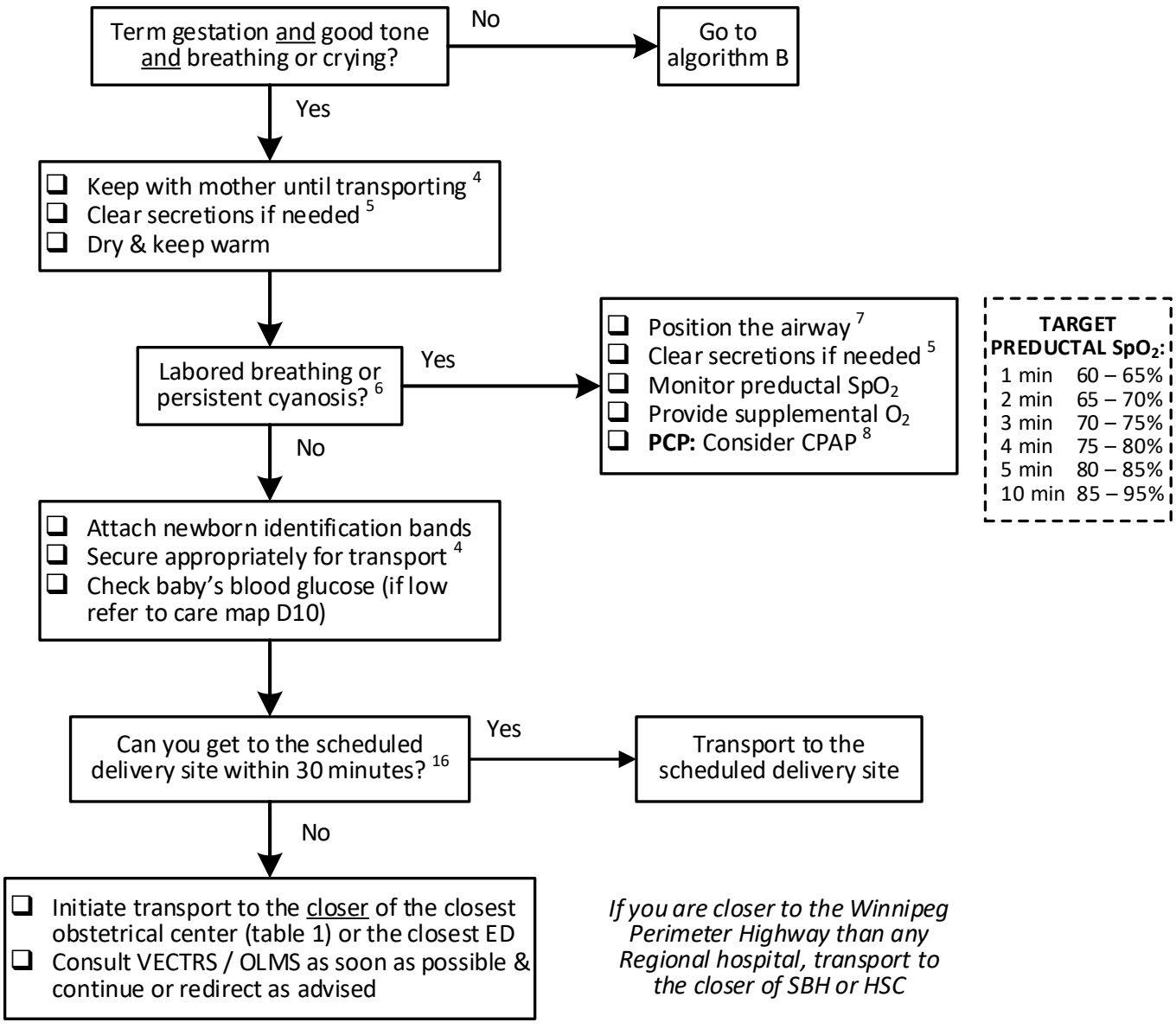
Shared health Soins communs Manitoba	D03 - NEWBORN CARE & NEONATAL RESUSCITATION	
	Version date: 2025-03-12	Effective date: 2024-04-30 (07:00)
PCP = PCP - ACP	ICP = ICP & ACP	ACP = ACP only	None = EMR - ACP

