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Contents

2 From the President

3 Air Travel with Neurological Conditions *A Melrose*

7 The Confused and Dementing Traveller *T Blackwood*

10 Resident and Tourist Health Care in Myanmar *I McIntosh*

12 Global Health and the Traveller *M Townend*

14 Health Services in Argentina *P M Bruno Gabay, M D Fernández*

17 Consequences of Structural Adjustment Programme for health policy and health outcomes in less developed countries *S Webb*

21 Challenges in managing chronic disease in low resource settings: Type 1 diabetes in Sub-Saharan Africa *S Kong*

25 **In the New**

Update
28 Chikungunya Fever
28 Deep venous thrombosis and pulmonary embolism
29 Hypothermia

31 **Scenarios from the NaTHNaC Telephone Advice Line** *A Stillwell*

Case Studies
33 Travel Vaccinations for Infants: a case study *E Pine*
35 Community Participation and Maternal Health: Case Studies from Peru and Malawi *N Vidal, I W Uny*

39 **BGTHA Conference Report 2014** *E Pine, M Townend*

43 **Journal Watch** *M Townend, J Moore*

47 A Global and Travel Health Experience in Malawi *J Moore*

Research
49 Infectious Diseases on Cruise Ships: A Systematic Review from 1973-2013 *L Jun, H Xiaohui, Q Jia*

55 Is it what it says on the packet? ATR FTIR provides a rapid answer to counterfeit tablet formulations *G Lawson, E Turay, R Armitage, L Goodyer and S Tanna*

58 Antibiotic prophylaxis of Traveller's Diarrhoea in Athletes *M Rossiter*

62 BGTHA members contribute to research published in the Journal of Travel Medicine *L Goodyer*

63 Ethics and clinical responsibility on medical student elective in Africa – a mixed methods study *J Stewart, G Watt*

Book Reviews
20 High Altitude Medicine and Physiology 5th edition
20 Searching Skills Toolkit-finding the evidence 2nd edition
27 Understanding Clinical Papers 3rd edition
27 Regression Methods for Medical Research
42 Prostate Cancer, Diagnosis and Clinical Management Ed
42 Minor Injury and Minor Illness at a Glance

From the President

POLIO – A GLOBAL EMERGENCY

In 1988, when the Global Polio Eradication Initiative was set up by the World Health Assembly with the aim of eradicating polio from this planet, 350,000 people fell victims to polio virus infection. By 2002, polio had been eliminated from 118 countries and the cases of polio infection fell below 2,000. Last year (2013), there were only 400 cases, of which 60% were the result of international spread of the virus. In the first 4 months of 2014, the polio virus was exported from Cameroon into Equatorial Guinea, Pakistan into Afghanistan and Syria into Iraq. Last year, Nigeria exported the virus to Somalia, in an area where al-Shabad, where commanders do not allow vaccination, and Pakistan exported the virus to Syria, which is facing a protracted civil war. A negative point in the quest to eliminate polio by vaccination was the release by the USA of the information concerning the location and killing of Osama Bin Laden. The US Central Intelligence Agency (CIA) organised a fake hepatitis vaccination campaign in Abottabad, Pakistan. The aim was to obtain DNA from the children of Bin Laden, to confirm the presence of the family in a house in that area. The announcement by the White House that the CIA will no longer use vaccination programmes as cover for espionage did not stop attacks against front line workers associated with the polio programme; 22 of them have died since December 2012.

It is in this climate of suspicion and increasing international spread of the virus that the WHO, on May 5th this year, has declared the recent international spread of the wild poliovirus as a Public Health Emergency of International Concern. The aim is to prevent further spread of polio. In order to achieve its aim the WHO issued Temporary Recommendations under the International Health Regulations (2005).[1,2] They advise that all residents and long-term visitors (i.e.>4 weeks) receive one dose of oral polio or inactivated poliovirus vaccine between 4 weeks and 12 months before international travel, and that those who are undertaking urgent travel (i.e. within 4 weeks), who have not received a dose of polio vaccine in the previous 4 weeks to 12 months, should have one dose of polio vaccine at least by the time of departure.

Such travellers should be provided with an International Certificate of Vaccination or Prophylaxis. This is a temporary measure and the WHO will reassess the situation in 3 months.

The last indigenous case of wild poliovirus infection in the UK was in 1984 and the last imported case in 1993. The UK was declared polio-free in 2003. Public Health England (PHE) and NaTHNaC have now issued recommendations for interim measures.[3] They recommend that travellers to Afghanistan, Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, Nigeria, Pakistan, Somalia and Syria should be advised to consider a booster dose of polio-containing vaccine if they have not been vaccinated in the last 12 months and they are travelling to settings with extremely poor hygiene (e.g. refugee camps), or likely to be in close proximity with cases (e.g. healthcare workers), and/or visiting for 6 months or more. Other shorter term travellers (4 weeks to 6 months) should ensure they have been vaccinated in the last 10 years. The WHO's new recommendations should not be seen as sanctions for particular countries. They are an absolute international public health necessity.

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1 World Health Organization. WHO statement on the meeting of the International Health Regulations Emergency Committee concerning the international spread of wild poliovirus. 5 May 2014 [Accessed 15 June 2014]. Available at: http://www.who.int/mediacentre/news/statements/2014/polio-20140505/en/

2 Public Health England. Briefing Note, Declaration of Public Health Event of International Concern by World Health Organization. 27 May 2014.

3 http://www.nathnac.org/pro/clinical_updates/interimadvice_polio_270514.htm

George Kassianos, President.

Air Travel with Neurological Conditions

A Melrose

Each year, approximately 1 billion people travel by air on domestic and international airlines, with further annual increase expected. Ageing populations in many countries, suggest many will be older air passengers with existing illness, including early or established dementia. If they become ill in the air, the passenger cabin of a commercial airliner, designed to carry the maximum complement in comfort and safety, cannot provide the facilities of an ambulance, emergency room or intensive care unit.

The UK Civil Aviation Authority's Aviation Health Unit (AHU) has a statutory function in safeguarding the health of all persons on board aircraft. Travel health professionals need to be aware of the environmental and physiological effects of air transportation on passengers and the stresses of flight, to properly advise patients proposing to travel by air. This transport mode may exacerbate existing medical conditions.[1]

The cabin of a commercial airliner in flight presents a number of physiological challenges. Commercial flights cruise between 28,000 and 43,000 ft.[2] and atmospheric pressure inside the cabin is reduced 15-18% as compared to sea-level.[3,4] At such altitudes the rate at which oxygen can diffuse into the blood is decreased.[5,6] The humidity in an air cabin is kept low(8-12%)[7] and exposure to cosmic radiation is about is about 100% greater than at sea level.[8] In addition, passengers' postural mobility in cabin settings is greatly restricted. Air travellers are exposed to cramped, dry, hypobaric and hypoxic environments, with high levels of cosmic adiation.[1,9,10] Passengers who cross several time zones are also subject to jet lag.[11]

The vast majority of passengers tolerate in-flight physiological challenges. In general, anyone who can walk 50 metres, or climb one flight of stairs and whose disease is stable can tolerate normal passenger jet cabin conditions, without additional oxygen.

However, air travel contributes to the development of a number of serious health problems particularly for specific at-risk populations.[12]

General contraindications to air travel include:
Severe respiratory disease, where the patient is:

- breathless at rest,
- unstable angina,
- uncontrolled arrhythmia,
- poorly controlled heart failure,
- had myocardial infarction within 21 days,
- deep vein thrombosis - until adequately anti-coagulated and in absence of pulmonary complications,
- suspected pneumothorax, pneumo-mediastinum,
- untreated communicable disease,
- acute gastrointestinal bleeding,
- severe anaemia - Hb less than 7.5 g/dL,
- had post- hollow viscous surgery, within ten days,
- had uncomplicated chest surgery - air travel must not be undertaken for 3 - 4 weeks.[7,11,12]

Neurological contraindications to flying
After *stroke or cerebrovascular accident*, passengers can usually travel 4 days following the event, if stable or recovering. Formal medical clearance should be sought if travel is required within 10 days. Flying is contraindicated for 7 to 10 days following a ischaemic stroke. For those with cerebral artery insufficiency, hypoxia may lead to problems and supplementary oxygen may be advisable. Patients who have had a recent cerebral infarction, or other acute neurological event, should be observed until sufficient time has passed to assure stability of the neurological condition. The risk of post-event complications, physical and mental disability and decreased capacity to withstand flight stressors, are reasons to avoid flight. Once the acute phase of recovery is over and the patient is stable, travel may be reconsidered.

