

MEDICAL PREPAREDNESS FOR OCEAN CRUISING

Dr Maria Forbes

My husband Alastair and I made our first Atlantic crossing in December 2017. We considered that we had done a reasonable amount of medical preparation, insofar as I am a retired medical practitioner and Alastair had ‘volunteered’ to do both of the Maritime and Coastguard Agency (MCA) first aid courses – Medical First Aid On Board Ship (four days) and Medical Care On Board Ship (five days). These courses are very useful for bluewater sailors, but they are designed for sailors on commercial vessels.

We wondered what other yacht crews did, so surveyed crews at the start of the 2018 ARC. We found that on 42% of boats the designated medic had done either none or just one day’s first aid training in the last five years, and that on 32% of boats the first aid kit carried was either a standard off-the-shelf or inshore waters level of kit. The ARC does not specify the level of first aid kit to be carried, only that one should be present. Of course, having an ocean-standard first aid kit is not much use if no-one knows how to use its contents safely.

Subsequently I did a study asking a Delphi* panel about what advanced skills are essential for small boat crews on an ocean crossing and what diagnostic/monitoring equipment to take. The findings of the research – ie. the questionnaire and the Delphi study – have provisionally been accepted for publication in *Wilderness and Environmental Medicine*, but this article mainly shares my thoughts about medical preparation for an ocean crossing and accident prevention.

* A focus group tasked with reaching a consensus decision based on the results of multiple rounds of questionnaires.

Mañana, our Malö 36, in St Georges, Bermuda



Pre-Voyage

Medications

Arrange to have an adequate supply of all prescription medicines and a (legible or typed) prescription on board using generic (official) drug names. Do not forget contraceptive drugs/equipment. Consult your family doctor regarding the best malaria prophylaxis for you and your crew if needed en route or at your intended destination.

Vaccinations

Required vaccinations can be found by checking your proposed route on the travelhealthpro.org.uk website.

Screening

Have a dental check-up and discuss with your dentist whether it would be sensible to have x-rays taken. Have your eyes tested, and if you wear glasses take a copy of your prescription and at least one spare pair. Consider prescription sunglasses or polarised clip-ons.

You may be eligible for various health screening programmes – abdominal aortic aneurysm, cancer (bowel, breast, cervical, prostate) – and if you would miss these because of your voyage it would be worth discussing with your doctor if they could be brought forward a few months, depending on when they were scheduled.

Insurance

Buy comprehensive medical travel insurance that includes rescue fees, as some countries charge for their rescue services – this will require a specialist insurance broker. Be precise about your itinerary. If you are not a resident of the USA or Canada, travel to these countries will incur a higher premium.

Training

A study was done in 2019 asking experts what training they thought ocean sailors should do. These experts were from three groups – telemedical providers, advanced first aid training providers and OCC members who were also doctors or nurses in practice or within five years of retirement. They were asked the question, 'Excluding those covered by a one-day elementary first aid course, what practical procedures/skills should be taught to amateur ocean sailors? Assume no medical/nursing/paramedical training has been undertaken'. 45 skills were suggested and, of those, six were listed by 50% or more of the panel. These were then ranked for importance.

The most important skill was assessing vital signs. These are temperature, pulse, respiratory rate and blood pressure, to which are usefully added oxygen saturation level and pain score. Temperature, blood pressure and oxygen saturation are measured with simple-to-use pieces of equipment. The pain score is obtained by asking the patient rate his or her pain between 0 and 10 where 0 is no pain and 10 is the worst pain they can imagine. These signs are seldom diagnostic, but they generally assess the severity of the patient's condition.

The next most important skill was recognising when to call for help or medical advice. This follows on from assessing the vital signs and means that the medic needs to know what is normal for the patient. Children have different normal values from adults.