ALGORITHM A: ROUTINE NEWBORN CARE



VECTRS / OLMS: (204) 949-4000

ALGORITHM B: NEONATAL RESUSCITATION

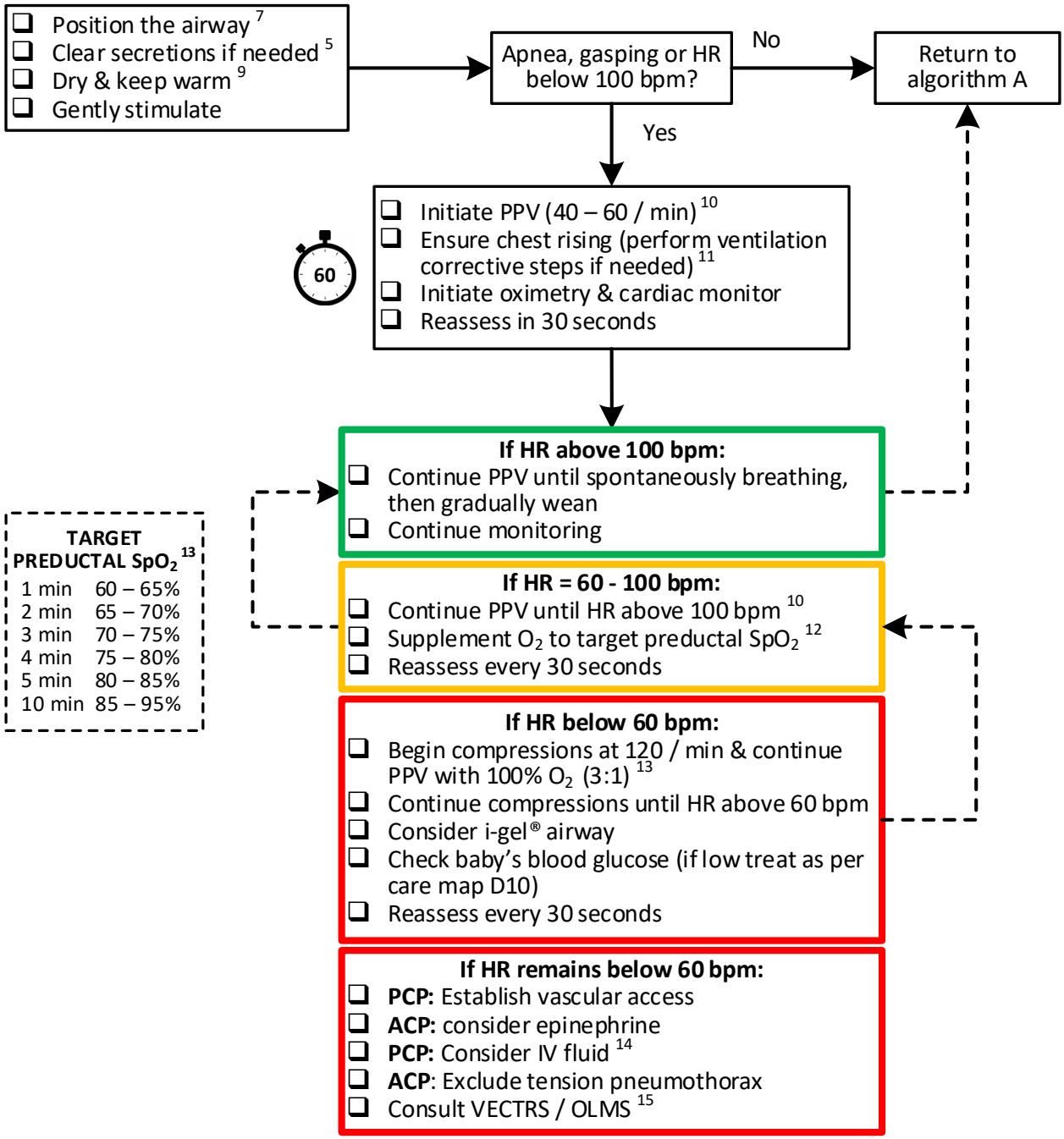


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TABLE 1: VENTILATION CORRECTIVE STEPS (MR. SOPA)	
STEP #1: ***M***ASK ADJUSTMENT & ***R***EPOSITION HEAD	1. Reapply the mask (consider the two-hand technique) 2. Reposition the head in a neutral or slightly extended position 3. Initiate PPV & assess chest movement & breath sounds
STEP #2: ***S***UCTION & ***O***PEN AIRWAY	1. Use a bulb syringe or suction catheter to suction mouth then nose 2. Open the mouth & lift the jaw forward 3. Initiate PPV & assess chest movement & breath sounds
STEP #3: ***P***RESSURE INCREASE	1. Increase ventilation pressure in increments of 5 to 10 (max = 40 mmHg) 2. Temporarily occlude BVM pop-off valve (careful about barotrauma) 3. Initiate PPV & assess chest movement & breath sounds
STEP #4: ***A***LTERNATIVE AIRWAY	1. Consider size 1 i-gel ® airway 2. Initiate PPV 3. Assess chest movement & breath sounds

