



COLLEGE OF REGISTERED  
DENTAL HYGIENISTS  
OF ALBERTA



# Guidelines

for Prescribing  
and Administering  
Nitrous Oxide/Oxygen  
Conscious Sedation  
in Dental Hygiene  
Practice

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This guideline will be updated and new evidence evaluated every 5 years, at a minimum. If indicated by the presence of new strong evidence prior to this planned review, the guideline will be reviewed at an earlier date.

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## Introduction

Registered dental hygienists in Alberta strive to provide Albertans with optimal dental hygiene services based on individual client need. The registered dental hygienist manages client pain, anxiety, and fears.

In Alberta, dental hygienists have been utilizing nitrous oxide/oxygen conscious sedation in the course of dental hygiene practice since the 1970s. Under the *Health Professions Act*, prescribing and administering nitrous oxide/oxygen conscious sedation is considered a restricted activity. Dental hygienists who have met the CRDHA education and experiential requirements (refer to *Appendix A*) may be authorized to perform this restricted activity.

Once members have successfully completed a program that meets these requirements, members must complete the ***CRDHA Application for Authorization to Prescribe and Administer Nitrous Oxide/Oxygen Conscious Sedation*** (*Appendix F*) and submit the completed form to the CRDHA office. Applicants will be notified in writing once their application for authorization to perform this restricted activity has been reviewed.

Inhalation sedation with nitrous oxide has proven to be an extremely effective and safe technique for the reduction of stress in the apprehensive or medically compromised client. The following guidelines are intended as a decision-making aid to support registered dental hygienists in providing clients with the benefits of nitrous oxide/oxygen conscious sedation in a safe and effective manner.

These guidelines are dynamic and are intended to reflect current best practices in relation to the provision of the restricted activity of nitrous oxide/oxygen conscious sedation by registered dental hygienists. Clinical practice guidelines are designed to assist the practitioner in decision-making. They are designed to enhance, not replace, clinical judgment or expertise. It should be recognized that there may be emergency situations that may require that these guidelines be modified on the basis of the judgment of the practitioner(s) responsible for the delivery of nitrous oxide/oxygen conscious sedation. It should be also recognized that there may be certain situations whereby these guidelines may be clinically impractical (e.g., combative client) and that adherence to the guidelines is no guarantee of a successful outcome.

In many instances, these guidelines reflect minimum standards. While variations may be warranted based on the needs of the individual client or practice, registered dental hygienists are cautioned that failure to follow these guidelines may constitute a breach of one or more Standards of Practice, which is “unprofessional conduct.” Dental hygienists employing the modality of nitrous oxide/oxygen conscious sedation must be familiar with these guidelines, be appropriately educated, and regulate their practice accordingly.

## Key Elements of These Guidelines

1. Meet legislated requirements both provincially and nationally.
2. Be consistent with professional standards and guidelines for the protection of the public.
3. Adhere to accepted standards of practice regarding nitrous oxide/oxygen conscious sedation.
4. Utilize, as appropriate, nitrous oxide/oxygen conscious sedation to optimize the outcome of dental hygiene care.
5. Collaborate with physicians, pharmacists, dentists, and other health professionals as necessary.
6. Enhance competency and assure quality of care through continuing education.

## Definitions

### Terms

**Administer:** To supply a dose of a drug to a person for the purpose of immediate ingestion, application, inhalation, insertion, instillation, or injection. In the case of nitrous oxide/oxygen conscious sedation, it is the act performed by the person who is responsible for making the decision to initiate sedation and/or adjust the flow of gases.

**Adverse Outcome:** A harmful event for a client or personnel, where transfer to hospital with or without admission is necessary. In the event of a critical incident or adverse outcome of any kind, a written incident report must be completed and reported to the CRDHA forthwith. (Refer to *Practice Guidelines: Section 11* for details on the incident report.)

**Agent:** A parent or guardian legally authorized to act on behalf of a client.

**Continual:** Repeated regularly and frequently in a steady succession.

**Continuous:** Prolonged without any interruption at any time.

**Critical Incident:** An event creating a substantial risk of serious health or safety consequences. In the event of a critical incident or adverse outcome of any kind, a written incident report must be completed and reported to the CRDHA forthwith. (Refer to *Practice Guidelines: Section 11* for details on the incident report.)

**Drug Profile:** A component of the client's comprehensive health history that is conducted for each client prior to initiating dental hygiene care. The client's drug profile, which is used to develop a care plan, aids the registered dental hygienist in determining possible contraindications and adverse effects, such as drug-drug and drug-food interactions. The drug profile includes:

- A comprehensive list of drugs (prescription and non-prescription) that the client is currently taking, or has taken, since the last update of the client's health history. When determining non-prescription drugs for the client's health history, the drug profile must include any drugs listed in Schedules 2 and 3 of Alberta's Drug Schedules, unscheduled drugs, as well as alcohol, tobacco, and natural health products not encompassed in the provincial drug schedules.
- Adverse drug reactions (e.g., known allergies or sensitivities that the client has to any drugs).
- Client compliance.

- The dental hygienist's interpretation about how the client's medications are affecting the client's systemic health and the health of the oral cavity.

**Health History:** A complete and thorough legal document that contains information about the client's past and present medical and dental conditions, risk factors for disease, a drug profile, undiagnosed conditions, and allergies or sensitivities. The health history should also include information about the client's lifestyle, cultural practices related to health and disease, past and present emotional problems, and general state of mind. This written report is obtained from the health history questionnaire, a verbal interview, and direct client observation.

**Immediately Available:** On-site in the facility and available for immediate use.

**Informed Consent:** The client has been provided with information about the proposed treatment, including material effects and costs, significant risks and side effects of the proposed treatment, alternative treatments and the consequences of not having the treatment. You must also answer the client's questions. If the client is a minor or lacks the capacity to make a decision, consent must be obtained from the client's agent. A practitioner may wish to consider the additional legal protection of a written consent form. A practitioner must obtain written consent prior to the provision of nitrous oxide/oxygen conscious sedation.

