

## Travel medicine: a personal view on medical equipment for a peripatetic diving doctor

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### Key words

Dive travel, travel insurance, communications, medical facilities, oxygen

### Abstract

A practical discussion on dive travel medicine for a diving doctor is provided, with recommendations based on the provision of such services in remote areas, particularly in the South Pacific region. Practical advice on basic medical equipment and requirements to assist injured divers are included. Recommendations are given on insurance for divers, communication difficulties, the provision of appropriate oxygen therapy and medical equipment, and pharmaceutical agents that may be useful. The minimum of equipment needs to provide the maximum benefit.

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### Introduction

Primary factors in determining the contents of a medical kit for diving abroad are where you are going and what you are going to do there. Some of the best dive locations are found in very remote and isolated areas. The following commentary is largely directed at travelling diving medical practitioners and reflects the author's many years of diving around the Asia-Pacific region. It will, in particular, address the challenges involved in the provision of oxygen for diving in remote areas. Much of this advice relates to potentially treating one or two injured divers. It would be difficult to carry more equipment without undertaking a major exercise in logistics.

### Travel and diving insurance

Travel insurance is an essential expense. Make certain what you are buying in the way of insurance will cover your likely needs with regard to treatment and evacuation, and that it covers the types of activities you will be undertaking. Read the fine print with regard to exclusions and restrictions. Does your insurance cover the diving you will be undertaking?

There are two aspects to insurance cover: the cost of medical therapy and possible evacuation expenses (The Divers Alert Network can provide useful coverage; DAN SEAP, P O Box 384, Ashburton, Victoria, 3147, Australia. < [www.danseap.org](http://www.danseap.org) >). General travel insurance covers changes to travel plans, changes to airline travel and possible significant alterations to travel secondary to your medical problems. However, you need to make certain it covers the diving you are actually performing. Some insurers will cover only within the limits of your diver certification, which may be 18 metres for base certification.

Without insurance, a diver may generate very large bills for treatment and transport, and the cost of medical evacuation via air may be very high. Reimbursing local medical facilities for treatment costs will also ensure that the local populations

are not deprived of medical resources. If you are travelling with others or as part of a group, it would also be wise to advise fellow travellers of the need for appropriate insurance.

### Communications

Check telephone numbers and contact details for your insurers and local medical facilities before you leave, and take the details with you. Check communications at your proposed destination. Do they have a telephone and does it work most of the time? Many destinations now have cellular networks, which are often more reliable than the land-based system. Check whether your telephone will work or whether a local SIM card may be obtained at your destination (<[www.gsmworld.com](http://www.gsmworld.com)> has information on networks).

If communications are important for the diving activities, then consider bringing a portable satellite telephone (purchase or rent) with you, as well as a plentiful supply of batteries or perhaps a solar charger if the local power supply is uncertain. Many isolated areas will have a satellite telephone service, as these services are now widely and relatively cheaply available, but check before departure.

### Medical facilities

Medical facilities and hospitals in most of the Pacific region are very unlikely to be of the same standard as those in developed countries, indeed they may be very basic. This is not a criticism of local medical facilities, but simply a matter of local economics. Do the medical services at your destination re-use medical supplies? Consider taking a supply of basic medical consumables (dressings, needles and syringes, intravenous equipment, etc.). Will treating an injured diver result in the local population being deprived of valuable resources? How might you mitigate this impact? This particularly applies to some basic resources, such as oxygen. Treating a diver may use considerable oxygen, and deplete the local medical services, which may have delays or difficulties with resupply.

At the end of a dive trip, donate your consumables to the local medical establishment. At SPUMS meetings, there is usually a voluntary collection of registrants' medical kit consumables and drugs at the end, and these are donated to the local healthcare facilities. Some registrants pack as much as they can get into their luggage for just this purpose.

### Oxygen

Oxygen is a key component in the first-aid management of diving accidents as well as other acute medical conditions. My preference is to carry my own system whenever this is possible. This way, you know that you will have appropriate equipment and that it will work. I have done this on diving trips abroad for many years, and the following pointers are based on these experiences.

