

# **National Dental Advisory Committee**

## **Emergency Drugs and Equipment in Primary Dental Care**

**January 2015**

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## Requirements

- Emergency drugs must be available in the dental practice at all times.
- Emergency equipment must be available in the dental practice at all times.
- Automatic External Defibrillators (AED) must be available in all dental practices.
- The requirement to take emergency drugs and equipment to each episode of domiciliary care should be on the basis of a risk assessment.
- If the risk assessment deems the domiciliary care to have a raised level of risk, emergency drugs and equipment must be available to the dental team;
  - A secondary set of emergency drugs and equipment must remain in the practice, when patients are being treated, if the primary set are taken on a domiciliary visit.
- Dental teams must familiarise themselves with current Resuscitation Council guidance.
- Records of staff medical emergency training consistent with the training requirements stated in this document must be made available at practice inspection.
- Resuscitation training must focus on the dental team, using scenarios to practise assessing and managing sick patients using the ABCDE rapid assessment tool. A course outline should be provided and distributed prior to the training session.
- The resuscitation training must include a practical demonstration and training in the use of an Automatic External Defibrillator (AED).

## Background

The National Dental Advisory Committee (NDAC) publication *Emergency Dental Drugs* (NHS MEL (1999)) 22 identified a list of drugs and equipment which should be available to manage medical emergencies within the dental setting. It also highlighted the need for dentists to carry a full emergency drugs kit (including portable oxygen supply and suction) for all domiciliary visits.

Since 1999 a number of additional relevant documents have been published as follows:

- *A Conscious Decision*<sup>1</sup> (2000). This resulted in the cessation of dental treatment under general anaesthesia in UK primary care settings.
- In 2006 the Resuscitation Council (UK) published standards for dental professionals in managing emergencies and resuscitation. In 2012 the Resuscitation Council revised these standards. The revised standards recommended the emergency drugs for use within a dental setting. In addition, the Council advised that Automatic External Defibrillators (AEDs) should be available in every healthcare environment.<sup>2</sup>
- The Scottish Dental Clinical Effectiveness Programme published *Drug Prescribing for Dentistry*<sup>3</sup> (2011). This included a list of drugs for use in medical emergencies together with information about their administration. This list reflected the list of emergency drugs recommended in British National Formulary (BNF)<sup>4</sup> and in the updated guidance from the Resuscitation Council (2012).
- The Scottish Dental Clinical Effectiveness Programme published a *Practice Support Manual*<sup>5</sup> with comprehensive lists of emergency drugs and equipment.
- A new *Combined Practice Inspection* document<sup>6</sup> was introduced from in 2013 for all dental practices across Scotland. This was revised from 1 January 2015.
- In 2013 the Resuscitation Council published *Quality standards for cardiopulmonary resuscitation practice and training. Primary dental care.*<sup>7</sup> These standards superseded those published in 2006 and do not cover aspects of managing medical emergencies beyond cardiopulmonary resuscitation. Information on medical emergencies encountered in dental practice other than cardiorespiratory arrest is now in the *Prescribing in Dental Practice* section of the British National Formulary (BNF)

A recent survey of Scottish Dental Practice Advisors reported that the provision of AEDs was not comprehensive or consistent either within or across Health Board areas.<sup>8</sup>

In light of the recent changes in practice and guidance, the NDAC commissioned a short life working group to update the 1999 publication *Emergency Dental Drugs*.

## Medical emergencies

All dental practitioners and dental care professionals may have to deal with medical emergencies. Fortunately, these are rare but can be life threatening and include:

1. Airway obstruction (choking and aspiration)
2. Anaphylaxis
3. Angina
4. Asthma
5. Hypoglycaemia
6. Myocardial infarction
7. Seizures
8. Vasovagal syncope (faint)

The Prescribing in Dental Practice section of the BNF<sup>4</sup> provides guidelines on the management of common medical emergencies which may arise in dental practice. A guide to the initial ABCDE approach which should be followed when assessing and treating patients with a medical emergency can be found in Appendix 5.

