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### Key Words

Decompression illness, transport, treatment sequelae.

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## THE WORLD AS IT IS

### SOME DIABETICS ARE FIT TO DIVE, BUT WHICH ONES?

#### THE AUSTRALIAN EXPERIENCE AND SPUMS POLICIES

John Williamson

SPUMS, the South Pacific Underwater Medicine Society, has at times been accused of advocating that "only perfect physical specimens should dive"! Regarding diabetes and diving, the original SPUMS statement published in 1992,<sup>1</sup> opposed diving for all but the diet-controlled diabetic. It contained no hard supporting data. The paper was followed by some vigorous opposing views<sup>2</sup> and criticism<sup>3</sup>, but little more than anecdotal opposing data.

Bryson, Edge and colleagues<sup>4,5</sup> and Dear and colleagues<sup>6</sup> gave notice of data collection in 1994. This and recent early data from Stephen Prosterman, of the Diabetic Association of the Virgin Islands ("Camp DAVI"),<sup>7</sup> lends support to the premise that certain insulin dependent diabetics (IDDM) can dive safely under the right control conditions. Opposing opinions continue.<sup>8,9</sup> On-going data collection from DAVI is promised.<sup>7</sup>

What "decent" Australian data exists, relevant to diabetes and diving? Medline contains none. There are none in the data base of the "DES Australia" phone. This contains detailed records of 1,950 calls since 1987, both Australian and international. Data from 1987-1990 are published<sup>10</sup> and 1991-1995 are in preparation for publication. There appear to be none contained within the "Project Stickybeak" data base, a continuous series of detailed mortality. and morbidity events in Australian and New Zealand diving from about 1969 to the present.<sup>11</sup>

That there are Australian (and thus likely New Zealand) divers with Type I diabetes mellitus is certain.<sup>2,3</sup> There is an interesting new study by Lerch, Thurm and Lutrop from North Queensland which supports diving for selected insulin-dependant diabetics. It is being prepared for publication in the SPUMS Journal (see pages 62-66).

There are extensive worldwide data on both Type I and Type II diabetes mellitus unrelated to diving. In addition consultation with experienced, but non-diving, diabetologist colleagues has occurred. Present evidence is that diving produces a fall in blood glucose levels in diabetics<sup>6,7</sup> and that measurement of peri-diving blood glucose levels is necessary for safety.<sup>4,5</sup> More "hard in-water data" are necessary.

### The case against

Diving diabetics, even experienced ones, cannot always be relied upon to measure their peri-diving blood glucose levels.<sup>7</sup>

Irregular food absorption (eg. sea sickness), or even meal timing (eg. alcohol), may occur during diving activities. Conditions may also predispose to insulin or drug administration errors.<sup>8,12</sup>

Hypoglycaemia symptoms usually begin at a blood glucose level of less than 2.5 mM/l (45 mg/decilitre). The onset can be rapid (minutes), will affect central neurological function (judgement, vision, consciousness) and any warning autonomic symptoms which normally precede those of CNS dysfunction (sweating, shaking, palpitations) may be hidden underwater.

Undetected autonomic neuropathy<sup>9</sup> in a diving diabetic may result in masking of warning symptoms of

acute hypoglycaemia, impaired baroregulation, with unpredictable cardiovascular effects of immersion.

The superimposition of even mild nitrogen narcosis upon underwater hypoglycaemic symptoms could create a particularly dangerous situation. Any danger is shared by the diabetic's diving buddy, who requires to be non-diabetic and familiar with the signs and management of any diabetic crisis, in-water or out.

The diving medical assessment of non-compliance or instability in a diabetic will often be difficult.

Wearing a MedicAlert bracelet underwater is unlikely to increase safety!

There is some evidence that severe hyperglycaemia (15-20 mM/l or 360 mg/decilitre) may impair cerebral function (Harding 1996, personal communication).

### The case for

Both Type I and Type II selected diabetics do dive safely<sup>3-6</sup> under controlled conditions and have done so for years.<sup>6,7</sup>

Some past criteria espoused by diving medicine physicians can still be described as "dogma-rich but data-free" (this applies not only to the realm of diabetes and diving)!

