

SPECIALISED SERVICES NATIONAL DEFINITIONS SET (2nd EDITION)

Hyperbaric Oxygen Treatment Services (Adult) - Definition No. 28

Preface

36 specialised services are covered by the Specialised Services National Definitions Set (2nd edition).

The definitions were developed through national working groups (one for each service). Many clinicians, hospital managers, finance and information staff and commissioners were directly involved in working group meetings and many more provided comments during the consultation stages. Some of the definitions have been endorsed by the relevant national organisations.

The definitions identify the activity that should be regarded as specialised and therefore subject to collaborative commissioning arrangements. The definitions provide a helpful basis for service reviews and strategic planning and enable commissioners to establish a broad base-line position and make initial comparisons on activity and spend. It should be noted that, currently, many of the definitions have coding gaps and other information problems as well as a lack of agreed standard service currencies; further work is needed in these areas.

Production of the Specialised Services National Definitions Set is an iterative process. Over time new specialised services will be provided by the NHS whilst other services will become more commonplace and cease to be specialised.

Each definition is divided into two sections.

Section A provides descriptions of the various services covered. In most definitions, the existing pattern or model of service provision is described as well as the clinical service. Each definition includes a list of relevant national guidelines, such as DoH or Royal College of Publications, and identifies any national databases containing health outcomes information. Section A also includes sections on finance and information, examines the best way of identifying the relevant activity in information systems and acknowledges any coding gaps or difficulties. Most of the definitions include a recommended standard currency for the service (e.g. banded bed days).

Section B includes specific issues considered to be important by the working group concerned. The views expressed in Section B are those of the particular working group and do not necessarily represent opinion within the DoH or the NHS. Resolving these issues is not within the remit of the definitions project.

It should be noted that the definitions are not service specifications nor do they prescribe service models or set service standards. Where national standards for a service already exist these may be referred to in the definition but specific decisions regarding the planning and procurement of a specialised service are matters for NHS commissioners themselves to address. Inclusion of a treatment or intervention in a definition should not be taken to mean that there is established evidence of clinical or cost effectiveness.

Comments and suggested improvements to the definitions are very welcome and can be sent to the email address: specialised.services.defins@doh.gsi.gov.uk

SECTION A

1. General Description

Hyperbaric oxygen treatment (HBOT) involves delivery of 100% oxygen inside a treatment chamber at a pressure greater than sea level. There are both monoplace and multiplace chambers available across the UK. Details of the location of services are set out in Appendix 1. The service centres are not evenly distributed on a geographical basis, and they provide different categories of services:

Category 1

Facilities should be capable of receiving patients in any diagnostic category who may require Advanced Life Support either immediately or during HBOT.

Category 2

Facilities should be capable of receiving patients in any diagnostic category who are judged by the referring medical officer not to be likely to require Advanced Life Support during HBOT.

Category 3

Facilities should be capable of receiving emergency referrals of divers and compressed air tunnel workers. These facilities should also be capable of providing elective treatment of residual symptoms of decompression illness. Patients may be accepted, in the name of the Medical Director (whose role is defined in paragraph 24 of the Cox Report, 1994), even when no Hyperbaric Duty Doctor is available at the time of referral provided, in the view of the referring clinician, the patient's condition demands immediate action. This does not obviate the need for discussion with the Hyperbaric Duty Doctor who should attend the patient as soon as is practicable.

Category 4

Facilities should be capable of receiving elective and emergency referrals of patients in any diagnostic category who are judged by the referring medical officer, on the advice of the Hyperbaric Duty Doctor, not to be likely to require access during HBOT. Normally monoplace chambers are not suitable for the immediate treatment of acute decompression illness.

Hyperbaric chambers are currently provided in a number of places, including a small number of hospitals, private organisations including a charitable unit, Royal Navy Centres, police diving units, professional diver training schools, and sites associated with the North Sea oil industry.

2. Rationale for the Service being included in the Specialised Services Definitions Set

The services deal with both emergency and elective requirements covering treatment of decompression accidents and a wider range of disorders, such as particular wound problems and some infection as well as emergency requirements. The majority of units providing services to the NHS are registered with the British Hyperbaric Association which is not regulatory, but aims to provide standards for benchmarking purposes and to facilitate research.

The requirements of the NHS are met by accessing the hyperbaric chamber services in the different units across the country. The capacity of the current service is likely to meet present and future needs.