**May/could:** Freedom or liberty to follow a reasonable alternative.

**Minor:** In Alberta, a minor is defined as any person under the age of 18 years. *Note:* A mature minor is a person under 18 who is able to consent to his or her own medical treatment, to understand the nature and consequences of the treatment, and to decide who has access to his or her information.

**Natural Health Products:** (NHPs) are defined in the Health Canada's Natural Health Products Regulations as vitamins and minerals, herbal remedies, homeopathic medicines, traditional medicines such as Traditional Chinese Medicines, probiotics, and other products like amino acids and essential fatty acids. Under the new Regulations, the product must be safe for consideration as an over-the-counter (OTC) product. Natural Health Products are available for self-care and self-selection, and do not require a prescription to be sold. Products requiring a prescription will continue to be regulated under the Food and Drug Regulations.

**Monitor:** To observe and evaluate a function of the body closely and constantly.

**Must/shall:** Indicates an imperative need and/or duty; an essential or indispensable item; mandatory.

**Prescribe:** A verbal or written direction or order to provide the person therein named a stated amount of drug specified in the direction. Prescribing includes the choice of drug, dosage form, and drug regimen (drug strength, dosing frequency, and duration).

**Should:** The recommended manner to obtain the standard; highly desirable.

**Time-Oriented Anaesthesia Record:** Documentation at appropriate intervals of drugs, dose, and physiological data obtained during client monitoring.

**Titration:** The administration of small incremental doses of a drug until a desired clinical effect is observed.

## ***Levels of Knowledge***

**Familiarity:** A simple knowledge for the purpose of orientation and recognition of general principles.

**Understanding:** Adequate knowledge with the ability to apply.

**In-depth:** A thorough knowledge of concepts and theories for the purpose of critical analysis and the synthesis of more complete understanding; the highest level of knowledge.

## ***Levels of Skill***

**Exposed:** The level of skill attained by observation of or participation in a particular activity.

**Competent:** Displaying special skill or knowledge derived from training and experience.

**Proficient:** Level of skill attained when a particular activity is accomplished with repeated quality and a more efficient utilization of time; highest level of skill.

## ***Routes of Administration***

**Enteral:** Routes in which drugs are placed directly into the gastrointestinal (GI) tract. Also known as alimentary routes, enteral routes are the most common routes of drug administration and comprise oral, sublingual, buccal, and rectal routes.

**Inhalation:** A technique of administration in which a gaseous or volatile agent is introduced into the pulmonary tree and the primary effect is due to absorption through the pulmonary bed.

**Parenteral:** A technique of administration in which the drug bypasses the GI tract. Because parenteral routes bypass the GI tract, they deliver a more accurate drug dose than enteral routes. Bypassing the GI tract allows a drug to reach its target site of action quickly. However, the rapid absorption of drugs by these routes increases the risk for more adverse events. Parenteral routes include inhalation, topical, subgingival, subcutaneous (SC), intranasal (IN), transdermal, intravenous (IV), intramuscular (IM), intradermal, intrathecal, and intraperitoneal.

**Transdermal/transmucosal:** A technique of administration in which the drug is administered by patch or iontophoresis.

## ***Methods of Anxiety and Pain Control***

**Analgesia:** The diminution or elimination of pain in the conscious client.

**Anxiolysis (minimal sedation):** The diminution or elimination of anxiety. A drug-induced state during which clients respond to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

**Conscious sedation (moderate sedation/analgesia):** Conscious sedation is a minimally depressed level of consciousness that retains the client's ability to independently and continuously maintain an airway and respond appropriately to physical stimulation and verbal command. It is produced by a pharmacologic or non-pharmacologic method or a combination thereof. In dental hygiene, it is used to reinforce positive suggestion and reassurance in a way which allows dental hygiene treatment to be performed with minimal physiological and



psychological stress, and enhanced physical comfort. The technique must carry a margin of safety wide enough to render loss of consciousness highly unlikely.

**Combination inhalation-enteral conscious sedation (combined conscious sedation):** Using a combination of inhalation and enteral agents. Nitrous oxide/oxygen when used in combination with appropriate sedation agents may produce anxiolysis, conscious sedation, or deep sedation/general anaesthesia. Registered dental hygienists are not authorized to prescribe enteral sedation. Enteral sedation can only be prescribed by a health care practitioner who has this prescriptive authority through their profession's regulation.

**Local anaesthesia:** The elimination of sensation, especially pain, in one part of the body by the topical application or regional injection of a drug.

**The following terms are included in this document for information. Registered dental hygienists are not authorized to perform these restricted activities.**

**Deep sedation/analgesia:** An induced state of depressed consciousness accompanied by partial loss of protective reflexes, including the inability to continually maintain an airway independently and/or to respond purposefully to physical stimulation or verbal command, and is produced by a pharmacological or non-pharmacological method or combination thereof.

**General anaesthesia:** An induced state of unconsciousness accompanied by partial or complete loss of protective reflexes, including the inability to continually maintain an airway independently and respond purposefully to physical stimulation or verbal command, and is produced by a pharmacological or non-pharmacological method or combination thereof.

# Practice Guidelines for the Utilization of Nitrous Oxide/Oxygen Conscious Sedation

The following guidelines are the minimum standards for the utilization of nitrous oxide/oxygen conscious sedation by registered dental hygienists.

