately
- Avoid stimulating infant before suctioning
- Remove as much meconium as possible before breathing starts
- Ensure the “PEEP” valve is closed on the pediatric BVM
- Update paramedics
Firefighter Pre-Hospital Care Program
Recruit Presentation

Unique Delivery Considerations
Twins

- Occur about once in every 80 births
- Twins are usually smaller than single neonates and delivery is typically not difficult
- Twins are generally delivered within 45 minutes of each other
- Delivery procedures are the same as that for single neonates.
Twins

- There may be one or two placentas to deliver

- Clamp and cut the cord of the first neonate as soon as it has been born and before the second neonate is delivered

- If the twins are identical, there will be one placenta with two umbilical cords coming from it

- If the twins are fraternal, there will be two placentas

- Time of birth is important to note and with multiple births, indicating the first neonate delivered with “Baby A” is important
Premature Neonates

- Delivery before 8 months gestation or weight less than 5 lb at birth is considered premature

- Keep the neonate warm

- Keep the mouth and nose clear of mucus

- Observe the cut end of the cord attached to the neonate for bleeding

- Give oxygen (blow-by)

- Protect them from contamination

- Update paramedics
Delivery Without Sterile Supplies

• You should always have safety glasses and nitral gloves with you
• Use clean sheets and towels that have not been used since being laundered
• Wipe the inside of the mouth with your finger in order to clear out blood and mucus
• Do not cut or clamp umbilical cord
• Keep placenta and neonate at same level
Firefighter Pre-Hospital Care Program
Recruit Presentation

Neonatal
Resuscitation
Age Parameters

When resuscitative care is required, the following age parameters will be considered:

**Neonate**

- is 0 to 24 hours of age.
- 0 is defined as the time of delivery or discharge from hospital

**Infant**

- is 24 hours to 1 year of age
Initial Assessment

- Calculate the first APGAR score

- While drying the neonate, be sure to use a vigorous motion for at least 30 seconds in order to aid in stimulating the infant

- Dry the neonate from head to toe, keep them warm by wrapping them in a blanket and cover their head

- Neonates DO NOT handle cold temperatures well
Clearing the Airway

• Position the neonate with the head slightly lower than the abdomen in order to promote continual drainage of 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
Breathing and Circulation Assessment

- Unlike adults, neonates who have difficulty will usually go into respiratory arrest first.

- It is essential to ventilate / oxygenate the neonate well, with the proper equipment.

- If the neonate is breathing well check the pulse rate by feeling the brachial pulse on the side closest to you.

- Follow the Neonatal Resuscitation Flowchart for care based on your respiratory and circulatory findings.
Performing Airway Management on a Neonate

- Ventilation rate for a neonate is 1 breath every 3 seconds
- Ensure you use a pediatric BVM with a properly sized face mask
- Ensure the “PEEP” valve is in the open position and that you only ventilate until you achieve adequate chest rise
- The “PEEP” valve will activate when 40cm of pressure is achieved
Performing Airway Management on a Neonate

• 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.
Performing Chest Compressions on a Neonate

• Chest compressions are needed for a heart rate below 60 or no pulse if the infant has not responded to 30 seconds of ventilation

• Compression / ventilation ratio for a neonate is 3:1

• 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 neonate's body (encircling technique), with your thumbs resting at the landmark position. For a single rescuer, use your index and middle finger to perform compressions.
Performing Chest Compressions on a Neonate

- Compress against the sternum, compressing 1/3 to 1/2 the chest depth

- Ventilate with a pediatric BVM after every third compression

- Compress at a rate of at least 100 compressions per minute and 20 ventilations per minute

- Switch rescuers performing compressions after every two minutes in order to prevent rescuer fatigue
Neonatal Resuscitation Flowchart

**Stimulate and Dry Vigorously**

- Effective Crying with Stimulation
- Evaluate Respiratory Effort
  - > 100 b.p.m.
    - Observe, Continue Primary Assessment and Monitor
  - > 60 b.p.m. and < 100 b.p.m.
    - Ventilate (BVM & Oxygen) for 30 seconds
  - < 60 b.p.m.
    - Perform CPR at a Rate of 3:1 for 30 seconds

- Ineffective Gasping / Apneic
  - Ventilate (BVM & Oxygen) for 30 seconds

**Evaluate Heart Rate**
Minimal Resuscitative Care

- When the neonate is breathing effectively and has a heart rate > 100 bpm, complete your primary assessment, provide supportive care and monitor.
Moderate Resuscitative Care

- When the neonate is breathing effectively and has a heart rate > 60 bpm and < 100 bpm, perform ventilations with a BVM at a rate of 1 breath every 3 seconds

- Reassess the neonate’s pulse rate after 30 seconds and continue with appropriate care based on the pulse rate until EMS arrives
Resuscitative Care with Effective Breathing

- When the neonate is breathing effectively and has a heart rate < 60 bpm perform compressions and ventilations at a rate of 3:1

- Reassess the neonate’s pulse rate after 30 seconds and continue with appropriate care based on the pulse rate until EMS arrives.
Resuscitative Care with Ineffective Breathing & Pulse Rate

- When the neonate is breathing ineffectively perform ventilations with a BVM at a rate of 1 breath every 3 seconds
- Assess the neonate's pulse rate after 30 seconds
- Continue with appropriate care based on the pulse rate until EMS arrives
Firefighter Pre-Hospital Care Program
Recruit Presentation

Midwives
Definition

• Registered Health Care Professionals who provide care to women with low-risk pregnancies

• There are approximately 500 Midwives in Ontario

• Ontario first Province to regulate in 1994

• Midwives provide care to the mother throughout the pregnancy and to the mother and neonate throughout labour and birth. They will also continue with follow up care for up to 6 weeks after birth
Midwives in Ontario

- Complete a four year University Degree (Midwifery Education Program)
- Licensed through College of Midwives of Ontario
- Funded by Ministry of Health & Long Term Care
- Midwives have hospital privileges and can order prenatal tests, ultrasounds and discuss results with patient
Interaction

- The midwife is responsible for care during the labour, birth of the neonate and postpartum (following childbirth) care.

- Confirm with the patient that the midwife has been retained by them.

- Confirm that midwife is registered with the College of Midwives of Ontario.

- Stand by and assist with providing quality care to mother and neonate.

- Prepare to take over care of the patients should the situation warrant or if requested by the midwife.

- Midwives can not delegate medical acts to firefighters.
Firefighter Pre-Hospital Care Program
Recruit Presentation

Any Questions?