

# Registered Nurse Initiated Activities

## Decision Support Tool No. 5A:

### Administration of Nitrous Oxide in Oxygen Nitronox<sup>®</sup> or Entonox<sup>®</sup>

Decision support tools are evidenced-based documents used to guide the assessment, diagnosis and treatment of client-specific clinical problems. When practice support tools are used to direct practice, they are used in conjunction with clinical judgment, available evidence, and following discussion with colleagues. Nurses also consider client needs and preferences when using decision support tools to make clinical decisions.

<b>The Nurses (Registered) and Nurse Practitioners Regulation:</b>	<b>Regulation: (6)(1)(h.1)</b> authorizes registered nurses to “manage labour in an institutional setting if the primary maternal care provider is absent.”
<b>Indications:</b>	For RN supervision of self-administration of Nitrous Oxide in Oxygen (Nitronox <sup>®</sup> ) in labouring women
<b>Related Resources, Policies, and Standards:</b>	DST #5–Discomfort and Pain in Labour <b>BCPHP (2007) Obstetric Guideline 4</b> –Pain Management Options During Labour
<b>Definitions and Abbreviations:</b>	<b>Nitrous Oxide in Oxygen (N<sub>2</sub>O/O<sub>2</sub>)</b> –a colourless, odourless, non-irritating, self administered, inhaled anaesthetic used for labour analgesia that is available in a mixture that contains 50% oxygen and 50% nitrous oxide and is called Nitronox <sup>®</sup> or Entonox <sup>®</sup> (referred to as nitrous oxide in this document) <b>Scavenging Device</b> –a device that collects and removes exhaled nitrous oxide during the administration of nitrous oxide

## Assessment

**For complete assessment for providing comfort measures to the labouring woman please refer to DST #5 – Discomfort and Pain in Labour**

### Specifically for the administration of nitrous oxide

- The woman has been assessed according to DST #5 Discomfort and Pain in Labour and nitrous oxide for labour has been chosen for pain relief
- Assess effectiveness of pain relief
- Monitor maternal vital signs during analgesia use including the woman’s level of consciousness
- Monitor fetal heart rate by auscultation or electronic fetal monitoring as per DST #2 Intrapartum Fetal Health Surveillance
- Observe for adverse effects of nitrous oxide use
  - Increased drowsiness
  - Maternal nausea and vomiting
  - Lethargy
  - Sleepiness
  - Poor recall of labour
  - Confusion
  - Perioral tingling
  - Throat irritation
  - Hyperventilation/hypoventilation sequences leading to hypoxia between contractions and

breathing in and out rapidly may predispose some women to hyperventilation (Health Canada, 2000; BCPHP, 2007; Halpern & Douglas, 2005)

## Nursing Diagnosis

- Woman's response to pain indicates need for comfort measures

## Special Considerations and Precautions

- Note contraindication for nitrous oxide use e.g. compromised respiratory status, excessive maternal sedation or unable to do self-administration
- Appropriately administered nitrous oxide can be used safely for women in labour
  - With appropriate instructions to the woman on self-administration
  - With nurse in attendance initially to ensure proper administration
  - With no ill effects to newborn (rapidly excreted by placenta or eliminated when newborn starts breathing)
  - In the presence of a scavenging unit or well ventilated systems (Halpern & Douglas, 2005)
  - Safe in the presence of pregnant health care workers with respect to workplace safety (Rosen, 2002)
- To ensure stability (prevention of gas separation and partial liquefaction) of nitrous oxide store in horizontal position and at temperatures above -7° Celsius (Birnbach, Gatt & Datta, 2000; EMA Licensing, BC Ministry of Health, 2007)
- If nitrous oxide has been stored in vertical position, follow **institution's guidelines** to enhance mixing (e.g. invert cylinder 3-4 times)
- Follow institution's guidelines for setup of nitrous oxide administration.
  - Check content of gases in tanks and pressure meter indicator is in the appropriate safety zone (e.g. in Green Zone at BCW, Woodward, 2008)
    - ◇ Oxygen 500 psi (Woodward, 2008) in green cylinder
    - ◇ Nitrous Oxide 600 psi (Woodward, 2008) in blue cylinder
- Nitrous oxide should be used with a scavenging device that eliminates exhaust gases and in well-ventilated rooms (to minimize occupational exposure to healthcare workers) (Halpern & Douglas, 2005)
- Single-use mouthpiece or mask is available. Mouthpiece may be less claustrophobic (BCPHP, 2007; Woodward, 2008)
- The side effects of nitrous oxide are non cumulative and are:
  - Reduced pain sensation
  - Tingling
  - Numbness
  - Dizziness
  - Drowsiness (Rosen, 2002, Woodward, 2008)
- The **adverse** effects of nitrous oxide may include:
  - Increased drowsiness
  - Maternal nausea and vomiting
  - Lethargy
  - Sleepiness
  - Poor recall of labour
  - Confusion
  - Perioral tingling
  - Throat irritation
  - Hyperventilation/hypoventilation sequences leading to hypoxia between contractions and breathing in and out rapidly may predispose some women to hyperventilation (Health Canada, 2000; BCPHP, 2007; Halpern & Douglas, 2005)

## Interventions

- Ensure woman is closely observed and check her q 15 min during nitrous oxide use
- Instructions given to the woman:
  - Self administer the gas
  - Hold the mask over mouth and nose or insert mouthpiece into mouth
  - At the onset of contraction breathe in and out deeply and fairly rapidly into the mask or mouth-piece
    - ◇ Approximately 30 seconds is needed before any pain relief is perceived and 45-60 seconds before maximal effect is achieved
  - Continue to breathe deeply but less frequently throughout the remainder of the contraction
  - Stop inhalation at the end of the contraction  
(Woodward, 2008; BCW, 2001)
- The woman self administers the nitrous oxide only during her contractions as prolonged breathing could result in unconsciousness
- Nitrous oxide does not prolong labour (has no effect on uterine contractions) and can be used right up until the birth of the baby (Halpern & Douglas, 2005; BC Ministry of Health, 2005)
- Use of a pulse oximeter may be required if there is increased maternal sedation or drowsiness
- Discontinue nitrous oxide administration if adverse effects are observed

## Intended Outcomes

- The woman's pain is assessed and appropriate comfort measures are provided
- Use of nitrous oxide has minimal adverse effects
- The woman understands the usage, equipment, risks, benefits and effects of nitrous oxide

## Education

- Instruct usage, equipment, risks, benefits and effects
- Support people are not to use nitrous oxide nor hold the mask or mouth piece for the woman
- Inhalation must stop as soon as contraction ends (to avoid reaching excessively high blood levels of nitrous oxide) (Woodward, 2008)

## Documentation

- Woman's description of pain and pain scale
- Maternal BP, pulse, temperature, respirations and emotional status
- Maternal responses to nitrous oxide administration
- Fetal response to nitrous oxide use

## References

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