



ANZCA
FPM

The ANZCA Advanced Certificate in Diving and Hyperbaric Medicine (Adv Cert in DHM) Curriculum

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<http://www.royalcollege.ca/portal/page/portal/rc/canmeds>

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Introduction

The Australian and New Zealand College of Anaesthetists is the professional organisation in Australia and New Zealand for Diving and Hyperbaric Medicine (DHM) physicians and physicians in training (trainees) and is directly responsible for the education and training, and assessment of DHM physicians in these countries. The college provides an advanced certificate training program in DHM, undertaken in hospitals and hyperbaric facilities approved by the ANZCA DHM subcommittee, leading to the qualification of ANZCA Advanced Certificate in Diving and Hyperbaric Medicine (Adv Cert in DHM) hereafter 'the advanced certificate'.

This document should be read in conjunction with:

- Regulation 36 *ANZCA Advanced Certificate in Diving and Hyperbaric Medicine (Adv Cert in DHM)*
- The *ANZCA handbook for Advanced Certificate in Diving and Hyperbaric Medicine (Adv Cert in DHM) training*
- *ANZCA handbook for Advanced Certificate in Diving and Hyperbaric Medicine (Adv Cert in DHM) Accreditation*

The scope of diving and hyperbaric medicine practice

The practice of DHM is concerned with the study of two related disciplines that are linked by the use of hyperbaric therapy to treat disease. Diving medicine studies the physics, physiology and health consequences of exposures to pressures other than normal atmospheric pressure, including the breathing of compressed gases. Hyperbaric medicine studies the physics, pathophysiology and management of a range of diseases and conditions where the respiration of high pressure oxygen may be of therapeutic benefit. Both disciplines are involved with the practice of evidence based medicine and both clinical and experimental research in relevant areas.

Aim of the curriculum

The purpose of the curriculum is to define the required learning, teaching and assessment of the advanced certificate training program. More specifically, the curriculum aims to:

- Articulate the scope of practice required by a diving and hyperbaric medicine physician (DHMP) including breadth and depth of knowledge, range of skills and professional behaviours necessary for quality patient care.
- Guide DHM supervisors of training and DHM clinical supervisors and other Fellows involved in the training program with respect to suitable learning experiences for trainees.
- Foster trainees' self-directed learning by providing clear requirements.
- Promote regular and productive interaction between trainees and supervisors, through formative workplace-based assessments and feedback.
- Provide consistency of standards and outcomes across different training settings.
- Enable comparison with international training programs with respect to standards of experience, education and assessment.
- Outline foundation knowledge and skills required to ensure that trainees are ready to commence the training program.
- Provide a framework to inform the scope of continuing professional development activities.

Key sections of the curriculum

The key themes/sections of the curriculum are the:

1. Diving Medicine
2. Hyperbaric Medicine
3. Diving and Hyperbaric Medicine Roles in Practice.

The first two sections, Diving Medicine and Hyperbaric Medicine, have been developed to inform trainees about the prerequisite knowledge and skills that underpin learning during the training program. Attainment of learning outcomes within sections 1 and 2 will ensure all trainees are prepared similarly to build on their current specialist medical abilities.

A key principle in designing the curriculum has been an emphasis on trainees' development across all professional roles. Using the CanMEDS framework from the Royal College of Physicians and Surgeons of Canada as a base (and with permission), the DHM Roles in Practice have been developed to emphasise a comprehensive orientation to practice, rather than a narrow, biomedical one. They have the titles of medical expert, professional, scholar, communicator, collaborator, leader (and manager) and health advocate. The DHM Roles in Practice, specifically the Medical Expert role, articulate the skills required of a DHM specialist.

For each role, learning outcomes that a trainee must achieve by the end of advanced certificate training are listed, followed by learning outcomes that a trainee is expected to demonstrate at the commencement of training, due to learning and experience in their pre-requisite Fellowship training program.

Assessment

The curriculum defines the assessment methods as detailed below that will be used to determine whether trainees have achieved the learning outcomes of the curriculum. The right hand column broadly indicates the primary assessment method/s for each learning outcome.

CSA	Clinical Skills Assessment
MPA	Management Plan Assessment
CbD	Case-based Discussion
MsF	Multi-source Feedback
Exam	DHM Examination
ALS	Advanced Life Support (ALS) Skills Course

Advanced certificate requirements

Trainees must complete the following:

- Clinical experience in at an accredited training site
- Specific clinical activities termed 'Volume of Practice'
- Formative workplace-based assessment
- Logbook and Portfolio
- Clinical Placement Reviews
- Formal learning/instruction
- DHM Examination.