Persons with *disturbed or unpredictable behaviour* which could endanger passengers and / or crew and those with psychiatric disorders, where behaviour is aggressive, disorganized, disruptive or unsafe, should not travel by air.

Patients with *psychotic disorders* who are stabilized on medication and are accompanied by a knowledgeable companion may be able to fly with airline permission, but any condition which may be exacerbated by the flight environment, or any unstable condition with a risk of deterioration prejudicial to the passenger or the flight is contraindicated. Because of safety implications, psychiatric disorders need to be stable and controlled. Acutely disturbed or psychotic patients should not travel.

After *skull fracture or brain surgery*, flying should be avoided for 10 to 14 days to allow absorption of any air that may be inside the skull due to trauma or surgery.[13]

The passenger with stable *epilepsy* may be more prone to seizures during a long flight. Mild hypoxia and hyperventilation are known precipitating factors, in addition to the aggravation of fatigue, anxiety and irregular medication. Air travel is associated with an increase in seizures for individuals with epilepsy.[13] Participants monitored their seizure frequency for one week prior to flying and for one week after flying. Seizures were significantly more common after flying ($p = .02$). No seizures were reported occurring during flight. Participants who experienced an increase in seizures after flying compared to those who did not (a), had a higher baseline of seizure frequency ($p = .004$), (b), were more likely to have previously experienced an increase in seizures after flying ($p =$

Air Travel with Neurological Conditions *continued*

.001), (c), were more worried about having a seizure while flying (p = .001) and (d), were more likely to avoid air travel (p = .02). Participants with complete seizure control prior to flying did not experience seizures after flying. Distance travelled, time zones crossed, duration of flight and direction of flight were not significantly different for those with seizure increase than for those without such an increase.[14]

This study suggests that air travel promotes an increase in seizures for those with a prior history of flight related seizures and a relatively high baseline seizure frequency. Several flight-related physiological challenges for example, sleep deprivation, oxygen desaturation may lower seizure threshold. The relative risk of passengers with epilepsy having a seizure either during or after flying has not been established. While there are no published estimates of how many people with epilepsy travel by air, the number of individuals affected is likely to be considerable. In one year 646 million passengers enplaned in the US.[15] An estimation based on a crude prevalence rate for epilepsy of 6.42 per 1000 suggests that individuals with epilepsy therefore flew over 4 million times. This is perhaps an overestimation, as individuals with epilepsy are less likely to fly due to concerns about air travel.[16,19] Nevertheless, this travel mode has the potential of affecting many individuals with epilepsy.

If air travel does lower seizure threshold it may do so through causing sleep disruption and sleep loss.[20-21] For many individuals with epilepsy, seizures appear more likely around fluctuations of consciousness associated with sleep, such as the brief period of falling asleep,[21] momentary awakenings,[22] and awakening in the morning while still drowsy.[22] Telemonitored observations indicate that seizures tend to be concentrated around fluctuations of consciousness.[23,24]

Prolonged air travel in a fixed environment with restricted movement and a limited range of activities, may promote drowsiness and periods of reduced cortical activation. Sleep rhythms may be disrupted for several days after flying, particularly with extended flights. Eastward air travel is particularly disruptive to sleep schedules.[25] The number of days required for a traveller to return to pre-flight sleep patterns is about one day for each 90 min travel westward compared to one day per 60 min travel eastward.[26]

Another means by which air travel may lower seizure threshold is through the effect of air cabin oxygen desaturation. At high altitudes the rate at which oxygen can diffuse into the blood is diminished. While most travellers tolerate prolonged exposure to decreased ambient oxygen during flight, individuals with epilepsy maybe at risk. Lower inspired oxygen during flight may trigger compensatory hyperventilation.[27] Seizures may result from metabolic instability created by hyperventilation.[28] The resultant decreased carbon dioxide intake results in reduced cerebral blood flow and oxygen supply to the brain. In addition, hyperventilation increases blood pH (alkalosis), which makes oxygen less likely to be released to tissues.[28] Hyperventilation induce seizures for those with idiopathic epilepsy[29,30] and controlled breathing can result in reduced seizures frequency.[31,32]

The likelihood that a person with epilepsy will have a seizure while flying is difficult to determine. Airline studies report the frequency of neurological events but seldom report the incidence of seizures per se. Neurological events range from 4 to 12% of all in-flight medical emergencies[33] with some of these events, seizures. One study,[34] found that in-flight medical emergencies occurred for about one of every 39,000 passengers and about 6% of these were seizures.The inability to adequately manage a seizure inflight has serious health and financial consequences. While most seizures resolve without the need for medical intervention, an episode of generalized convulsive status epilepticus may result in irreversible damage.

Management of potential air travellers

Fitness-to-fly – in people in the above categories, is best considered on an individual basis with expert advice if there is uncertainty. The freedom of the affected individual to travel must be balanced against those of other passengers and safety considerations.

Epilepsy – Contraindications to flying include frequent or uncontrolled fits, or within 24 hours of a grand mal fit. Passengers with a history of a loss of consciousness, or infrequent fits should be accompanied by a responsible companion. Travel should be delayed for 24 hours after a grand mal seizure. It may not be appropriate to change medication immediately prior to a trip. Consideration should be given however to providing extra anti-convulsant medication. The passenger with epilepsy must ensure that they have sufficient medication in hand luggage. Patients with controlled epilepsy can generally fly safely. However, they should be made aware of the potential seizure threshold-lowering effects of fatigue, delayed meals, hypoxia and disturbed circadian rhythm. Care should be taken that medication should not be omitted inadvertently when travelling through different time zones.[35]

Patient Advice

The patient should be advised:

- air travel may precipitate fits due to a variety of reasons
- Potential seizure threshold-lowering effects, are delayed meals, hypoxia, and disturbed circadian rhythm if passing through multiple time zones.
- to be cautious about consuming alcohol before or during the flight.
- of importance of complying with their treatment

regimen.
- anticonvulsant medication should be readily available in carry-on bags.
- to carry evidence of health status and medications.
- advise cabin staff of the risk of a seizure.
- to try to get usual amount of sleep.
- set a reminder to take epilepsy medicines at usual time.

Mental disorders – person may be fit to fly, if stable on medication and accompanied by responsible companion. A patient who has disruptive, unpredictable, aggressive or unsafe behaviour should not be allowed to fly.

Brain Tumour – patients who have a brain tumour are advised not to fly due to a risk of increased swelling in the brain, or cerebral oedema. During flight, air pressure and oxygen levels change when the plane reaches high altitudes. Swelling of the brain increases pressure inside the skull with symptoms of increased intracranial pressure which include headache, decreased consciousness and vomiting. Air travel with a brain tumour carries the risk of having a seizure. A common symptom of a brain tumour, noted that the risk for brain tumour patients is two-fold. First, the decreased oxygen in the airplane cabin lowers the seizure threshold. The second risk for patients is the difficulty of handling a seizure in the limited space.

Regulations and Guidelines

Each airline has its own regulations and medical standards and requires medical certificates confirming that a patient is currently stable and fit to fly. Most have medical advisors who provide advice and 'clear' passengers as "fit to fly".[36] They may ask for a medical information form (MEDIF). The British Medical Association advises doctors 'to word statements on a person's fitness to fly carefully, indicating the information on which the advice is based, rather than positively certifying a person's fitness'. For example:
- 'I know of no obvious reason why this person should not fly'; OR:
- 'There is nothing in the medical record to indicate that flying is risky for this patient'.

