

The Medical Preparation of Expeditions: the Role of the Medical Officer

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Introduction

The easy question 'what is expedition medicine?' needs to be analysed from a number of viewpoints. Firstly, there needs to be an answer to 'what is an expedition?' An expedition can be defined as an organised journey with a purpose¹. Such a purpose can be: an exploration of a particular location, a mission of academic or scientific research, an endeavour of personal or directed endurance, an investigation of environmental or archaeological concern, or a personal challenge.

Secondly, the regions where expedition medicine are usually 'in the wilderness'. Wilderness is described as 'a wild, uncultivated or desolate region'² and is a term frequently used in the United States where it has been additionally defined as a remote geographical location more than one hour from definitive care³. For the purposes of this article we will consider 'expedition medicine' as involving journeys to either the developing world or to very remote geographical regions where access to definitive medical care will involve prolonged evacuation over many hours or days.

There is no clear distinction between those who travel either as expedition team members or others who travel to 'wilderness' areas and, from the definitions noted above, there will be considerable overlap between adventure travel and leisure travel. There are many reasons why travellers go to remote regions, for:

- Enjoyment
- Exploration and discovery
- Achieving a geographical goal
- Testing endurance and the element of danger

- Scientific research
- Education
- Personal development
- Cultural exchange

THE ROLE OF THE EXPEDITION MEDICAL OFFICER

Exploration and adventure travel are increasingly attractive to people of widely differing ages, experience, physical health and interests. This creates new challenges to practitioners of expedition medicine but the aims remain to anticipate preventable medical problems, to maintain health throughout the expedition, to optimise achievement and enjoyment, but on no account to stifle enthusiasm or ambition¹.

The modern practice of expedition medicine is to encourage adventure but to attempt to minimise the risk of trauma and diseases by proper planning involving risk assessment, preventive measures such as vaccinations, prophylactic drugs and medical equipment, knowledge of first aid, emergency and primary healthcare skills, communication skills, and an attitude of caring for both the anticipated team and the anticipated cultures of the expedition^{1,4}. Planning will need to cover all contingencies; from mild illnesses and disease to group health insurances, through to unforeseen events such as evacuating a seriously ill, injured or dead person. Important also in the pre-trip planning is local knowledge of the area to be travelled. To this end, the Medical Officer (MO) needs to investigate local knowledge in the country, and this must essentially include an assessment of local hospitals and health care facilities, and the potential of needing to repatriate an expedition casualty.

Finally, the MO is often called upon to maintain 'standards in morals' upon an expedition, and in this regard will need to develop and emphasise a responsible attitude by the expedition towards the environment that is travelled in and the indigenous populations that are visited. This can mean, at times, accepting responsibility for the wellbeing of a local populace.

Many groups of expeditioners travel without a doctor, nurse or suitably qualified paramedic⁵. However, an experienced doctor or other medic needs to be a valuable member of the team and look after a number of medically related issues such as managing pre-existing health problems and advising on suitable immunisations and antimalarials, making preparations for the trip including assembling a suitable group medical kit and assessing the medical risks. Medical problems may arise during or after the expedition and the expedition doctor will need to have confidence in dealing with the varying demands of an expedition team which will vary enormously depending on the individuals, the expedition task and the location.

Conveniently the role of the expedition doctor can be divided into three main phases

- Pre-expedition
- During the expedition
- Post-expedition

The medical support required, to make an expedition successful, is challenging and requires essential and complex pre-planning both on a personal and impersonal, or professional, level. Expedition medicine is a reflection of many dipoles; personal and interpersonal, social and intimate, security and insecurity, and finally ecological and materialistic⁴. The MO may be asked to opine on any of them, but will need to know about all.

PREPARING FOR EXPEDITIONARY LIFE

The most successful and popular expedition MOs contribute to the many aspects of an expedition and are able to deal with all of the medical problems that come their way. Essential in this care for fellow-expeditioners is a routine to follow up any medical problems within the group.