## Emergency drugs in the dental practice

You must ensure that the following drugs are available at all times.

1. Glyceryl trinitrate spray (400 µg per metered dose)
2. Salbutamol inhaler (100 µg per activation)
3. Adrenaline (1 ml ampoules or pre-filled syringes of 1:1000 solution for intramuscular injection) <i>Note that pre-filled syringes are useful in an emergency situation for ease of use.</i>
4. Aspirin (300 mg dispersible tablets)
5. Glucagon (for intramuscular injection of 1 mg)
6. Oral glucose/sugar (several alternative forms are available commercially including non-diet fizzy drinks, glucose gel, powdered glucose and sugar lumps)
7. Midazolam buccal liquid (10 mg/ml), <u>or</u> Midazolam injection (as hydrochloride) (5 mg/ml 2 ml ampoules) for topical buccal administration
8. Oxygen cylinder: <u>Size:</u> Every practice should have sufficient oxygen to ensure at least 30 minutes supply at 15 litres/minute. Three main sizes of cylinder are in current use in dental practices: <ul style="list-style-type: none"><li>• A full Size D cylinder contains 340 litres of oxygen and will provide oxygen for less than 30 minutes;</li><li>• A full Size CD cylinder contains 460 litres of oxygen and should provide oxygen for 30 minutes;</li><li>• A full Size E cylinder contains 680 litres of oxygen and should provide oxygen for up to 45 minutes.</li></ul> An urban practice should either have two Size D or two Size CD or one Size E cylinder. In rural areas the ambulance response times may be prolonged. In these circumstances additional cylinder capacity may be required to ensure that a collapsed patient can be adequately maintained on oxygen. In order to achieve this it is recommended that rural practices should have two E cylinders. <u>Flow:</u> The oxygen cylinder should provide flow of at least 15 litres per minute. <u>Serviced:</u> at least every 5 years (or according to manufacturer's instructions). <u>Charged:</u> at least 75% full and evidence of regular checks. Note: some cylinders have a built-in regulator whereas others have a bolt on regulator; these are not interchangeable; dental staff should ensure there is awareness of the type of cylinder in use and that spare cylinders are useable.
9. Flumazenil (0.5 mg/ 5 ml): <b>only required for those dental settings where conscious sedation is undertaken using benzodiazepines.</b>

## Emergency equipment in the dental practice

You must ensure that the following items of equipment are available at all times.

1. Oxygen cylinder: See Emergency Drugs.
2. Oxygen face mask capable of delivering high concentrations of oxygen (reservoir bag) with tubing.
3. Basic set (0, 1, 2, 3, 4) of oro-pharyngeal airways for adults and children.
4. Bag-valve-mask, with additional child mask.
5. Portable independently powered suction machine with appropriate suction tips and tubing.
6. Single-use sterile syringes, (1 ml) and 21G (green) needles.
7. Spacer device for inhaled bronchodilators.
8. Pocket masks with oxygen port available in every surgery.
9. Automated External Defibrillator (with razor and scissors).  The AED should be mapped on to the Scottish Ambulance Service control system to enable ambulance call handlers to direct the public to the practice while an ambulance is on its way.

## Additional emergency equipment in sedation dental practices

Sedation dental practices are those where conscious sedation, using intravenous, oral or transmucosal routes, is undertaken and would be a useful adjunct in managing a medical emergency.

1. Pulse oximeter with audible alarm: for ongoing monitoring.
2. Blood pressure monitor: for patient assessment visit and pre and post-treatment readings.
3. Nasal cannula set: for giving supplemental oxygen.

## Emergency drugs and equipment for domiciliary dental treatment

Where possible, it is preferable to deliver care in a dental surgery setting. Clinicians should satisfy themselves that a patient requires a domiciliary visit because of genuine need and not personal choice dictated solely by convenience.

Every episode of domiciliary care should be risk assessed, assigned a risk category and a decision made as to whether it is necessary and, if so, how any risk should be mitigated.