For more information on each requirement, refer to the ANZCA Advanced Certificate in Diving and Hyperbaric Medicine handbook.

For the formal learning/instruction requirements, trainees must complete:

- South Pacific Underwater Medicine Society (SPUMS) Diploma of Diving and Hyperbaric Medicine
- A primarily Diving Medicine orientated course and a primarily Hyperbaric Medicine orientated course. Each course is required to address the learning outcomes within Section One, Diving Medicine, or Section Two, Hyperbaric Medicine of the ANZCA Advanced Certificate in Diving and Hyperbaric Medicine curriculum. Each course must:
 1. Have significant involvement of ANZCA diploma and advanced certificate in DHM holders in the planning and teaching of the course to ensure it reflects the advanced certificate curriculum. .
 2. Have a detailed course outline which defines the:
 - sessions included in the course
 - duration of each session
 - objectives of individual sessions.
 3. Be conducted by facilitators who have suitable expertise for the relevant session. A facilitator's guide should be provided to ensure consistency of delivery of the session content.
 4. Provide pre-course reading which provides relevant foundation knowledge of the course content.
 5. Be deliverable as a continuous course or in parts, and total approximately 60 hours of learning time.
 6. Utilise learning methods that are appropriate for the session content. For example, case discussions for the application of clinical knowledge, and hands-on activities for learning practical skills.
 7. Incorporate interaction with other participants of the course, such as guided discussion regarding realistic case scenarios.
 8. Include an assessment with issue of a certificate of satisfactory completion and a mechanism to provide feedback to participants who may need further development in specific areas.
 9. Distribute session and/or course evaluation form/s to monitor participant satisfaction and have a system for implementing suggestions obtained from participants to maintain and improve the quality of the course.
 10. Ensure that a record is maintained of previous courses, including the date, venue, names and qualifications of facilitators, names of participants and outcomes of their assessments.
- An ALS course, or equivalent. ALS courses must meet the standard defined in the [ANZCA Handbook for Training and Accreditation](#).

Section One
DIVING MEDICINE

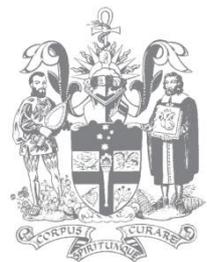


1. Diving Medicine

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Applied science		
1.1	Describe the principles of physics that pertain to the diving environment and its influence on the diver, including but not limited to those in relation to pressure, temperature, buoyancy, gases used in diving and gas laws.	Exam
1.2	Outline the principle physiological changes to the body on immersion and the physiological limits to compression.	Exam
1.3	Discuss the direct and indirect effects of pressure on the body during descent.	Exam
1.4	Discuss the direct and indirect effects of pressure on the body during ascent.	Exam
1.5	Describe the effects of nitrogen narcosis, oxygen toxicity, carbon dioxide toxicity and high pressure neurological syndrome.	Exam
Practical aspects of diving and safety		
1.6	Discuss the history of diving and the development of diving techniques and systems including diving by indigenous populations, occupational diving, recreational diving, technical diving (and the training / certification systems relating to these modern disciplines).	Exam
1.7	Outline the various modes of diving, the physiological demands of each and the potential clinical problems that could arise.	Exam
1.8	Outline the occupations that include diving as a part of their job role.	Exam
1.9	Describe the range of diving equipment available for both recreational and commercial diving, including but not limited to: <ul style="list-style-type: none"> • Snorkelling equipment • Scuba equipment • Technical diving (including the use of rebreathers) • Surface supply breathing apparatus • Bell diving – wet and closed • Dry pressurised gas environments. 	Exam
1.10	Outline the advantages and disadvantages of particular diving equipment for different circumstances.	Exam
1.11	Explain decompression theory and the historical development of dive tables.	Exam
1.12	Outline the key principles in relation to dive planning and risk assessment.	Exam
1.13	Demonstrate knowledge of the structure and content of dive tables, dive computers and the principles of single and repetitive/multilevel diving to determine whether a particular profile is acceptable.	Exam