There are a number of ways that expedition doctors, and medics, can make themselves more valuable to an expedition team:

First and foremost, the MO needs to be able to deal with the medical problems that are most likely to occur. There needs to be a confidence in the management of care from minor ailments through to, in a worst case scenario, multiple casualties with major trauma. If appropriate to the expedition destination, the MO needs to be familiar with conditions such as: the management of altitude-related illness, temperature-dependant injuries, barotrauma and other environmental problems such as tropical diseases. To this end, there are many suitable courses such as pre-hospital trauma life support courses, mountain first aid courses, the Diploma in Mountain Medicine or specialised courses that are designed to prepare doctors for life on an expedition. Useful clinical experience in an out of hospital environment can be gained by joining a cave or mountain rescue team but this will usually necessarily involve a heavy time commitment.

Nevertheless being a useful expedition MO is much more than just doing the medicine alone. An MO must ensure that they never become a liability during the trip and thus depend on other team members to ensure their own or a casualty's safety. This essentially means that the MO should feel entirely comfortable in the expedition environments be they on mountains, underwater, in the jungle or in a desert. Thus it is important that an MO considers developing skills that can be

useful for any expedition: navigation skills, undertaking courses in mountain leadership, in-water rescue or bushcraft and survival. A list of relevant interests or expertises for any expedition planning could include:

- Attending courses on expedition and remote health management e.g.
 - Royal Geographical Society's Expedition Advisory Centre www.rgs.org
 - The US National Safety Council www.nsc.org
 - Seminars and meetings with organisations such as the Wilderness Medical Society
- Practical aspects of expeditions
 - Mountain leader courses
 - Learning basic bush craft
 - Taking a 4x4 driving course and learning vehicle maintenance
 - Getting navigation skills up to scratch (map and compass, GPS)
 - Learning field cooking skills, especially for large groups
 - Learning basic rope work, knots and lashings
 - Learning radio technique and technology
 - Developing photographic skills
 - Learning basic building skills
- Personal preparation
 - Developing sources of information (TABLE 1)
 - Taking a first aid course, and teaching it to colleagues
 - Going camping and developing a personal routine for travel
 - Getting fit, both physically and psychologically
 - Becoming proficient in adventure disciplines like: diving, sailing, etc
 - Learning a foreign language
 - Learning survival techniques for various environments

EXPEDITION ITINERARY

Failure to have knowledge of an expedition's itinerary or to liaise with host country contacts before arriving on a voyage, makes the expedition at best a travelling holiday and at worst a group of trespassers⁶. It is imperative that the itinerary of an expedition be known by the MO before travel. This is so for a number of reasons, not the least of which are the need to plan for any disease and dis-ease potential in areas of intended travel, and also to develop a medical sieve should problems occur. Such a sieve is a structure to grade aid required, and where to get it, in helping with the severity of problems that may be encountered.

Medical back-up planning will need an identification of the organisations in the host-country that can cover the interests of the expedition, and good contacts should be made with them. Questions in determining such groups can be: Which organisations cover the expedition's interests? Which groups will help with verbal and media

communication? What local hospitals and medical facilities are there that can provide back-up if required? Who can help with medical transport of sick and injured casualties? One of the most important questions to be asked will be: 'Which insurances companies will cover costs, as appropriate, in expedition countries?

With itinerary-dependant planning on the part of the MO, a good morale begins the journey. The work of the MO ensures a common sense of purpose, a trust and openness at what the MO is doing and has already achieved for the expedition, and finally a significant contribution to the expedition's pre-planning resources.

EXPEDITION RISK ASSESSMENT

The expedition MO is the guardian of an expedition's health⁷, although it is usually not a high risk activity⁴. The MO has two primary roles: a) to maintain the physical and psychological health of the team members. This is usually done in a remote or wilderness location with limited communications, a restricted medical kit and traditionally modest support b) to provide treatment where accident or disease occurs, together with appropriate emotional back-up for the expedition team.

