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minimising exposure to nitrous oxide includes:
- Use an appropriate (i.e. dedicated) sedation flowmeter with active dental scavenging i.e. 45 L/min
- The breathing system should have a variety of mask sizes available, which can be cleaned in an autoclave, or are disposable
- Assess the surgery ventilation available—i.e. natural or mechanical. Enhance if necessary
- Monitor exposure on a regular basis—at least once a year
- Always employ a machine pre-use checklist
- Inspect cylinder connections, hoses, tubings and reservoir bag for holes and/or leaks and replace at recommended intervals (Figure 4)
- Ensure regular equipment maintenance by the original equipment manufacturer’s approved provider at least once a year
- Careful patient management—e.g. discourage the patient from talking.

Summary
All members of the dental team have a responsibility to ensure that the working environment is safe. There is no excuse for ignorance or mismanagement. A wealth of information is now available—both in printed form and on the internet—and all staff should ensure they are well-educated on the subject. Nitrous oxide exposure is unlikely to cause major health problems during normal working conditions where correct, active dental scavenging, is employed. If in doubt, seek specialist advice.


There is some evidence to suggest that chronic exposure to high levels of nitrous oxide can have an effect on reproduction, and it is generally agreed that dental staff should not be exposed to nitrous oxide in the first trimester (3 months) of pregnancy. This is mainly due to the significant demand for folic acid during organogenesis in the first three months and, therefore, avoidance of nitrous oxide sedation is recommended during this period.

There is some suggestion that taking a vitamin B12 supplement gives some protection and reduces toxic effects (Buckingham, 1994). However, as yet, there has been no definitive study and it remains a subject for further investigation.

Certainly, for a pregnant female employed in a setting that uses nitrous oxide it is important to know the exposure levels. Therefore, safeguards should be in place, including regular maintenance and documented monitoring.

### Overview of health risks

Nitrous oxide interacts with cobalamin (vitamin B12) and prevents efficient methionine synthase. This is vital for normal DNA production and cell proliferation (Brockley and Coy, 1986). Although most exposure is towards female dental staff, male fertility can also be compromised.

It is sometimes difficult to establish that a correlation exists between nitrous oxide and bioaesthetic effects occurring. Stanley Malamed’s book Sedation: A Guide to Patient Management states that they are most likely to occur in anaesthetic gas exposure and spontaneous abortion has been described. This section discusses the results of a questionnaire sent to 7000 dental assistants between the age of 18–39 in 1989. The questionnaire surveyed the health of the females involved and their relationship to their exposure to nitrous oxide. The study found that chronic exposure to nitrous oxide levels were not significantly different from that expected in the general population.

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