This ensures that the doctor is not guaranteeing in any way that this patient can travel without any problem but rather saying that, on the available evidence, there is nothing to indicate a greater risk for this person than for others. However, the doctor is partly dependent on what the patient chooses to disclose to them about past health problems.

The main factors to take into account are whether air travel could adversely affect a pre-existing medical condition and whether or not a patient's condition could adversely affect the comfort and safety of the other passengers, or the operation of the flight. Regardless of a doctor's opinion on this latter question, the ultimate sanction to refuse travel lies with the airline and captain of the flight. If they consider there is a risk to the aircraft or its passengers, they may refuse to carry a particular passenger.

British Airways *air travel guide* for physicians advises: Medical clearance must be sought well in advance of intended travel. For passengers with other disorders, such as anxiety or depressive neurosis, the impact of the airport environment and the flight itself has to be considered.

The objectives of medical clearance are to provide safe, healthy travel, and prevent delays and diversions to the flight as a result of a deterioration in the passenger's well-being. It depends, upon self-declaration by the passenger and upon the attending physician having an awareness of the flight environment and how this might affect the patient's condition.

Information Form (MEDIF) is available from airlines.

Medical clearance is required when fitness to travel is in doubt as a result of recent illness, hospitalisation, injury, surgery or instability of an acute or chronic medical condition. Part 1 of the MEDIF is completed by the agent and/or passenger and Part 2 by the passenger's doctor and passed to the airline at booking, to ensure timely medical clearance.

Allan Melrose is a retired GP with a special interest in air travel.

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The Confused and Dementing Traveller

T Blackwood

Government and professional attention is focusing on people with very early symptoms of mental confusion and dementia, in the hope that proactive intervention may slow a dementing process. This initiative is bringing increased awareness that there are many people living in the community who have cognitive deficits, but continue to maintain conventional activities of daily living. Supported by spouse or companion, they continue to travel locally and internationally. Many are elderly, affluent and wish to continue with regular overseas vacation relocation. Memory deficit and behavioural aberrations are common in these travellers and added to common features of old age, such as indecisiveness, slower problem solving, inflexibility of intent, tardy adaptation and cognitive decline, can place them at health risk in unfamiliar environments. Pre-existing illness and routine medications are also a consideration with these people and they are vulnerable in uncontrolled situations.[1,2]

Recent climatic, terrorist and environmental events have made all forms of transportation a more worrying experience for everyone, adding to common fears and phobias relating to travel in a ship, aircraft, or through a tunnel. While mild flight anxiety is common place and causes little disruption, the confused or mentally-impaired traveller can suffer severe anxiety resulting in a transportation emergency. Major transport delays, queues in airports, port terminals and rail and coach stations and the uncertainty of arrival and departure can have a very deleterious effect on the cognitively unstable. Airport environments and flights in particular, pose novel situations where limited personal control, bureaucracy, overt and covert regulations add to frustrations felt by the normal and mentally compromised individual.

In one study, passengers had heart and finger monitors fitted to record blood pressure and pulse rate while in an airport, en- route to flight departure. Skin conductance-a reliable measure of stress- was also measured. Readings were correlated with the amount of psychological stress they experienced.[3] Passengers passing through the airport, who were healthy and not exercising, showed monitored stress levels equivalent to on-duty riot police. During the test, there were marked physiological changes. ECG and BP monitors showed immediate and sustained changes. Within minutes of entering the terminal, heart rates had increased from 55 beats per minute to over 70 per minute in the non-exercising state. In the average four hours it took to board the aircraft, rates continued to rise to more than 200 beats per minute in transit, with a rise also occurring in blood pressure.

Queues at check-in and security increased blood pressure levels from average of 123/81 mm Hg to 170/99mm Hg. There was a marked increase in skin conductance with a rise 100 times that in a relaxed state. Associated stress levels peaked four times but were sustained at a high level overall. Causes of peaking were queues, unfriendly, unhelpful staff, lack of, or misinformation. Monitoring on the return journey revealed that return transit through the airport was almost as stressful as departure, primarily because of queues at immigration, security channels and lost luggage.[3] These stresses may have little serious effect on younger fit travellers, but may impact heavily on mentally compromised and disturbed passengers, who may not receive understanding and support from terminal staff. A study of 1009 passengers transiting an airport reported that 69% stated that rude staff were a contributory problem to stress with 52% considering this a major cause of travel related stress.[4] and staff training was inadequate in dealing with the mentally distressed.

Despite these considerations confused people and those with established dementia frequently traverse airports, take flights, coach trips and sea cruises. Their disturbed conduct is often seen as eccentricity and fellow passengers are frequently tolerant and supportive of individuals foibles, particularly if they are travelling on their own. Many of these travellers are also elderly. Older people find stressors at airports and protracted delays difficult to cope with, as there is a slight decline with advancing age, in reaction speed, new learning ability and flexibility.[5] Many accompanying adults are also elderly and vulnerable and not well-placed to meet the extra demands upon them and the affected companion. Contending with a partner's additional mobility, sensory or cognitive impairment issues can be a challenge and burden adding to their personal stress levels.[6]

The cumulative effect can promote tension and angst, with psychological effects resulting in adverse physiological responses, cardiac stress and possible heart attack and stroke in the carer.[7] Maladaptation results in aggressive behaviour which may be partly responsible for an increase in reported police intervention at major airports.[8] Elderly people living on the borderline of social competence are not immune to the behavioural disturbance referred to as air rage. A build-up of fatigue, frustration and anger can result in verbal and physically aggressive behaviour to fellow travellers and staff. Over-indulgence in alcohol drinking to "calm the nerves" and routine medication interaction can also result in behavioural misconduct and make it more likely in this group. People with dementia and their carers are vulnerable travellers. They should be considered at higher health risk and identified by health professionals as requiring pre-travel assessment, risk assessment and counselling. Early Alzheimer's disease symptoms can be seen in the aberrant behaviour displayed by some elderly vacationers.[8] Sometimes solo travellers, they can be

The Confused and Dementing Traveller *continued*

seen wandering round cruise ships and getting lost from tour groups. Fellow travellers are often tolerant and helpful but, the afflicted put themselves at health risk on ships, in the air and in road traffic situations. Unaccustomed surroundings and travel-related stressors can bring deterioration in mild confusional states and they should be dissuaded from unaccompanied travel.

Contraindications to air travel
Persons with disturbed or unpredictable behaviour that could endanger passengers and/or crew and psychiatric disorders where behaviour is aggressive, disorganized, disruptive or unsafe, should not travel by air. Acutely disturbed or psychotic patients should not travel in an aircraft. Patients with psychotic disorders who are stabilized on medication and are accompanied by a knowledgeable companion may be able to fly with airline permission, but any condition which may be exacerbated by the flight environment, or any unstable condition with a risk of deterioration prejudicial to the passenger or the flight, is contraindicated. Safety implications dictate that psychiatric disorders need to be stable and controlled before embarkation can be considered.

People with early dementia are particularly likely to become disorientated in airports. In 40% of these early cases some measure of agitation, sleep disturbance, wandering, increased irritability and aggression is apparent. Locational change tends to increase their mental instability and they should be discouraged from participating in holidays with an ever-changing environment such as cruise, coach or, train tours. If they do travel, anti-psychotic medication should be reviewed before departure. They should travel with a companion –now mandatory on cruise ships -and provisional emergency plans should be in place for unwanted illness in the accompanying person.

Case Histories.
1 – A 75 year old man had travelled alone to Australia despite a diagnosis of senile dementia. His visit to family was successful but on the return, tired, dehydrated and confused, he became disturbed and wandered around Heathrow for many hours while transferring between aeroplanes. Totally disorientated, he missed his onward flight and was only identified as ill and lost by a patrolling policeman, after the last flight of the day had departed. He never fully recovered his former cognitive state and was institutionalised when he finally arrived in his home town.

