

The workshop on EAT was acceptably conclusive in highlighting the main cause of the problem and in suggesting a number of options for both the diver and the instructor. The workshop also had a very real informative periphery i.e. all the well informed articles in December and March issues. This amount of attention given to the topic should and must make people think about the importance of the subject. This was a very worth while workshop. In comparison the UHMS Workshop did not produce this amount of detailed printed material.

I would like to suggest for future workshops that the chairperson(s) should write an article outlining their thinking and current thinking on the subject. Then invite written submissions. The workshop now has a large base of material to discuss. All the submissions together with the workshop report could then be published. In turn this would generate further discussion. This is the way this one basically worked and it worked well in my opinion.

Gerry Stokes

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27/4/94

Dear Editor,

The discussion of out-of-air situations in diving by Dr Walker (SPUMS Journal 1994; 24(1): 2-5) is a good demonstration of the limitations of numerator research and a great advertisement for alternative methods of assessing diving safety to analyses of deaths and accidents. Both of the latter are numerator research models and the conclusions made by Dr Walker on the basis of such data are in my opinion untenable.

Dr Walker states that because nearly half of the diving deaths in Australia occurred in "grossly inexperienced divers", that an acceptable level of training is not being achieved "by a proportion of those certified." Further, he argues that running out of air is "a serious indictment of the training they have received." Both these statements have to be considered in context; that is the absence of data about the number of dives being made without incident and the percentage of the total dives that were made by grossly inexperienced divers. These data are needed as they are the denominators to Dr Walker's numerators. Market diving surveys show that most divers stop diving within a few years of being trained. It follows that most dives then will be made by novice or inexperienced divers. At face value, from Dr Walker's mortality data, inexperienced divers would appear to be under-represented among the diving fatalities.

Data from numerator research should be treated cautiously and any conclusions be made in this context. Measurement of diving exposure is urgently needed and numerator research should be attributed a relatively low priority in assessments of diving safety.

Des Gorman

This letter was shown to Dr Walker and he has submitted the following reply.

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20/5/94

Dear Editor

I would like to thank Dr Gorman for his critical attention to my paper,¹ although I find it rather strange that he has presented a longer criticism in Dive Log Australia.² Dr Gorman has raised fundamental concerns, the basics of any scientific or medical investigation. He appears to have forgotten Paracelsus' axiom, that the first step to cure is to know the disease. Nobody can investigate a problem until it has been shown to exist. The investigations which he deprecates act as an early warning system.

Dr Gorman disputes the significance of the proportion of deaths which occur in trained but grossly inexperienced scuba divers. He disagrees with my opinion that running out of air, which is in most cases due to the diver failing to monitor his or her air supply, casts doubt on the adequacy of training received. He casts doubt on the value of treating incidents reports as a significant element in attempts to improve the awareness of problems which are associated with dives where functional impairment, morbidity or even death has occurred.

I find his stance surprising as no diving problems have ever been predicted by researchers or medical specialists. Such people operate in the secondary, but highly important, phase by working on the problems after they have been identified.

Dr Gorman deserves a reasoned response to the critical points he has raised, particularly as he has brought the matter to the attention of the general diving public.

The dangers of gross inexperience

My paper did not provide full details of the training of the grossly inexperienced scuba divers (those who have made less than 6 dives since finishing their training) who died. As since 1980 divers usually have had to show

evidence of formal training to get air fills, I have used the cases from 1980-1991 to produce the table.

SCUBA FATALITIES 1980-1990

Total deaths	94
Grossly inexperienced scuba divers	36
No formal training	10
Some training	4
In class (cardiac death)	1
Resort dive (1 cardiac death)	2
Recently trained	19

While newly trained divers are “only” a little over 50% of the grossly inexperienced, this is a significant finding as they represent 20% of the mortality for the 12 years. If it was discovered that 20% of drivers killed in road traffic accidents had driven less than six times since passing their driving test, most people would demand that testing standards be raised. There would be investigations into the training they had received. Unfortunately the facts concerning divers, readily available to anyone with an interest in diver safety, have produced no response from either the instructor organisations or anyone else in the diving community.

Perhaps Dr Gorman can inform us how many deaths in the grossly inexperienced, as a percentage of the total scuba diving deaths, can be considered acceptable and how many diving deaths a year must be accepted as inevitable. It might assist if Dr Gorman stated the numbers of diving deaths a year which he would accept as inevitable and requiring no search for causal factors. My approach to diving fatalities is not to accept even a low mortality if this could be further reduced, so my failure to calculate risk rates per 100,000 dives does not appear to me to constitute a research error. He talks of a diving population while I consider divers as individuals. There is a place for both approaches, with each having its value and neither being exclusive.