TABLE 2: OBSTETRICAL CENTERS & OBSTETRICS-CAPABLE FACILITIES IN OR NEAR MANITOBA

- Bethesda Regional Health Centre (Steinbach)
- Boundary Trails Health Centre (Winkler)
- Brandon Regional Hospital
- Dauphin Regional Health Centre
- Health Sciences Centre (Winnipeg)
- Lake of the Woods District Hospital (Kenora, ON) *
- Neepawa Health Centre
- Portage District General Hospital (Portage La Prairie)
- Selkirk Regional Health Centre (Selkirk)
- St. Anthony's General Hospital (The Pas)
- St. Boniface Hospital (Winnipeg)
- Thompson General Hospital
- Yorkton Regional Health Centre (Yorkton, SK) *

(*) Where indicated call ahead to confirm that normal obstetrical services are currently available

INDICATIONS

- Preterm newborn (less than 36 weeks)
- Poor muscle tone
- Not crying or breathing
- Labored breathing or persistent cyanosis
- Bradycardia (HR less than 100 bpm)

WARNINGS

- Newborn known with certainty to be less than 20 weeks gestational age [2]

NOTES

This care map has been adapted from the contents of the American Heart Association / Canadian Pediatric Society / American Academy of Pediatrics Neonatal Resuscitation course (appendix B).

1. Obstetrical calls can be stressful, and the care of a potentially compromised newborn particularly so. Paramedics should have a low threshold to call the Virtual Emergency Care & Transport Resource Service (VECTRS) and consult on-line medical support (OMS) for clinical assistance and destination decision support. [15]

   VECTRS / OLMS can access the Shared Health Child Health Transport Team (CHTT) if necessary, and can conference in the transport physician and air medical crew for consideration of air intercept or transport.

2. Unless it can be confirmed that a fetus is less than 20 weeks gestational age or an intrauterine death has already occurred (appendix A) paramedics must initiate resuscitative efforts.

3. Neonatal compromise is most commonly due to apnea or hypoventilation causing hypoxemia. The focus is on effective ventilation of the baby's lungs. The vast majority of newborns will respond to initial basic measures. Some may require ventilatory assistance. A few may require chest compressions. Very few will require drugs.

4. Until transporting, placing the baby skin-to-skin with the mother will keep them warm. However, once transporting the newborn must be appropriately restrained in accordance with the Highway Traffic Act.

5. Gently suction the mouth before the nose ("M before N") with a bulb syringe if the secretions are meconium-stained, obstructing breathing, or the baby is having difficulty clearing them. If using a suction catheter, do not exceed 80 to 100 mmHg of negative pressure.

6. With labored breathing, persistent central cyanosis, or low oxygen saturation (SpO_2), administer free-flowing supplemental oxygen (O_2) at 5 liters per minute (L/min) by holding the open end of the O_2 tubing close by the baby's mouth and nose.

   Normal newborn SpO_2 values increase over about ten minutes after birth. Measuring at the right hand approximates normal preductal values.

7. Place the head in the "sniffing" position, using a shoulder role if required. Avoid excessive neck flexion or extension.

8. Continuous positive airway pressure (CPAP) ventilation using an infant T-piece resuscitator (e.g. Neo-Tee®) may be helpful in the spontaneously-breathing newborn with signs of labored breathing, ongoing cyanosis, or a persistently low SpO_2. It cannot be used if the heart rate (HR) is less than 100 beats per minute (bpm). CPAP should be started with an inspiratory positive airway pressure (IPAP) of 20 cm H_2O.

9. In infants less than 32 weeks gently dry to avoid damaging their fragile skin, and cover the torso and limbs with plastic wrap to preserve moisture and warmth.

10. In neonatal resuscitation every set of actions should be completed in 30 seconds blocks. You must begin positive pressure ventilation (PPV) if needed by the 60 second mark.

    When providing PPV without chest compressions, begin using room air (equivalent to an O_2 concentration of 21%). Studies have shown this to be as effective as starting with 100% , and it reduces the risks of over-oxygenation. In newborns under 35 weeks gestation, however, it is also acceptable to administer up to 30% oxygen (this can be accomplished by removing the reservoir from the self-inflating bag and utilizing an O_2 flow rate of 5 L/min).

    The infant T-piece resuscitator may be used to provide 5 cm H_2O of positive end-expiratory pressure (PEEP). This will help stabilize lung inflation more quickly by removing fluid in the alveoli and preventing their collapse during exhalation.

