Medical Contingency– Prevention and Cure

Progress?

Steve Sheppard and Dr Phil Bryson

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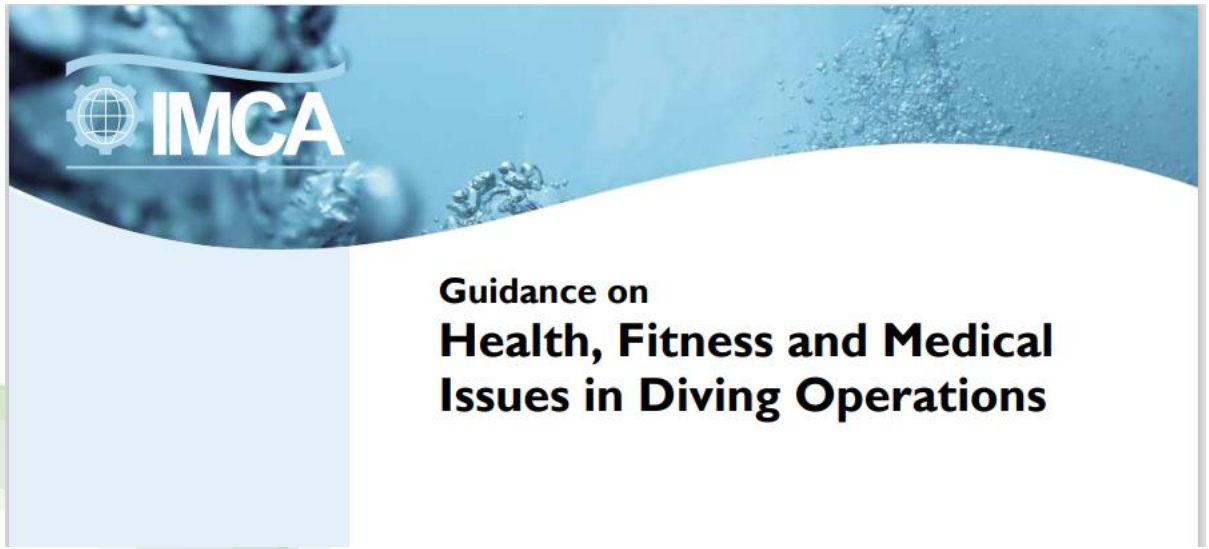

IMCA DO 61

- we all need to revisit this which was published in Oct 2018

- it is still very relevant

BUT……

Do we have diver and companies' acceptance and understanding?

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The medical examination and assessment of commercial divers (MA1)

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12 Dealing with Failure to Report Pre-Existing Medical Issues

12.1 The Duties of Divers

Sections 6.1 and 7.3.3 of this document set out the industry requirements and standards of conduct that commercial divers are required to meet insofar as fitness to dive issues are concerned.

In particular, Section 7.3.3 noted that the diving industry expects and requires divers to:

- Take reasonable care of their own health and safety and the health and safety of other persons who may be affected by their acts or omissions at work;
- Co-operate with their employers in the employers' efforts to deliver safe diving projects;
- Inform their supervisor of any medications they are taking;
- Do all that they can to ensure that they are medically fit when they report for diving duties, and that they are also physically fit enough to carry out the tasks they may be reasonably expected to undertake while underwater safely, efficiently and without undue fatigue;
- Have a valid certificate of medical fitness to dive issued by a competent medical examiner of divers;
- Have undergone any pre-dive medical checks specified by the diving contractor in its own procedures;
- Declare in writing that they feel they are medically fit and sufficiently physically fit for diving duties;
- Report any concerns they have over their own fitness to dive to the diving supervisor;
- Report any concerns they have over the fitness to dive of other divers to the diving supervisor.

Section 7.3.3 also noted that the diving industry expects and requires divers not to:

- Conceal anything which they think may make them unfit to undertake diving duties;
- Put other persons at risk (e.g. members of the dive team who may be required to perform a rescue) by diving at work when they know of something (including any illness or medical condition) which makes them unfit to dive;
- Collude in hiding a colleague's illness, or any medical conditions that may make that person unfit to dive.