2 – An elderly couple joined a fly/coach tour through Bulgaria, an ill-advised destination as they had never previously travelled beyond Margate. He had dementia and was wholly dependent on her surveillance and support. She became unwell en route and he wandered off without her at the first coach stop beyond the frontier. Fellow passengers and police searched for him for 2 hours before he was discovered. For the remainder of the tour, the couple never left the coach on any of its many stops and had to be escorted by volunteers from coach to hotel. He became increasingly agitated and quite aggressive as the journey continued with an ever-changing environment and she was incapable of meeting his needs. This vacation was completely unsuited to their requirements. With foresight and planning he would have managed within his capabilities, if they had chosen a conventional resort holiday with a stay in one place.

3 – An 80 year old lady booked herself on a cruise crossing the Atlantic. Her aberrant conduct was not appreciated until the ship was south of the Azores and 5 days away from the next port of call, where her conduct necessitated premature disembarkation. Often disorientated in time and place, she wandered round the ship entering locations forbidden to passengers. Initially quiet and assuming, staff and passengers tolerated her behavioural peccadillos and would redirect her to cabin or lounge. The ship offered a free drink package to passengers and she began to haunt the bars consuming alcohol to excess. She became noisy and truculent and began to vocally and physically abuse crew members concerned for her well- being and safety. Environmental change and alcohol consumption had destabilised her Alzheimer's disease status and she should not have ventured on a ship with its hostile environment for those with mental illness.

Management of agitated, confused and cognitively impaired travellers
"Fitness-to-fly" should be considered on an individual basis and travel health professionals should seek expert advice if there is uncertainty. Accepted personal freedom and right to travel of the affected individual must be balanced against those of other passengers and safety considerations.

Travel health professionals should:
- Have an understanding of passengers' previous experiences and anxieties regarding transportation, en voyage and in transit and recognise that these travellers are at higher health risk.
- Knowledge of psychological aspects of air travel, the specifics of worry experience and anxiety-provoking situations should inform management and direct pretravel advice, to minimise psychological and physiological stress.
- Should be aware of the psychological manifestations which can affect the global older traveller and particularly those with early manifestations of mental disorder.

- Should identify potential problems and offer solutions in pre-travel consultation.
- Consider destination travel route and transportation mode and discuss likely problems.

Advice for carer and health professional
Recognise travel-related anxieties and talk to the person about what would work best for them.

- In *cars* the affected person with dementia should sit directly behind the driver so he/ she cannot see the road ahead to reduce anxiety reactions to forward travel.
  Some mentally impaired people prefer to lie down on the back seat, or even cover up so they cannot see where they are going. A contrasting colour blanket on the seat of the car will help mark out where the seat begins and help with balance.
  Taxi and coach drivers should be apprised about the dementia.
- *Air travel*. Medif information form should be completed prior to travel by air and given to airline. Person and carer should plan the journey well in advance, allow plenty of time for transport check-in and transfers and request assisted transportation by wheelchair or electric car travel in airports on booking.

Traveller should seek alternatives to air transport when possible or:

- Use direct, day time flights.
- Book into airline courtesy lounges.
- Travel in best affordable class.
- Book into local hotel accommodation the night prior to departure.
- Assume delay and take emergency food and water.
- Avoid air travel in winter, the strike season and round public holidays.
- Use relaxation techniques or distraction, such as reading or listening to music.
- The *cruise* line should be advised of impaired mental status on booking and the traveller must have a companion. Staff have special training on how to deal with people with mild degress of mental impairment. Personal assistance on day of travel should be sought at stations, airports and shipping terminals.[11]

Summary
Many people with confusional states and early dementia are travelling the world. They can be a danger to themselves and others but most travel safely. Fellow passengers are tolerant and air and ships crews are trained in their management. Ideally they should travel with a companion and use good preplanning to anticipate problems, take travel health professional advice and utilise support services where available.

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Resident and Tourist Health Care in Myanmar

I McIntosh

Resident and Tourist Health Care in Myanmar The Republic of Myanmar – former Burma – once the Asian pariah and long the target of economic embargo is now coming to the fore as a tourist destination. Governmental liberalisation is encouraging enterprising travel companies to add the country to itineraries. A long time focus for Indian and Chinese travellers, new hotels and improved communications are encouraging European and British visitors to this land of pagodas. The number of tourists has doubled this year and the first direct air flights from the UK started in the Spring.

Despite recent political repression and relative poverty, the Burmese are a friendly people who welcome visitors and their rich cultural heritage encourages extensive travel across the country. The communications and transportation structure is being developed and roads and air links are improving, but the health care system is still deficient for both the indigenous population and foreign visitors. Travellers should be aware that the quality and immediacy of good medical care may not be of a standard met in UK.

Myanmar quadrupled its health budget in 2012 and is focusing on hiring more doctors, securing supplies and renovating hospitals as it tries to modernise after decades of isolation, according to Health Minister Pe Thet Khin. The country needs to grow the number of doctors who graduate every year to more than 1,500. Recently, the four state-owned medical schools have started to train about 2,000 doctors annually ,but in a country with limited access to cadavers for medical students, the level of training new students receive may be inadequate. According to the UN World Health Organization (WHO), Myanmar is facing a critical shortage of medical staff, defined as fewer than 23 health workers per 10,000 people, the minimum needed to provide 80 %coverage for births and measles immunizations. It had an estimated 13 doctors and nurses/midwives per 10,000 residents.[1]

As of 2010, there were about 26,000 doctors, 23,800 nurses and 19,000 midwives nationwide, according to the government. The former military Government spent between 0.5 and 3% of the country's GDP on health care ranking it one of the lowest in the world.[2] The Mandalay region with a population of 7.6 million people had at one time 1000 doctors and 2000 nurses working in 44 hospitals and the same number of clinics. Many hospitals have less than 100 beds and many public hospitals lack basic facilities and equipment. Nationwide, there are 1,504 rural health centres covering more than 65,000 villages.

In rural areas - where 70 %of the country's 58 million people live - most villages lack basic healthcare. Patients travel hours - in some hilly regions nearly a day - to reach hospitals or clinics located only in towns. Due to remoteness between villages and towns, rural patients attend hospital only when they cannot cope with deteriorating health conditions.

There is no universal health service in Myanmar and the general state of health care is poor. Although health care is nominally free, in reality, patients have to pay for medicine and treatment. Those who can afford it pay for private health care. In rural areas, ill people depend upon herbal and traditional medicine and few can afford modern medications. Primary care in small clinics and in the cities is provided by private consulting doctors. Pharmacies carry a wide range of medicines, but there is a risk from counterfeit drugs. The rural poor and deprived city dwellers have no money to pay for modern medications. They will in extremis get hospital attention in government hospitals but resources are limited and drug prescriptions have to be paid for. In a land rich in vegetable produce, mineral and gem resources, little has been spent on the health care system. Many existing facilities are provided or maintained by foreign aid. European physicians and surgeons devote time and skill for short time slots on visits to improve the service.