The expedition MO has other diverse secondary roles, requiring skills in interpretation, empathy and communication both for the expedition team and for those populations that the team inter-relate with⁴. The MO may also be seen as a neutral soul, or a referee, should there be tensions within the team; thus they may need to preserve distance from other team members. For all that, however, the expedition doctor will need to work closely with the expedition leader to formulate a formal risk assessment and to brief all team members on likely health hazards.

Risk assessment can be divided into two main areas:

1. Medical risk assessment

This includes choosing suitable antimalarials and immunisations together with health advice for those who have pre-existing health conditions.

2. General Risk Assessment

Once the team selection has taken place then the MO will need to dedicate time on the pre-travel health of its team members. There will need to be an information search on immunisations and malaria prophylaxis necessary for the trip, and global websites such as the World Health Organisation and the Centers for Disease Control, or national sites such as the Scottish centre for Environmental Health should be consulted for any country specific information for the intended region of travel. **TABLE 1.** Any advised medications or malaria prophylaxis will need to be chosen with care to ensure the team is protected as best as possible. Such medicines should have as minimal a side-effect profile as possible.

Serious expedition risks

Whilst they happen infrequently⁵, the most serious risks to those travelling on expeditions are likely to be: road traffic accidents, falls and other injuries, drowning, environmental health issues (e.g. altitude illness and heat stroke), infections (e.g. malaria, hepatitis and HIV) and homicide⁸. The MO will require knowledge in coping with the physical and psychological issues of such traumatic medicine in a particular risk environment. **TABLE 2.**

Briefing the team - topics to cover

All members of an expedition will need to be made aware of potential hazards related to:

- Water and food, including methods of water purification
- The sun and the environment
- Personal hygiene
- Sexual health
- Emotional problems
- The dangers of illicit drugs and alcohol
- Avoiding bites and stings
- Walking barefoot
- Special journey-specific risks such as: travel to high altitude and scuba diving
- Immunisations, anti-malarials and animal and insect bite prevention
- The need for a dental check-up 3 months prior to the trip
- General fitness for the specific journey
- First aid training
- Preparing a personal first aid kit

Medical support in-country

It may not be possible for the MO solely to deal with all medical problems, and it is thus useful to visit local hospitals, clinics or dispensaries to see what level of medical care can be provided in the host country. Many embassies may be able to provide information and may also keep a list of approved, English-speaking doctors. However any medical crisis in the expedition remains the MO's responsibility, although team members should be aware of how long it may take to evacuate a patient with a serious injury to a centre with adequate surgical, or intensive care, facilities. In many countries military support with helicopters, 4-wheel drive vehicles, communications, and the like, may be available in a crisis. The MO will need to be fully familiar with such information before travel.

Methods of communication

Increasingly teams can now obtain more and more sophisticated means of communication to contact the outside world but none is 100% reliable and it is

important that team members' expectations are realistic when discussing evacuation and treatment of seriously ill or injured casualties. Not all helicopters have night-flying capability and local ambulances may have very basic equipment. Equipment for extricating a trapped road traffic accident victim will be non-existent in many parts of the developing world.

There are a variety of communication tool in the field, and they include: 2-way radios, emergency position indicating radio beacons (EPIRB), satellite phones, email and mobile phones, and the like. Nevertheless, all are unreliable in certain circumstances and casualty evacuation times may be very prolonged because of this.

SELECTION OF THE EXPEDITION TEAM

Being part of a team of expeditioners, who may not always work well together and could be competing with one another, can be very challenging. The team provides the backdrop for a glimpse into behaviour when stakes are perceived as high, and the MO is often the gauge of this.

To this end, it is important for an MO to review references, and wherever possible, to be involved in interviewing potential expedition colleagues with a view to assessing them medically for the team composition. Then, for a particular task or job, to assist the group leader to choose people who can work together and who show a high level of personal responsibility. Team members need to promote teamwork, keep others informed, listen to and appreciate colleagues, encourage the development of new ideas and techniques, encourage others to express and defend their views, work towards common goals, and align their goals with those of the team.