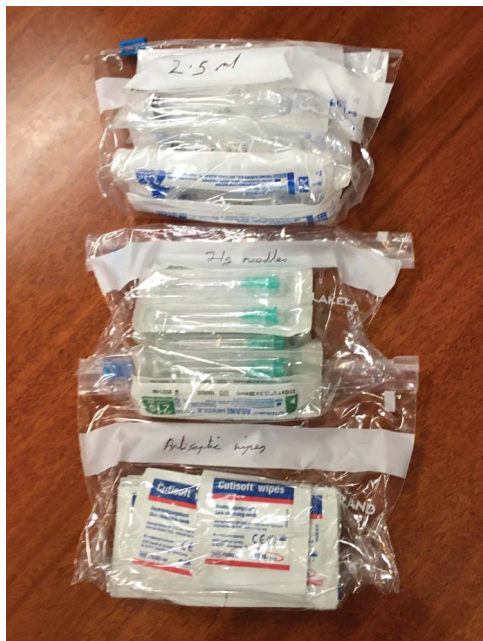
The more technical skills then followed. The most important of these were the

ability to control blood loss, including direct pressure, the safe use of tourniquets and packing and the use of blood clotting granules. Skin closure techniques came next, including applying wound closure strips, use of suture glue and skin staples. The panel did not think that suturing was an appropriate skill due to the practice needed to master it and unlikely maintenance of the skill.

Basic long bone and finger splinting was next. Effective splinting of fractures reduces the risk of further damage from the bone ends and reduces the pain significantly. Inflatable splints come into their own in this scenario as they are relatively compact to store, though a structured aluminium malleable (SAM) splint could also be useful.



Examples of inflatable and SAM splints



Injection equipment

The final skill which the panel agreed that the boat's medic should master was that of doing intramuscular (IM) injections – far preferable to only being able to use an epinephrine auto-injector. IM injections could be needed in several circumstances – for giving epinephrine (adrenaline), hydrocortisone (a steroid) and chlorphenamine (an anti-histamine) for anaphylaxis (allergy), for giving antibiotics for serious infections where the patient is too ill to take antibiotics by mouth, for anti-sickness medicines, and for morphine or other strong painkillers. The panel did not feel

that intravenous capabilities were essential as it takes a long time to train in this skill.

These skills are beyond the level of a standard one-day course. If you do the full nine days of the two MCA courses you will have the skill level of the medic on any commercial ship responding to a Mayday call. This would be optimal – usually only cruise ships with over 100 passengers and larger warships will carry a doctor. I suggest that if you wish to



Holdall containing diagnostic equipment

learn the advanced skills listed above, but cannot afford the time for the full courses, you join with a few like-minded friends and contact a maritime first aid training provider company to arrange bespoke training. I believe that it is important to have these skills, and then to select and carry the necessary equipment to support them. There is no point in buying equipment if you do not have the skills to use it – it may even be harmful to attempt to use equipment without the appropriate training.

Equipment

The same study asked a second question: ‘What medical diagnostic/monitoring equipment should be carried on a yacht of under 70ft on an ocean passage, assuming the vessel is not constrained

by commercial regulations?’. 21 items of equipment were suggested, 11 of which were selected by 50% or more of the panel. These were also ranked in order.

The most important was considered to be a satellite phone or HF radio as a means of calling for help or advice, and it is vital that more than one person can operate this equipment effectively in case the radio operator is the patient. Radio medical advice is free, but telemedical services via satellite phone are paid for, usually by subscription. The service provider will often organise the necessary equipment and drugs and provide the training in their use.

The other ten items of equipment were: blood pressure machine, digital thermometer, stethoscope, urinalysis sticks, pulse oximeter, glucose meter, otoscope (for looking into ears), pen torch and blue light, low reading thermometer and a pregnancy test.