## **General Guidelines**

The registered dental hygienist shall:

1. Successfully complete a CRDHA approved nitrous oxide/oxygen conscious sedation educational program. (Refer to *Appendix A*.)
2. Provide nitrous oxide/oxygen conscious sedation in a facility that is suitably staffed and equipped for this modality as prescribed in these guidelines. (Refer to *Facilities and Equipment Guidelines* and *Appendices G* and *H*.)
3. Follow current accepted guidelines to control nitrous oxide exposure. (Refer to *Appendix B*.)
4. Keep an adequate, clearly recorded health history, including present and past illnesses, hospital admissions, current medications and doses, allergies (in particular to medications), and a preoperative physical evaluation. (Refer to *Appendix D*.) This must form a permanent part of each client's record.
5. Determine the client's Physical Status Classification in accordance with the American Society of Anesthesiologists (ASA) Patient Classification System, (refer to *Appendix C*), as well as careful evaluation of any other factors which may affect the client's suitability for nitrous oxide/oxygen conscious sedation.
6. Obtain written informed consent from the client or agent prior to initiating the procedure. If the client is a minor or lacks the capacity to make a decision, consent must be obtained from the client's agent.
7. Not exceed that level of sedation for which they are qualified.
8. Only administer nitrous oxide/oxygen conscious sedation for the purposes of providing combination inhalation-enteral nitrous oxide/oxygen conscious sedation if an appropriately trained physician or dentist is prescribing the enteral (oral) sedation agent. The prescribing physician or dentist must be present in the operatory for the duration of the treatment and the post-operative monitoring, and must make the discharge decision.
9. Halt the provision of dental hygiene services should the administration of nitrous oxide/oxygen sedation produce depression beyond that of conscious sedation. Appropriate support procedures must be administered until the level of depression is no longer beyond that of conscious sedation, or until additional emergency assistance is available.
10. Ensure that recovery and discharge are appropriately monitored.
  - 10.1 All clients must be specifically assessed for adequate recovery as described in the section on Post-Operative Monitoring.

- 10.2 Discharge of clients will occur only under the conditions noted in Post-Operative Monitoring.
11. In the event of a critical incident or an adverse outcome of any kind to the client or personnel, a written incident report must be completed and submitted to the CRDHA forthwith. Incident reports must include the following:
  - 11.1 Name, age, and sex of the person involved
  - 11.2 Name of witness(es) to the incident
  - 11.3 Date and name of procedure
  - 11.4 Nature of the incident and treatment rendered
  - 11.5 Analysis of reason(s) for the incident
  - 11.6 Outcome
12. Remain current in this modality.

### ***Procedural Guidelines for the Administration of Nitrous Oxide/Oxygen Conscious Sedation***

The registered dental hygienist shall:

1. Perform a suitable preoperative health evaluation of the client. (Refer to *Documentation – Prior to Treatment*.)
2. Ensure the following preoperative procedures are completed:
  - 2.1 Advise the client and/or agent regarding the procedure and obtain informed consent.
  - 2.2 Determine that there is adequate oxygen supply.
  - 2.3 Determine baseline vital signs (blood pressure, pulse rate, oxygen saturation, and ventilation) unless the client's behaviour prohibits such delineation.
  - 2.4 Give the client or agent appropriate instructions for specific medication(s), including dietary instructions.
3. Ensure the client receives appropriate operative monitoring. (Refer to *Monitoring Procedures – Operative Monitoring*.)
4. Ensure that at least one additional personnel is immediately available in the facility while administering nitrous oxide/oxygen conscious sedation.
5. Maintain an appropriate time-oriented anaesthetic record, including documentation of individual(s) present during nitrous oxide/oxygen conscious sedation. (Refer to the section on *Documentation*.)

6. Follow appropriate recovery and discharge procedures. (Refer to *Monitoring Procedures – Post-Operative Monitoring and Discharge.*)
  - 6.1 Operating and recovery area must have immediately available oxygen and suction equipment.
  - 6.2 Until vital signs are stable and the client is appropriately responsive for discharge from the facility, the client must be monitored.
  - 6.3 An explanation of post-operative instructions must be provided to the client or agent at the time of discharge.
  - 6.4 Prior to leaving the facility, the client must meet the discharge criteria.
  - 6.5 If needed, clients must be discharged to the care of a responsible adult/agent.
7. Have available the proper facilities, personnel, and equipment to manage any reasonably foreseeable emergency situation which may be experienced by the client.
  - 7.1 Backup emergency services should be identified with protocol outlining necessary procedures for their immediate employment.
  - 7.2 All staff members must be prepared to recognize and treat adverse responses utilizing appropriate emergency equipment and drugs when necessary.
  - 7.3 All clinical staff must have the training and ability to perform basic cardiac life support (BCLS) techniques. (CPR at the level required by CRDHA Council for annual renewal of a practice permit is sufficient.)
  - 7.4 Protocols for emergency procedures should be established and reviewed on a consistent basis.
  - 7.5 It must be documented that all emergency equipment and drugs are checked and maintained on a regularly scheduled basis.
  - 7.6 For non-hospital facilities, an emergency-assist system should be identified for ready access to emergency medical services. The anaesthesia provider is responsible for the anaesthetic management, the adequacy of the facility, and the diagnosis and treatment of emergencies associated with the sedation provided until the emergency medical services arrives to take over the management and transportation of the emergency to a medical facility.

# Facilities and Equipment Guidelines

## **Facilities**

The registered dental hygienist who uses nitrous oxide/oxygen conscious sedation must follow accepted infection control guidelines and have available the proper facilities, personnel, and equipment to manage any reasonably foreseeable emergency situation which may be experienced by the client.

## **Registration of Facilities**

Under the *Health Professions Act*, dental hygienists can provide their services in a wide variety of settings. Settings and practice models include independent dental hygiene practice, mobile practice, and practice in association with another person or another regulated health professional.

Owning and operating a dental hygiene practice may include ownership of nitrous oxide/oxygen conscious sedation equipment. All dental hygiene facilities **must** be registered with the CRDHA prior to initiating use of the nitrous oxide/oxygen conscious sedation equipment. Refer to *Appendix H* for the registration application form.

## **Equipment**

1. Gas delivery systems used for the administration of nitrous oxide and oxygen must:
  - 1.1 Have a fail-safe mechanism such that it will not deliver an oxygen concentration of less than 30% in the delivered gas mixture.
  - 1.2 Have pipeline inlet fittings, or pin-indexing, that do not permit interchange of connections between oxygen and nitrous oxide.
  - 1.3 Be checked regularly for functional integrity, must function reliably and accurately, and receive appropriate care and maintenance according to manufacturer's instructions. A written record of this service must be kept.
  - 1.4 Be equipped with a common gas outlet compatible with 15 mm male and 22 mm female conical connectors.
  - 1.5 Be equipped with connectors, tubing, and reservoir bag which allow use of a full face mask for resuscitative ventilation with 100% oxygen.
  - 1.6 Be equipped with a scavenging system installed per manufacturer's specifications.
2. There must be a readily available reserve supply of oxygen for immediate use. This shall:
  - 2.1 Be portable, an "E" size cylinder as a minimum.
  - 2.2 Have an appropriate regulator, flowmeter, and connectors as described above in 1.4 and 1.5.
  - 2.3 Be checked prior to use with each client to determine adequate oxygen supply.
3. A pulse oximeter should be used to monitor oxygen saturation.