All expedition team members will need to complete a carefully-worded questionnaire about pre-existing health conditions as the MO, and the expedition insurers, will need to be informed about any significant conditions. The latter may decline to meet the cost of a claim in certain medical circumstances, so knowledge prior to travel is essential. Rarely, a potential team member may need to be excluded on health grounds if the risk is deemed to be unacceptable - examples may include unstable angina, brittle asthma or uncontrolled epilepsy.

PRE-EXISTING MEDICAL CONDITIONS

Some potential expedition team members may have significant pre-existing health problems, nevertheless the majority of those with them can enjoy safe, successful trips with careful planning. It is possible that the rigours of living in the field may worsen an underlying condition, and possibly compromise others. However, with prior knowledge planning can be made should an underlying condition deteriorate, and the need for adequate facilities arise.

Minimising the risks

Follow-up any significant declarations on the questionnaire with the expeditioner, to obtain more details or medical reports, chest xrays, blood tests, ECGs etc as appropriate. Such a report will need to recognise how severe, and how stable, a condition is. Questioning should probe how an applicant has managed to cope with the health problem while travelling in similar conditions.

The MO will then need to undertake a complete risk assessment including appraisal of the travel environment, duration of travel, medical backup, communications in the field and evacuation logistics about the subject expeditioner and then make a decision as to whether this person will be travelling at *unacceptable* risk?

Before the expedition, the MO will need to review the medical kit to determine if any items, peculiar to the expeditioners in the group, will be needed. Pre-expedition, the expeditioner will need to present an adequate knowledge of any medical condition that he/she has, and demonstrate that they are able to look after themselves in the field. The MO will need to discuss openly any risks of the journey, and to determine that the expeditioner is prepared to accept these.

The MO will need to revise any management strategies for those in the expedition team who have particular medical conditions such as allergies, asthma, diabetes, epilepsy, cardiovascular disease and hypertension, inflammatory bowel disease, joint disorders and locomotor disease, psychiatric disease, skin diseases, thromboses, and finally physical disabilities.

It may well be that the MO could recommend a Medic-Alert talisman for some conditions such as epilepsy and allergies, and also advise the rest of the team as to how to 'first aid' manage any underlying condition, such as epilepsy, hypoglycaemia, anaphylaxis and the like.

During the expedition, the MO will need to provide support and advice to minimize concerns. To this end it could well be appropriate that the 'buddy system' is encouraged, particularly for younger groups so that all individuals are looking out for any problems.

LEGAL LIABILITY AND INSURANCE

With a society that is becoming more litigious, expedition MOs will need to inform their medical defence organisation of any impending journey and if they intend to act as MO for the expedition. Involve any insurance company early on in the pre-

travel planning for whilst insurance will not completely take away the danger of being sued, it will give some peace of mind in planning for an intended journey.

Since October 1999, the Medical Defence Union provides 'Good Samaritan Cover' for every country in the world, including the USA and Canada. Nevertheless, if one travels as an expedition MO, even were there no payment for services, then there would be no 'Good Samaritan Cover'. This would only be provided if a person is present as a layman, and not as a doctor, required to treat an affected party member or a person unconnected with the expedition - even more reason to specifically talk the issues through with an insurer before travel.

Any MO treating any patient (this also applies to MO advising an expedition company) has a duty to the participants on the expedition who will have expectations of appropriate standards of care. Whilst, currently, there are no such standards of care for expeditions, the MO needs to practice "the ordinary skill of an ordinary competent man exercising that particular art" can do⁹. Beware inducements such as discounted expedition costs for doctors which imply that the MO is acting in an official capacity¹⁰

Planning a trip involves communication between the MO and the team members. The MO needs to explain his/her credentials as part of open disclosure in the expedition pre-planning phase. Expedition members cannot expect to receive the same 'standards of care' as they may expect in a developed country, but they will need to expect to receive a similar standard to that of any competent MO in a similar situation.