3. Links to Other Services on the Specialised Services Definitions Set

No.1, Specialised Cancer Services (adult)

No.8, Specialised Neurosciences Services (adult)

No.9, Specialised Burns Services (all ages)

No.23, Specialised Services for Children

No.34, Specialised Orthopaedic Services (adult)

4. Detailed Description of Specialised Activity

HBOT uses specialist equipment and experienced personnel to deliver oxygen at higher than atmospheric pressures. The safe and rational use of this therapy is increasing as medical and paramedical staff become familiar with its potential benefits.

Evidence base

HBOT is widely accepted as standard clinical care for:

- decompression illness
- gas gangrene
- air and gas embolism

There are few alternative treatments for these life-threatening conditions.

HBOT has been used for a very wide range of other conditions. The evidence base for use for HBOT in 27 conditions was assessed by the Australian Medicare Services Advisory Committee in a report published in 2001 (www.health.gov.au/haf/msac). This committee concluded that public funding for HBOT should be supported for:

- decompression illness
- gas gangrene
- air and gas embolism

- diabetic wounds including diabetic gangrene and diabetic foot ulcers
- necrotising fasciitis and Fournier's gangrene
- prevention and treatment of osteoradionecrosis

Five separate Succinct and Timely Evaluated Evidence Reviews (STEER) reports were published in 2002 ([www/signpoststeer.org](http://www.signpoststeer.org)) which reviewed the evidence about the use of HBOT for the following conditions:

- necrotising fasciitis or Fourier's gangrene
- osteoradionecrosis
- central retinal artery occlusion
- multiple sclerosis
- carbon monoxide poisoning

An addendum STEER report was published in October 2002 on carbon monoxide poisoning which took into account an influential randomised trial supporting the use of HBOT in carbon monoxide poisoning (Weaver LK, Hopkins RO, Chan KJ et al. Hyperbaric oxygen for acute carbon monoxide poisoning. *New Eng J Med*; 347(14): 1057-1067).

The European Committee for Hyperbaric Medicine (<http://www.oxynet.org/01WhatisHBO/1st%20EUROPEAN%20CONSENSUS%20CONFERENCE.htm>) advocates hyperbaric oxygen for the first line treatment of the following conditions:

- decompression illness
- gas gangrene
- air or gas embolism
- carbon monoxide poisoning
- necrotising fasciitis
- post-radiotherapy tissue damage
- preparation for surgery in previously irradiated tissue.

Treatment procedures

The treatment involves breathing 100% oxygen intermittently while the pressure of the treatment chamber is increased to a point higher than sea level pressure. At a pressure of 3 atmospheres, dissolved oxygen in plasma is approximately sufficient to supply the requirements of many tissues without contribution from oxygen bound to haemoglobin.

HBOT is widely accepted as standard clinical care, and should be accessed as a specialised service, for the following conditions:

<p>Emergency treatment</p> <p>Decompression illness Air and gas embolism Carbon monoxide poisoning</p>
<p>Urgent treatment required within 24 hours</p> <p>Necrotising fasciitis Gas gangrene</p>
<p>Elective treatment</p> <p>Osteoradionecrosis Diabetic wounds</p>

5. Recommended Units of Activity / Currency Measurement

Within the NHS there is some lack of consistency, whereby some patients receiving HBOT are not recorded on central information systems. Recording in some instances appears to be in local systems, but this varies across the country.

In the private sector, the recording systems are not known in any detail, but purchasers of the service are given a small amount of information together with the cost of the service purchased.

The recommended units of activity are:

- inpatients and day cases (Finished Consultant Episode)
- outpatients (first and subsequent attendances)

National minimum data set information is theoretically available for both inpatient and outpatient treatment/attendances from all service providers, including all non NHS providers, for each individual patient episode. The inpatient activity is categorised as emergency, urgent (within 24 hours) and usually referred from a secondary care unit, and elective.

The British Hyperbaric Association collects information from its member units in order to try to provide comparative data, and collects information on diving accidents, but it is not complete at the present time.

Attached at Appendix 2 is a list of diagnoses together with ICD 10 codes for conditions referred to in this definition. It should be noted that the ICD 10 codes do not give any indication of severity of the condition. HBOT may be one of several components of clinical management of the patient.

6. Elements of the Service / Guidance for Costing

It is important to have detailed, accurate prices for all of the individual hyperbaric investigations/treatments/treatment regimes commissioned. The prices should reflect the inpatient episodes and outpatient attendances in line with the recommended units of activity to be used. All service agreements/payments for treatment are likely to be on an individual 'named patient' basis.