Malaria is a leading cause of morbidity and mortality in the country. Many deaths occur from a drug-resistant form of the disease common along the country's border with Thailand. Government malarial eradication programmes have been successful and malaria has become a diminishing threat in all but forested areas and wetlands, however dengue fever remains a recurrent problem. TB rates in Myanmar are estimated to be three times the global rate, and the majority of cases are drug-resistant. AIDS cases had fallen to about 0.6 percent per 100,000 people from 1.9 percent five years ago.[2]

Roads are congested, poorly surfaced and occupied by cyclists, motor cyclists, horse and ox carts, cars and coaches, all driven with scant regard for other road users and pedestrians. Out of the cities unsurfaced roads become impassable in the wet and often can only be negotiated by four wheel drive vehicles. Road traffic accidents are common and the injured are carted off to the poorly resourced local A&E unit and transferred if necessary to a district hospital.[2] The country's trauma care capabilities, especially in rural areas, are inadequate and there are only 61 oncologists in the entire country and 3 radiation machines.[3] Chronic alcoholism is a problem in many rural communities.[2]

Myanmar although rich in resources is one of the poorest countries in the world, with one of the highest maternal and infant mortality rates in south-east Asia. There is limited access to qualified antenatal and postnatal assistance. In Myanmar, over 70 % of deliveries are home births and of those, 43 %are not attended by a skilled health worker. More remote villages do not

have any access to health facilities as antenatal clinics are predominantly located in towns.[4]

Tourist Health facilities

Most tourists will visit Yangon, Mandalay and the fabulous pagoda country round Bagan or the Inle Lake region with its stilted houses and reed-lined waterways. Here there are a few district hospitals and primary care units with one two private clinics accessible to the traveller. Private Travel health insurance is a prerequisite for the visitor to ensure that in emergency the patient is transferred either directly to a private hospital or clinic and any time in a state institution is limited. Neither sector can provide state of the art surgical and medical interventions, but the latter will transfer patients requiring advanced care promptly to Thailand and surgical units in Bangkok, with good facilities.[5]

This will entail a 1 1/2 hour air journey from Yangon and 2 1/2 hours from Mandalay. Road transfer on poor roads can be prolonged and airline schedules subject to seasonal and climatic disruption. Mandalay has 10 public hospitals and one specialising in traditional Burmese medicine. Yangon has a privately owned hospital of reasonable standard in the township Hiang Thar Har and International SOS operate a clinic staffed by several doctors and nurses in the Inya Lake resort Hotel complex .Care is expensive and seriously ill cases are transferred to Thailand.

As in many developing countries gastro intestinal infection is a constant threat. The country produces fine vegetables and fruit ideal for salads, but their preparation often entails use of contaminated water. There are adequate water supplies for the local populace, but visitors should use bottled water. Ice, salads and uncooked foods are best avoided. Typhoid vaccination is recommended but yellow fever protection is only required if travelling from an infected country. Travellers to Myanmar should have conventional vaccinations, with elderly travellers having influenza and pneumococcal protection.[5]

Heat and humidity in the monsoon season brings problems with rabid dogs and vaccination should be considered for those living in the rural scene. Dengue fever is endemic and anti- mosquito protection is important by night and day. Mosquitos invade hotels, aircraft and coaches and skimpy tourist clothing should be replaced with leg and arm cover up apparel before sunset.

The risk of malarial infection in the big cities is low and is now becoming rare in tourist visited areas with risk highest in the wet season. In the popular Inle Lake region malaria seems to have been constrained with only one case reported in a local community in six months but visitors may be less resistant to infection. Bilharzia is a problem for lake users.

There are thousands of temples and pagodas in Myanmar which attract the tourist. It is mandatory to enter these barefoot with potential for injury and infection, In Bagan most ancient pagodas can be clambered upon to considerable height, with tourists intent upon seeing the sunrise over a myriad of shrines. Their crumbling brick structures, low doorways and dark interiors are traps for the unwary and visitors suffer lacerations and fractures from falls. In the absence of Health and safety regulations, tourists should visit with care. Bicycle, motorcycle and e-cycle hire is popular but hazardous, as road travel is shared with over-loaded pick-up buses, oxen and horse carts , trucks and coaches, on single track, poor road. Off road-travel on sandy racks requires skill not always possessed by the tourist. Riders should remember that emergency care may be delayed and evacuation protracted.

Recommendations

Travellers should be aware that there are limited health facilities available in Myanmar.Health insurers can only provide the best that is available and serious cases may have to be transferred to Thailand, several hours flight away.

- There is high risk from road traffic and trauma.
- Malaria risk in the main tourist season is low.
- Dengue fever infection occurs all year.
- Gastro intestinal infection is likely.
- Typhoid vaccination is recommended.
- There is a bilharzia risk in lake areas.
- Rabies vaccination should be considered for those who will be living in the rural scene.

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Global Health and the Traveller

M Townend

The concept of global health was outlined in a landmark paper in The Lancet[1] in 2009 as focussing on issues that directly or indirectly affect health but that can transcend national boundaries, and on health equity among nations for all people. Travel health, on the other hand, has a much narrower focus on the health of travellers, most often concentrating on travellers from developed to less developed countries. Endemic diseases may well have a potential effect on the health of travellers, but they also present a threat, numerically much greater, to the health of the indigenous population. The concept of health equity implies the need to concentrate not only on the needs of the traveller but equally on the needs of indigenous populations. Putting it in another way, if a health threat can be controlled or eliminated in the indigenous population it will be controlled or eliminated as a threat to travellers. Global health and the health of travellers are, therefore, inextricably linked.

Two examples of global health problems that may have an impact on travellers will be considered in this paper, namely malaria and diarrhoeal disease.

Malaria

In 2012[2] it was estimated that there were over 200 million cases of malaria globally (estimated range 135-287 million) and 627,000 deaths (estimated range 473,000 to 789,000). 90% of all deaths occurred in sub-Saharan Africa, 77% in children under the age of 5 years. It was estimated that 3.4 billion people, half of the world's population, were at risk from malaria. In contrast, in the same year, 2012, 1,378 cases of malaria were imported into the UK[3], the lowest figure since 1993, and in the years between 1993 and 2012 the highest recorded rate was 2069 in the year 2000. Although it is important to attempt to prevent malaria in travellers, controlling the transmission of malaria in indigenous populations can produce an immeasurably greater effect on the global impact of malaria whilst at the same time protecting the health of travellers.

Methods of Controlling Malaria

Vector control benefits both indigenous people and travellers.

In order to practise effective vector control it is important to understand the natural history of the mosquito. Mosquitoes lay their eggs in water where the larvae hatch out and live close to the surface of the water, breathing air through short breathing tubes. Stagnant or slowly moving water is the favoured habitat, and some species are capable of breeding in very small reservoirs of water such as rainwater gathered in containers such as old tyres or oil drums. Female mosquitoes bite between dusk and dawn, with a peak biting time around 01.00 to 02.00 for *Anopheles gambiae*, the commonest malaria vector in Africa. *A. gambiae* entering a house will usually rest on an interior wall or other surface before and after taking a blood meal.

Indoor residual spraying with insecticide leaves a residue of insecticide on all surfaces. Mosquitoes resting on treated surfaces before biting will be killed before they are able to transmit malaria parasites, and those resting after a blood meal will be prevented from transmitted ingested parasites to further victims.

Elimination of breeding sites can be achieved by a number of measures. Drainage of stagnant pools of water, clearing irrigation channels of plant growth and debris to accelerate the flow of water and ensuring that oil drums, tyres and other potential containers are not left out to collect rainwater are all useful in the elimination of breeding sites. Used diesel oil on the surface of collections of water has been used as it interferes with the respiration of larvae, but has obvious environmental implications. Larvicidal fish which feed on larvae can be introduced into pools of water.

Anti-bite precautions also benefit both indigenous people and travellers.

Insecticide treated bed nets[4] are relatively inexpensive and the newer type of nets with longer-lasting impregnation can be used for several years without needing re-impregnation. As they are impregnated with insecticide they offer some degree of protection to other occupants of a room who are not using nets by killing mosquitoes that may have gone on to bite the other occupants has they not come into contact with the insecticide, though ideally all occupants should sleep under a net. Extensive programmes intended to roll out the use of bed nets have been introduced into many African countries.

Insect repellents are relatively expensive and are therefore more likely to be applicable to travellers. The most effective measure is still the use of repellents containing DEET . Repellents must be applied over all exposed skin surfaces between dusk and dawn.

Clothing should cover as much of the skin surface as possible, especially between dusk and dawn.

Chemoprophylaxis is relatively expensive. It is therefore more likely to apply to travellers who are exposed to the risk of malaria for much shorter periods the indigenous populations.

