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Carl Edmonds, MB, BS, DPM, MRCP(Lond), MRCPsych FRACP, FRANZCP, DipDHM, FAFOM 11/69-74 North Steyne Manly, NSW, 2095, Australia E-mail: <puddle@bigpond.net.au>

Dr Vandenhoven replies:

Dear Editor,

Thank you for the opportunity to respond to Dr Edmonds' criticisms of our study.¹ Evaluation of prospective paediatric divers in this study was based largely on medical opinion, as there was only limited information in the literature and no adequate evidence-based medical data available in the mid-1980s.

To establish and assess a system of scuba diving initiation for children with a focus on safety and prevention of diving or other injuries, we undertook a prospective study in the first children's diving club in Belgium.

Two hundred and thirty four children between the ages of six and 13 years entered the study over an eight-year period. The average follow up was five years, with a range between one and eight years. The drop-out rate in this study reflects a real-life situation in different diving organisations throughout the world (CMAS, PADI, etc., since many divers, adults and or children, discontinue their diving activities after one or more years for different reasons. If one of the 205 children approved for scuba training discontinued diving activities, the reason(s) for this discontinuation was/were recorded as described in our paper. If the child was still diving, a phone survey of each child was performed by a registered recreational dive instructor using a structured questionnaire in order to avoid

loss to follow up and eventual under-reporting of diving accidents and fatalities. No diving accidents were recorded in the above-mentioned group during the eight-year period of the study.

The study population sample is a highly selected group of Belgian and other European children living in Brussels. Potential paediatric scuba divers and their parents were first informed by the registered recreational instructors of the Brussels children's diving club of major contra-indications, such as asthma, epilepsy, etc. At that time, all divers in the Belgian diving federation (FEBRAS/BEFOS, a member of CMAS) had to undergo a mandatory, annual medical fitness-to-dive evaluation including resting and exercise ECGs and an EEG during the initial medical check. The children of this scuba diving club underwent the same medical evaluations. Therefore, the children in this study had a much lower incidence of asthma, epilepsy and other medical problems due to pre-selection as is commonplace before sports and diving medicine evaluation in Belgium. In other words, a high standard of medical evaluation of sports divers was and is required in our country.

EEGs were performed to exclude previously undiagnosed epilepsy in these paediatric divers, and not to assess psychological maturity as suggested by Edmonds. EEGs were mandatory for initial fitness-to-dive evaluation in Belgium until the mid-1990s. Presently a yearly sports medical evaluation is still mandatory, but an EEG is at the discretion of the evaluating physician.

The psychological maturity of children in terms of fitness to dive was very difficult to evaluate, a problem we all recognise. Optimal communication between parents, instructors and the diving physician during swimming-pool scuba training sessions allowed the evaluation of some aspects of psychological maturity before open water dives. The objectives of the indoor pool sessions were not only the introduction of the child to scuba diving and the equipment to be used, but also the progressive acquisition of diving skills and confidence before open water experiences.

Open water dives were allowed only once children had acquired sufficient basic diving skills. This included unaided swimming and snorkelling skills, as mentioned by Edmonds, and knowledge of the underwater environment in order to minimise the risk of panic reactions. These dives, under vigilant supervision and competent 'duty of care', were strictly limited to a maximum depth of 5 m for children certified divers aged eight to 11 years old and 10 m for the children certified divers aged 12 to 14 years. In practice, none of the children in this study undertook open water diving until the age of 10 years. Incidents and accidents were recorded by registered recreational dive instructors and a sports diving physician. Medical supervision by one or more sports diving physicians was provided during all 12 open water diving trips in this eight-year study. No incidence of aural barotrauma occurred during openwater diving activities because the children were well trained and practised in the skills of ear clearing by that time.

Basic requirements and rules for teaching children to scuba dive are a specific educated and trained team, detailed sports medical evaluation, a minimum age of eight years, modified equipment, education and training programmes focused on the individual child, selected environments within a suitable range of water temperature and limited depth and diving times. Communication between parents, instructors and the

sports diving physician must be optimised. This system resulted in safe diving for these children.

At a recent conference in Switzerland, experience was reported from French (FFESSM) and Belgian (FEBRAS/BEFOS) children's diving programmes over the previous three years.^{2,3} No fatalities, pulmonary barotrauma or decompression illness were reported since the introduction of these programmes, which were developed from our experience. These programmes differ from those of PADI.

Education, training and diving must be focused on and adapted to the individual child; if you can't change the child, adapt the environment.

*Guy Vandenhoven, MD, FFPM(UK), MBCPM
Sports Medical Center
Jules Maloulaan 63
BE-1040 Brussels
Belgium
E-mail: <Vandenhoven@compagnet.be>*

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Dr Richardson replies:

Dear Editor,

Thank you for the opportunity to respond to the comments of Dr Carl Edmonds. Despite his personal and historical bias against 'DIOs' such as PADI, I believe Dr Edmonds reinforces a vital message for diving safety and for the importance of addressing complacency in avoiding morbidity and mortality in divers. Even though the tragic case studies he uses are thirty years old, from an era when diving standards and practice were not as well developed as today, they serve to reinforce the importance of vigilance when it comes to diving safety and supervision, especially for young divers. As programme and standards developers, my colleagues and I share a personal commitment to this end in our professional practice.

Dr Edmonds may be surprised to learn that we have more

in common than he thinks. However, his allegation that we have taken a minimalist approach to the topic of diving programmes for children is simply ludicrous. Had he taken the time to read our publication *Children and scuba diving: a resource guide for instructors and parents*,¹ and the extensive body of PADI standards and educational material addressing this topic, he would find that many of his criticisms and concerns are actively addressed in detail. Given his lack of background and experience in instructional design, training and education, I find it disappointing that he persists in ignoring or dismissing out of hand sophisticated programmes, methods and techniques of the modern educational approach to diver education. Rather, he seems stuck with his pre-existing, and very dated, negative perceptions. His comments, that PADI programme and safety limitations on junior divers "even if applied would not prevent child deaths", are not supported by empirical data and therefore purely speculative