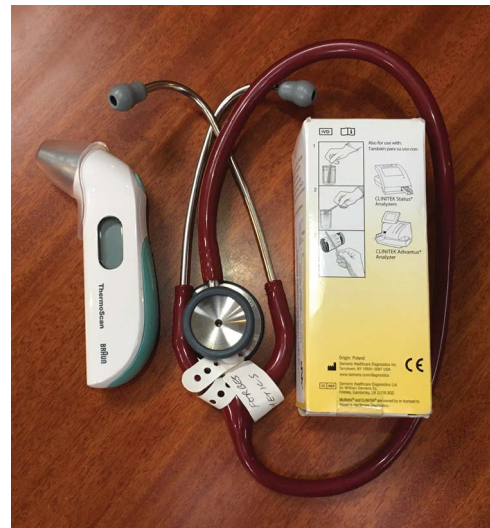
Equipment	Approximate price in £ sterling
Blood pressure machine	£45–£70
Digital thermometer	£5 (basic) or £35–£45 (tympanic)
Stethoscope	£5–£25
Urinalysis sticks	£10–£15
Pulse oximeter	£50–£75
Glucose meter	£15–£20
Otoscope	£30–£60
Pen torch and blue light	£5
Low reading thermometer	£10
Pregnancy test	£5–£10



Automatic blood pressure machine

Blood pressure machines and digital thermometers will be familiar to most readers. They are easy to use. I recommend removing the batteries and keeping them alongside but separate in a small zip-lock bag to guard against in-machine corrosion. The stethoscope is for basic detection of the presence or absence of equal air entry in both lungs in a patient with a chest problem. Practise on each other! It can also be used for detecting the presence or absence of bowel sounds by listening over the abdomen.

*Tympanic thermometer,
stethoscope and urinalysis sticks*



The urinalysis sticks are dipped in a sample of urine and can test up to ten reactions, which are read as a colour change against a chart after a specified number of seconds. Four types of problem can be detected – diseases of the kidney and urinary tract including infections, diabetes, liver diseases and haemolytic (blood) disorders. Good light is essential for assessing the colour changes and familiarity with the instructions is important as the reactions have to be read at precise time intervals. They are cheap and simple and there is no reason not to have them.

A pulse oximeter has multiple uses. Its primary function is to measure oxygen in the blood, but it usually also shows heart rate and rhythm and can indirectly indicate if the blood pressure is low (as it is unable to obtain a reading). It is also handy if a limb is in a splint, as lack of the pulse on a finger or toe will indicate that the splint is too tight.



Pulse oximeter showing oxygen saturation, heart rate and wave form (showing heart rhythm)

The glucose meter, otoscope, pen torch and blue light, and low reading thermometer were all agreed to be important items but were ranked lower. I will add my personal view, to aid decision-making when assembling the medical kit:

- Any diagnosed diabetic is very likely to have his or her own glucose meter. (As noted above, diabetes can be diagnosed by use of urinalysis sticks).
- Ear infections can be treated symptomatically, although the otoscope is useful for detecting ear drum perforations
- Corneal abrasions are diagnosed using fluorescein staining which appears yellow under normal light and fluoresces green under cobalt blue light. A pen torch with the correct filter is cheap and easily available.
- Low reading thermometers are not easily available. A standard digital thermometer reads from 32–42°C. A low-reading goes from 26°C. The precise degree of hypothermia of your patient is unlikely to affect your management.
- A pregnancy test is valuable for any crew containing women of childbearing age. It can provide useful information for the differential diagnosis of vomiting and abdominal pain.

Note the absence of a defibrillator (AED) from this list. The panel felt that in the absence of intensive care facilities to follow on from defibrillation, the chances of surviving a cardiac arrest were extremely low and did not justify carrying one. A defibrillator may be more use when on passages within range of helicopter rescue (around 150 miles offshore).

Finally, I would suggest carrying a face mask for rescue breathing, even though it did not feature on the Delphi panel's list. A face mask makes rescue breathing

much easier than the basic mouth to mouth technique as the air cushion round the rim of the mask provides a considerably better seal on the face of the casualty. An advanced first aid course will include training on this equipment.