Appendix 3

Medical questionnaire for completion by the candidate diver and their GP to confirm medical history (no examination is required)

Question	Yes	No
(Females only) Are you pregnant or likely to be pregnant?		
Are you taking any prescribed or other medication?		
Do you have any allergies?		
Have you ever had or been treated for decompression illness?		
Have you ever had or do you now have:		
Cancer?		
Mental health problems (including panic attacks, claustrophobia)?		
Drug and/or alcohol misuse in the past 3 years?		
Lung disease (e.g. chronic obstructive pulmonary disease, asthma)?		
Collapsed lung (pneumothorax)?		
Injury or surgery to the chest, lungs or heart?		
Disease of the heart and circulation (e.g. high blood pressure, angina, heart attack, chest pains, palpitations)?		

If the candidate diver or GP has any comments on the medical history, please use another sheet.

Candidate diver – I certify that the above answers are correct:

Full name ..... DOB .....

Address .....

Signature ..... Date .....

GP – I confirm the medical history:

Practice stamp

Signature ..... Date .....

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The Diving Medical Advisory Committee

DMAC, Eighth Floor, 52 Grosvenor Gardens, London SW1W 0AU, UK
Tel: +44 (0) 20 7824 5520 · Fax: +44 (0) 20 7824 5521

www.dmac-diving.org
info@dmac-diving.org

Saturation Diving Chamber Hygiene

DMAC 26 Rev. 1 – January 2016

Supersedes DMAC 26 dated June 1995, which is now withdrawn

1 Introduction

Infection is the most frequent medical problem encountered during saturation diving. The closed environment, with raised temperature and humidity as well as hyperoxia contribute to enhanced microbial growth. Superficial infections, especially of the external ear canal and of soft tissues following minor wounds, are particularly common. Research has suggested that a significant source of microbial contamination in the chamber environment is the fresh water supply and sea water. Other sources may include equipment, food and materials introduced into the chamber. It is believed that the divers themselves are not normally significant contributors to the introduction of infections or the spreading of Pseudomonas aeruginosa infections. Thus, measures to prevent infections can include control of microbial growth in water supplies and equipment.

This guidance note considers those few microbes of particular relevance to saturation diving (certain bacteria, and, to a lesser extent, some fungi and viruses) and describes measures to prevent/discourage infection by them.

This guidance note will be updated as further relevant research and knowledge concerning microbes becomes

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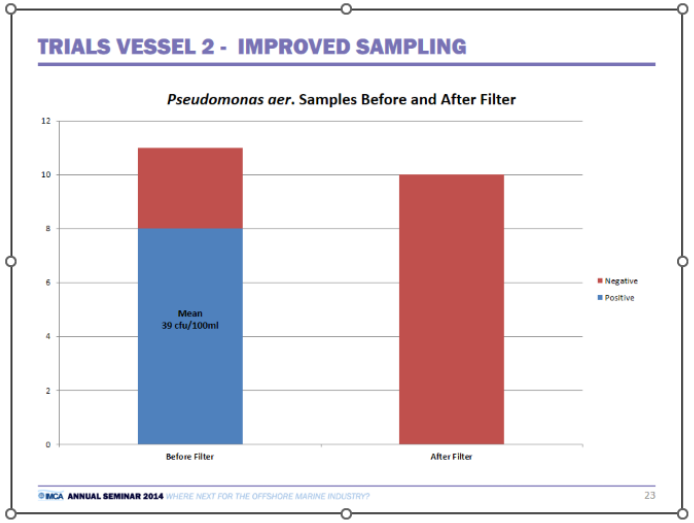
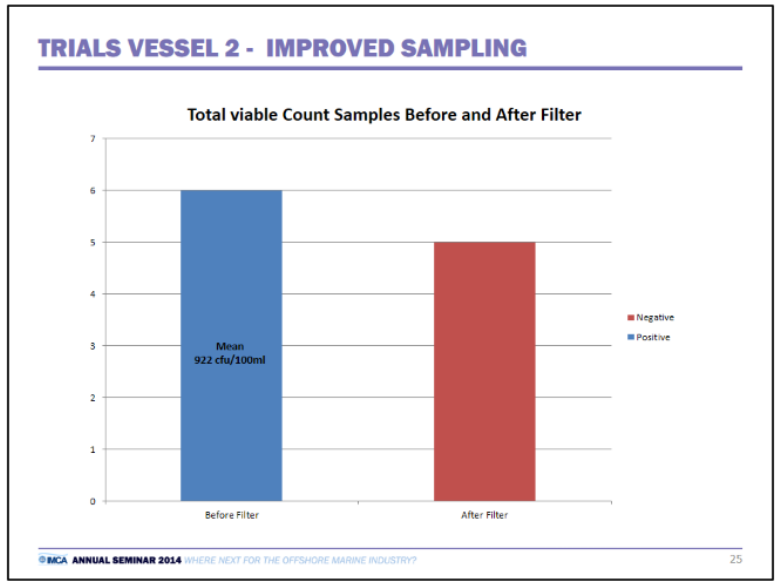
Water filters – infection reduction