The out-of-air problem

The single most important factor for surviving in the underwater environment is to have available an adequate supply of air (or a suitable alternative gas mix). It is therefore the primary and essential responsibility of each and every diver to ensure their remaining air is adequate at all times. To both assume and accept that every diver will fall into this error is to admit that their training was possibly inadequate, in that they have failed to understand this basic safety rule. Anyone who is unable to follow this simple rule should not be certified as adequately trained.

The only acceptable reason for any out-of-air situation should be equipment failure or becoming trapped.

Surely basic training should ensure the diver “over learns” this behaviour, rather than inculcate a belief that there is no real necessity to avoid running out of air because the emergency ascent training included in the course has made the diver able to perform this in a stress situation. No evidence has ever been presented to back this belief, indeed BS-AC divers survive without this training element, indicating that it may be irrelevant. As I have noted elsewhere, there have been no investigations by any of the Instructor organisations into the causes, frequency and management of “low/no air” emergencies. Both UMS and SPUMS have run “Workshops” in which responses to emergency situations were discussed from a training viewpoint but neither considered why such situations arose, how they could be avoided, nor evidence that the proposed remedy was effective. This I regard as reprehensible.

Incident reports and denominator or numerator in research

The base on which our knowledge of diving problems has been developed has been incident reporting and analysis, which can be seen from any consideration of diving history. I do not believe that Dr Gorman would write critically of “the intrinsically limited nature of almost all the published assessments of diving safety”² when he rereads Paul Bert’s book.³ This is full of such reports, including the first reports of Caisson Disease, by an engineer (Triger), and the later report from the two general practitioners (Drs Pol and Watelle) who cared for the health of his workers. Paul Bert also reported on the medical problems of sponge divers (Dr Alphonse Gal) and those working on digging the foundations of bridges (engineer Eads and others). Dr Gorman will be aware of the papers by Drs Babington and Cuthbert,⁴ Dr A.H. Smith,⁵ Dr Corning,⁶ Dr Van Rensselaer⁷ and many others. None of these can claim any valid statistical basis but all made very significant contributions to our understanding of pressure related problems.

There has been no possibility of calculating risk factors in relation to the number at risk, for many reasons. There is no source of accurate information concerning the number of divers active on any day, let alone in any year, the training they have received is unknown, as is their true experience, the type and frequency of the dives they perform, and the frequency and types of the problems they encounter but survive. It is surely unacceptable to accept complacently the death of any healthy person, particularly one who has just completed training and been certified as competent to perform safely in the environment responsible for his or her death.

It is my belief that to dismiss morbidity and fatality reports because there is no statistical data base to define

the population at risk is an improper response. A single paper by Craig⁸ altered for ever our thoughts on the dangers of hyperventilation before making a breath-hold dive. A paper by Polak and Adams⁹ defined the distinction between decompression sickness and air embolism. Unfortunately the new nomenclature, introduced because of the occasional clinical difficulty of the differential diagnosis, is blurring the difference. It was only the persistent complaints of recreational divers which finally persuaded Naval Authorities to question their belief that decompression sickness was always the fault of the diver and to recognise that the Tables were not a perfect protection.

There are many paths to enlightenment, or so it is claimed, and certainly more than one way to uncover truths. To the Chinese is ascribed the belief in Yin and Yan, the complimentary elements which are present in problems. As Samuel Butler said, "Life is the Art of drawing sufficient conclusions from insufficient evidence". This may not be statistically satisfying but it is the way of the world which we inhabit.

I thank the Editor for this opportunity to respond to a criticism from an Authority in the field of Diving Medicine.

Douglas Walker

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DIVING DIABETICS

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Dear Editor

I concur with many of the sentiments expressed by Bryson, Edge, Lindsay and Wilmshurst in the March journal.¹ I was surprised to see this as an original paper, because there really is nothing new in most of the comments and recommendations they made. In particular, I would stress the entire basis of diabetes management in the 1990's is prevention and not cure. The mention of oral glucose tablets or glucose paste seems a little bit dated in this day and age. Much more effective is a small bottle of 50% glucose which can be drunk if required. I was also trying to envisage how to administer glucagon intramuscularly to a diver in a 5 mm wetsuit. I am not quite sure where one would start. The authors apparently have not heard of the use of intra-nasal glucagon.²⁻⁴ Nor am I sure what a diabetologist is; perhaps I will ask some of my diabetic friends if they have ever met one.

It may interest readers that Dr Douglas Walker, the coordinator of Project Sticky-Beak, has asked me to assist him in setting up a confidential register of diabetic divers who for the first time ever, now feel they are able to "come out" and be accepted within the recreational scuba diving community.

Mark J. Sullivan

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