A pocket face mask with case, instruction leaflet, gloves and antiseptic wipe

Drugs

Have a small hard-bound notebook within which are listed all the drugs on board, one to each page. Make a note of the expiry date and list to whom the drug has been issued with the date and the number of tablets/ampoules remaining. This is particularly important for controlled drugs (CDs).

Remember to check for drug allergy/intolerances among your crew – eg. penicillin – and choose suitable alternatives. A list of recommended drugs can be obtained by accessing the *International Medical Guide for Ships, 3rd edition* (a World Health Organisation publication) online*. Chapter 33 is entitled *The Ship's Medicine Chest* and includes a drug list at the end. I suggest printing off this list and discussing it with a health professional. Some may clearly be unnecessary – eg. neonatal Vitamin K for a crew with no women of child-bearing age on board.

Telemedical service providers can source necessary drugs, and persons holding the Certificate of Medical Care On Board Ship can order drugs for the crew.

It is legal for an ocean-going yacht to have controlled drugs in the ship's medical store for the use of the crew. Ideally CDs – eg. morphine – should be kept in a double-locked cupboard (a cupboard within a cupboard), but a compromise is to keep the packet of morphine ampoules in a locked cash box within a locked cupboard.

I recommend storing the drugs in combination packs. An anaphylaxis (allergy) pack would contain epinephrine (adrenaline), chlorphenamine and hydrocortisone ampoules for intramuscular injection, along with syringes, needles and antiseptic wipes. It would also have chlorphenamine and prednisolone tablets for the recovery phase. Do NOT store this pack in a locked cupboard as it may be needed in a great hurry. I suggest using strong, labelled zip lock bags to keep items together. Other groupings could be antibiotics, eye drops of various sorts, and skin medications.

Oxygen is problematical on a small yacht. A cylinder of size E (680 litres) weighs 7kg and is 50cm tall, but only contains enough oxygen for a few hours' use. Oxygen supports combustion and is stored at high pressure, and it is difficult to arrange a refill or exchange.

* Search online for 'International Medical Guide for Ships latest edition PDF'. All 492 pages are downloadable – the drugs list occupies pages 430–450 inclusive.



Lockable cupboard and cash box containing codeine tablets

During the Voyage

A very useful study was conducted in 2008* which collected information from cruising yacht arrivals in Martinique over a period of six months. In total 56 injuries were reported from 100 crews. These were analysed and nine recommendations made which would have reduced the incidence of injuries. These were:

- Training and care in use of winches, pulleys and cables
- Use of a spray hood to aid protection against a swinging boom
- Use of a bimini to protect from the sun, including at sea
- Use of a windlass to prevent back injury. If no windlass is available then sit on the deck with the feet braced against the pulpit to raise the anchor
- One hand for the boat! In other words, hold on
- Shoes should be worn on deck to prevent broken toes, which accounted for 13 out of 20 lower limb injuries
- Sturdy gloves and an appropriate knife should be used when gutting fish
- The chest and lower limbs of the cook should be protected by wearing waterproof overalls
- Daily treatment of skin wounds is essential until healing is complete

I would add three notes to the above:

- In the tropics wearing waterproof trousers in the galley is a counsel of perfection. A compromise would be to obtain and wear a long, plastic apron.
- Always wear a sunhat with an all-round brim to protect your neck and ears, unless you have long, thick hair. Buy a hat with a chin strap so that it cannot blow off.**
- Rings and ropes are not a good combination. For day sailing it is possible to wear gloves all the time except when eating or washing hands, but it is not practical to do this on a long voyage when I suggest removing all rings for the duration of the trip. Sentimental rings can be worn on a neck chain under a shirt.

I hope that this information and these suggestions are helpful and will assist in your medical preparedness. Safe voyaging!

* Rouvillain JL, Merky F, Lethuillier D. *Injuries on Offshore Cruising Sailboats: Analysis for Means of Prevention*. British Journal of Sports Medicine. 2008; 42(3):202-6

** Your editor swears by her Tilley Hat [www.tilley.com], which has a padded crown and restraining straps front and back.