2014



Pall Corporation

Contact Us: www.pall.com/contact

Kleenpak™ Disposable Shower Head Filter

Description

For up to 31 Day Use

Features	Benefits
Immediate protection from waterborne micro-organisms for up to 31 days	Instant protection to allow continuity of services. Adjunct to critical water safety management practices
Unique Ultipleat® filtration media engineering	High dirt trapping capacity to allow maximum volume throughput. Compatible with thermal and chemical systemic treatments
Long filter life	Cost effective protection, convenient logistics, reduced waste, no shelf-life limitation
Advanced retrograde contamination control measures	Bacteriostatic additive throughout housings minimizes the risk of retrograde contamination
Fully recyclable materials	Environmentally friendly

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Helix WELL OPS	**PRE-SATURATION DIVERS MEDICAL FORM**	Doc. No.: op/haf/gen/14 Rev. No.: 4 Date: 14/07/2022

PRE-DIVING MEDICAL CHECK		**Date: (DD/MM/YY)…… Time:……**
Diver's Name:	Date of Birth:	Age:
Vessel/Site:	Area/Location:	
Type of diving: Surface supply/Saturation	Planned depth of Diving:	

Is the Diving medical certificate in date? **Yes** **No**

Is the Diver's Log Book up to date, in order, with relevant medical pages signed (Parts 1, 2 and 7)? **Yes** **No**

If NO or if there are any restrictions, limitations or conditions noted on this certificate or in the Log Book, refer to the Diving Supervisor.

	Pre-Diving Medical History	**Yes**	**No**
1	Does the diver have any known allergies (for example food, medication or latex,…)?		
2	Does the diver have any current illness such as cough, cold, flu, or any other upper respiratory tract infection, ear infection, sinusitis, skin infection, or other infectious disease?		

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The Diving Medical Advisory Committee

DMAC, Eighth Floor, 52 Grosvenor Gardens, London SW1W 0AU, UK
Tel: +44 (0) 20 7824 5520

www.dmac-diving.org
info@dmac-diving.org

Medical Equipment to be Held at the Site of an Offshore Diving Operation

DMAC 15 Rev. 5 – December 2021

Supersedes DMAC 15 and all previous revisions, which are now withdrawn.

Commercial diving operations include both surface supplied and saturation diving operations and cover a wide range of work activities. The appropriate medical equipment to be held at any particular site is best determined by an occupational health service with special knowledge of commercial diving operations. This document is designed to provide guidance on equipment and medical supplies to be held at the site where such advice is not available. It is recognised that in certain circumstances similar or greater facilities may be available from other sources which are sufficiently close and reliable. Geographical distances to both equipment, pharmaceutical agents and other competent personnel/specialists should be considered and evaluated before the commencement of Diving Operations (i.e., SAR helicopter capabilities). This document will use the term *Vessel Medic* for the personnel with the responsibility for medical examination and treatment of ill or injured divers. We recognize that this function in some areas will be handled by a vessel medical officer, a dedicated vessel nurse or a vessel physician, or even a DMT in surface supplied operations.