4. A stethoscope and a blood pressure cuff or an automatic blood pressure and pulse rate monitor should be used to continually monitor blood pressure and pulse rate.
5. An emergency cart or kit must be immediately available and shall include the necessary drugs and equipment to assist in the resuscitation of a non-breathing and unconscious client and provide continuous support until the emergency medical services arrives.
6. All related equipment must meet published CSA Standards for Equipment. (Refer to *Appendix G.*)

## **Personnel**

### ***Education of Personnel***

1. All personnel must have the education required for them to provide their assigned duties competently and safely.
2. All personnel should be adequately trained in emergency management as detailed in these guidelines.

### ***Number of Personnel Required***

1. A minimum of two appropriately trained clinical personnel (e.g., the dental hygienist who provides the nitrous oxide/oxygen conscious sedation and a chair-side dental assistant who monitors the client) must be in attendance at all times.
2. In the event of special circumstances (e.g., an emergency in another operatory), a modification in the number of personnel present may be made according to the best judgment of the practitioner responsible for the client under nitrous oxide/oxygen conscious sedation. However, at no time should the monitoring of the client be interrupted.

## Monitoring Procedures

The most important technique of monitoring during any conscious sedation, including nitrous oxide/oxygen conscious sedation, remains direct communication between the client and the registered dental hygienist. The ability of the client to respond appropriately to command is an integral part of the definition of consciousness. Lack of an appropriate response calls for immediate action to determine and correct the cause. Monitoring of the respiratory and cardiovascular systems, although important, is considered secondary to central nervous system (CNS) monitoring during nitrous oxide/oxygen conscious sedation. Refer to *Appendix E* for a sample of recordkeeping documents and recommended monitoring time intervals.

### **Operative Monitoring**

1. An appropriately trained individual shall continually monitor (direct clinical observation) the client.
  - 1.1 The best method of monitoring the physical status of a client is continuous client contact. Verbal contact should be continuously maintained, although physical, not verbal, responses from the client should be encouraged.
  - 1.2 Colour of mucosa, skin, or blood must be continually evaluated. The client's colour (i.e., nailbeds, mucosa, etc.), should be visually monitored continuously. If a sterility barrier, which covers the client, is used, a hand or foot should be kept exposed.
2. It is strongly recommended that clinical observation be supplemented with the additional means of monitoring noted below:
  - 2.1 Oxygenation: saturation should be evaluated continually by pulse oximetry.
  - 2.2 Respiration rate: monitoring of the respiration rate (observation of chest excursions and listening for breath sounds) by a trained individual should occur in the intervals recommended in *Appendix E*.
  - 2.3 Circulation: blood pressure and heart rate (pulse) should be continually monitored through the use of a stethoscope and a blood pressure cuff or an automated blood pressure and pulse rate monitor.
  - 2.4 If any other pharmacologic agent is used in addition to nitrous oxide/oxygen conscious sedation and a local anaesthetic, monitoring guidelines for the appropriate level of sedation must be followed.
3. An appropriate time-oriented anaesthesia record must be maintained.
4. The client's head position should be checked frequently to ensure a patent airway.
5. At no time shall a sedated person be left unobserved.
  - 5.1 If necessary, a staff member of the same sex is to accompany a sedated person to the washroom and remain outside the unlocked door and in constant verbal communication with the person.

## ***Post-Operative Monitoring and Discharge***

1. When the treatment procedures have been completed and the client is being readied for discharge, vital signs should be recorded.
2. The only situation in which a registered dental hygienist may discharge an adult client unaccompanied is when the client is fully recovered and nitrous oxide/oxygen conscious sedation alone has been used. Clients under the age of 18 must be discharged to the care of a responsible adult.
  - 2.1 It is important to remember that not all clients recover following nitrous oxide/oxygen conscious sedation to the extent that they may be discharged without an escort.
  - 2.2 All clients must be specifically assessed for fitness for discharge using the criteria in Section 3 below.
  - 2.3 If needed, clients must be discharged to the care of a responsible adult/agent when they are oriented (i.e., to time, place, and person relative to the preanaesthetic condition) and ambulatory, with stable vital signs and showing signs of increasing alertness.
3. The registered dental hygienist must assess the client's responsiveness and shall discharge the client only when the following discharge criteria are met, providing the client met these criteria preoperatively:
  - 3.1 vital signs are stable
  - 3.2 client is alert
  - 3.3 client can talk
  - 3.4 client can sit up unaided
  - 3.5 client can ambulate with minimal assistance
  - 3.6 client is oriented to time, place, and person relative to his or her pre-anaesthetic condition
  - 3.7 client has returned to his or her preoperative vital sign status



# Documentation

## ***Prior to Treatment***

1. The registered dental hygienist must document each nitrous oxide/oxygen conscious sedation procedure in the client's chart. Documentation shall include:
  - 1.1 A suitable preoperative health evaluation. Prior to the administration of nitrous oxide/oxygen conscious sedation, a current health evaluation must be documented. The health evaluation should include, but is not limited to:
    - i. preoperative physical evaluation (refer to *Appendix D*)
    - ii. client's ASA classification of physical status (refer to *Appendix C*)
    - iii. current health history and drug profile
    - iv. possible medical consultation with primary care physician or consulting medical specialist regarding risk or special monitoring of individuals who may not be medically stable or who have significant disability that places the client in the ASA III category
  - 1.2 Name and contact information for the client's physician.
  - 1.3 Name and contact information for the responsible adult/agent to notify in case of emergency.
  - 1.4 A notation of the explicit verbal instructions and/or a copy of the written preoperative instructions distributed to the client or agent.
  - 1.5 Specific dietary restrictions should be delineated based on the client's determined physical status.
  - 1.6 A notation describing the content of the medication or a copy of the prescription must be placed in the client's chart, along with a description of the instructions given to the client if enteral (oral) sedation has been prescribed by the client's physician or dentist.