In making this decision clinicians should take into account:

1. The nature of the dental care. Some dental procedures such as examinations and the construction of dentures are essentially non-invasive and will carry a much lower risk.
2. The patient's medical history and any possible/likely causes of collapse or reaction to treatment.
3. The physical environment and any possible risks related to this.

**Low risk:** If it is thought that the dental procedure presents a low risk to the patient then emergency drugs and equipment need not be taken on the domiciliary visit.

**Moderate Risk:** Where the care provided is deemed to be of moderate risk, the following recommended emergency drugs and equipment must be available to the dental team in the domiciliary setting.

1. Emergency drugs kit and single-use sterile syringes.
2. Portable oxygen with flow-meter, tubing and a face mask capable of delivering high concentrations of oxygen.
3. Oro-pharyngeal airways and bag-valve-mask.
4. Portable independently powered suction machine with appropriate suction tips and tubing.
5. Spacer device for inhaled bronchodilators.

**Significant risk:** If the risk assessment determines that there would be a significant risk of patient collapse or reaction to the dental procedure in a domiciliary setting, the dental team should refer the patient to the Public Dental Service or local hospital dental department as appropriate.



## Training in the management of medical emergencies

The 1999 NDAC *Emergency Dental Drugs* document recommended that all dental professionals in contact with patients should receive annual training in Emergency Life Support (ELS), and that the training should be undertaken by an accredited instructor. Within Scotland resuscitation training is a practice inspection requirement. The General Dental Council highly recommends that dental registrants undertake resuscitation training as part of their Continuing Professional Development.<sup>9</sup>

Training in cardiopulmonary resuscitation within the dental setting should follow Resuscitation Council guidance<sup>7</sup>. The management of other medical emergencies should also be covered in the training session. It is important that both dental professionals and the public are reassured that the training they undertake is of a consistently high standard across all parts of Scotland. It is therefore recommended that records of staff medical emergency training are made available at practice inspection. The contents of the training should follow Resuscitation Council (UK) standards, advice in the BNF and General Dental Council (GDC) guidance.

Training should use scenarios to allow the dental team to practise the assessment and management of patients with the life-threatening conditions that a dental professional is likely to encounter in dental practice. These will include cardiac arrest, myocardial infarction, anaphylactic reactions, vasovagal attacks, seizures, and hypoglycaemia. A course manual should be distributed prior to the training session.

The content of any training should include:

1. Assessment of the patient using the ABCDE rapid assessment tool.
2. Basic Life Support (BLS) sequence (adult and child), including risks to the rescuer and victim, rescue breaths, chest compression, regurgitation during CPR, choking and the recovery position.
3. Use of oxygen, oro-pharyngeal airways and bag-valve-mask ventilation.
4. Use of emergency drugs to manage dental emergencies. This should include a practical demonstration of each item within the emergency drug kit.
5. Practical demonstration and training in the use of an automatic external defibrillator.

Resuscitation training for the dental team can be undertaken within the practice or at local or regional training centres. Qualified trainers in resuscitation from within the dental practice staff should be encouraged to deliver 'cascade' training to other staff members (e.g. in BLS).

NHS Board Public Dental Services may require some of their employed clinical staff to undertake training in more advanced techniques such as Immediate Life Support (ILS) which will require a trainer of more advanced skills (e.g. Resuscitation Officer) or attendance at a designated course. Also, this may be an appropriate level of training for practices delivering treatment under sedation. Detailed training options for dental professionals can be found in Resuscitation Council guidance.

All training should be logged and records of staff medical emergency training must be available at the Practice Inspection visit.

## **Practice improvement**

To provide evidence that a dental practice maintains and improves its capability to manage medical emergencies, the dental team should ensure that:

- the resuscitation equipment is checked weekly to ensure that it is ready for use.
- the practice has a system in place to regularly check that the emergency drugs have not passed their expiry dates.
- a log of staff training is kept.
- a Significant Event Analysis (SEA) is undertaken after every medical emergency with any learning points shared and an action plan for improvement produced.