The document covers equipment and drugs suitable for the treatment of diving related disorders on the surface or in a recompression chamber and for other potential problems (e.g. trauma) which may occur during diving operations. The document takes into account situations where the diving operation may be remote from a vessel

The Diving Medical Advisory Committee

DMAC, Eighth Floor, 52 Grosvenor Gardens, London SW1W 0AU, UK
Tel: +44 (0) 20 7824 5520 · Fax: +44 (0) 20 7824 5521

www.dmac-diving.org
info@dmac-diving.org

The Provision of Emergency Medical Care for Divers in Saturation

DMAC 28 Rev. 2 – December 2014

Supersedes DMAC 28 and DMAC 28 Rev. 1, which are now withdrawn
DMAC 28 also superseded DMAC 25 and DMAC 27.

1 Background

DMAC has published guidance over a number of years aimed at providing divers in saturation with a level of medical care which is as similar as possible to the level of medical care available to other personnel who work offshore.

In the early days of the offshore diving industry it was considered desirable to transport (under pressure) an ill or injured diver in saturation from an offshore location to an onshore facility which would provide specialised medical care. As experience was gained however, it became clear that it was much better to retain the casualty at the offshore work site and transport medical equipment and personnel to the casualty. This has now become the accepted method of operation.

In many cases the most practical concept is to stabilise the patient until suitable decompression allows definitive care under atmospheric pressure.

DMAC published Guidance Note 25 in October 1993 and raised this to Revision 1 in March 1996. Guidance Note 27 was published in April 1996. Guidance Note 28, published in November 1997, superseded all three previous notes, and aimed to combine the advice which they contained in to one succinct source which can be applied anywhere in the world. This revision of DMAC 28 updates that advice to reflect current practice and equipment.

Whilst this document gives general guidance, detailed arrangements should exist for each work site, agreed and documented between the diving company and its specialist medical adviser.