- Does your destination have oxygen? Better still, is their system appropriate to your needs? Checking they have oxygen is not enough. On some SPUMS conferences it has been necessary to import oxygen supplies.
- Perhaps one advantage of Nitrox diving is that it has resulted in many isolated dive resorts and dive boats having large supplies of oxygen. Therefore, prior knowledge that Nitrox is available should provide some confidence there will be adequate supplies.
- Airline regulations may affect what equipment you may travel with, particularly with regard to oxygen cylinders and anaesthetic agents. Check with the airlines well before you travel, as regulations vary from airline to airline. It may be easier to fly small oxygen cylinders empty for filling at the destination, but this also needs planning. You may need to demonstrate to airline authorities that your oxygen cylinders are empty.
- How much oxygen you take is often a compromise, and ultimately determined by weight and size. The simple rule is take as much as is practical for the destination. From a first aid viewpoint, one needs enough to get from the dive site to the next resupply/medical facility or to last until a medical evacuation can be arranged.
- The oxygen delivery system needs to be able to deliver as near to 100% oxygen as possible for two injured divers. It is likely that if one diver is injured then at least a second will also be injured.
- Carry an adapter to refill the small 320-litre, pin-indexed cylinder from larger cylinders at the destination, as well as a pin-indexed to bull-nose adapter to run off larger cylinders with medical fittings.
- Most dive operators carry emergency oxygen equipment on their dive boats, and most of them work. It may be wise to politely check the dive operator's equipment at the start of your trip. In general, the availability of oxygen for first aid is improving throughout the region.
- As a general rule, if you have the equipment with you, then you will not need it.
- Check everything thoroughly before you leave, and pack everything in such a way that it will survive travel.

### CHOICE OF OXYGEN EQUIPMENT

There are many oxygen systems available on the market. The theoretical function of different systems was reviewed at the New Zealand meeting in 1997.<sup>1</sup> DAN SEAP produce an excellent publication that provides a thorough review of the different oxygen resuscitation systems available.<sup>2</sup>

In order to obtain maximum supply duration with minimal size, a rebreathing system is needed. This system is ideal for some of us with a medical background, but requires extra training for many before it can be used effectively. I carry and recommend the 'Oxi-dive' system (Medical Developments, 7/56 Smith Road, Springvale, Victoria 3171, Australia). Its advantages are that it uses oxygen supply efficiently whilst achieving high inspired oxygen concentrations. It also has a robust waterproof case that will survive travel and most trauma. The extra room available in the case allows one to pack this spare space with other medical supplies. A good alternative for many is the demand regulator system marketed by DAN SEAP.

### Medical equipment

What should you take in the way of general medical equipment? This is ultimately determined by what will fit in your luggage, and the resources at your destination. If you are travelling in a group, it may be possible to spread some equipment amongst others.

Legal aspects of the destination country may be important. Regulations relating to medications vary from country to country, and some are very restrictive. Most importantly, remember to remove all narcotics or restricted drugs from your medical kit before you leave, or apply for an importation permit (these are often very difficult to obtain).

Weight restrictions may be very strict, especially on small aircraft. Ultimately, you may need to compromise to meet these restrictions, and weight and volume may be the limiting factors. It may be worth investigating with the airlines to see if you can have an increased baggage allowance for medical equipment. Again, this varies with different airlines, some may be uncompromising over such issues.

### ESSENTIALS

- Intravenous fluids and cannulae: normal saline 500 ml packs are often easier to pack. Take enough to treat two divers for 24 hours. Medical evacuation may take between 12 and 24 hours to organise. Remember that one severe case of traveller's diarrhoea may use up all your intravenous supplies. How much you can take is determined, ultimately, by space/weight restrictions.
- Drugs – lignocaine/adrenaline/anti-emetics/antibiotics (broad-spectrum are recommended for diving)/diazepam/frusemide. Choices will be determined by your destination, medical training and the local regulations.

Both oral and injectable analgesics should be considered. The choice may be determined ultimately by regulations at your destination and the countries you pass through.

- Antiseptics/dressing materials – to treat basic wounds and coral cuts.
- Antimalarial agents appropriate to the destination. Make certain that the particular agent you and your travelling companions are taking is compatible with diving.<sup>3</sup>
- Anti-diarrhoeal agents – traveller's diarrhoea is common, and very inconvenient on a dive boat.
- Diagnostic tools – such as auriscope, stethoscope, sphygmomanometer

#### EXTRAS

- Emergency contraception – morning after pill, etc.
- Extra antibiotics to treat dive staff and the local population. Medical practitioners are often valued guests, particularly at isolated destinations, and will often be called upon to treat the staff.
- Suture kits (disposable), sutures and steri-strips to treat minor trauma.

In summary, plan the medical aspects of dive travel. Assume everything that can go wrong will go wrong, and anticipate problems. Even then, you might have to face something you had not thought of and are not prepared for!

#### References

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**FIGURE 1. OXI-DIVE OXYGEN RESUSCITATION KIT**

