

The world as it is

An estimate of the risk of fatal shark attack whilst diving in Western Australia

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Key words

Marine animals, deaths, epidemiology

Abstract

(Buzzacott P. An estimate of the risk of fatal shark attack whilst diving in Western Australia. *SPUMS J.* 2005; 35: 92-4.) Many divers reassure themselves that they are more likely to perish by bee sting or lightning strike than by shark attack. Methods of estimating exposure to risk amongst scuba divers are described. The risk of a fatal shark attack whilst scuba diving in Western Australia is estimated to be less than one in three million dives.

Introduction

Though the absolute risk of a fatal shark attack whilst diving in Western Australia (WA) cannot be calculated with certainty, the likelihood is assured to be less than if there were twice as many attacks as reported, and the number of dives made in WA fewer than is conservatively estimated. By this method the likelihood can be given as "less than..." an estimate of the risk in the worst imaginable case.

Number of shark attacks

A review of the Western Australian newspapers indexed by Factiva found just one report of a diver being attacked by a shark during the last decade. The Taronga Park Zoo Australian Shark Attack File records one fatal attack on a scuba diver during the last ten years, and one on a diver using surface supplied air (hookah) during the decade prior to that (West J, personal communication, 3 December 2004). In the interests of estimating the risk conservatively, we may consider it unlikely that there are more than two fatal shark attacks upon divers per decade in WA, and that only one is reported.

Number of divers

In 2000 the Australian Bureau of Statistics (ABS) conducted the Participation in Sport survey and found that 30,700 Western Australian divers had made dives during the previous year.¹ In 2002, however, the next ABS Participation in Sport survey found only 17,200 Western Australian divers had made dives during the previous year.² Differing methodology probably accounts for the estimated number of divers almost halving in two years. In 2000 people were asked, in four quarterly surveys, to choose sports in which they had participated from a list, whereas in 2002, during autumn only, they recalled sports from memory.

Methods of estimating numbers of dives

In the Orkney Islands dive boat operators record the number of boat dives made, whilst shore dives are reported by local dive centres.³ With just two dive centres in the Orkneys it is easier to count dives there than it is in WA. At L'Esartit on the Mediterranean coast personal interviews were conducted at popular dive sites by researchers.⁴ This is a similar method to both a study conducted since 1996 in Japan, and to a study completed on Saba, a Caribbean island.^{5,6} With 10,000 km of coastline this method would be difficult to use in WA. Studies in the United Kingdom cited membership of the British Sub Aqua Club and the Scottish Sub Aqua Club when estimating exposure, though there are reservations about the completeness of this strategy.^{7,8} It is not known what proportion of divers in WA belong to dive clubs.

Possibly the most reliable method for determining exposure within a defined area is to count air fills supplied. This method was used in the US military community on Okinawa Island, Japan, where treatment records of the hyperbaric chamber were compared with the number of air fills recorded.⁹ A similar method was employed in the Northern Arabian Gulf to measure the frequency of decompression sickness within a population of commercial divers making scuba dives.¹⁰ In Victoria air fills were used to determine the number of recreational dives made during one year, in a monthly telephone survey of 46 dive centres.¹¹ Likewise, air fills supplied by dive centres were counted during a 14 month survey of dive centres in British Columbia.¹²

Research into the number of dives made by divers in WA alone has not been identified. In a survey of charter boat divers in the Florida Keys, just 54% reported making fewer than 25 dives within the previous year.¹⁵ In Great Britain, a prospective survey of 100 asthmatic divers recorded 12,697 dives over five years, averaging just over 25 dives each per

year.¹⁶ Surveys of British Sub Aqua Club members in 1986 and 1990 found mean annual diving rates of 22 and 33 dives per year respectively. In Geneva, a survey of 215 dive club members found a mean of 28 dives made during the preceding six months, while a survey of 29 Australian dive clubs, four of which were in WA, found 346 divers averaged 39 dives per diver per year overall.^{17,18} This latter statistic is higher than found elsewhere and may reflect the high number of diving professionals within these clubs.

Diving exposure in Western Australia

The Recreational Diving Taskforce was appointed in WA in 1999, and tasked with analysing the accident and injury data for Western Australian scuba divers.¹³ The taskforce reported "...there is no mechanism to collate information on dive activity, e.g. tank fills, as part of a statewide database on recreational diving in Western Australia," (p.11) before conceding "It has not been possible to quantify nor qualify the degree of exposure to risk in the industry" (p.12). The aforementioned British Columbia study managed a participation rate of 65%.

Taking the estimate of 30,700 divers in 2000 as the most accurate to date, and allowing for an annual population growth of 1.4%, we might reasonably expect there to be 32,500 divers in WA today.¹⁴

Unless the mean number of dives made annually by Western Australians significantly differs from the populations surveyed in the above studies, then it is likely the average number of dives made in WA each year by Western Australians is no less than between 15 and 20 per diver.^{15 18} If 32,500 divers make no fewer than 17 dives per year in WA then local divers account for at least 550,000 dives per year.

Between March 2000 and March 2003 there were, on average, 1.45 million visitors to Western Australia per year, not including interstate and day visitors.¹⁹ If the proportion of this visiting population that dive is approximately equal to the proportion of Western Australians that dive, which in 2001 was 31,100 divers out of 1,826,676 Western Australians within Australia on the night of the last census, then 25,000 of the visitors to WA each year made dives during the preceding year.

A survey of visitors to the southern half of the state between 1999 and 2002 found that, whilst on holiday in Australia/WA, 48% of international visitors had engaged in a sport or activity such as scuba diving, golf and/or fishing during their visit.²⁰ When domestic visitors were added the overall sports participation rate fell to 32%. If we accept that 25,000 visitors per year are divers and, on average, at least 32% will take either one single dive or one double dive trip during their stay, then a further 12,000 or more dives are made in WA each year by visiting divers.

At last count there were 50 dive centres operating in WA, certifying more than 9,000 people each year and generating at least an additional 40,000 dives. Therefore, the estimated number of dives made in WA each year is no fewer than 550,000 by locals, 40,000 by trainee divers and staff, and at least 12,000 by visitors, totalling no fewer than 600,000 dives per year in WA.

Results

If the number of fatal shark attacks on divers in WA is estimated as above at less than 0.2 per year, and no fewer than 600,000 dives are estimated to be made in WA each year, then the risk of a fatal shark attack while diving in WA is less than one in three million dives (1:3,000,000).

Discussion

It cannot be known for certain how many divers are killed by sharks in WA each decade. It is possible, though unlikely, that fatal attacks remain unreported in either the media or the Australian Shark Attack Files. The 2001 census did not account for Western Australians who were overseas for the night of the census, so the population of WA may be slightly higher than the denominator used to estimate popularity of diving amongst residents. The number of international visitors to WA is calculated by surveying visitors at airports as they are leaving, missing international visitors travelling by other means. The number of interstate visitors is generated by telephone survey. The proportion of visitors who dive may differ significantly from the proportion of Western Australians who dive.

There were 8,900 Professional Association of Diving Instructors (PADI) certifications issued in WA during 2003 (Oliver D, personal communication, 31 January, 2005). The total annual number of certifications is likely to be higher than this as other training providers certify divers in WA.

If a risk of shark attack as low as this fails to reassure, then nervous divers might consider the adage: if you dive with a buddy, your own risk of an attack feels immediately halved.

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