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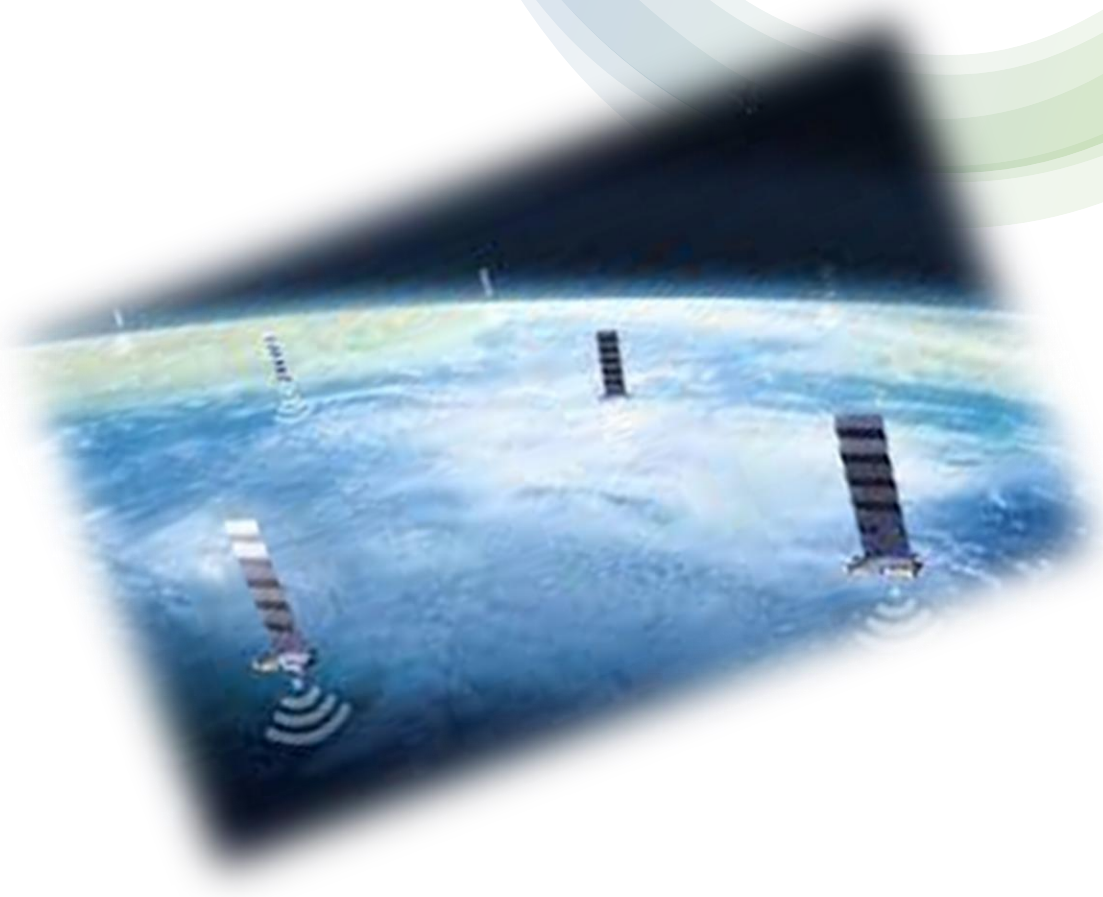
Remote monitoring and improved satellite comms



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HELIX WELL OPS	Testing of Zoll AED Plus in hyperbaric heliox	Doc. No. :7715-DIV-007 Rev. No. : 2 Date: 24.02.14

Report on tests of Zoll automatic external defibrillator function in hyperbaric heliox conditions.

REVISION STATUS

2	Appendix revised to include testing on Well Enhancer and additional detail on training set-up	24.02.14	SSH		
1	Appendix added. Installation, testing, training	15.07.13	SSH		
0	For information	27.05.13	SSH		
A	For Review	30.04.13	SSH		
Rev	**Reason for Issue**	**Issue Date**	**Prepared**	**Checked**	**Approved WOUK**