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### Appendix 1: Guidelines for the storage of medical gas cylinders

Medical oxygen is a non-flammable gas but is a very strong oxidant. It may react violently with combustible materials and can cause certain substances to burn vigorously, including some materials that would not normally burn in air. Oxygen is highly dangerous in the presence of oils, greases, tarry substances and many plastics due to the risk of spontaneous combustion in the presence of oxygen when in relatively high concentrations. Compressed medical oxygen cylinders, therefore, should be stored carefully and:

- stored under cover, preferably inside, kept dry and clean, and not subjected to extremes of heat or cold and away from stocks of combustible material;
- stored separately from industrial and other non-medical cylinders;
- stored to maintain separation between full and empty cylinders;
- used in strict rotation so that cylinders with the earliest filling date are used first;
- stored separately from other medical cylinders within the store;
- F size cylinders and larger should be stored vertically. E size cylinders and smaller should be stored horizontally.

Warning notices prohibiting smoking and naked lights should be posted clearly in the cylinder storage area. Emergency Services should be advised of the location of the cylinder store, as cylinders may explode if subjected to extremely high temperatures (e.g. if involved in a fire).

Medical oxygen should never be stored in a vehicle.

## Appendix 2: Guidelines for the transport of medical gas cylinders

The Health and Safety Executive advice that oxygen cylinders as used in dentistry, which include a regulator, hose and mask, form part of a “ready to use” set. As such they are exempt from European Agreements concerning the International Carriage of Dangerous Goods by Road (ADR) by virtue paragraph 1.1.3.1 (b). Measures need to be taken to prevent leakage of contents in normal conditions of carriage.<sup>10</sup>

A car insurance company should be informed if a vehicle is being used to transport medical oxygen. There is normally no additional charge for the carriage of D size cylinders.

You must ensure that:

1. the cylinder valve is properly closed;
2. the equipment is carried securely in the vehicle;
3. the equipment is carried in purpose-made bags or cases;
4. the equipment is removed from the vehicle as soon as possible.

Duty-holders will still need to carry out a risk assessment and provide appropriate training under other legislation such as the Management of Health and Safety at Work Regulations and the Provision and Use of Workplace Equipment Regulations.

Such training should include:

1. Adequate knowledge of the properties of the gas;
2. Correct operating procedures for the cylinder;
3. Awareness of the potential load including the precautions and actions to be taken in the event of an emergency or oxygen leak.

Appendix 3: Membership of the Working Group

Graham Ball	Consultant in Dental Public Health	South East Scotland Network
Brett Duane	Specialty Registrar Dental Public Health (Chair)	NHS Lothian/NHS Fife
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Elaine Hynds	General Dental Practitioner	British Dental Association
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Mike MacMillan	General Dental Practitioner	NHS Fife
Anne Mather	Hygienist	NHS Lothian
John McAnaw	Head of Pharmacy	NHS 24
Ian Robertson	Resuscitation Officer	NHS Greater Glasgow and Clyde
David Shaw	Dental Practice Adviser	NHS Grampian
Andy Yuill	Dental Practice Adviser	NHS Fife

#### Appendix 4: Terms of reference

To review and revise the 1999 NDAC *Emergency Dental Drugs* document with a particular focus on domiciliary oxygen and defibrillators, specifically:

1. To identify a list of drugs and equipment which should be available for the emergency care of patients in dental settings:
  - where the normal range of procedures are carried out;
  - where intravenous or inhalational (conscious) sedation is used;
  - where dental services may be provided on a domiciliary basis (e.g. care homes, home visits).
2. To identify the type and extent of resuscitation training and knowledge for the dental team.
3. To ensure that any recommendations are practical and realistic.



## Appendix 5: The 'ABCDE' approach to the sick patient

This appendix provides guidance on the initial approach and management of medical emergencies which may arise in dental practice. Further information on the management of specific medical emergencies is available in the *Prescribing in Dental Practice* section of the BNF. Dental Practitioners, Dental Care Professionals and their staff should be familiar with standard resuscitation procedures as recommended by the Resuscitation Council (UK). In all circumstances it is advisable to call for medical assistance as soon as possible by dialling 999 and summoning an ambulance. Early recognition of the 'sick' patient is to be encouraged. Pre-empting any medical emergency by recognising an abnormal breathing pattern, an abnormal patient colour or abnormal pulse rate, allows appropriate help to be summoned e.g. ambulance, prior to any patient collapse occurring.