## ***During Treatment***

1. Documentation should include:
  - 1.1 Heart rate (pulse), blood and tissue oxygenation, blood pressure, and adequacy of respiration. Recommended documentation intervals are no less than 15 minutes.
  - 1.2 Length of the procedure and sedation notes must be included.
  - 1.3 Medication given:
    - i. Documentation should list the route, site, and time of administration together with the type of drugs and dosages.

- ii. The sedation record must document individuals present during the administration of the enteral and/or nitrous oxide/oxygen conscious sedation.

### ***After Treatment***

1. Documentation should include:

- 1.1 An assessment of the client's stable vital signs and alertness prior to discharge.
- 1.2 The time of discharge.
- 1.3 Name of the agent to whom the client was discharged.
- 1.4 The written post-operative instructions distributed to the client or agent.
- 1.5 A notation of any complications, critical incidents, or adverse outcomes.
- 1.6 In the event of a critical incident or an adverse outcome of any kind to the client or personnel, a written incident report must be completed and submitted to the CRDHA. Incident reports must include the following:
  - i. Name, age, and sex of the person involved
  - ii. Name of witness(es) to the incident
  - iii. Date and name of procedure
  - iv. Nature of the incident and treatment rendered
  - v. Analysis of reason(s) for the incident
  - vi. Outcome
- 1.7 Length of the nitrous oxide/oxygen conscious sedation procedure.
- 1.8 Length of the dental hygiene procedure.

Refer to *Appendix E* for a sample of recordkeeping documents and recommended monitoring time intervals.

## **Appendix A: Policy Regarding Approval of Nitrous Oxide/Oxygen Conscious Sedation Courses**

An educational program designed to produce competency in the utilization of nitrous oxide/oxygen conscious sedation will be considered a CRDHA Council approved program if it meets the following criteria:

1. Contains a minimum of:
  - 1.1 4 hours of didactic instruction, and
  - 1.2 3 hours on-site clinical experience with clients
2. Course content must include:
  - 2.1 Nitrous oxide and oxygen conscious sedation medical emergencies and other adverse events (including prevention, recognition, and management of adverse events)
  - 2.2 Indications and contraindications for use
  - 2.3 Client evaluation and selection
  - 2.4 Pharmacology of nitrous oxide
  - 2.5 Description of the function of the basic components of the inhalation sedation equipment
  - 2.6 Nitrous oxide and oxygen conscious sedation techniques (includes the signs of adequate client sedation, signs of client distress, and proper client monitoring)
3. Courses must be delivered by:
  - 3.1 The University of Alberta Faculty of Medicine and Dentistry's Dental, Dental Hygiene, or dental continuing education programs, or
  - 3.2 Other accredited faculties of dentistry and/or dental hygiene undergraduate, postgraduate, or continuing education programs, or
  - 3.3 Other continuing education programs which the Registrar or Registration Committee deem substantially equivalent to a faculty of dentistry sponsored program and are:
    - i. organized and taught by medical or oral health practitioners certified to administer nitrous oxide and oxygen conscious sedation as it applies to the provision of oral health services, and
    - ii. held in a properly equipped dental environment, which will permit the candidates to utilize the techniques being taught on clients during dental hygiene treatment.
4. Programs must issue evidence of successful completion of the course.

## Appendix B: Recommendations for Controlling Nitrous Oxide Exposure in the Dental Office

<b>Equipment</b>	<ul style="list-style-type: none"> <li>properly installed nitrous oxide delivery system</li> <li>appropriate scavenging equipment with a readily visible and accurate flowmeter</li> <li>vacuum pump with capacity up to 45 litres of air per minute per work station</li> <li>variety of mask sizes to ensure proper fit</li> </ul>
<b>Ventilation</b>	<ul style="list-style-type: none"> <li>vacuum exhaust and ventilation exhaust vented outside</li> <li>outside venting not in close proximity to fresh air vents</li> <li>good room air mixing for general ventilation</li> </ul>
<b>Inspections</b>	<ul style="list-style-type: none"> <li>with each use and when gas cylinder is changed, pressure connections tested for leaks using a soap solution or a portable infrared spectrophotometer</li> <li>daily, prior to first use, inspected for worn parts, cracks, holes or tears, and replaced as necessary</li> <li>appropriate flow rates (up to 45 litres/min or per manufacturer's recommendations) verified</li> </ul>
<b>Clients</b>	<p><b>Before Administration</b></p> <ul style="list-style-type: none"> <li>use properly sized masks to ensure a good, comfortable fit</li> <li>check for over- or under-inflation of reservoir (breathing) bag while the patient is breathing oxygen (before nitrous oxide administration)</li> </ul> <p><b>During Administration</b></p> <ul style="list-style-type: none"> <li>minimize talking and mouth breathing by patient while mask is in place</li> <li>reservoir bag periodically inspected for changes in tidal volume</li> <li>vacuum flow rate verified</li> </ul> <p><b>After Administration</b></p> <ul style="list-style-type: none"> <li>100% oxygen delivered to patient for five minutes before removing mask to purge patient and system of residual nitrous oxide</li> <li>system oxygen flush should not be used</li> </ul>
<b>Dental Personnel</b>	<ul style="list-style-type: none"> <li>periodic (i.e., semi-annual) sampling of dental personnel, especially chair-side personnel exposed to nitrous oxide (e.g., with a diffusive sampler, such as a dosimeter or infrared spectrophotometer)</li> </ul>

*Source: ADA Council on Scientific Affairs and the ADA Council on Dental Practice*

## Appendix C: ASA Physical Status Classification System

The American Society of Anesthesiologists (ASA) developed a method of classifying clients according to medical risk. You can use this classification system to identify the physical status of a client prior to initiating dental hygiene care. As you complete an assessment of the client's health and physical status and develop a care plan, this system is a tool that helps to increase client safety and comfort. This tool will help you determine whether or not nitrous oxide/oxygen conscious sedation is the best pain management option for a client.