Vaccination. Over 20 subunit vaccine constructs are currently being evaluated in clinical trials or are in advanced preclinical development.[5] RTS,S / AS01 is the most advanced vaccine candidate against *Plasmodium falciparum*. A Phase III trial began in May 2009 and has completed enrolment in 2011 with 15,460 children in seven countries in sub-Saharan Africa. It is beyond the scope of this paper to describe the mode of action of malaria vaccines, but by its nature malaria vaccination is more likely to apply to indigenous people rather than to travellers.

Diarrhoeal Disease

Globally, there are nearly 1.7 billion cases of diarrhoeal disease every year.[6] It is the second leading cause of death in children under five years old, with around 760 000 deaths in children under five years. A significant proportion of diarrhoeal disease can be prevented through safe drinking-water and adequate sanitation and hygiene. Diarrhoea is a leading cause of malnutrition in children under five years old, leading to potential stunting of growth and intellectual development.

In travellers from developed to less developed countries as many as 60% may experience travellers' diarrhea (TD), accounting for 40,000 travellers daily or more than 15 million travellers annually.[7] Although it is important to attempt to prevent TD in travellers, the provision of safe drinking water and adequate sanitation and hygiene can produce an immeasurably greater effect on the global impact of diarrhoeal disease whilst at the same time protecting the health of travellers.

Prevention of Diarrhoeal Disease

In a rural population in Nepal where the author worked only 16% of the local population had access to relatively clean drinking water, the remainder drawing water from the local river or from irrigation channels. It was not surprising that many of the children suffered from severe diarrhoeal illness.

Water purification can be achieved by filtration or chemical means. Travellers often use chlorine-releasing tablets or iodine (now banned by EU regulation, though not on grounds of basic safety) or small personal filtration devices. These methods are not applicable for long term use by indigenous populations on practical and cost grounds, though chemical purification may be used in emergency situations such as the aftermath of natural disasters.

Bottled water is often used by travellers, but is not always safe to drink, depending on its provenance. It is too expensive to be used routinely by indigenous populations in low income countries and has environmental implications due to the accumulation of non-biodegradable plastic bottles.

Clean water supplies can be provided by piping water from springs or from wells or boreholes. Many charities and NGOs provide such facilities and their work is to be encouraged.

Sanitation. In the area of Nepal referred to above, only 4% of the population had access to any form of sanitation, even a pit latrine. Defaecation took place in certain areas of the fields which were situated by the river or adjacent to irrigation channels, which as noted above were the source of domestic water supplies, thus facilitating faecal-oral transmission of micro-organisms. In communities in which water is at a premium, flush toilets are not an option, though this has not always deterred well-meaning people from providing them, as in the case of a rural Indian village where they were donated and stood empty and unconnected.[8] In the absence of flush toilets or the means of operating them, sanitation can be greatly improved by the simple process of digging of pit latrines on sites where they will not contaminate water supplies.

Personal hygiene. Washing hands after defaecation and before eating food is of great importance in the control of faecal-oral transmission. The effectiveness of this procedure depends once again on the provision of relatively clean water. In many countries the hands are the usual eating implements, and while custom may dictate that hands are washed before eating, the provenance of the water used for this purpose may be dubious. Travellers often carry antiseptic wipes and/or hand gel, and trekking agencies will often provide hand washing facilities for their clients close to latrine tents or mess tents where meals are served. Where piped water is available an essential part of the traveller's kit is a bar of soap.

It is hoped that these two examples, malaria and diarrhoeal illness, will demonstrate that, in effect, there is little difference between global health and the health of travellers. It therefore behoves all who have an interest in the health of travellers to do their utmost to promote global health in all its aspects.

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Health Services in Argentina

P M Bruno Gabay, M D Fernández

The Argentine health service comprises three sub-sectors: public, social security (social work) and private (insurance pre-paid medicine), which provides the health care for much of the population. There are major inequalities in health coverage and financing of the national health system with respect to per capita, population cover and guaranteed benefits. It is a very fragmented system, without coordination and integration, heterogeneous in its organisation

The coexistence of different sub-sectors and strategies used by national, provincial and municipal-governments provide the system with a mode of operation that generates implications, not only in population access to services, but also in quantity and quality of goods and services provided in different jurisdictions, which vary even within provinces. This is significant when considering regional disparities, with inequalities in funding and access to services between the different sub-sectors and within them. There is no linear relationship between employment and coverage. Money is contributed by employees (3% of total wages) and employers (6% of each employee's wage).There are also differences in indicators of health status of the population.

There is little or no integration between public and private sectors, with fragmentation within each accentuated and deepened by two factors:

1) decentralisation of public health services, involving separated health institutions from central state to provincial and municipal levels. The Federal Government provided Provincial States with health institutions and determined that they were in charge of them and, in turn, the Provincial States did the same with the municipalities. Then the national government stopped sending money to the provinces for health management.

2) the severe economic downturn of recent years generated significant social problems associated with lack of employment, marginalisation and poverty and increase in" black" labour, which does not contribute to social work system .

Health spending has three funding sources: direct household spending (including pre-paid health systems), three levels of government (national, provincial and municipal) and workers and employers, who contribute to social welfare, linked to the unions. The private sector accounts for between 40 and 50% of total health expenditure. The rest covers social work and public subsector and corresponds to 8% of GDP (Gross Domestic Product).

Composition of Expenditures and Coverage in Health in Argentina

The public subsector.

The public subsector is divided by uncoordinated jurisdictions (national, provincial and municipal). The central level (Ministry of Health) leads the whole system through policies and programmes. Provincial governments have some degree of autonomy in their health policies and are responsible for most service provision.

The public subsector is characterised by universality and gratuitousness of care. In 2005, with a total of 17,485 structures in the three sectors, 44% belonged to the public subsector. Increased demand for services comes from the population without coverage, or who are underinsured. Children under 15 years have lower coverage (44%) and those over 65 have only 81.3% coverage.

The organisation is decentralised with great disparity in economic and social development by geographic region, with inequalities in public spending per capita in each of the 24 provinces. There are asymmetries between public hospitals by national, provincial or municipal membership and even within each of these levels.

The financing of the health system is performed through three forms, one for each of the three sectors that compose it. The public health sector is financed through taxes, charges and contributions. The collection for the three levels of government is basically intended to cover the needs of low-income individuals and those who have no formal health coverage, although some beneficiaries of the Social Security receive care in public hospitals. The public subsector does not have a basket of benefits that covers all possibilities.

The State operates a national compensation fund that redistributes money between the most powerful and economically disadvantaged social work departments, to ensure equitable health coverage to all workers. Currently there are complaints from this sector to the government, arguing that it is owed a large sum of money, creating a risk they may not be able to fulfil their functions. The State is responsible for the cost of decentralised organisations and programmes that provide REMEDY (free distribution of medicines), Community Health (primary care to the most needy population), Maternal and Child Plan (parturients and babies), vaccinations, etc. This compensates for differences in resources and health outcomes among the provinces, at the primary level. It constitutes 19% of national public expenditure, 30% of which is delivered to the provinces in the form of goods and services. 67% of the uncovered population live in provinces where governments are unable to provide the minimum coverage required by the Mandatory Emergency Medical Services (PMO-E). These promulgated obligations for provinces and municipalities, but without delineating economic commitment. The national government has discretion to send money to maintain centralised control over decisions of governors and mayors.

The public sector health expenditure comes to 66% of the provincial governments' and is intended for hospitals where there is the largest source of expenditure on human resources. The expense is associated with greater or lesser development of each province. Calculated on population uninsured or underinsured, spending is $40/month per capita. Provincial differences range from $ 93 to $ 637 per capita, giving an average of $154. Municipal Governments commit to 15% of public spending, particularly in primary care centres

Social works (social security)

Nearly 53% of Argentines have health coverage through social work units of trade unions or private insurance. The development of social work departments, related to guilds of workers from different areas, increased the degree of fragmentation of the system. Each guild seeks care for workers affiliated to it. The money is automatically deducted from the employee's salary. Social work projects are managed by the relevant union, and unions receive and manage large amounts of money from workers through their social work commitment. Unionisation, with its corresponding economic contribution by the worker to the guild is not mandatory, unlike membership in social work itself thus Guilds receive monies for social work people who are not union members – a source of acrimony. .