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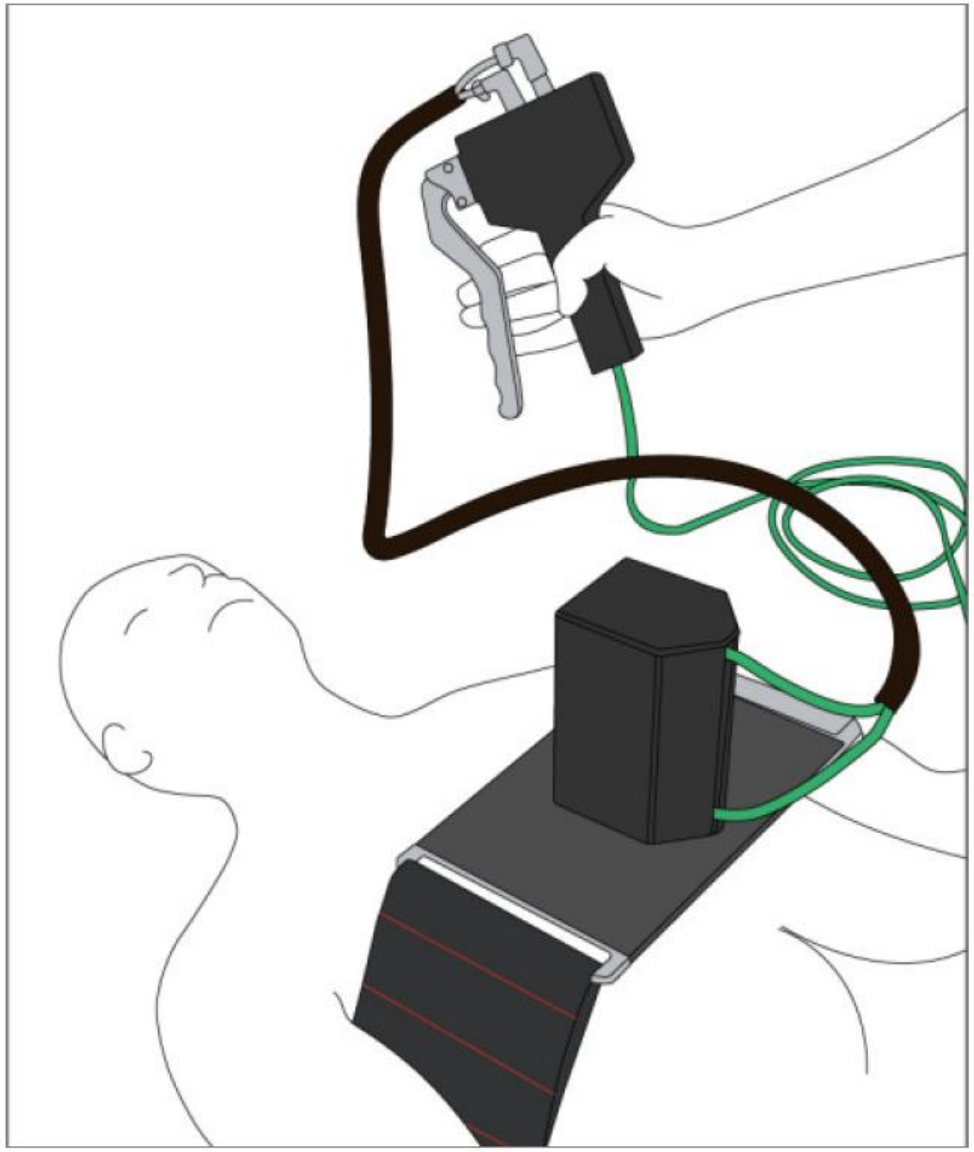
NUI Compact Chest Compression Device



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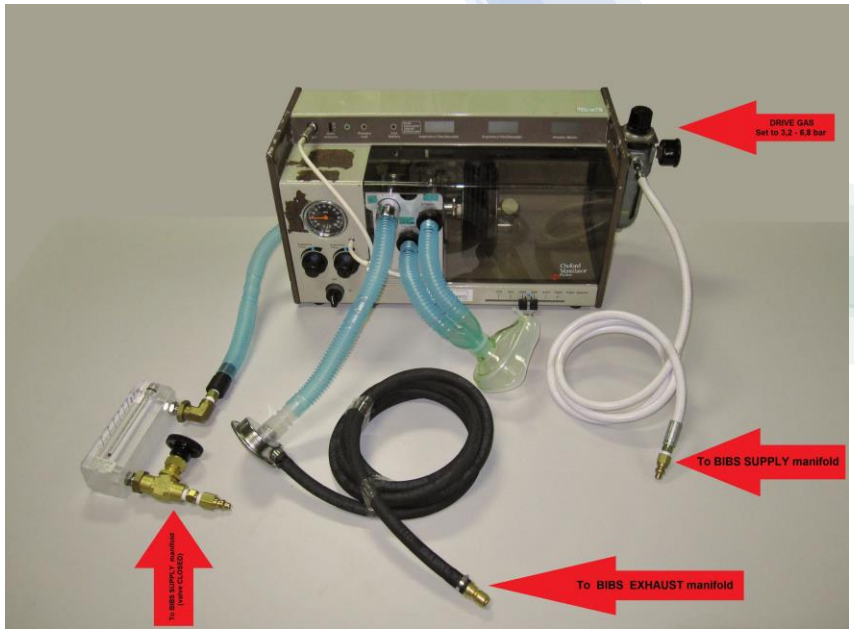
DMAC 28 is being reviewed to consider equipment availability and obsolescence