There are currently some difficulties in relation to the inclusion of patient transport costs and any patient overnight stay costs (not a hospital bed stay) in the cost of the service. It is recommended that transport costs, where appropriate, should be included in the overall cost of the service. Patients may need 30 or more daily treatments for some conditions such as osteoradionecrosis.

7. Recommended National Standards, Guidelines and Protocols

- The Faculty of Occupational Medicine. A Code of Good Working Practice for the Operation and Staffing of Hyperbaric Chambers for Therapeutic Purposes. "The Cox Report" (1994)
- Guide to Fire Safety Standards for Hyperbaric Treatment Centres. The British Hyperbaric Association (1996)
- Guide to Electrical Safety Standards for Hyperbaric Treatment Centres. The British Hyperbaric Association (1996)
- The Training and Education of Hyperbaric Unit Personnel. The British Hyperbaric Association (1999)
- Hyperbaric Oxygen Therapy: A Committee Report. Undersea and Hyperbaric Medical Society (1999)
- Health and Safety for Therapeutic Hyperbaric Facilities: A Code of Practice. The British Hyperbaric Association (2000)
- Standards for Treatment of Acute Decompression Illness in Therapeutic Chambers. The British Hyperbaric Association (2000)
- National Minimum Standards for Independent Health Care. Care Standards Act 2000.
- Indications for Hyperbaric Therapy. European Committee for Hyperbaric Medicine

SECTION B

Not applicable.

British Hyperbaric Association Member Hyperbaric Chambers

Category 1 Chambers:

Facilities should be capable of receiving patients in any diagnostic category who may require Advanced Life Support either immediately or during hyperbaric oxygen treatment.

- **Aberdeen** – Hyperbaric Medicine Unit, Aberdeen Royal Infirmary
- **Gosport** – Centre for Defence Hyperbaric Medicine – Royal Hospital Haslar, Gosport / Queen Alexandra Hospital, Cosham
- **Great Yarmouth** – James Paget Hospital Hyperbaric Chamber
- **Hull** – North of England Medical Hyperbaric Unit, BUPA Hospital, Anlaby, Hull
- **London** - Capital Hyperbarics, The Hospital of St John & St Elizabeth, St John’s Wood
- **London** – London Hyperbaric Medicine Ltd, Whipps Cross University Hospital NHS Trust, Leytonstone
- **Plymouth** – The Diving Diseases Research Centre, The Hyperbaric Medical Centre (DDRC), Tamar Science Park (supporting hospital: Derriford Hospital)
- **Poole** – Atlantic Enterprise UK Ltd – “Poole Hyperbaric Centre” (supporting hospital: Poole General Hospital)
- **Wirral** – North West Emergency Recompression Unit, Murrayfield Hospital

Category 2 Chambers:

Facilities should be capable of receiving patients in any diagnostic category who are judged by the referring medical officer not to be likely to require Advance Life Support during hyperbaric oxygen treatment.

- **Isle of Man** – Isle of Man Hyperbaric Facility (supporting hospital: Nobles (IOM) Hospital, Douglas)
- **Guernsey** – Hyperbaric Unit, St John Ambulance and Rescue Service, Rohais, St Peterport (supporting hospital: Princess Elizabeth Hospital)
- **Oban** – Dunstaffnage Marine Laboratory, PO Box 3, Oban, Argyll (supporting hospital: Lorn and the Islands District General Hospital)
- **Portadown** – Regional Recompression Chamber Unit for Northern Ireland, Craigavon Area Hospital

- **Preston** – No 1 Police Region Hyperbaric Chamber, Lancashire Police HQ (supporting hospital: Royal Preston Hospital)

Category 3 Chambers:

Facilities should be capable of receiving emergency referrals of divers and compressed air tunnel workers. These facilities should also be capable of providing elective treatment of residual symptoms of decompression illness. Patients may be accepted, in the name of the Medical Director (whose role is defined in para 24 of the Cox Report), even when no Hyperbaric Duty Doctor is available at the time of referral provided, in the view of the referring clinician, the patient's condition demands immediate action. This does not obviate the need for discussion with the Hyperbaric Duty Doctor who should attend the patient as soon as is practicable.