1.14	Describe the principles of accident prevention, including appropriate training and supervision, risk and hazard assessment, and control strategies.	Exam
1.15	Explain regulations and standards and how they apply to medical supervision of diving.	Exam
1.16	Outline how an investigation of a diving death should occur, including the provision of appropriate records.	Exam
1.17	Identify the important elements of a post-mortem examination of a diver.	Exam
Diving incidents and injuries		
1.18	Discuss the pathophysiology, signs and symptoms, early management, treatment and prognosis of: <ul style="list-style-type: none"> • Decompression illness • Arterial gas embolism • Barotraumas • Salt water aspiration • Immersion pulmonary oedema • Injury or envenomation from hazardous marine life • Drowning • Hypothermia • Dysbaric osteonecrosis. 	Exam
1.19	Describe the in-water rescue priorities for a diving accident.	Exam
1.20	Describe the first aid that should be administered to an injured diver.	Exam
1.21	Discuss the risks and benefits of retrieval strategies and treatments.	Exam
1.22	Discuss the indications for recompression of a diver.	Exam
1.23	Prescribe an appropriate recompression schedule, where indicated.	Exam
1.24	Discuss the adjunctive therapies for the management of decompression injuries.	Exam

Section Two HYPERBARIC MEDICINE



2. Hyperbaric Medicine

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Applied science		
2.1	Describe the physics associated with hyperbaric medicine.	Exam
2.2	Discuss the mechanisms of action of hyperbaric oxygen (HBO).	Exam
Indications and treatment		
2.3	Outline the accepted ANZHMG indications for HBO therapy.	Exam
2.4	Using the ANZHMG list of indications discuss: <ul style="list-style-type: none"> • Rationale for use of HBO therapy. • Evidence base to support the use of HBO therapy. • Criteria for acceptance for HBO therapy. • Non-HBO options for treating the same condition. • HBO treatment protocol. • Evaluation of treatment outcomes, including appropriate clinical investigations to test efficacy and effectiveness of HBO therapy. 	Exam, MPA, CbD
2.5	Discuss the use of HBO therapy for experimental and 'off-label' indications.	Exam
2.6	Discuss the concept of HBO pre-treatment and preconditioning.	Exam
2.7	Describe and discuss management for the potential side effects of HBO therapy.	Exam
2.8	Outline the absolute and relative contraindications for patients being treated with HBO therapy.	Exam
2.9	Discuss how HBO treatment complications can be managed and/or treated.	Exam
Patient assessment and preparation		
2.10	Describe the effects of HBO therapy on the patient, including any expected effects on co-morbid diseases.	Exam
2.11	Discuss how the hyperbaric environment affects drug administration and how to resolve the issues that arise.	Exam
2.12	Discuss patient preparation for HBO treatment	Exam
2.13	Discuss the management of the intensive care patient in the hyperbaric environment and the necessary modifications required to ensure safety.	Exam
<i>Refer also to DHM Roles in Practice – Medical Expert</i>		

Technical, engineering and facility management		
2.14	Discuss the advantages and disadvantages of the different chamber types used to deliver HBO treatment.	Exam
2.15	Discuss the role of portable recompression facilities.	Exam
2.16	Discuss the different methods of oxygen delivery in a hyperbaric facility and the advantages and disadvantages of each.	Exam
<i>Refer also to DHM Roles in Practice – Leader and Manager</i>		

Section Three
DIVING AND HYPERBARIC MEDICINE
ROLES IN PRACTICE



3.1 Medical Expert

By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:		
Code	Learning outcome	Assessment
Practice medicine within their defined scope of practice and expertise		
3.1.1	Integrate the roles of collaborator, communicator, health advocate, manager, medical expert, professional, and scholar into practice as a diving and hyperbaric practitioner.	CSA, MPA, CbD, MsF
3.1.2	Apply knowledge of Diving Medicine (<i>refer to Section One</i>) and Hyperbaric Medicine (<i>refer to Section Two</i>) to the assessment and care of patients.	CSA, MPA, CbD, MsF
Perform a complete patient centred clinical assessment and establish a management plan		
3.1.3	Assess prospective divers for fitness to dive, including screening and medical assessment, and health monitoring.	CSA
3.1.4	Arrange pre-diving optimisation and treatment when required.	CSA
3.1.5	Correctly interpret and discuss the implications of results of investigations in relation to DHM.	CSA, MPA, CbD
3.1.6	Assess patients presenting with various diving-related injuries.	CSA
3.1.7	Assess patients presenting for HBO treatment.	CSA
3.1.8	Arrange pre-treatment optimisation and treatment when required.	CSA, MPA, CbD
3.1.9	Formulate appropriate clinical plans in collaboration with patients, their families, other health care professionals and team members.	MPA, CbD
3.1.10	Demonstrate understanding of relevant issues that may impact upon patient care in DHM including patient's health status, procedure, pathology, and identify any risks and alternative therapies that can be used.	MPA, CbD
Demonstrate proficient and appropriate technical/procedural skills		
3.1.11	Demonstrate knowledge and understanding of DHM procedures including indications, contraindications, anatomy, technique side-effects and complications.	Exam
3.1.12	Interpret spirometry on a prospective diver.	Exam, MPA, CbD
3.1.13	Interpret audiometry and tympanometry on a prospective diver.	Exam, MPA, CbD
3.1.14	Interpret transcutaneous oxygen measurement.	Exam, MPA, CbD
3.1.15	Demonstrate advanced life support skills.	ALS Course

