Invited editorial

The further development of medical support for professional diving

David Elliott

SPUMS was in the forefront of those who established the need for a regional registry of doctors who were competent to decide on an individual's fitness to dive. It was agreed that this would include the names of only the medical practitioners who had attended an approved course in diving medicine. In contrast, the fitness of sport divers in much of the world was determined by each recreational training agency. For divers wishing to work in the North Sea, the medical examination needed to be conducted by a doctor approved by the government of that national sector. There was much reciprocation between the European countries involved in the North Sea for the approval of suitable doctors to follow the various national standards and, because offshore divers tend to follow contracts and the seasons around the world, this recognition was also extended to some doctors outside Europe. All went well until one erroneous overseas decision demonstrated to the national lawyers that their government had no powers of medical audit or investigation beyond their own borders. As a result, in 2001, the Health and Safety Executive in the United Kingdom removed doctors outside of the UK from the designated list.

From this arose the need for international recognition of fitness standards for working divers by the European Diving Technology Committee (EDTC) and, jointly with the European Committee of Hyperbaric Medicine (ECHM), of the training required by examining doctors (at Level I) with content for working divers audited by DMAC. Although the style and frequency, and even some details about content, of such medical examinations may vary internationally, the principles are effective and so perhaps now it is only the need for periodical refresher training for 'approved' doctors that needs wider implementation.

The training of doctors to manage diving accidents and illnesses is still evolving but common to both recreational and working divers is the treatment of those admitted for recompression by a land-based chamber (e.g., EDTC-ECHM: Level II basic). After this beginning, the further training separates into those with responsibilities for working divers (Occupational, Level IIa) and those in clinical HBO therapy (Hyperbaric Medicine, Level IIb). Many doctors become dually qualified. The application of occupational medicine to all working divers plus the use of different equipment and procedures from those used in recreational and technical diving, have led to continued developments in training for doctors who need to be 'on call' for diving companies and employed divers. In many countries, there are no Level IIa courses, possibly because the naval and academic course providers who cover the needs of military, recreational and some occupational diving have neither the hours nor the budget to expand them. All this lies behind parts of the 'Opinion' section in this issue.

The DMAC 'top-up' course in Malaysia last December was run with the support of the Asian Hyperbaric and Diving Medical Association for the benefit of international doctors well experienced in the management of recreational diving accidents. For those readers who are not familiar with the broad challenges of working dives, the following are some of the topics covered by Level IIa courses:

- The multiplicity of different underwater tasks
- The need
  - to complete each specific task effectively
  - to follow agreed diving procedures
  - to dive how and when required to do so
- In-water control of the diver by a surface supervisor
- Line-management's responsibilities for the diver's health and safety
- pO_2 limits in nitrox diving; on-line monitoring; management strategies for seizures
- Surface decompression, its advantages and safety constraints (e.g., hot-water suits)
- DCS is rare in commercial diving and PB/AGE almost unknown. Nevertheless a requirement is for chamber availability without delay (often on site)
- Fitness to return to all diving and associated duties after illness, surgery or injury
- Workplace assessments:
  - risk elimination, avoidance and control
  - acceptance of residual risk
  - maintenance of exposure and diving records
  - individual health surveillance after exposures to specific hazards
- Long-term health effects (neurological, pulmonary, NIHL, bone, etc)
- Assessment of exposure to hazards at depth:
  - *Physical:* noise, radiation, cold, differential pressures, tools, electric fields
  - *Biological:* from leptospirosis to hippopotami
  - *Chemical:*
    - equipment, off-gassing, etc (e.g., caprolactam, epichlorhydrin)
    - chamber atmosphere (solvents, ultrafine welding particles, contaminant gases)
    - environmental sources (petrochemicals, degraded muds, lead, H_2S)
- Saturation compression rates and control of HPNS
- Atmosphere monitoring and control
- pO_2 limits for each phase of saturation and excursions
- Maximum duration of saturation dives, bell-runs and in-water excursions
- Weight loss during saturation dives
- Saturation chamber hygiene (particularly *Pseudomonas,* HIV)
- Physiological assessment of any new procedures and of breathing equipment

- In-water diver monitoring and need for continuous communication
- Hot-water suits, control of thermal balance in deep dives
- Monitoring and control of hyperbaric contaminants in a welding habitat at depth
- Special management requirements for accidents and illness in saturation
- Medical advice, to be given on-site or remotely, on the management of complex diving or major emergencies whether occurring on the surface, in-water and/or in saturation (e.g., a lost bell on the seabed, hyperbaric evacuation by HRV, fire in control room)
- Recovery of an unconscious diver into the bell, resuscitation while upright
- In-chamber medical intervention (e.g., traumatic amputation, crushed chest management)
- Maintaining the skills of trained diver-medics

A more complete syllabus of training objectives, including revision of Level I and Level II-basic, can be completed by distance learning (e.g., at the University of Stellenbosch) plus less than a week of simulated cases and appropriate in-water training on location. The International Marine Contractors Association (IMCA) recognises the relevance of such training for doctors retained by its world-wide member companies. Not many Level IIa doctors may be needed in a region but the working divers and their employers within it will depend on their competence.

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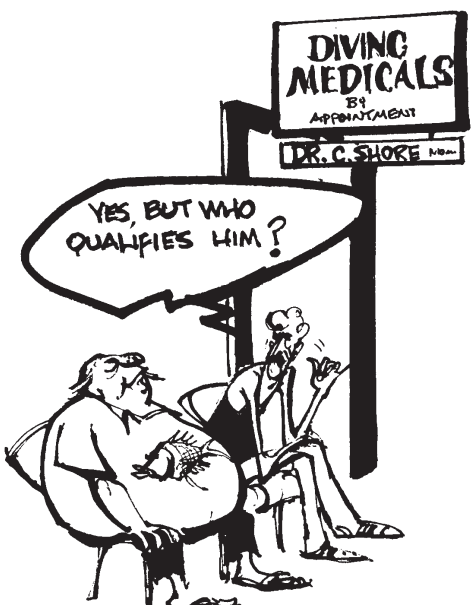
Key words
Occupational diving, occupational health, health surveillance, training, editorials



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