The ASA system is quite simple to use when a client has an isolated health problem. However, many clients have several significant diseases. In these cases, you must make a professional judgment regarding the appropriate ASA category.

If you are unable to determine the clinical significance of one or more of the diseases, consult with the client's physician, specialists, or with other medical or dental colleagues. Remember that the ultimate decision of whether to provide or postpone dental hygiene care is made by you, the dental hygienist. Professional responsibility and liability also rests with you, as the health professional that did or did not provide care to the client.

All clients must be dealt with on an individual basis, but clients who are ASA I or II are usually candidates for conscious sedation. Clients who are ASA III require special considerations, which often includes provision of dental hygiene services in a hospital setting. Clients who are ASA IV are NOT candidates for in-office conscious sedation.

The ASA Anesthesiologists classifications are summarized in this appendix, along with details to help you determine how to categorize a client.

Notice the icons beside each classification.



Stop — do not treat.



Proceed with caution — obtain the necessary medical clearance before providing care.



Go — provide dental hygiene care.

## Appendix C: (Cont'd)



### ASA I: NORMAL HEALTHY CLIENTS

These clients are able to tolerate mild physical exertion and psychological stresses. They do not possess any organic, physiologic, biochemical, or psychiatric disturbances. These clients should be able to tolerate the physical and psychological stresses associated with your dental hygiene care plan with no added risk of serious complications.

Inhalation sedation should pose no risk to these individuals.

<b>Determining Factors</b>	A review of this client's health history would reveal that all systems (such as heart, lungs, and kidney) are functioning within normal limits (WNL). ASA I clients are able to perform normal activities without distress: they are able to walk up a flight of stairs or walk two level city blocks without undue fatigue, shortness of breath, or chest pain.
<b>Types of ASA I Clients</b>	Healthy clients with little or no anxiety.
<b>Therapy Modifications</b>	Therapy modifications are usually not warranted for this classification.

## Appendix C: (Cont'd)



### ASA II: CLIENT WITH MILD [TO MODERATE] SYSTEMIC DISEASE

These individuals, upon mild physical exertion and/or psychological stress, are less tolerant than ASA I clients. Fatigue and/or distress are factors that limit function in these individuals.

Inhalation sedation usually poses no risk to these clients, but clients should be carefully considered on a case-by-case basis.

<b>Determining Factors</b>	ASA II clients are able to complete normal activities, but then must rest because of distress. These clients can walk up a flight of stairs or walk two level city blocks, but must rest after completing this walk (due to chest pain, undue fatigue, or shortness of breath).
<b>Types of ASA II Clients</b>	<ul style="list-style-type: none"> <li>• Clients with a drug allergy or with multiple allergies to foods, metals, etc.</li> <li>• Clients with controlled and monitored health conditions, including:             <ul style="list-style-type: none"> <li>• non-insulin dependent diabetes (NIDDM or type 2)</li> <li>• adults with blood pressures between 140–159 mmHg (systolic) or 90–94 mmHg (diastolic)</li> <li>• well-controlled asthma, epilepsy (no seizures in past year), and thyroid conditions</li> </ul> </li> <li>• Clients who are healthy but extremely anxious about receiving dental or dental hygiene care.</li> <li>• Clients who are pregnant and healthy.</li> <li>• Clients aged 65 or older who are healthy.</li> <li>• Smokers.</li> </ul>
<b>Therapy Modifications</b>	Elective dental hygiene care is acceptable although consideration must be given to possible therapy modifications. Necessary modifications may include antibiotic premedication, stress reduction techniques, and consultation with the client's physician, pharmacist, or other health care provider.

## Appendix C: (Cont'd)



### ASA III: CLIENT WITH SEVERE SYSTEMIC DISEASE


These clients have a severe systemic disease that limits their activities, but does not incapacitate them. These clients cannot tolerate exertion and stress.

These clients present a greater risk for treatment; however, using nitrous oxide/oxygen conscious sedation does lessen anxiety and provide oxygen enrichment to the body systems.


<b>Determining Factors</b>	<p>ASA III clients are able to complete normal activities, but then must rest because of distress. These clients can walk up a flight of stairs or walk two level city blocks, but must stop to rest before completing this walk. These clients do not display signs or symptoms of distress while at rest; however, in stressful situations (including your dental hygiene operatory), signs and symptoms develop.</p>
<b>Types of ASA III Clients</b>	<ul style="list-style-type: none"> <li>• Clients with well-controlled insulin dependent diabetes (IDDM or type 1).</li> <li>• Clients with a history of a myocardial infarction (MI) or cerebrovascular accident (CVA) that occurred more than 6 months ago, but with no residual complications (i.e., no lasting negative effects after recovery).</li> <li>• Adults with blood pressures between 160–199 mmHg (systolic) or 95–114 mmHg (diastolic).</li> <li>• Clients with asthma that is not well controlled or is exercise or stress induced, or the client has a history of hospitalization because of “status asthmaticus.”</li> <li>• Clients with epilepsy that is not well controlled (i.e., several seizures in the past year).</li> <li>• Clients with symptomatic thyroid diseases.</li> <li>• Clients with stable angina.</li> <li>• Clients with COPD (Chronic Obstructive Pulmonary Disease, including emphysema and chronic bronchitis).</li> </ul>
<b>Therapy Modifications</b>	<p>Elective dental hygiene care is still appropriate. However, the need for stress-reduction techniques and other treatment modifications is increased. Medical consultation is recommended for these clients, particularly those with unstable conditions.</p>