A systematic approach to recognising the acutely ill patient based on the 'ABCDE' principles is recommended. Accurate documentation of the patient's medical history should further allow those 'at risk' of certain medical emergencies to be identified in advance of any proposed treatment. The elective nature of most dental practice allows time for discussion of medical problems with the patient's general medical practitioner where necessary. In certain circumstances this may lead to a postponement of the treatment indicated or a recommendation that such treatment be undertaken in hospital.

### **General principles**

1. Follow the **A**irway, **B**reathing, **C**irculation, **D**isability, and **E**xposure approach (ABCDE) to assess and treat the patient.
2. Treat life-threatening problems as they are identified before moving to the next part of the assessment.
3. Continually re-assess, starting with Airway, if there is further deterioration.
4. Assess the effects of any treatment given.
5. Recognise when you need extra help and call for help early. This may mean dialling 999 for an ambulance.
6. Use all members of the dental team so that essential tasks, such as collecting emergency drugs and equipment, dialling 999, can be carried out without delay.
7. Organise the team and communicate effectively.
8. The aims of initial treatment are to keep the patient alive, achieve some clinical improvement and buy time for further treatment whilst waiting for help.

9. Remember - it can take a few minutes for treatment to work.
10. The ABCDE approach can be used irrespective of your training and experience in clinical assessment or treatment. Individual experience and training will determine which treatments you can give. Often only simple measures such as laying the patient down or giving oxygen are needed.

## **First steps**

- In an emergency, stay calm. Ensure that you and your staff are safe.
- Look at the patient generally to see if they 'look unwell'.
  - In an awake patient ask, "How are you?" If the patient is unresponsive, shake him and ask, "Are you all right?" If they respond normally, they have a clear airway, are breathing and have brain perfusion. If they speak only in short sentences, they may have breathing problems. Failure of the patient to respond suggests that they are unwell. If they are not breathing and have no pulse or signs of life, start CPR according to current resuscitation guidelines.

## **Airway (A)**

1. Look for the signs of airway obstruction:
  - Airway obstruction causes 'paradoxical' chest and abdominal movements ('see-saw' respirations) and the use of the accessory muscles of respiration e.g., neck muscles. Central cyanosis (blue lips and tongue) is a late sign of airway obstruction. In complete airway obstruction, there are no breath sounds at the mouth or nose.
  - In partial airway obstruction, air entry is diminished and usually noisy
  - Inspiratory 'stridor' is caused by obstruction at the laryngeal level or above.
  - Expiratory 'wheeze' suggests obstruction of the lower airways, which tend to collapse and obstruct during expiration. This is most commonly seen in patients with asthma or chronic obstructive pulmonary disease.
  - Gurgling suggests there is liquid or semi-solid foreign material in the upper airway.
  - Snoring arises when the pharynx is partially occluded by the tongue or palate.

2. Airway obstruction is an emergency:

- In most cases, only simple methods of airway clearance are needed:
  - Airway opening manoeuvres – head tilt/chin lift or jaw thrust;
  - Remove visible foreign bodies, debris or blood from the airway (use suction or forceps as necessary);
  - Consider simple airway adjuncts e.g. oropharyngeal airway.

3. Give oxygen initially at a high inspired concentration:

- Use a mask with an oxygen reservoir. Ensure that the oxygen flow is sufficient (15 litres per minute) to prevent collapse of the reservoir during inspiration;
- If you have a pulse oximeter, titrate the oxygen delivery aiming for normal oxygen saturation levels (94-98%). In very sick patients this may not be possible and a lower oxygen saturation (more than 90%) is acceptable for a short period of time.

