

# Nitrous Oxide

## Classification

Inhaled anesthetic

## Indications

■ EMR: Relief from moderate to severe pain

- Includes pain caused by extremity injuries, burns, or other injuries or clinical conditions not including inhalation injuries

## Contraindications

- Traumatic or spontaneous pneumothorax
- Air embolism or decompression sickness following a recent SCUBA dive
- Bullous emphysema
- Gross abdominal distension
- Altered mental status or an inability to comply with instructions
- Inhalation injury (i.e., smoke or chemicals)
- Nitroglycerin use within five minutes prior to administration of nitrous oxide

Consider the use of the mnemonic **CDCPAIN**:

- Ability to **com**ply
- **D**ecompression sickness
- Altered level of **con**sciousness
- **P**neumothorax
- **A**ir embolism
- **I**nhalation injury
- **N**itroglycerin use within five minutes

## Adult dosages

■ EMR: All indications

- Self-administered to effect

## Pediatric Considerations And Dosing

[Follow weight-based dosing](#)

■ EMR: All indications

- Self-administered to effect

## Mechanism Of Action

As used in BCEHS, nitrous oxide is supplied as a 50/50 mixture with oxygen and known as Entonox. Nitrous oxide is a sweet-smelling, colorless gas that is a potent analgesic and a weak anesthetic, whose specific mechanism of action is not well understood. It is believed that endorphin release is likely involved in the analgesic effects of nitrous oxide.

## Pharmacokinetics

When administered by inhalation:

- Onset: rapid
- Peak: immediate
- Duration: requires continuous use

Nitrous oxide is excreted unchanged from the body through the lungs.

## Adverse Effects

- Lightheadedness, dizziness, numbness in lips, sedation, drowsiness, disorientation
- Nausea and/or vomiting

## Warning And Precautions

- Nitrous oxide's blood/gas partition coefficient at body temperature is significantly higher than that of nitrogen's. It will therefore expand into internal gas spaces in the body, and must not be used in cases where additional gas loading would be dangerous (e.g., decompression sickness or air embolisms, abdominal distension, pneumothorax); this phenomenon accounts for the majority of nitrous oxide's contraindications.
- Do not use nitrous oxide in confined spaces that cannot be adequately ventilated. When using nitrous oxide inside an ambulance, ensure exhaust fans are running or windows are open to provide for sufficient ventilation of the patient compartment.
- Do not use nitrous oxide aboard aircraft due to the risk of flight crew exposure.
- Nitrous oxide must be used with caution in patients who are hypotensive or in shock, have ingested or are suffering from the effects of depressant drugs, have a history of chronic obstructive pulmonary disease, or have suffered facial injuries.

## Drug Interactions

The depressant effects of nitrous oxide can be potentiated by the presence of other CNS depressants such as alcohol, sedatives, antihistaminics, or psychotropic medications.