    The correct rate and rhythm for providing ventilations alone can be maintained by counting out loud *". . . breathe . . . two . . . three, . . . breathe . . . two . . . three, . . . breathe . . .two . . . three . . .".*

11. Visualizing chest rise and palpation of the umbilical pulse may be difficult in a smaller infant. Auscultation with a stethoscope is the preferred method for assessing both the HR and ventilations.

    If you cannot hear air entry with your first few ventilations or if the HR is not improving within the first 15 seconds, implement ventilation corrective steps using the mnemonic "MR. SOPA" (table 1).

12. With ongoing PPV, supplemental O_2 should be added to achieve the appropriate preductal SpO_2 values.

13. When providing PPV with chest compressions use an O_2 flow rate of 10 L/min with the reservoir attached. This will deliver as close to 100% as possible.

    Compressions should be combined with ventilations at a three-to-one ratio. The correct cadence can be maintained by counting aloud *" . . . one & two & three & breathe, . . . one & two & three & breathe, . . . one & two & three & breathe . . . ".*

14. A newborn may be in hypovolemic shock due to fetal-maternal hemorrhage, placental or umbilical trauma, vasa previa with hemorrhage, or even extensive vaginal bleeding. If not responding to chest compressions and PPV establish vascular access and administering 0.9% (normal) saline at 10 ml/kg over 5 to 10 minutes. If no response, consider a second bolus of 10 ml/kg over 5 to 10 minutes.

15. Paramedics with the basic (EMR), primary (PCP) and intermediate (ICP) work scope must consult VECTRS / OLMS before discontinuing resuscitative efforts.

16. It is usually best for the patient to receive their post-partum care at their scheduled delivery site, by the health care provider most familiar with their prenatal course. However, if the baby requires neonatal intensive care this may require a subsequent interfacility transfer (IFT) of both mother and child.

    If the transport time to the scheduled delivery site will be excessive, initially transporting a closer obstetrical center (table 1) or emergency department (ED) may be the best course of action. An interfacility transfer (IFT) can subsequently be arranged after stabilizing the situation.

LINKS

- D02 - Prehospital Delivery
- D10 - Neonatal Hypoglycemia
- M07 - Epinephrine
- P03.9 - Neo-Tee®

APPROVED BY	
	
EMS Medical Director	EMS Associate Medical Director

VERSION CHANGES (refer to X04 for change tracking)
• Addition of advanced work scope and epinephrine • Revised notes & flow charts for greater clarity & ease of use • Addition of 2020 AHA Neonatal resuscitation algorithm for comparative purposes (appendix B)

APPENDIX A: MISCARRIAGE, STILLBIRTH, & PERINATAL DEATH

Pregnancy dating can be challenging and discrepancies of 1 to 2 weeks can have profound implications for survival. Estimating gestational age (GA) by recall of dates may be inaccurate. Fetal age can most reliably be determined by ultrasound (US) but even that will have some margin of error (up to a week in early pregnancy).

Before 20 weeks a fetus is universally regarded as incapable of survival outside of the womb and delivery before 20 completed weeks is termed a **miscarriage**. Delivery after 20 weeks but before the full gestational term (37 to 38 weeks) is called a **premature birth**.

A fetus that delivers at 22 completed weeks *might* survive with immediate resuscitative efforts, and the probability of survival improves with increasing GA. There are a few reports of neonates less than 22 weeks surviving with immediate resuscitative efforts and aggressive post-resuscitation care.

A death that occurs after 20 completed weeks but *before* the onset of labor is called a **stillbirth.** Before 28 weeks it is known as an **early stillbirth**, and after 28 weeks it is referred to as a **late stillbirth**. An early stillbirth will sometimes present with signs of tissue degeneration (or maceration), but this finding may be more subtle or absent in later stillbirths. Other signs commonly associated with stillbirth, such as fused eyelids or translucent skin, are unreliable or difficult for the novice to discern.

Deaths that occurs *during* labor are known as **perinatal deaths.** Some occur during labor (**late fetal death**) and some occur after delivery of a liveborn (**early neonatal death**). Many early neonatal deaths are due to absent or ineffective respirations and can be prevented by prompt initiation of resuscitative measures.

It may be quite challenging to differentiate a premature liveborn with absent vital signs from a stillborn fetus, especially with a late stillbirth. It may be equally as challenging to distinguish late fetal death from a viable neonate without signs of life. **Unless it can be confirmed that the gestational age (GA) is less than 20 weeks or intrauterine death has already occurred, paramedics must consider all neonates viable and initiate resuscitative efforts.**

APPENDIX B: AHA / CPS / AAP NEONATAL RESUSCITATION ALGORITHM *(for information)*