Demonstrate safe, effective and efficient patient-centred care		
3.1.16	Manage the care of a patient recovering from a diving-related injury.	MPA, CbD
3.1.17	Implement an evidence-based management plan for a patient undergoing HBO therapy.	CbD, MPA
3.1.18	Demonstrate situational awareness during HBO treatments through constant monitoring of the patient (both clinically and electronically as indicated) and other personnel including the chamber technician and medical attendants.	MsF
3.1.19	Anticipate and prepare for predictable clinical changes during HBO therapy.	Exam, MsF
3.1.20	Explain HBO treatment to the patient and obtain valid informed consent.	MPA, CSA
3.1.21	Arrange and document plans for post-treatment patient care.	CbD
Actively contribute to the continuous improvement of health care quality and patient safety		
3.1.22	Recognise limits of their expertise and scope of practice.	CbD, MsF
3.1.23	Recognise and respond to harm from hyperbaric chamber therapy delivery, including patient safety incidents.	CbD
3.1.24	Recognise and respond to harm from wound care therapy delivery, including patient safety incidents.	CbD
3.1.25	Seek assistance, abandon a hyperbaric treatment or other intervention or arrange for alternative care to prevent harm to a patient.	CbD

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>
Practice medicine within their defined scope of practice and expertise
Demonstrate a commitment to high-quality patient care.
Perform appropriately timed clinical assessments with management plans and recommendations that are presented in an organised manner.
Carry out professional duties in the face of multiple, competing demands.
Recognise and respond to the complexity, uncertainty, and ambiguity inherent in medical practice.
Perform a complete patient-centred clinical assessment and establish a management plan
Elicit a relevant history and perform a focused examination (may include cardiovascular, respiratory, neurological, ENT, abdominal, musculoskeletal, and airway).
Adapt history taking, examination and further investigations to patient circumstances.
Gather relevant information from all available sources including patient's notes, investigations and other health professionals where required.
Identify and prioritise the significant issues and problems that need to be addressed including the patient's preferences and cultural beliefs and incorporate these into the management plan.

Document assessment and findings.
Prioritise treatment or management options taking into account clinical urgency and available resources.
Demonstrate proficient and appropriate technical/procedural skills
Demonstrate an aseptic technique and standard (universal) precautions in relation to clinical procedures.
Provide reassurance to patients and check for discomfort, concerns and complications during procedures.
Document episodes of care including any problems and complications that arose.
Demonstrate safe, effective and efficient patient-centred care
Demonstrate situational awareness through appropriate monitoring of the patient (both clinically and electronically as indicated), the treatment procedure and the activity of other personnel.
Maintain focus on patient care and avoid distraction.
Manage emerging clinical problems or complications early to maximise patient safety.
Interpret available data and integrate information to generate differential diagnoses and management plans.
Actively contribute to the continuous improvement of health care quality and patient safety
Recognise and respond to harm from health care delivery, including patient safety incidents.
Demonstrate awareness of issues that may affect own performance such as fatigue and illness.
Adopt strategies that promote patient safety and address human and system factors.

3.2 Communicator

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Accurately elicit and synthesise relevant information		
3.2.1	Elicit a patient's knowledge and experience of diving and hyperbaric medicine and correct unrealistic expectations and misconceptions.	CSA
Accurately convey and explain relevant information		
3.2.2	Explain complex terms to patients in a simple and clear way to ensure they can understand, for example, middle ear pressure equalisation, hyperoxic myopia, compression and decompression, to ensure informed consent and co-operation.	CSA, MsF
3.2.3	Inform patients and families to allow them to understand the risks and be actively involved in shared decision-making.	CSA, MPA
3.2.4	Provide appropriate resources to patients to facilitate understanding of HBO therapy.	MPA
Develop a common understanding of issues, problems and plans		
3.2.5	Encourage discussion, including questions, with the patient to ensure a common understanding of issues, problems and plans.	MPA
3.2.6	Develop a shared plan of hyperbaric care by engaging patients, families and health professionals in decision-making.	MPA
3.2.7	Communicate (both verbally and in writing) expected and unexpected complications and difficulties (for example, the development of cerebral or pulmonary oxygen toxicity, drug interactions with HBO,) to patients, their families and other health professionals.	MPA

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>
Develop rapport, trust and ethical therapeutic relationship
Establish positive relationships with patients that are characterised by trust and the involvement of patients and families as partners in their care.
Demonstrate effective communication skills including: <ul style="list-style-type: none"> • Active listening • Encouraging discussion • Reinforcing key points • Attending to verbal and nonverbal cues • Adapting to individual patient context displaying cultural sensitivity • Recognising and addressing miscommunication and barriers to communication.
Adapt communication to a variety of clinical contexts including emergency and life-threatening situations where time is limited.