## **Breathing (B)**

During the immediate assessment of breathing, it is vital to diagnose and treat immediately life-threatening breathing problems, e.g. acute severe asthma.

1. Look, listen and feel for the general signs of respiratory distress: sweating, central cyanosis (blue lips and tongue), use of the accessory muscles of respiration (muscles of the neck) and abdominal breathing.

2. Count the respiratory rate. The normal adult rate is 12 to 20 breaths per minute and a child's rate is between 20 and 30 breaths per minute. A high, or increasing, respiratory rate is a marker of illness and a warning that the patient may deteriorate and further medical help is needed.

3. Assess the depth of each breath, the pattern (rhythm) of respiration and whether chest expansion is equal and normal on both sides.

4. Listen to the patient's breath sounds a short distance from their face. Gurgling airway noises indicate airway secretions, usually because the patient cannot cough or take a deep breath. Stridor or wheeze suggests partial, but important, airway obstruction.

5. If the patient's depth or rate of breathing is inadequate, or you cannot detect any breathing, use bag and mask (if trained) or pocket mask ventilation with supplemental oxygen while calling urgently for an ambulance.

6. Hyperventilation and panic attacks are relatively common in general dental practice. In most patients these will resolve with simple reassurance.

## **Circulation (C)**

Simple faints or vasovagal episodes are the most likely cause of circulation problems in general dental practice. These will usually respond to laying the patient flat and if necessary raising the legs. The systematic ABCDE approach to all patients will ensure that other causes are not missed.

1. Look at the colour of the hands and fingers: are they blue, pink, pale or mottled?
2. Assess the limb temperature by feeling the patient's hands: are they cool or warm?
3. Measure the capillary refill time. Apply cutaneous pressure for five seconds on a fingertip held at heart level (or just above) with enough pressure to cause blanching. Time how long it takes for the skin to return to the colour of the surrounding skin after releasing the pressure. The normal refill time is less than two seconds. A prolonged time suggests poor peripheral perfusion. Other factors (e.g., cold surroundings, old age) can also prolong the capillary refill time.
4. Count the patient's pulse rate. It may be easier to feel a central pulse (i.e., carotid pulse) than the radial pulse.
5. Weak pulses in a patient with a decreased conscious level and slow capillary refill time suggest a low blood pressure. Laying the patient down and raising the legs may be helpful. In patients who do not respond to simple measures urgent help is needed and an ambulance should be summoned.
6. Cardiac chest pain typically presents as a heaviness, tightness or indigestion-like discomfort in the chest. The pain or discomfort often radiates into the neck or throat, into one or both arms (more commonly the left) and into the back or stomach area. Some patients experience the discomfort in one of these areas more than in the chest. Sometimes pain may be accompanied by belching, which can be misinterpreted as evidence of indigestion as the cause. The patient may have known stable angina and carry their own glyceryl trinitrate (GTN) spray or tablets. If they take these, the episode may resolve. If the patient has sustained chest pain, give GTN spray if the patient has not already taken some. The patient may feel better and should be encouraged to sit

upright if possible. Give a single dose of aspirin and consider the use of oxygen.

## **Disability (D)**

Common causes of unconsciousness include profound hypoxia, hypercapnia (raised carbon dioxide levels), cerebral hypoperfusion (low blood pressure), or the recent administration of sedatives or analgesic drugs.

1. Review and treat the ABCs: exclude hypoxia and low blood pressure.
2. Check the patient's drug record for reversible drug-induced causes of depressed consciousness.
3. Examine the pupils (size, equality and reaction to light).
4. Make a rapid initial assessment of the patient's conscious level using the AVPU method: **A**lert, responds to **V**ocal stimuli, responds to **P**ainful stimuli or **U**nresponsive to all stimuli.
5. Place unconscious patients in the recovery position if their airway is not protected.

## **Exposure (E)**

To assess and treat the patient properly loosening or removal of some of the patient's clothes may be necessary. Respect the patient's dignity and minimise heat loss. This will allow you to see any rashes (e.g. anaphylaxis) or perform procedures (e.g. defibrillation).



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