Where different opinions exist as to management of a particular course of action, if an MO can show that they followed a course that has the backing of a body of respectable opinion within the profession, then liability will not be imposed. This is known as the 'Bolam' test and states that a doctor "is not guilty of negligence if he has acted in accordance with the practice accepted as proper by a responsible body of medical opinion". This 'test' is a difficult hurdle in proving a case of negligence: the practitioner who treated a seriously injured patient could be an 'outlier' (compared to the majority of his or her peers) in the standard of care provided but not be held to be negligent. In the late 1990s another authoritative judgment modified the Bolam test (*Bolitho v City and Hackney Health Authority*) and provides that if the medical opinion is not capable of withstanding logical analysis the judge is entitled to conclude that the opinion offered is unreasonable and the action is negligent.

An MO who prescribes or advises on the use of drugs on an expedition retains 'duty of care' towards the individual for whom they are prescribed and retains the

responsibility for the effects of these drugs. It follows that any medication for expeditions should be clearly labelled, and with dosages and indications for use. Protocols for use need to be devised together with records of contraindications and side-effects of any medications taken in the medical pack.

Finally a comment about disclaimers. There will sometimes be disclaimers added to contracts for those on expeditions, so that either a company or an individual may avoid culpability. Before signing these or indeed before issuing them on ones behalf, get them assessed and approved by medical insurers for the expedition and the MO for that expedition. Most disclaimers are not of appropriate legal value, however a statement of understanding may hold more weight in court; e.g. *"I understand that high altitude mountaineering is a potentially hazardous pastime (initials of the expeditioner inserted here). I also understand that the medical treatment on this expedition will be limited because of the great distances from definitive medical care (initials of the expeditioner inserted here)"*.

MEDICAL KITS AND SUPPLIES

Organising an expedition's medical kit takes time and considerable reflection on the types of illnesses and injuries that can occur whilst 'en voyage'. It will never be possible or practical to deal with every possible situation, even with the best of equipment, so planning should look to managing the common things well and the more difficult medical crises in the best possible way. Improvisation is the name of the game...

The commonest medical conditions whilst travelling are likely to be: gastrointestinal dis-eases, respiratory problems, skin conditions and minor trauma. It is essential that the medical kit can cope with these situations. Items from medical kits that tend to be used most frequently by an expedition, are those for blisters, headache, minor cuts and sprains, sunburn, diarrhoea and insect bites. Inevitably there needs to be a compromise between taking so little equipment that even small issues cannot be dealt with and taking so much gear, that the group is overburdened with an unneeded kit that is never used¹¹. Planning will enable most of the expedition's common medical problems to be dealt with, without outside medical help.

There are specific requirements that will reflect a particular expedition, and clearly extra drugs and equipment may be needed to deal with problems in particular areas. Nevertheless, it is often difficult to judge how much, and what sort of, medical equipment to take. This will depend upon such factors as:

- the medical knowledge of the expedition MO
- the size and organisation of the party
- whether or not each individual will require a personal medical kit
- the duration of the trip

- the remoteness of the location
- the likelihood of having to treat local staff and villagers. If this is a possibility, then drugs in smaller doses should be available for children
- the local medical facilities

There are many recommendations for what is actually put into medical kits, depending on the extent and isolation of the expedition. The reader is referred to articles from Illingworth¹¹, Zell¹², A'Court et al¹³ and others to review the kind of medical kits that could be required depending on the nature and isolation of an expedition. TABLE 3 gives an example of a medical kit that could be used for travel to a remote region, where medical facilities are limited. In going to specific regions, however, there will need to be an emphasis on certain group needs for disease and illness prevention, for example, in:

Malarious areas, spare anti-malarials should be taken if the group is going to a region where malaria is endemic; just in case tablets are lost.