Communicate in a way that encourages confidence, allays anxiety and facilitates co-operation.
Comfort and reassure patients during stressful situations and procedures.
Deliver bad news, deal with anger, confusion and misunderstanding with understanding, respect and compassion.
Recognise, negotiate and manage conflict with patients and families.
Avoid major miscommunication by identifying and moderating negative emotions such as anger and frustration which are possible symptoms of stress.
Accurately elicit and synthesise relevant information
Gather information about the patient's medical condition as well as their beliefs, concerns, expectations and experience.
Organise personnel and resources to facilitate communication where there are cultural or language barriers, for example, by the use of an interpreter.
Individualise communication to the patient taking into account factors including but not limited to: <ul style="list-style-type: none"> • Gender • Age • Religion • Ethnicity and culture (including indigenous cultures) • Language • Mental health status (including psychiatric conditions, dementia and intellectual disability) • Disability • Knowledge level and intellectual capacity.
Explain complex terms to patients in a simple and clear way to ensure they can understand.
Inform patients and families to allow them to understand the risks and be actively involved in shared decision-making.
Synthesise and convey relevant information concerning patients and plans to team members.
Provide written information to patients to facilitate understanding of procedures and plans.
Develop a common understanding of issues, problems and plans
Provide clear and concise instructions to assisting staff for clinical tasks.
Individualise communication to the patient taking into account factors including but not limited to: <ul style="list-style-type: none"> • Gender • Age • Religion • Ethnicity and culture (including indigenous cultures) • Language • Mental health status (including psychiatric conditions, dementia and intellectual disability) • Disability • Knowledge level and intellectual capacity.
Encourage discussion, including questions, with the patient to ensure a common understanding of issues, problems and plans.
Respect diversity and difference and the impact they may have on decision-making.

Develop a shared plan of care by engaging patients, families and health professionals in decision-making.
Synthesise and convey relevant information concerning patients and plans to team members.
Effectively convey oral and written communication
Comprehensively, concisely and legibly document assessment and management plans.
Record episodes of care including risks, complications and difficulties.
Convey all relevant information when handing over responsibility of patient care to another healthcare professional/s.

3.3 Collaborator

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Participate effectively and appropriately in an inter-professional healthcare team		
3.3.1	Describe the roles and responsibilities of a diving and hyperbaric physician and the other professionals in the healthcare team typically involved in caring for a patient undergoing HBO therapy.	Exam
3.3.2	Convey the hyperbaric management plan to team members with clear instructions as to the roles and responsibilities of the team.	MsF
3.3.3	Participate effectively in team aspects of care, for example, pre-compression checklists.	MsF
3.3.4	Liaise with on-site medical support in the comprehensive assessment of a diver for diagnostic and therapeutic purposes (including any pre-hospital advice and treatment).	MsF

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>
Participate effectively and appropriately in an inter-professional healthcare team
Describe the principles of team dynamics.
Function as an effective team member in inter-professional team meetings or during team decision-making and follow the leadership of others when required.
Consult and work with others to develop and provide a shared plan of care.
Enlist the cooperation and assistance of others, to optimise patient care and safety.
Co-ordinate the safe transfer of patients.
Safely hand over the responsibility of patient care to another healthcare professional or team.
Work collaboratively with colleagues and/or other health professionals on research, educational, quality assurance, and/or administrative tasks.
Demonstrate leadership in healthcare teams, when required.
Effectively work with other health professionals to prevent and resolve inter professional conflict
Demonstrate a respectful attitude towards all members of the inter-professional team.
Acknowledge and show consideration for the professional perspectives, goals and priorities of all team members.
Negotiate and work with others to prevent and resolve conflict in a manner and timeframe that is appropriate to clinical demands.

Ensure that any workplace conflict does not impact patients or the care they receive.
Respect and acknowledge differences, misunderstandings and limitations in self and other professionals that may contribute to inter-professional tension.
Use communication concepts such as graded assertiveness and closed-loop communication.
Participate in team debriefing and implement strategies to improve performance.