In the 1990s, a reform reducing the large number of existing social works by ***merging or affiliation was*** tried. It also allowed social work projects to be subcontracted to private companies' health insurance (pre-paid) with special plans and to those who had double coverage. Some social work projects acquired private health effectors to provide services directly to members.

By National Law there are 290 social work projects throughout the country. The system consists of:

1) – National Social Service (National Social Work, OSN)

It includes: the National Institute of Social Services for Pensioners (INSSJyP) covering retirees across the country, their children and many handicapped; the social work union and social work staff bringing health coverage to about 11,000,000 people

2) – Provincial Community Projects (OSP).

One per province, 24 in total include the Provincial Institutes of Forecast and provide health care and retirement.

3) – Social Work with special regulations provides for members of the armed forces, staff of national universities and legislative and judicial powers.

4) – Primary Health Care (PHC), funded by the Federal Government (for the uninsured) and by the Social Services and the Provincial States.

Since 1999 certain benefits are guaranteed by both the national social work (OSN) and INSSJyP (PAMI), for companies pre-paid medicine (PPMS, private) which are required to provide a Basic Package Mandatory Medical Services (PMO), defined by the health authority. The INSSJyP (PAMI) should work as a comparison level of benefits for its breadth, diversity and coverage throughout the country.

Social Security is funded through personal contributions of formal workers and their employers, is transferred to social works (national, provincial, municipal) and funds finance care for the population incorporated into the formal labour market.

Social work receive 80 to 90% of the share contributed ($5,700 million per year in 2007). The provincial health care plans (OSP) are funded from the contribution of the provincial public sector workers, volunteer members and treasury income of each province. OSP resources come from the provincial government and are dependent upon input from employers, with the same provincial statute. The difference in coverage between the different provinces ranges from 30 to 70% of the population.

The INSSJyP (PAMI) receives resources from active workers, retirees and the State Treasury. Spending in 2007 was estimated at $2,482 million annually. The INSSJyP (PAMI) has the highest per capita spending because it caters mostly (70% performance) to individuals over 65 years of age.

There is a free choice in health coverage to beneficiaries of National social work and INSSJyP (PAMI), but not to members of other social works (provincial armed forces). This choice causes breakdown of populace solidarity, for those who acquire more social work services are usually richer, and earn more money. Their contribution is larger than the average contribution of social work source. Thus, poorer social works are getting poorer and the richest even richer. The offering of additional plans ensures coverage is not equal in all social works. This *adverse selection mechanism*, by which OS are affiliated with some increased risk in relation to their proportionate economic contribution, is not commensurate with the benefits required by the PMO.

There is a Solidarity Redistribution Fund receiving between 10 and 20% of the remaining money of each payment received by social work (depending on the amount of income of workers and their trade union membership in social work). This Fund redistributes resources to finance the Special Programs Administration and the Nominating Automatic Grant.

The latter complements the quota of each family to reach a minimum value of $22 – monthly per group. Since the financial crisis of 2001-2002, affecting OSNs, the INSSJyP (PAMI) and PFMT a Compulsory Medical Emergency Program (PMO-E), with various forms of rationing of resources is in place to meet minimum service and essentials requirements of the widest possible population. In the case of PAMI, whose population is over 65 years old and, therefore, their

Health Services in Argentina *continued*

average costs are double the average population, the cost of PMO-E is around $ 100 per month per capita, with a tendency to spend more than it collects, requiring contributions from the national government, or failure to provide services to members.

Both OSN, OSP and INSSJyP (PAMI) contract private providers. Due to increases in the cost of care without a price increase of compensatory services, the deficit fall on these private providers and not the funders (OSN, OSP and INSSJyP - PAMI). This has led to private providers not being able to pay taxes, to make a technology advances and renovations and in debt with staff and suppliers.

Private sector

The private sector is resourced through direct household spending and payment of insurance premiums. Companies who do not have private medical and compensatory mechanisms are financed by fees paid by the beneficiaries of the various schemes, covering at least the PMO-E.

In early 2007, with the stated purpose of controlling the rising cost of health coverage for members to pre-payments (private) services were offered two possibilities: 1) increasing the share of about 20% , adding new services (eg, discounts in gyms, optical and cosmetic) or 2) a much smaller increase (5%) and the addition of additional affiliate payments in each service. Most members chose the first option.

Summary

The Argentine Health service is served by many organisations both public and private. It is fragmented and uncoordinated, with many inequalities in financing, administration, health provision and care.

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Consequences of Structural Adjustment Programme for health policy and health outcomes in less developed countries

S Webb

Introduction

During the early 1980's, the two largest financial institutions in the world, the World Bank and International Monetary Fund (IMF), released a joint mission statement declaring that poverty in the developing world was "the greatest challenge facing the international community" and that together they would play an important role in its eradication (Easterly, 2003, p.361). This was a response to a series of crises during the 1970's that ranged from natural disasters in the form of droughts to man-made failures like erroneous currency overvaluations (Peabody, 1996); these caused economies throughout the developing world to go into stagnation. The chief strategy proposed by the World Bank and The IMF for rebuilding these economies came in the form of Structural Adjustment Programme (SAPs). These were conditional loans that focused upon the shifting of power from the state to the market, which mirrored the neoliberal ideologies dominant in the West in the same era under the Thatcher and Reagan administrations. SAPs were offered to developing countries without exception and were deployed in remarkably similar ways, which is why in many respects the effects of SAPs can be generalised across the developing World (Gloyd, 2004). These economic policies have been described as "short-term austerities that lead to long-term growth" (Peabody, 1996, p.823) and there is a wealth of literature charting the successes and failures of them in all spheres of society. This essay will focus on both the direct and indirect consequences of SAPs on health policy, which unlike some other aspects of economic planning, cannot be delayed. For an individual short term 'health austerities' cannot necessarily be corrected by improved healthcare in later life.

Structural Adjustment Loans

The structural adjustment loans offered by the World Bank and IMF to developing nations could only be arranged if certain conditions were met. These focused on embracing globalisation by liberalising transnational trade through increasing imports and decreasing exports as well as taking power away from centralised governments by withdrawing subsidies and reducing the number of civil servants (Wakhweya, 1995). Has this Western free market ideology been successful? Many think not, and the facts tend to agree with them: debt throughout the developing World almost doubled in the first six years of SAP's implementation, from $562 billion in 1982 to $1020 billion in 1988 (Kanji, 1991). SAPs have also been criticised for having a more selfish motive than was first publicised. In reality, they have served to maintain the international 'status quo' created under imperialism and colonialism in which the South was financially exploited by the North. SAP's have continued this exploitative relationship by re-orienting the economies of debtor nations towards "cut- price" exports which the developed World can exploit, as well as forcing governments to switch economic priorities away from a focus on the interests of their own people (Pettifor, 2001). The failure of the SAPs is acknowledged by research from the World Bank itself, who found that while in 1979 there was a net flow of capital of $40 billion from the developed to developing countries (through aid payments), by 1991 this trend had reversed, with a flow of $60 billion from the poorest to the richest countries in the World, primarily through debt repayments of SAP loans (Kanji, 1991).