Sailing parties are prone to sea-sickness, to developing chapped hands, salt water boils and to getting sunburn. Thus, sea-sickness medication, lanolin hand cream, povidine-iodine and fluoquinolones, and sunscreen are respectively useful.

Tropical areas, wound infections are common and small individual povidone-iodine bottles are recommended to clean wounds. Snake and scorpion antisera may be appropriate for high risk areas. Malaria self-test kits can be useful for diagnosing this vicious disease, though they need to be used correctly for useful interpretation. Mosquito nets should be re-treated with permethrin regularly, every 3 - 6 months (depending on the amount of rain and UV exposure).

Diving expeditions should carry extra eardrops for otitis externa (Diver's ear). Aluminium acetate or distilled water may be instilled into the outer ear after each dive. Oxygen, chest drains and ventilation equipment are likely to be needed. Pre-travel research demands knowledge of where the nearest decompression facilities are located.

Mountain expeditions, oxygen is bulky and heavy but essential for any trip above 6,000 metres. Acetazolamide, dexamethazone, nifedipine and salmeterol and ibuprofen are recommendations for high altitude travel.

Desert environments will have considerations where dehydration and heat related illnesses are of major concern; so perhaps intravenous fluids are an important kit item. Sunscreen, eyewear (including goggles for sandstorms), appropriate cool and hot weather clothing are recommended, as is a hand-held global positioning system in case of disorientation or loss in sand-surrounds. Carry a spare set of car keys too!

Histoplasmosis a fungal infection of the lungs, may be contracted when caving. Prevention of an expedition's anticipated diseases will involve education, knowledge and appropriate vaccinations pre-travel. Silicone cream is recommended for

macerated skin produced by prolonged contact with moisture and wet-suits. As foul air can cause lethal carbon-dioxide and monoxide poisoning, oxygen may be required.

EXPEDITION MANAGEMENT

Day to day medical care

There is the potential for accidents or medical incidents to occur on any expedition, and those participating in such ventures need to be aware of the risks in being part of the group. Those participating on an expedition do so at their own risk, though 'risk' means different things to different people⁵. Nevertheless, well organised expeditions aim to minimise risk; 'risk' being defined as the probability of a hazard or an adverse event to cause harm¹⁴.

Whilst the majority of expeditions experience what are described as minor medical incidents which are easily managed 'en route', there needs to be preparation for the 5% that could be serious⁵. Therein lies much of the pre-travel planning for the MO.

Common diseases to be encountered on the trip.

Non-traumatic disease is the most common on any trip, with the commonest conditions reported as being : gastrointestinal problems, respiratory disease and skin problems^{5,12}. Minor accidents and trauma are uncommon¹⁵. Each case must be assessed according to the severity of the condition and the remoteness of the expedition. Take specialist advice if necessary, particularly from other expedition doctors who may have the relevant experience to make an informed decision.

2. Management of accidents and trauma
3. Personal Hygiene

The MO has a primary role in dis-ease prevention on any expedition and this starts with personal care and hygiene. Such attention will lower the incidence of gastrointestinal disease and prevent the loss of working person-hours during the trip¹⁶. An awareness that an individual's hands can be a source of cross infection is undisputed since the 1840s, when the efficacy of hand washing in the prevention of puerperal sepsis was reported¹⁷.

Expedition psychology

Psychological factors impact on many aspects of the expedition and it is important for the expedition MO to have an awareness of causes of discordance in the team.

Team Selection

Ideally the expedition MO should play a role in selecting team members (see above) but in many circumstances the doctor joins the team later than others and so has little say in the composition of the group.

Team members should be able to get along together in close confines some time before the expedition. For weeks or sometimes months together, if at all possible. Inevitably such intimacy causes considerable strains on group relationships so adaptable, sociable individuals who respect others' opinions, beliefs and behaviours will fit in better. If team members have been on expeditions before it is worth enquiring how they have coped with difficult situations where there has been conflict on a trip. This can prove quite enlightening, and will certainly give good guidance as to the team's composition. Selection week-ends and training courses often highlight whether individuals will get along together, particularly if there is a degree of hardship because of cold weather, working at night or in other difficult circumstances.