3.4 Leader and Manager

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Contribute to the improvement of healthcare delivery in teams, organisations, and systems		
3.4.1	Discuss the characteristics underpinning the provision of quality hyperbaric services, that is, safe, effective, efficient, timely and patient-centred.	Exam
3.4.2	Outline the financial, administrative and human resource requirements needed to operate a hyperbaric medicine department.	Exam
3.4.3	Outline the steps necessary to obtain certification of a pressure vessel for human occupancy.	Exam
3.4.4	Outline the principle safety features desirable in a hyperbaric facility, including the appropriate number and mix of staff, and their training.	Exam
3.4.5	Outline the medical and technical emergency procedures required for a hyperbaric facility.	Exam
3.4.6	Describe the program of maintenance for a hyperbaric chamber and its related equipment.	Exam
3.4.7	Explain the process required to conduct a risk assessment of in-chamber equipment.	Exam
3.4.8	Apply knowledge of applicable safety standards, codes of practice and guidelines when working in a hyperbaric facility.	Exam
3.4.9	Outline the elements of an effective infection control policy.	Exam
Develop efficient and effective work practices		
3.3.10	Demonstrate effective leadership and organisational skills in the hyperbaric facility environment including: <ul style="list-style-type: none"> • Case allocation and prioritisation • Efficient running of treatment schedules • Prioritisation of clinical tasks to match workload and calling for assistance when appropriate • Ensuring a safe environment and suitable resources for patient care. • Allocation of resources. 	MsF
3.4.11	Discuss the standardisation of equipment between a hyperbaric unit and other areas of care within a hospital.	Exam
Allocate finite healthcare resources appropriately		
3.4.12	Outline the relative costs of HBO therapy and equipment.	Exam
3.4.13	Rationalise the accepted indications for HBO therapy as defined by: <ul style="list-style-type: none"> • Australian and New Zealand Hyperbaric Medicine Group (ANZHMG) 	Exam

	<ul style="list-style-type: none"> • Undersea and Hyperbaric Medicine Society (UHMS) • European Underwater and Baromedical Society (EUBS) • Medicare. 	
3.4.13	<p>Balance safety, effectiveness, efficiency and equitable allocation of resources in:</p> <ul style="list-style-type: none"> • Choosing when to offer HBO therapy • Allocating patients to monoplace versus multiplace treatment options • Assessing the risks versus benefits of HBO therapy. 	MPA, Cbd
Demonstrate leadership and effective management in professional practice		
3.4.14	Outline the administrative structure and lines of communication available within their health network, hospital and department.	Exam
3.4.15	<p>Understand the financial, administrative and human resource requirements needed to manage a hyperbaric facility, including but not limited to:</p> <ul style="list-style-type: none"> • Planning health care delivery (for example, staff rosters/rotas/schedules) • Factors affecting expenditure • Adherence to local guidelines concerning hyperbaric indications, practice and equipment • Quality improvement activities • Processes by which HBO is approved for research and clinical use in Australia and New Zealand. 	Exam

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>	
Contribute to the improvement of health care delivery in teams, organizations, and systems	
<p>Discuss the processes of quality assurance and quality improvement, and their application to medical practice including:</p> <ul style="list-style-type: none"> • Principles of quality assurance • Quality improvement cycle • Risk management • Nature of error • Relationship between adverse events, system factors and human factors • Incident monitoring • Root cause analysis. 	
Outline strategies to identify and manage adverse events and near misses and analyse these to improve future patient care.	
Contribute to a culture that promotes patient safety, including participation in quality improvement activities.	
Develop efficient and effective work practices	
Set priorities and manage time to balance patient care, practice requirements, outside activities and personal life.	

Develop and appraise their work practices and organisational skills to improve efficiency and effectiveness.
Use information technology for patient care including accessing computerised results and medical records to facilitate and plan care.
Recognise the opportunity provided by advances in health informatics, such as clinical data repositories, for the design and evaluation of quality improvement activities.
Discuss how evidence-based medicine and management processes can be used to optimise cost-appropriate care for patients.
Optimise cost-appropriate care to minimise waste in the workplace and impact on the environment.
Allocate finite healthcare resources appropriately
Understand general principles and sources of organisational and healthcare funding.
Demonstrate leadership and effective management in professional practice
Discuss the dynamic nature of healthcare and the necessity of change, including the drivers and barriers to change.
Describe the principles of change management in a clinical environment.
Participate effectively in committees and meetings.