- **Gravesend** – Marine Services, Port of London Authority (supporting hospitals: Gravesend Hospital (day) and Dartford Hospital (night))
- **Isle of Cumbrae** – University Marine Biological Station, Millport (supporting hospital: The Lady Margaret Hospital, Millport)
- **Jersey** – Jersey Hyperbaric Treatment Centre, The Albert Quay, St Helier (supporting hospital: The General Hospital, St Helier)
- **Orkney** – Orkney Hyperbaric Unit (supporting hospital: Balfour Hospital)
- **Leicester** – Stoney Cove Marine Trials Ltd (supporting hospital: Leicester Royal Infirmary)

Category 4 Chambers:

Facilities should be capable of receiving elective and emergency referrals of patients in any diagnostic category who are judged by the referring medical officer, on the advice of the Hyperbaric Duty Doctor, not to be likely to require access during hyperbaric oxygen treatment. Normally monoplace chambers are not suitable for the immediate treatment of acute decompression illness.

- **Dundee** – Ninewells Chamber, Ninewells Hospital and Medical School
- **Manchester** – Monplace Hyox, Ward J4, North Manchester General Hospital
- **Peterborough** – Hyperbaric Unit, District Hospital

Diagnoses and ICD 10 Codes for Conditions for which Hyperbaric Oxygen Treatment has been used

Note: This list is provided for convenience. Please see the text of the definition for comments on the assessment of the evidence base for use in these conditions.

Decompression illness

T70	Effects of air pressure and water
T70.0	Otitic barotrauma
T70.1	Sinus barotrauma
T70.3	Caisson disease (decompression sickness)
	- compressed air disease
	- diver's palsy or paralysis

Arterial gas embolism

T79.0	Air embolism (traumatic)
T80.0	Air embolism following infusion, transfusion and therapeutic injection
T81.7	Vascular complications following a procedure not elsewhere classified
	- air embolism following procedure NEC

Carbon monoxide poisoning

T53	Toxic effects of halogen derivatives of aliphatic and aromatic carbons
T53.0	Carbon tetrachloride
	- Tetrachloromethane
T58	Toxic effect of carbon monoxide
X47*	Accidental poisoning by and exposure to other gases and vapours
X67*	Intentional self poisoning by and exposure to other gases and vapours
Y17*	Poisoning by and exposure to other gases and vapours, undetermined intent

* These codes are external cause codes and would not be used on their own, they are usually associated with an injury code e.g. T53.0

Necrotising infections

No codes available

Clostridial myonecrosis

No codes available

Treatment of acute blood loss anaemia

D62	Acute post haemorrhagic anaemia
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Post radiation tissue damage and preparation for surgery in previously irradiated tissues

Radionecrosis

T66	Unspecified effects of radiation
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K10.2 Osteoradionecrosis of jaw

N30.4 Irradiation cystitis

Radiation mucositis

L55 - L59 Radiation related disorders of the skin and subcutaneous tissue

K52.0 Gastroenteritis and colitis due to radiation

Laryngeal radionecrosis

No code available

Refractory osteomyelitis

M86.4 Chronic osteomyelitis with draining sinus

M86.6 Other osteomyelitis

K10.2 Inflammatory conditions of jaws
- osteoradionecrosis

Selected problem wounds

T01.0 Open wounds involving head and neck

T01.1 Open wounds involving thorax with abdomen, lower back and pelvis

T01.2 Open wounds involving multiple regions of upper limb(s)

T01.3 Open wounds involving multiple regions of lower limb(s)

T01.6 Open wounds involving multiple regions of upper limb(s) with lower limb(s)

T01.8 Open wounds involving other combinations of body regions

T01.9 Multiple open wounds, unspecified

T14.1 Open wound of unspecified body region

E14 Diabetes mellitus (relating to wound).

This code would be in addition to the code for the specified wound.

Crush injury

T14.7 Crushing injury and traumatic amputation of unspecified body region

Crushing injury NOS

Traumatic amputation NOS

T04 Crushing injuries involving multiple body regions

T04.0 Crushing injuries involving head and neck

T04.1 Crushing injuries involving thorax with abdomen, lower back and pelvis

T04.2 Crushing injuries involving multiple regions of upper limb(s)

T04.3 Crushing injuries involving multiple regions of lower limb(s)

T04.4 Crushing injuries involving multiple regions of upper limb(s) with lower limb(s)

T04.7	Crushing injuries of thorax with abdomen, lower back and pelvis with limb(s)
T04.8	Crushing injuries involving other combinations of body regions
T04.9	Multiple crushing injuries, unspecified
G06.0	Intra-cranial abscess and granuloma
A48.0	Gas gangrene (including cellulitis)