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Possible Future Developments include

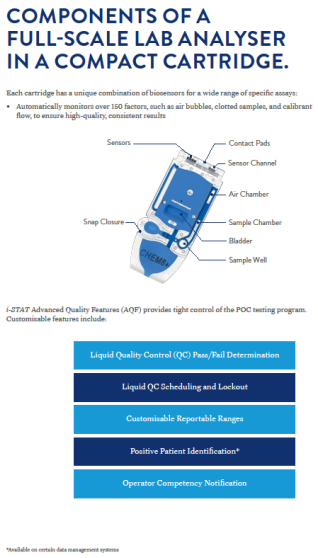
Blood gas analysis

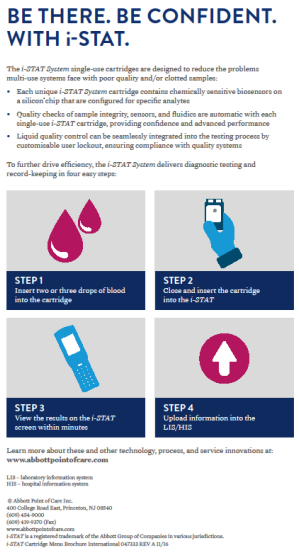
X-ray

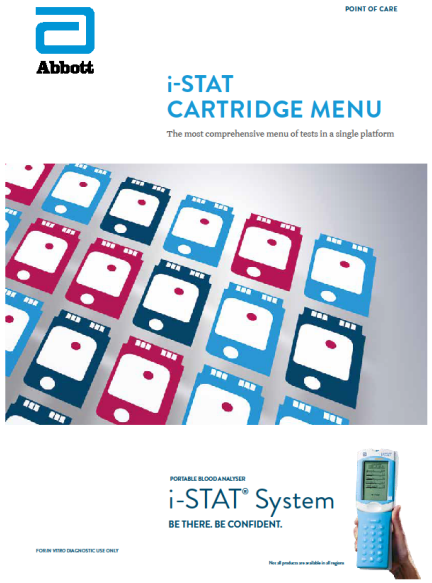
Ultrasound

Rods and Cones

Additional physiological and biomarker monitoring







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Diving Doctor training and sharing lessons learned :
Possible common exam upon course completion

DMT review of course content and focus on skill-fade and realistic drills

Role and knowledge of Ship's Medics

- Could they go into sat?
- Immediate improved care?
- Better use of medical telemedical technology?
- Training in Skill-fade?

DRAFT

Ongoing skill training for Diver Medic Technicians

Introduction

Since 1997 IMCA has been the custodian of the offshore Diver Medic Technician (DMT) Course. Over the years this programme has been extremely successful and, as a result, trained diver medic interventions have resulted in several successful outcomes for casualties. The initial course typically takes 60 hours to complete, and a refresher course of 30 hours is required at 2 yearly intervals. The learning objectives and course syllabi are described in IMCA D 020.

Skill Fade

"Skill fade" is the gradual loss of skills and knowledge needed to perform a task through lack of use of that skill over time. The ability to perform some critical tasks in a diving medical emergency is essential. However, a period of 2 years

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Ongoing and future studies / research

IMCA Diver Recovery Working group:

- <2016
- Tasked to look at emergency diver recovery into the bell
- Effectiveness of CPR and resuscitation in the bell
- Conclusions / Recommendations……?

