# Nitrous Oxide for Labor Pain

Nitrous oxide (also called "laughing gas" or "gas and air") has long been in common use for labor pain in other countries, being used by more than half of laboring women in such countries as England, Finland, Sweden, and Canada. It has not been common in the United States in recent decades (it was only available at 5 hospitals in 2012); however, its popularity is now increasing as equipment becomes more widely available, and may soon be seen in more hospitals and out of hospital birth centers. This online article is intended as a supplement to chapter 13 of the 2016 edition of *Pregnancy, Childbirth, and the Newborn* which does not cover nitrous oxide.

## How Administered

Nitrous oxide is a gas. It is mixed 50/50 with oxygen, and inhaled through a mask. (Note: If you've had nitrous at the dentist, that's a 70/30 or 80/20 mixture. So the dose given in labor is lower than the dose at dental procedures, and has a milder effect.) The laboring mother holds the mask to her face whenever she wants a dose. The gas only flows when she inhales. When she moves the mask away, the medication stops. (To see what the equipment looks like in use, do an online image search for "nitrous oxide in labor.")

The peak pain relief effect kicks in about 50 seconds after you start inhaling. But the peak intensity of contraction pain tends to be 25–45 seconds into a contraction. That means you need to start inhaling 30 seconds **before** the next contraction is expected so the gas is in full effect when the contraction pain peaks. It can be tricky to get timing just right.

## Benefits

Nitrous oxide stimulates the brain to release endorphins and dopamine, hormones that help to reduce pain. Nitrous oxide does not completely relieve labor pain, but women are less bothered by the pain. It reduces anxiety, and can cause a mildly euphoric feeling. Women describe themselves as feeling relaxed and calm while using it. Women report that they liked the fact that they had control over the administration. (To learn more about the laboring person's experience of nitrous, watch this video from Vanderbilt at https://www.youtube.com/watch?v=lPyuerAoKg8)

Other benefits are that it's inexpensive (at some hospitals, there's no extra charge—it's included in room cost; at birth centers, there would be a fee on top of the regular birth center cost), it takes effect quickly, and if you stop using it, the effects fade quickly (it has a half-life of 3 minutes) rather than remaining in your system for a long time. That means that if you decide nitrous does not provide enough pain relief, it's easy to move on to other options, such as epidural analgesia.

## Effectiveness

One study (Pasha, 2012) found that 92% of women had less pain with nitrous than without. They were also less likely to have severe pain. On nitrous, 41% reported severe pain and 10% reported very severe pain. In the no-nitrous group, 55% had severe pain and 27% had very severe pain.

It's important to note that nitrous oxide is a mild pain reliever. You should not expect it to take away all your pain. An epidural is much more effective at that; however, an epidural also has more tradeoffs and side effects, so you may choose to start with nitrous and see if that offers enough relief. Some nurses describe the choice to have nitrous as "why not try it and see if it helps." Rather than thinking of nitrous as pain relief, it may help to think of it as a 'coping boost.' One study showed that it did not reduce the intensity of pain much (as measured on a visual analog pain scale), but after the study period, when given the option to stop using it, women wanted to continue using it anyway. (Carstinou, 1994) The unpleasantness of the pain was reduced, and seemed more manageable. Another study found that 98% of users were satisfied with the experience of using nitrous oxide. (Pasha, 2012) Studies also show that women say they would use it again in a subsequent labor.

## Tradeoffs

Unlike epidural analgesia, nitrous does not require extra procedures or extra monitoring. You will not need an IV or continuous fetal monitoring. You are also able to stand, move, and change positions. (If the oxygen comes from a portable tank, you can move around with it, but if the oxygen is piped in from the wall, you'll need to stay near the bed.)

## Possible Side Effects

Side effects on mother and baby are minimal, and less than those experienced with epidural analgesia and with IV/IM narcotics. They can include nausea, dizziness, drowsiness and a hazy memory of events. There is a small chance you could lose consciousness, but if you do, you drop the mask away from your face, and quickly recover. Nitrous does not slow labor and does not affect

your ability to push. It does not appear to affect baby at birth. The portable pump is loud, but nurses report this does not seem to bother the user.

Nitrous is contra-indicated if you have persistent anemia / vitamin b12 deficiency. If you have the MTHFR gene mutation, consult with your caregiver.

## Timing in Labor

Can be used at any time in labor, except you cannot have nitrous if you have had narcotics in the past two hours. You must wait for them to wear off.

Some cases where it might be especially helpful: during transition, during anxiety provoking procedures (such as vaginal exams, IV starts, stitches for a tear), for women who arrive at the hospital in heavy labor and need quick relief, and at any time by someone who wants to delay getting an epidural. Birth center midwives also report using it when a mom is considering a transfer to the hospital for pain medication. Anecdotally, they say that about half the time it has allowed the client to remain at the birth center.

## Comparison to Other Methods

On page 211–212 of the book, we offer a chart called "Nonmedicated Labor versus Medicated Labor" that compares what labor is like if no pain medications are used, or if IV narcotics or epidural analgesia are used. Here is that same information for nitrous oxide, so you can easily compare and contrast to the other options.

| Pain-Relief Option Used | Nitrous Oxide |
|---|---|
| How it affects your experience of pain | Increases pain-relieving endorphins, eases anxiety or fear, and enhances your mood. Small decrease in pain intensity, but makes pain less unpleasant. Can boost your ability to cope. |
| Feedback from women who used it | "Labor was still intense, but it took my fear away and helped me calm down. It made it seem like coping with the pain was doable." |
| How it affects your mental state | You're relaxed, calm, may be drowsy or light-headed. |
| How it affects your mobility | You can walk, move around and change positions. If the equipment is hooked up to the wall (rather than being on a mobile cart), you will have to stay close to the bed. |
| What you'll need from your support people | You'll still be experiencing pain (though you'll be less distressed by it). You'll still want support with comfort techniques and emotional support. Also, they can tell you when a contraction is about to start so you can begin inhaling. (Nitrous oxide is most effective if you start 30 seconds before the contraction.) |
| Equipment and precautions required | You'll hold the mask that dispenses the nitrous, inhaling from it as desired. Some women need an oxygen sensor on their fingers. |
| Impact on labor progress | Does not affect labor progress. |
| Timing | Can be used at any time, especially during anxiety provoking times in labor. |
| Availability | Very limited availability in the U.S. |
| Possible risks to you | Minimal. (See above.) |
| Possible risks to baby | No apparent risks |
| Cost | Inexpensive |
| Best option for you if… | You just need a little boost to your ability to cope, or need to reduce your anxiety. |

**For more information:**

- Nitrous Oxide, http://www.childbirthconnection.org/article.asp?ck=10188
- Nitrous oxide for pain relief: http://www.midwife.org/acnm/files/ccLibraryFiles/Filename/000000003905/Nitrous_oxide_for_pain_relief_pregnancy.pdf
- Nitrous oxide. www.asahq.org/resources/resources-from-asa-committees/nitrous-oxide

Source for study data cited: Pasha, et al. Maternal expectations and experiences of labor analgesia with nitrous oxide. Iran Red Crescent Medical Journal, 2012. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3587869/