People go on expeditions for different reasons and this can be explored in group sessions before the trip begins - successful expeditions demonstrate clear objectives and common aims. Every team will be different and it is important that there is a diversity of personalities within the group, to shape the developing team culture and chemistry.

Group communication

Communication is the key thing so that all parties are informed and any concerns are raised early. This is best done during briefing sessions, team training and informal discussions. The aim is to bring issues to the surface for discussion, to validate expectations and for the whole group to challenge then accept and agree what each team member wants to get out of the expedition. Key points for discussion will tend to evolve around the following questions:

1. Why do you want to be involved in the expedition?
2. What do you want out of the expedition?
3. Do you have any fears or concerns about going on the journey?
4. What will your role(s) be and how do you plan to contribute?

Answers to these questions are intended to identify confused objectives, priorities and overall expedition tasks. People who join the team at a late stage may not have been through the same process of discussion and may fail to have the same understanding and objectives. They may fail to integrate with the rest of the team and may not be as aware of the realities of living and working as an expedition team member. This may also apply to those who miss briefing and training sessions. There should be adequate preparations so that all group members are physically and emotionally ready for the trip.

Successful, happy teams share a common sense of purpose, trust each other and are open and tolerant. Most teams require good leadership and a good mixture of

abilities and skills within the team. These need to be supplemented with good medical support.

Conversely, unhappy teams often have poor communication and there may be a lack of structure to activities and the team, with confused motives often compounded by environmental problems such as illness, poor weather and boredom. Problems within the group include the formation of splinter groups, exclusive relationships, even promiscuity.

Recipes for psychological disaster include unfairness towards some team members in the form of treats, special treatment and other favouritism. The expedition MO cannot afford to fall out with anyone else in the team as all are potentially patients. This can sometimes be a great challenge for the doctor in cramped conditions where tempers can become frayed.

The expedition MO needs to be aware of the effects of culture shock, homesickness, changing relationships within the group, the knock on effects of lack of fitness, health and hygiene or even adopting different living standards when operating in the developing world.

There are many potential stressors on expeditions depending on the environment - for example: the perpetual wetness in the jungle, the insects, the heat and dryness of the desert, and the unrelenting cold of Arctic conditions. All of these may trigger psychological reactions such as moodiness through to panic attacks and depression. Whilst an MO may think of psychological disorder in any patient assessment, they must always remember to exclude physical underlying causes of behavioural changes such as infections, altitude illness or decompression sickness. The neutral expedition MO will be in a position to help the team by facilitating debriefing in the field and preparing for the return home. The aim of a debriefing at the end of the expedition is to bring closure to the experience and try to avoid any 'post-expedition blues'. The term 'reverse culture shock' is sometimes used to describe the changes that occur as group members return to their normal lives, families, friends and jobs.

It is often helpful for groups to meet after the end of the trip to summarise shared experiences and to relive some of the better moments, even if at the end of the trip some of the main objectives were not met. For some this will be a chance to begin to plan the next expedition.

POST-EXPEDITION SURVEILLANCE AND ADVICE

Any medical conditions encountered within the expedition group, need to be followed up at the completion of the journey. There could well be risks of disease that will present through the natural incubation process of any disease, specific for the region of travel. The MO will need to be vigilant in following up on any reassessment of medical conditions encountered on route, with the patient's health professional. At this time all reports of any significant medical problems during the expedition will need to be forwarded.

The data from Steffen et al on the incidence of health problems amongst travellers each month of a stay in developing countries is now well established¹⁸. 55% of all travellers to developing countries or regions will develop some sort of health problem. Given that expeditions tend to be to remote areas, then the potential for health problem within the expedition group is large. It is thus essential that the MO gives clear guidance on any anticipated problem that may result from travel to an exotic region, what to do about such a problem if it should occur, and to whom to refer for any ongoing management.