## Appendix C: (Cont'd)

	<p><b>ASA IV: CLIENT WITH SEVERE SYSTEMIC DISEASE THAT IS A CONSTANT THREAT TO LIFE</b></p>
<p>Seek medical consultation or referral. These clients are categorized as high risk for many situations; the potential for an acute emergency situation is great.</p>	
<p>Nitrous oxide/oxygen conscious sedation is not usually indicated except in emergency situations.</p>	
<p><b>Determining Factors</b></p>	<p>ASA IV clients are unable to walk up a flight of stairs or walk two level city blocks. These clients display signs or symptoms of their health problems while at rest.</p>
<p><b>Types of ASA IV Clients</b></p>	<ul style="list-style-type: none"> <li>• Clients with uncontrolled IDDM.</li> <li>• Clients with myocardial infarction (MI) or cerebrovascular accident (CVA) history that occurred less than 6 months ago.</li> <li>• Adults with blood pressures between 200+ mmHg (systolic) or 115+ mmHg (diastolic).</li> <li>• Clients with unstable angina.</li> <li>• Clients with severe Congestive Heart Failure (CHF) or COPD that leaves them confined to a wheelchair or requiring supplemental oxygen.</li> </ul>
<p><b>Therapy Modifications</b></p>	<p>Elective care should be postponed until the client's health condition improves to at least ASA III. (It is best to consult with the client's physician prior to proceeding at that time.) These clients have a health problem that is of greater significance than elective dental hygiene care. Management of dental emergencies, such as infection and pain, should be done as conservatively as possible until the client's condition improves.</p> <p>In cases where the client requires immediate intervention by the dentist, such as an extraction, the dentist will determine the most appropriate facility to perform this procedure. It is likely that this type of emergency care would be provided in an acute care facility, such as a hospital, since the client would have a better chance of survival if an acute medical emergency occurs.</p>

## Appendix C: (Cont'd)

 <b>ASA V: MORIBUND CLIENT WHO IS NOT EXPECTED TO SURVIVE WITHOUT THE OPERATION</b>	
<p>Clients with this classification are not expected to survive 24 hours with or without an operation.</p>	
<b>Determining Factors</b>	<p>These clients are almost always a hospitalized client with an end stage disease. The physical condition of the ASA V client is fragile at best.</p>
<b>Types of ASA V Clients</b>	<ul style="list-style-type: none"> <li>• Clients with end-stage cancer.</li> <li>• Clients with end-stage renal, hepatic, heart, or lung disease.</li> <li>• Clients with end-stage infectious disease (e.g., AIDS).</li> </ul>
<b>Therapy Modifications</b>	<p>Elective dental hygiene services would not be required at this stage. However, provision of palliative oral health care (in the form of relief of pain or infection) might be necessary for these individuals. Following careful consultation with any necessary health care providers, if a decision is made to provide any form of palliative care, ASA V clients should be monitored throughout the procedure.</p>

 <b>ASA VI: DECLARED BRAIN-DEAD CLIENT WHOSE ORGANS ARE BEING REMOVED FOR DONOR PURPOSES</b>	
<p>Dental hygiene services would not be required at this stage.</p>	

### (E) EMERGENCY OPERATION MODIFIER

Any client who requires an emergency operation may have an E modifier beside their ASA classification (e.g., ASA Class IE).

Information provided in this Appendix is adapted from the American Society of Anesthesiologists (1963). *ASA Physical Status Classification System*. and Malamed Stanley F. (2010). *Physical Status Classification System*. In *Sedation: A guide to Patient Management*, 5th ed. (pp.56–59). USA. Mosby, Inc.

## Appendix D: Preoperative Physical Evaluation

1. A current basic physical examination, suitable for determining information that may be significant to nitrous oxide/oxygen conscious sedation, must be carried out for each client. At a minimum, nitrous oxide/oxygen conscious sedation requires the evaluation and recording of significant positive findings related to:
  - General appearance (note obvious abnormalities)
  - Head, neck, and intra-oral examination (particularly pertaining to airway, such as range of motion, loose teeth, potential obstruction from large tongue, tonsils, etc.)
  - The taking and recording of vital signs
2. If a more in-depth physical examination is required, it must be performed by a physician or dentist who has received formal education in a postgraduate anaesthesiology program or an oral and maxillofacial surgery program. This in-depth examination may include:
  - Auscultation (cardiac or pulmonary)
  - Examination of other physiologic systems
  - Other assessments
3. The core physical examination may include an order for an assessment of laboratory data, if indicated.

# Appendix E: Recordkeeping and Monitoring Recommendations

The following is a sample clinical record for nitrous oxide/oxygen conscious sedation that may be used as an adjunct to the existing client's chart. The use of this particular form is not mandatory, but any client record should include all the information set out below.

Client Name: _____		Age: _____		Date: _____			
Base Line Vital Signs (Date of V.S.: _____)		ASA Classification: I II III IV E		Dental hygiene procedure(s) to be performed: _____ _____ _____			
BP:	Resp:		Medical consultation completed: <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable				
Pulse:	O <sub>2</sub> Sat:						
Height:	Weight:						
Medical History Reviewed: <input type="checkbox"/>				Responsible Adult (Agent): _____			
Written Informed Consent Obtained: <input type="checkbox"/>							
Vital Signs Monitoring	Preoperative	Intraoperative					Post-Operative
	Time/Stats	Time/Stats					Time/Stats
BP:							
Pulse/Quality:							
Respiration:							
O <sub>2</sub> Saturation (SpO <sub>2</sub> ):							
Local Anaesthetic: <input type="checkbox"/> Yes <input type="checkbox"/> No		If Yes: Administered by: _____					
Local Anaesthetic Administration: (List time: amount and injection type(s))							
N <sub>2</sub> O Start Time:			N <sub>2</sub> O Finish Time:				
Procedure Start Time:			Procedure Finish Time:				
Titrated % of N <sub>2</sub> O:			Post-Operative O <sub>2</sub> : (in minutes)				
Discharge Criteria (relative to preoperative condition) Client was oriented to ⇨			<input type="checkbox"/> Time		<input type="checkbox"/> Place		
			<input type="checkbox"/> Person				
<input type="checkbox"/> Post-Op Instructions Given	Time of Discharge:		Discharged to Responsible Adult (Agent) <input type="checkbox"/> Yes <input type="checkbox"/> No				
Comments:          							
Practitioner Signature: _____							