3.5 Health Advocate

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Advocate for patients and colleagues		
3.5.1	Discuss the selection of HBO treatment table options to maximise benefits to patients.	Exam
3.5.2	Intervene when a wound care procedure or HBO treatment cannot be completed without undue stress or potential harm to a patient, and institute alternative management.	MsF
3.5.3	Identify the appropriate resources and facilities required to undertake treatment safely for a patient, and intervene when these resources and facilities are not available.	MsF
3.5.4	Discuss how access to appropriate DHM services is limited and describe strategies to address this issue.	Exam
3.5.5	Discuss the principles of health policy relating to DHM and their implications for patients, the healthcare system, and the community.	Exam
Promote health and respond to health needs of patients and the working environment		
3.5.6	Describe ways DHM physicians can act individually or collectively to improve health in the populations they serve.	Exam

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>
Advocate for patients and colleagues
Identify opportunities for patient advocacy in particular by promoting: <ul style="list-style-type: none"> • Delivery of timely care • Safe work practices.
Ensure respect for patient privacy and dignity including those who are unconscious.
Advocate for management options that are in the best interests of a patient.
Advocate for the health, well-being and safety of colleagues and assist or intervene when required.
Actively promote and practice safety and risk reduction in the workplace.
Describe the ethical and professional issues inherent in health advocacy including altruism, social justice, autonomy, integrity and idealism.

Promote health and respond to health needs of patients and the working environment

Develop an understanding of the determinants of health in the populations they provide care for including:

- The social and economic environment
- The physical environment
- Healthcare system factors
- Individual patient's characteristics and behaviours
- Availability and barriers to access healthcare resources.

Implement evidence-based approaches to promoting good health and refer patients to appropriate resources.

Identify and capitalise on opportunities in their practice for patients to improve their health through lifestyle modification, health promotion and disease prevention.

3.6 Scholar

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Engage in the continuous enhancement of their professional activities through ongoing learning		
3.6.1	Describe and utilise the available evidence-based resources in DHM, including but not limited to: <ul style="list-style-type: none"> • Prominent relevant peer-reviewed journals • http://rubicon-foundation.org/ • http://hboevidence.unsw.wikispaces.net/ 	Exam
Critically evaluate information and its sources, and integrate best available evidence into practice		
3.6.2	Integrate evidence into decision-making in clinical practice in both diving and hyperbaric medicine.	MPA, CbD
Contribute to the creation and dissemination of knowledge and practices		
3.6.3	Summarise and communicate to professionals and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry and information about DHM.	MPA, CbD
Teach others		
3.6.4	Teach technical skills and lead small group teaching and information sessions using a structured approach including: <ul style="list-style-type: none"> • To groups of other medical practitioners including, for example, wound care nurses, intensive care physicians and surgeons concerning relevant aspects of hyperbaric care • To groups of professional and recreational divers concerning the safe conduct of diving operations and the presentation and treatment of diving medical conditions • Providing advice to consumer groups and dive training organisations. 	MsF
3.6.5	Actively participate in the teaching of medical attendants and chamber operators within a hyperbaric facility.	MsF

Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:

Engage in the continuous enhancement of their professional activities through ongoing learning

Describe the principles and processes involved in the maintenance of competence and life-long learning.

Participate in self-directed learning including:

- Developing and amending learning plans as necessary
- Identifying educational resources
- Keeping a log book of experience and learning issues
- Reflecting upon learning issues in practice
- Keeping abreast of relevant developments in other specialties.

Initiate discussions with colleagues about performance improvement and be receptive to feedback from colleagues.

Participate in organised continuing professional development such as educational and scientific meetings and apply new insights to daily practice.

Participate in quality improvement, patient safety initiatives and peer-review activities to continuously improve personal practice and contribute to collective improvements in practice.

Participate in audit, including audit of personal practice.

Critically evaluate information and its sources, and integrate best available evidence into practice

Describe the basic concepts of evidence-based medicine, including levels of evidence, meta-analysis and systematic review.

Describe the limitations of evidence-based medicine.

Recognise practice uncertainty and knowledge gaps and formulate focused clinical questions from cases or scenarios to address them.

Critically appraise retrieved evidence in order to address clinical questions:

- Conduct a literature search
- Critically evaluate the integrity, reliability, quality and applicability of research and literature
- Identify limitations of evidence
- Describe how evidence influences practice.

Integrate evidence into decision-making in clinical practice.

Contribute to the creation and dissemination of knowledge and practices

Describe the principles and processes of research and scientific enquiry including:

- Research ethics
- Asking a research question
- Conducting a systematic search for evidence
- Selecting and developing appropriate methods to address a research question
- Applying appropriate statistical analysis.

Demonstrate an understanding of the role of research in healthcare.

