Routine occupational dive medical examinations

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Surveillance of the health of working divers is justified by the nature of the work and acknowledged short- and long-term health consequences.[1,2] There is frequent confusion between what is more properly practical or physical competency testing and what is germane to the 'medical fitness' for occupational diving. In respect of the latter, a recent diving industry publication proposed "*more extensive screening and record-keeping in order to monitor and protect divers' long-term health*".[3] The suggestions included blood gas testing, examination for specific chemicals and toxins, tissue screening and the recording of baselines against which future illness could be measured in cases of employment-related compensation.

Most jurisdictions mandate an annual comprehensive medical examination of occupational divers to determine their 'fitness to dive', but for New Zealand occupational divers this comprehensive approach was shown to be of doubtful validity at even the initial evaluation.[4] A system of a five-yearly comprehensive interview and examination plus an annual health status questionnaire was consequently instituted over five years ago and has been recently evaluated.[5]

To undertake this evaluation, we examined the records of all registered occupational divers who had completed a second comprehensive medical assessment after a five-year interval. Three hundred and thirty six divers (23% of the total occupational diver population) qualified. We found that only ten (3%) had an assessment outcome of this second comprehensive review that had a career impact. One was considered permanently unfit, four were temporarily unfit, and five were issued with conditional certification. Two were identified by respiratory function testing and eight by way of their responses to the questionnaire; none was found independently by the medical interview and examination process. This poor sensitivity is not surprising in a healthy worker group and where there is both extensive pre-screening and a rigorous and demanding training process.

We conclude that five-yearly medical examinations have a low detection rate for important health problems, but may be useful for ongoing discussions of risk understanding, acceptance and mitigation. Importantly, the questionnaire system did not 'miss' any divers who had developed a critically important health problem, and detected most of those who had less important problems.

Critics of self-reporting health questionnaires claim that they depend on the honesty of the diver, but such self-reporting of health issues by workers is an integral part of health surveillance regardless of the nature of the process. Based on our anecdotal experience, when we changed the system in New Zealand, misreporting is most likely if the worker feels their livelihood is at stake and that they cannot influence the outcome other than by way of the manner in which their health is represented. That is, the veracity of health reporting is probably more related to the nature of the outcome of the process (discretionary versus prescribed approaches to determining fitness) than it is to the conduct of the evaluation (questionnaire versus history taking by interview and physical examinations and investigations). Regardless of the drivers of these behaviours, the study we have cited above shows that there is no gain in sensitivity in this context when a self-reported questionnaire is supplemented by an interview, a physical examination and conventional investigations.[5]

There is no basis in evidence or logic then to compel us to unnecessarily frequent or extensive medical examinations and investigations. For occupational divers, a so-called comprehensive medical examination without honest disclosure by the diver is unlikely to discover epilepsy, drug addiction, or psychological and other conditions that may compromise diving safety.

We endorse most of the recommendations of the DMAC statement (p. 104 this issue) regarding health surveillance of commercial divers, but we disagree that health surveillance and fitness for work evaluations should be separate. This will increase compliance costs. A critical goal of health surveillance is to enable timely intervention to prevent further illness/injury, such that our current system of concurrent collection of health surveillance data and the fitness for work assessment seems justified both pragmatically and in terms of good health and safety practice.

A robust system for data collection in regard to exposure is required as our recent study found that only 15.5% of divers responded explicitly to the question "*how many dives in the past 12 months*?". In an attempt to address the non-reporting of such information, an electronic (internet-based) form of the annual health questionnaire will be introduced in New Zealand this year. Questions such as those relating to exposure will be 'required fields'. It is possible that in the future such a system could operate internationally.

In summary, we believe that there is a need to distinguish between issues that are best addressed through practical and physical competency assessments and those that are properly elements of 'medical fitness' for occupational diving. Secondly, those elements of fitness that are assessed, need to be so from an evidence base. Thirdly, emphasis needs to be on system design that addresses the drivers of reporting behaviour and hence that encourages veracity. Simply put, an iterative and comprehensive assessment of 'medical fitness' for diving that is either evidence-free and or is low in integrity is not only expensive but also delusory.

References

1 Macdiarmid JI, Ross JAS, Taylor CL, Watt SJ, Adie W, et al. Co-ordinated investigation into the possible long term health effects of diving at work. Examination of the long term health impact of diving: *The ELTHI diving study*. Sudbury: HSE Books, Research Report 230; 2004. <www.hse.gov.uk/research/rrhtm/rr230.htm>

2 Hope A, Lund T, Elliott DH et al. *Long term health effects of diving*. An international consensus conference. Godøysund 6-10 June 1993. Bergen: John Grieg forlag A/S; 1994:387-391, cited in: Brubakk AO, Neuman TS, editors. *Bennett and Elliott's physiology and medicine of diving*, 5th ed, Edinburgh: Saunders; 2003.

3 Glenn M. Screenings need a boost. H2Ops. 2008;5(5):36.

4 Greig P, Gorman D, Drewry A, Gamble G. The predictive power of initial fitness-to-dive procedures for occupational divers in New Zealand. *SPUMS Journal*. 2003;33(4):182-7.

5 Sames C, Gorman D, Mitchell S, Gamble G. The utility of regular medical examinations of occupational divers. *Internal Medicine Journal*. 2009; in press.

6 DMAC statement on health surveillance of commercial divers; April 2008. <www.dmac-diving.org/guidance/DMAC-Statement-200804.pdf> (Accessed 12 May 2009).

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