Guidelines that do exist tend to select "the fit edge" of the diabetic population, who are well educated about their own disease, and its control.

Autonomic neuropathy<sup>9</sup> in the absence of other detectable neuropathy in diabetes is very uncommon (Harding 1996, personal communication).

The technology for reliable on-site capillary blood glucose measurements is now available at reasonable cost.<sup>5,7</sup>

### Summary

1 While recreational diving for diabetics is quite suddenly something of a bandwagon topic, and while more in-water hard evidence is awaited, what exists is suggesting that, within certain defined boundaries, diving with diabetes (including insulin dependency) may be possible at a risk level acceptable to both the diver and the physician. However, the "worldwide jury" is still out on the subject.

2 That an increased risk exists is indisputable and the diabetic diver must accept and assume at least part-responsibility for this risk, when recreational diving.

3 It is the author's experience that individuals with lifelong medical disabilities, given accurate advice, may know more about what they can and cannot do, than do their healthy physicians. The guided "disabled person" may teach the "able teacher"!<sup>13</sup> The author does not understand how else meaningful human data in this challenging area can be safely and ethically obtained.

4 The opinions presented here are the author's. The present SPUMS position with regard to diving and diabetes, to this author's knowledge, remains closer to the stance that insulin dependent diabetics should never dive,

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## Key Words

Diabetes, safety.

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## A STUDY INTO THE NUMBER OF DIVES CONDUCTED ON THE GREAT BARRIER REEF IN 1994

David Windsor

## Introduction

There has been an almost total lack of statistical data on the numbers of visiting divers or individual dives conducted on the Great Barrier Reef. It is difficult therefore to establish any meaningful trend or assess the impact or revenue generated by the Dive Tourism Industry.

A study of diver numbers was commissioned by the Great Barrier Reef Marine Park Authority in 1993. This study was found to be statistically inaccurate because of the lack of response from permit holders, particularly those who operate large dive tourism businesses. In addition the questionnaire was felt to be too complicated and sought to obtain too wide a range of data.

As a result of the perceived potential of the initial study, the Association of Marine Park Tourism Operators (AMPTO) and DIVE Queensland approached interested bodies with a view to completing the study. It was felt that with industry support a majority of operators would support the project and that this could be done on a very limited budget with the support of DIVE Queensland and AMPTO.

Support was sought from the Great Barrier Reef Marine Park Authority (GBRMPA), the Queensland Travel & Tourism Corporation (QTTC), the Division of Workplace Health & Safety (WHS) and the Queensland Department of Environment and Heritage (QDEH). Financial assistance was provided by all except QDEH.

In addition to permit holders, operators in SE Queensland were asked to participate in the study

## Methodology

The GBRMPA data base of permit holders was accessed. This provided a list of 1,242 individuals or companies with permits in the following categories, general tourism, diving and both.

Examination of the data revealed that there were large numbers of permits issued to the same businesses but in the names of each of the partners or shareholders in the companies. By removing the duplications it was possible to arrive at a list of 532 permit holders of whom 243 indicated some involvement in diving.

A simplified form was drawn up and mailed, together with a supporting letter from DIVE Queensland, to all 532 persons or companies holding the relevant Great Barrier Reef permits, plus an additional 22 operators who do not require GBRMPA permits.

Completed forms were collated and a direct approach was made to those who did not respond by mail. This was conducted by direct contact, or by phone if direct contact was not possible.

## Findings

Of the 532 questionnaires mailed 225 were returned completed. Of these, 121 were from the holders of general tourism permits (total permits 289) who indicated no diving took place in their operation. A further 86 permit holders who did not respond were then approached and confirmed that they did not conduct diving activities. With 207 out of a total of 289 (71.6%) permit holders in this group indicating no involvement in diving it was decided that this was indicative of the group and no further contact was made with these permit holders.

Of the 243 permit holders with permits for general tourism and diving 104 responded to the mail-out. The remaining 139 were approached directly and it was possible to obtain data from all but 21 operators. These were all small operators and their figures would have little impact on the overall findings. They have been disregarded for the purposes of the study