Teach others
Describe the principles of adult learning relevant to medical education including individual learning styles and approaches to learning
<p>Teach technical skills and lead small group teaching sessions using a structured approach including:</p> <ul style="list-style-type: none"> • Identifying the learning needs and desired learning outcomes of those they are teaching including their current level of confidence and competence. • Selecting effective teaching strategies, methods and content appropriate to the individual or group • Organising and convey teaching points at a level appropriate to the learner or audience • Providing constructive feedback to learners to enhance learning and performance • Guiding learners to reflect on their learning experiences.
Present effectively to larger groups.
Use multimedia educational resources and information technology effectively, to facilitate learning.
Recognise the influence of role-modelling and the role of both formal and informal learning.
Promote a safe learning environment in the workplace, for trainees and other learners.
Ensure patient safety is maintained when learners are involved in care.

3.7 Professional

<i>By the end of the Advanced Certificate in Diving and Hyperbaric Medicine, a trainee will be able to:</i>		
Code	Learning outcome	Assessment
Demonstrate a commitment to patients through ethical practice		
3.7.1	Discuss commonly encountered ethical issues including: <ul style="list-style-type: none"> • Relief of pain and suffering and end-of-life decisions • Involvement in procedures to which there may be moral, ethical or clinical objections, for example, application of HBO therapy to indications with a poor evidence-base • Prevention of futile medical care • Consent for HBO therapy • Off-label use of HBO therapy. 	Exam
3.7.2	Discuss the tension between a hyperbaric physician's role as advocate for an individual patient and the need to manage scarce resources.	Exam
3.7.3	Demonstrate sound judgment and ethical behaviour in the allocation of resources and balancing of competing needs in their workplace.	CbD
Demonstrate a commitment to society and the profession		
3.7.4	Disclose to patients all costs associated with their diving or hyperbaric assessment and treatment to enable their informed financial decision-making.	MPA
3.7.5	Contribute to a culture of continuous quality improvement by actively participating in the reporting of adverse events and near misses and subsequent management processes.	MsF
3.7.6	Describe how to respond to and constructively learn from a complaint, legal action or request for expert opinion.	Exam
Demonstrate a commitment to own health, sustainable practice and supporting colleagues		
3.7.7	Outline the professional responsibilities of hyperbaric physicians who may be carriers of a communicable disease.	Exam

<i>Trainees are expected to demonstrate the following competencies at the commencement of the Advanced Certificate in Diving and Hyperbaric Medicine:</i>		
Demonstrate a commitment to patients through ethical practice		
Display the following values in all aspects of care: <ul style="list-style-type: none"> • Altruism • Commitment • Compassion • Honesty • Humility • Integrity • Respect. 		

<p>Exhibit appropriate professional behaviours in practice, including, but not limited to:</p> <ul style="list-style-type: none"> • Showing respect for the confidentiality and privacy of patients and colleagues • Punctuality • Working in a calm and considered manner, even in stressful situations • Responding promptly to requests for assistance or advice and taking responsibility for ensuring ongoing care.
<p>Respect patient autonomy by enabling shared decision-making and ensuring informed consent is obtained.</p>
<p>Demonstrate a commitment to delivering the highest quality care, without judgment of the patient or situation.</p>
<p>Appropriately manage conflicts of interest.</p>
<p>Maintain appropriate relations with patients and their families.</p>
<p>Teach and learn in the workplace without compromising patient care.</p>
<p>Explain the potential abuses of social media and other technology-enabled communication, and their relation to professionalism.</p>
<p>Intervene when aware of breaches of professionalism, including those involving technology-enabled communication and social media.</p>
<p>Follow relevant policies regarding the ethical use of electronic medical records.</p>
<p>Demonstrate cultural awareness and sensitivity with patients and colleagues</p>
<p>Describe how their own religious and personal beliefs and cultural biases may influence interactions with others.</p>
<p>Describe how the history and culture of various indigenous populations impacts upon their current health status, education and communication.</p>
<p>Modify care as required in response to cultural preferences.</p>
<p>Demonstrate a commitment to society and the profession</p>
<p>Obtain valid informed consent.</p>
<p>Respect confidentiality.</p>
<p>Contribute to a culture of continuous quality improvement by actively participating in the reporting of adverse events and near misses and subsequent management processes.</p>
<p>Respond to actual or potential clinical error by accurately recording the event and applying the principles of open disclosure.</p>
<p>Fulfil the regulatory and legal obligations required of practice in their jurisdiction.</p>
<p>Outline the professional obligations and intervention necessary to protect patients when a colleague is impaired or practising beyond the limits of their capabilities.</p>
<p>Demonstrate a commitment to own health, sustainable practice and supporting colleagues</p>
<p>Balance personal and professional priorities to ensure personal well-being and fitness to practice.</p>

Promote a culture that recognises, supports, and responds effectively to colleagues and trainees in need.

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