

## Action

Reference:  
**NIA-2017-001**

Issued:  
**06 Sept 2017**

Valid to:  
**Until withdrawn**

## Risks associated with nitrous oxide waste gases

### Summary

Nitrous Oxide gas can present a health risk to staff, when control measures do not reduce the level of gas to or below the Workplace Exposure Limits (WELs), required to comply with the COSHH regulations. All areas where Nitrous Oxide gas is used should be subject to a Multi - Disciplinary Risk Assessment to identify the risks and control measures required.

### Action

Bring this alert to the attention of all appropriate managers, staff and specialist advisors, e.g. health & safety, estates leads, governance and risk managers

1. Identify rooms where nitrous oxide inhalation services take place.
2. A multi-disciplinary risk assessment, at room level (identified in No.1) as set out by COSHH, must be carried out and maintained to ensure staff are not exposed to Nitrous Oxide levels above the Workplace Exposure Limits (WELs). It should include:-
  - a. Identify the risk and the selected control measures e.g. working practices and procedures, anaesthetic gas scavenging systems (AGSS), room ventilation systems, service delivery patterns,.
  - b. Assess the value for the Nitrous Oxide levels with the selected control measures in place including the exposure values for the operator, support staff and background room level. These figures may require to be revisited periodically to verify the environment is within the Workplace Exposure Limits (WELs).
3. Scavenging Systems and ventilation systems should be maintained in accordance with the manufacturer's instructions and guidance given in "Controlling airborne contaminants at work" HSG-258.
4. All staff in the service area should be fully informed of the risk assessment and the control measures in place. Where control measures include AGSS or other devices they should be trained in their use and application and understand any limitations of the equipment. In particular the relationship between the type of procedure, the patient's physiology and the method of scavenging the waste gases.
5. The risk assessment for the room should be regularly reviewed in line with COSHH requirements and updated if there is any change in any of the selected control measures.

**Deadlines for actions**

Actions initiated: 07 Sept 2017  
Actions completed: 27 Oct 2017

**Problem / background**

Nitrous Oxide is therapeutically important in the delivery of inhalational sedation for the provision of certain procedures, or the treatment of particular individuals. It is known that prolonged exposure to low levels of Nitrous Oxide can be associated with adverse health effects. While the risk to the patient is low, the potential risk to staff who are regularly working in such an environment is higher.

It is a legal requirement under the COSHH regulations that staff are not exposed to hazardous substances, such as nitrous oxide, above the Working Exposure Limit (WEL). For Nitrous Oxide the exposure limit is set at 100ppm, eight hour time weighted average. To adhere to the regulations employers must carry out a 'suitable and sufficient' risk assessment to identify any risks with the use of Nitrous Oxide. The risk assessment should include assessment of the risk associated with waste nitrous oxide gas and establishing what, if any, control measures are required to ensure exposure levels are maintained below the WEL.

Recent monitoring tests of waste Nitrous Oxide in some community dental facilities have highlighted that the selected control measures, including mechanical systems, in place to reduce waste gas levels may not be sufficient in some cases. This was highlighted by widely varying levels of Nitrous Oxide exposure recorded on monitors carried by a dentist during different procedures. Given that the selected control measures (ventilation and scavenging systems) did not change and deemed operating to specification, the variance in exposure levels suggest other risks need to be addressed e.g. differences in working practice and /or patient compliance.

**Suggested onward Distribution**

- All staff involved with the Nitrous Oxide inhalation services
- Community Dental Service
- Estates/Facilities
- Health & Safety
- Governance & Risk Management

## References

G409 Exposure measurement: Air sampling

<http://www.hse.gov.uk/pubns/guidance/g409.pdf>

Working with substances hazardous to health - A brief guide to COSHH

<http://www.hse.gov.uk/pubns/indg136.pdf>

EH40/2005 Workplace exposure limits - Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations (as amended)

<http://www.hse.gov.uk/pubns/priced/eh40.pdf>

Health Services Advisory Committee – Anaesthetic Agents : Controlling exposure under COSHH

[https://www.cdc.gov/niosh/docket/archive/pdfs/niosh-064/0064-010195-mcgregor\\_ref1.pdf](https://www.cdc.gov/niosh/docket/archive/pdfs/niosh-064/0064-010195-mcgregor_ref1.pdf)

NHS estates guidance for medical gas pipeline systems (HTM 02-01)

<https://www.gov.uk/government/publications/medical-gas-pipeline-systems-part-a-design-installation-validation-and-verification>

## Enquires

Enquiries and adverse incident reports in Northern Ireland should be addressed to:

**Northern Ireland Adverse Incident Centre**

Medical Device and Estates Safety Policy Branch

Safety Strategy Unit, CMO Group

Department of Health

Room D1

Castle Buildings

Stormont Estate

Belfast

BT4 3SQ

Tel: 028 9052 3868

Email: [niaic@health-ni.gov.uk](mailto:niaic@health-ni.gov.uk)

<http://www.health-ni.gov.uk/niaic>

**Reporting adverse incidents in Northern Ireland**

Please report directly to NIAIC using the [forms on our website](#).