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TABLE 1

SOURCES OF INFORMATION	
Books	International Travel and Health , Vaccination Requirements and Health Advice, WHO, Revised annually Health Information for International Travel , Centers for Disease Control, revised annually Immunisation against Infectious Disease . Department of Health HMSO (<i>Green Book</i>) Health Information for Overseas Travel . Department of Health HMSO
Governmental and Professional Travel Health Information Sites	CDC, Centers for Disease Prevention and Control www.cdc.gov/travel/index.htm
	Eurosurveillance www.eurosurveillance.org
	Health Canada www.hc.sc.gc.ca
	International Society for Infectious Diseases www.promedmail.org
	International Society of Travel Medicine www.istm.org
	TRAVAX, <i>Scottish Centre for Infectious and Environmental Health</i> www.travax.scot.nhs.uk
	UK Malaria Guidelines www.phls.co.uk
	US Centre for Infectious Diseases www.cdc.gov/travel/index.htm
	World Health Organization www.who.int
Medical and Academic Organisations	Bangkok Hospital for Tropical Diseases, Mahidol University, Thailand www.tm.mahidol.ac.th/
	James Cook University, Queensland, Australia www.jcu.edu.au/school/sphtm
	Liverpool School of Tropical Medicine

	www.liv.ac.uk/lstm/lstm.html
	London School of Hygiene and Tropical Medicine www.lshtm.ac.uk
	Royal Free and University College Medical School www.rfc.ucl.ac.uk/departments/TravelHealthCentre/home/home.htm
Expedition and Adventure	British Mountaineering Council www.thebmc.co.uk
	International Society of Mountain Medicine www.ismmed.org
	Royal Geographical Society www.rgs.org
	Wilderness Medicine Society www.wms.org
Health, Safety and Security Sites	Australian Department of Foreign Affairs & Trade www.dfat.gov.au
	United Kingdom Department of Health www.doh.gov.uk/traveladvice
	British Foreign and Commonwealth Office www.fco.gov.uk/travel
	US State Department www.travel.state.gov/travel_warnings.html

TABLE 2:

HAZARDS AND RISKS
<p><i>General</i> Sun, temperature, humidity, water quality, food, isolation, overcrowding, attitudes and behaviour → sunburn, heat and cold injuries, infection, psychological reactions, URTIs, STIs, horseplay, walking barefoot</p> <p><i>High altitude</i> Elevation, sun, cold, avalanche and rock fall, blizzard, lightning, low oxygen tension, high risk activity → trauma, falls, AMS, hypothermia, frostbite, snow blindness, CO poisoning (snow holes)</p> <p><i>Desert</i> Sun, heat, lack of water, snakes, scorpions → sunburn, dehydration, heat exhaustion/stroke, envenomation</p> <p><i>Jungle</i> Heat, humidity, river crossing, deadfall, plant, animal and insect hazards → infected wounds, fungal infections, trauma, drowning, poisoning</p> <p><i>Maritime</i> Sun, wind, cold/heat, salt water, ropes, pulleys and high rigging, isolation → sunburn, eye damage, windburn, trauma, drowning, blisters, motion sickness, hand injuries, salt water boils, poisoning, psychological reactions</p>

Other hazards

Wildlife

Dogs, leeches, snakes, ticks, hippopotamuses, parasites, bears

→ rabies, infected wounds, snakebite, infectious diseases, drowning, animal attack

Local Conditions

Lack of shelter, poor water quality, food and hygiene, dangerous roads, open fires and stoves, endemic diseases malaria, schistosomiasis, dengue fever, Japanese encephalitis

→ hypothermia, gut infections, RTAs, burns

Human factors

Assault, kidnapping, terrorism, conflict

Type of Expedition

Mountaineering, sailing, caving, diving, canoeing, flying, wildlife study