Resuscitation in a diving bell

Dr Graham Johnson
Dr Andrew Tabner
Dr Phil Bryson

REMEDY

Summary: - A draft algorithm for the delivery of resuscitation in a diving bell will be published

- Airway and breathing management prioritised.
- mCPR is the most effective method of delivering chest compression
- Conventional CPR can be delivered on some bell floors
- Knee to chest CPR is safe, teachable and somewhat effective
- Head to chest (and prone knee to chest) CPR is NOT advised

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Original articles

Delivering manual cardiopulmonary resuscitation (CPR) in a diving bell: an analysis of head-to-chest and knee-to-chest compression techniques

Graham Johnson[1,2], Philip Bryson[3], Nicholas Tilbury[1], Benjamin McGregor[4], Alistair Wesson[4], Gareth D Hughes[1], Gareth R Hughes[1], Andrew Tabner[1,2]

[1] *University Hospitals of Derby and Burton NHS Foundation Trust, Royal Derby Hospital, Derby, UK*
[2] *University of Nottingham Medical School, East Block, Lenton, Nottingham, UK*
[3] *International SOS, Forest Grove House, Forrester Hill Road, Aberdeen, UK*
[4] *No specified affiliation*

Corresponding author: *Dr Graham Johnson, University Hospitals of Derby and Burton NHS Foundation Trust, Royal Derby Hospital, Uttoxeter Road, Derby, DE22 3NE, UK*
ORCiD ID: 0000-0001-6004-6244
graham.johnson4@nhs.net

Keywords
Cardiovascular; Deaths; Diving deaths; Diving incidents; Diving medicine; Diving research; Resuscitation

Abstract
(Johnson G, Bryson P, Tilbury N, McGregor B, Wesson A, Hughes GD, Hughes GR, Tabner A. Delivering ma

Emergency Life Support Equipment for Commercial Diving Operations

Compiled by: Dr Philip Bryson, Dr Ian Millar and Francois Burman Pr Eng

Reviewed and accepted by DNV-GL

Guidance Note

An evaluation of the NUI Compact Chest Compression Device (NCCD), a mechanical CPR device suitable for use in the saturation diving environment

Andrew Tabner[1,2], Philip Bryson[3], Nicholas Tilbury[1], Benjamin McGregor[4], Alistair Wesson[4], Gareth R Hughes[1], Gareth D Hughes[1], Graham Johnson[1,2]

[1] *University Hospitals of Derby and Burton NHS Foundation Trust, Royal Derby Hospital, Derby, UK*
[2] *University of Nottingham Medical School, East Block, Lenton, Nottingham, UK*
[3] *International SOS, Forest Grove House, Forrester Hill Road, Aberdeen, UK*
[4] *No specified affiliation*

Corresponding author: *Dr Andrew Tabner, University Hospitals of Derby and Burton NHS Foundation Trust, Royal Derby Hospital, Uttoxeter Road, Derby, DE22 3NE, UK*
ORCiD ID: 0000-0003-4191-9024
andrew.tabner@nhs.net

Keywords
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Abstract
(Tabner A, Bryson P, Tilbury N, McGregor B, Wesson A, Hughes GR, Hughes GD, Johnson G. An evaluation of the NUI Compact Chest Compression Device (NCCD), a mechanical CPR device suitable for use in the saturation diving environment. Diving and Hyperbaric Medicine. 2023 September 30;53(3):181–188. doi: 10.28920/dhm53.3.181-188. PMID: 37718291.)

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Next 2 phases:

- Further research and trials in a more realistic setting into
  - The mCPR system (NCCD)
  - The knee to chest

- Develop algorithms

- Develop teaching and training support material

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The work has been generously supported and we can now move to part 3 and 4 of the study

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Research Proposal:
The Australian Deep Dive

The proposal as originally envisaged and as Ethics approved:
Get as many of the involved divers back (including those who were “OK”).
Re-test them using the same MRI, neuropsychology and blood sampling protocol
Recruit 12 healthy sat divers with similar years of experience but nothing deeper than 150MSW.

Run comparisons between groups and sub-groups on “voxel by voxel” MRI analysis (requires super-computer access time payment)
Neuropsychs will run comparison analysis between previous and present, affected and OK, and controls
Biomarkers group will see what budget we can offer and pick the best set of tests achievable within the very large list. Probably run 6-10 different assays in the first instance.

Quick estimate - total around USD$70,000 - $100,000

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Thank You!!

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