## Appendix E: (Cont'd)

### RECOMMENDED MONITORING FOR ADULT CLIENTS

Monitor	Local Anaesthesia			Oral Sedation			Nitrous Oxide/ Oxygen Conscious Sedation		
	Pr	In	Po	Pr	In	Po	Pr	In	Po
Heart Rate	**	O	*	**	O	*	***	***	***
	q5min								
Blood Pressure	**	*	*	**	*	*	***	***	***
	q5min								
Respiration	**	O	O	**	O	O	***	***	***
	V			V			V	V	V
Oximetry	O	O	O	O	*	O	***	***	***
Temperature	*	O	O	*	O	O	*	O	O

### RECOMMENDED MONITORING FOR PEDIATRIC CLIENTS

Monitor	Local Anaesthesia			Oral Sedation			Nitrous Oxide/ Oxygen Conscious Sedation		
	Pr	In	Po	Pr	In	Po	Pr	In	Po
Heart Rate	**	O	*	**	**	**	***	***	***
	Cont.						Cont.		
Blood Pressure	**	*	*	**	**	**	***	***	***
	q5min			q5min			q5min		
Respiration	**	O	O	**	**	**	***	***	***
	V			V	PT		V	V/PT	V
Oximetry	O	O	O	**	**	**	***	***	***
Temperature	*	O	O	*	O	O	*	O	O

#### Key

O	- Not essential	PT	- Pretracheal stethoscope
*	- Optional	Pr	- Preoperative
**	- Recommended	In	- Intraoperative
***	- Must	Po	- Post-Operative
V	- Visual	Cont.	- Continuous

Revised from Malamed Stanley F. (2010). *Sedation: A guide to patient management*, 5th ed. (Tables 5-2 and Tables 5-3; pp.68-69). USA. Mosby, Inc.

# Appendix F: CRDHA Application for Authorization to Prescribe and Administer Nitrous Oxide/Oxygen Conscious Sedation

Date \_\_\_\_\_

Registrar  
 CRDHA  
 302, 8657 51 Ave NW  
 Edmonton, AB T6E 6A8

Dear Registrar:

Re: Nitrous Oxide/Oxygen Conscious Sedation

Please be advised that I wish to register as a dental hygiene practitioner providing nitrous oxide/oxygen conscious sedation.

My education consists of the following course(s) which meets the criteria set out in the CRDHA Policy Regarding Approval of Nitrous Oxide/Oxygen Conscious Sedation Courses:

Course date(s)	
Course title	
Course provider and location	
Evidence of completion	A notarized copy of evidence of successful completion must be attached. Detailed course information may be requested to determine that the course completed meets CRDHA Council Criteria. For U of A course graduates, this evidence is provided directly to CRDHA and does not need to be included with this application.
Evidence of currency	Required if course was completed more than 36 months prior to application. Employer verification of currency of administration of nitrous oxide/oxygen conscious sedation, in the form of a letter, must be attached.

I confirm that my CPR certification at the level required by CRDHA Council is current. (CPR certificate must be issued within the past twelve (12) months.)

I have read and understand the *CRDHA Guidelines for Prescribing and Administering Nitrous Oxide/Oxygen Conscious Sedation in Dental Hygiene Practice*.

Yours truly,

\_\_\_\_\_  
 Member Signature                      Member Name (please print)                      CRDHA Registration No.

## **Appendix G: Published CSA Standards for Equipment**

The Canadian Standards Association (CSA) is a **not-for-profit membership-based association** serving business, industry, government, and consumers in Canada and the global marketplace. The CSA functions as a neutral third party that develops standards in many areas including the field of health care technology.

Health care standards are developed to enhance the safety and effective application of technology in health care for the benefit of consumers and health care staff.

The standards are living documents, continually revised to address changing requirements and emerging technologies. Each standard is reviewed at least every five years.

Copies of any applicable CSA Standards for related equipment for the provision of nitrous oxide/oxygen conscious sedation or further details about CSA or the training workshops can be obtained by contacting the CSA directly:

### **Canadian Standards Association**

#### **Head Office**

5060 Spectrum Way  
Mississauga, ON L4W 5N6

Toll free: 1-800-463-6727

Ph: (416) 747-4000

Fax: (416) 747-4149

website: [www.csa.ca](http://www.csa.ca)

#### **Regional Office**

1707 94 St NW  
Edmonton, AB T6N 1E6

Toll free: 1-800-463-6727

Ph: (780) 490-2007

Fax: (780) 490-2059

## Appendix H: Registration of Dental Hygiene Facilities

If you have arranged to purchase, acquire, or install nitrous oxide/oxygen conscious sedation equipment, please complete this form and return it to the College of Registered Dental Hygienists of Alberta (CRDHA). You will then be provided with further information about the registration of your facility and the equipment. Nitrous oxide/oxygen conscious sedation equipment must **not** be used until it is registered. CRDHA will contact you to arrange for a facility and equipment inspection.

*Note:* A separate form must be completed for each piece of nitrous oxide/oxygen conscious sedation equipment. Completion of this form does **not** constitute registration of the equipment.

Facility Description	
Facility Name:	
Facility Address:	
City:	Postal Code:
Telephone:	Fax:
Name of Contact Person:	

Equipment Description	
Room Location in Facility:	
<input type="checkbox"/> Stationary <input type="checkbox"/> Mobile <input type="checkbox"/> Portable	
<input type="checkbox"/> Installed <input type="checkbox"/> In Storage	
Manufacturer:	
Model:	Serial No:
Manufacture Date (year/month):	

Owner Information	
Owner Name:	
Address:	
City:	Postal Code:
Telephone:	Fax:
Owner Signature:	Date:
Print Name:	

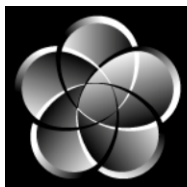
Return by mail to: CRDHA, 302, 8657 – 51 Ave. NW, Edmonton, AB T6E 6A8

Or by Fax to: (780) 440-0544



## References

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COLLEGE OF REGISTERED  
DENTAL HYGIENISTS  
OF ALBERTA