SAP's and malnutrition

One of SAPs' greatest effects on health comes indirectly through their impact on agriculture. SAPs encourage a shift from subsistence farming to the production of cash crops like tobacco and coffee for export, in an attempt to increase the income of the rural populations whilst promoting trade with the developed world. A study in Ghana and Zambia exemplified this by showing that between 1983 and 1986, when SAPs in these countries had just been introduced, per capita output of each major food staple, such as rice and cassava, decreased by 30% (Loxley, 1990). However, the market competition created by dozens of countries moving into cash crop exports served to drive the prices down, limiting exporters' income to a bare minimum, while allowing the importers (e.g. the global North) to enjoy huge savings (George, 1990). For these two reasons the poorest people were unable to either grow their own food or raise enough money to buy imported food, so malnutrition rates increased in countries that were already hampered by famine and drought. This is particularly dangerous for children as demonstrated by a recent study involving 53 developing countries, which found that 56% of child deaths throughout the developing world are attributable to malnutrition's debilitating effects (Pelletier, 1995). Women, and in particular mothers are also a group at risk from malnutrition which result from SAPs because the programs assume that the whole workforce is "equal before the market." Due to women's arbitrary culturally assigned social responsibility for sustaining

Consequences of Structural Adjustment Programme… *continued*

the family, they cannot participate in the, albeit small, benefits of cash crop farming. So men reap the benefits of the agricultural adjustment and women are often left caring for children with little source of income, so are prone to malnutrition (Stromquist, 1999). Anaemia rates are important indicators for malnutrition and it has been shown that 65% of pregnant women in developing countries are anaemic, which is a risk factor for low birth weights and increased perinatal mortality (Kanji, 1991).

A study into the effects of SAPs in Jamaica explored another way in which Structural Adjustment can cause malnutrition and hence the adverse health effects discussed earlier. The SAP loan here, and in many other countries, was conditional upon economic steps that induced a steep devaluation in currency. The aim was to make their goods cheaper for foreigners to buy but also made it more expensive to import goods. The latter consequence had a particularly damaging effect on the price of food, as two staple foods, rice and flour, inflated exponentially due to increased import prices. The study found that the short-term indicator of malnutrition, wasting, increased in children after SAP implementation and so the researchers concluded that the SAP was the causal link for increased malnutrition (Handa et al., 2003).

Decentralisation of the state:
Many other sectors of society, also indirectly related to health outcomes, were damaged by the Structural Adjustment through the decentralisation of the state and consequent reduced government spending. Investment in education, sanitation and infrastructure, all major determinants of the health status of the poor, suffered as the cost of social services that had previously been provided free or at minimal prices increased (Gloyd, 2004). Literacy rates, an indicator for better child health outcomes, went down as recurrent expenditures on education aids were slashed and efficiency measures to increase class sizes were implemented (Gloyd, 2004). Sanitation and Infrastructure projects were also halted all over the developing World, with increasing rates of diarrhoeal diseases and reduced access to health services, particularly in rural areas (Peabody, 1996).

Curiously, the World Bank and the IMF did not focus their demands on reducing military expenditures, which in many developing countries take up a large proportion of public sector spending (Gloyd, 2004). Many governments, particularly in Sub-Saharan Africa, have argued that this spending was necessary in robustly tackling the violent protests that started in the 1980's and became almost ubiquitous amongst adjusting nations in response to SAPs. However, the paradox is that if more social sector spending in SAPs had been on the poorest parts of societies as opposed to the military, then the populations would have been less prone to stratifying into the "have" and "have not" groups which tend to brew conflict and civil unrest (Wakhweya, 1995).

Health system privatisation
The primary effect of SAPs on health is through the changes they bring about to national healthcare systems. In the context of SAP privatisation, healthcare is seen as a commodity for purchase as opposed to a basic human need (Kanji, 1991). The introduction of user fees in many developing countries is testament to this, and the implications for health are considerable, with many inhabitants seeking other means of cheaper healthcare. In Zimbabwe, shortly after the country embarked on an SAP in the early 1990's, user fees were introduced into primary healthcare settings and healthcare attendance immediately declined. Research indicated that during the first two years of adjustment attendance at healthcare facilities declined by 25-30% (Bassett, 1997). The majority of those affected were in the lowest income households. They compensated for not being able to afford modern medical treatments by relying on traditional health practices and home- based medicine. The same research study in Zimbabwe found that home treatments increased shortly after implementation of SAPs (Robson, 2000). Despite strong beliefs in the value of traditional medical practices within the cultures of many developing countries, there is very little scientific evidence base for their effectiveness. It is a clear example of social inequality. If affordability makes people resort to these practices rather than the biomedical healthcare, which is scientifically proven to be effective.

The cost of treatment
Another major problem for healthcare is the lack of financial resources to buy medicine, which has been brought about by SAPs. Around 80% of medicines in Africa are imported from huge multinational pharmaceutical countries in the West, which, even before the birth of Trade Related Intellectual Property Rights in 1994, was an unsustainable practice (Sanders, 1991). With SAP conditions including currency devaluation and decreased healthcare budgets, drug spending was inevitably curtailed in many developing countries. Zambia and Uganda are primary victims of this as the 1986 allocation for drug imports was only 25% of its value in 1983, with SAPs both being implemented in this three year period (Sanders, 1991). Even more worryingly, in Mozambique, immunisation outreach programmes stop in August or September every year, as the allocated money runs out before the end of their fiscal year (Gloyd, 2004). As a result of this drop in availability of medicines and vaccines, market prices within the country invariably increase, only adding to the effect of user fees in preventing the poorest people from accessing healthcare.

Effect on healthcare workers

The human resources, doctors and nurses, are also caught up in Structural Adjustments. SAPs often required huge layoffs in public sector employees, with the ministry of health usually the hardest hit due to its large volume of workers (Gloyd, 2004). This triggered many healthcare professionals to either transfer to the private sector, contributing to the social phenomenon of brain drain, or if no jobs became available, to face unemployment. Even the healthcare personnel lucky enough to keep their jobs faced salary cuts, as highlighted in Mozambique, where nurses who had been earning $150 per month in 1980 were earning $30 by 1995, a 500% decrease (Gloyd, 2004). As health care workers faced a reduction in earnings and decreased job security, it is understandable that economic survival, not patient care, became a dominant daily concern (Bassett, 1997). It is no surprise then that nurses across Sub-Saharan Africa began to strike (Bassett, 1997) and many others started to charge patients under –the- table fees to raise their incomes (Gloyd, 2004). This is highlighted by a 2013 study by 'The Afrobarometer' that found that nearly a third of Africans have paid a bribe in the last year, with medical treatment being the second most likely reason for this (*Washington Post*, 2013).

Conclusions

SAPs were set up by the IMF and World Bank ostensibly to demonstrate their strong commitment to ending poverty. However, from the outset, the policy's cardinal flaw was to focus solely on economic growth, and overlooked the fact that it takes more than just fiscal policy adjustments to improve health (Breman et al., 2007). It is difficult to blame reduced health outcomes throughout the developed world unequivocally on SAPs because there were no areas or countries that were left unadjusted to use as 'controls' to give us a comparison. But what is true is that there has been little improvement in health and healthcare throughout Africa and other adjusting countries during the 1980's and 1990's, despite it being a period of unparalleled economic expansion throughout the world (Gloyd, 2004). UNICEF argues that development must be implemented with a "human face" and that social effects of development should take precedence over economic growth (Cornia et al., 1987). The Jubilee movement, a coalition of 40 countries established in 2000, echoed UNICEF's sentiments and called for the cancellation of SAP debts, to allow developing countries to rebalance their books, in order to prioritize their spending on the critical areas of health, education and clean water. Gloyd neatly summarises the situation in the book '*Sickness and Wealth: The Corporate Assault on Global Health':* "The economists of the IMF and World Bank have pushed many countries down paths that have undermined the capacity of governments to respond to the needs of their population and to provide basic services" (Gloyd, 2004, p.54). And as has been argued earlier, all of these services play a critical role in maintaining the most basic of human rights: health.

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SAPs were set up by the IMF and World Bank ostensibly to demonstrate their strong commitment to ending poverty. However, from the outset, the policy's cardinal flaw was to focus solely on economic growth, and overlooked the fact that it takes more than just fiscal policy adjustments to improve health. The "short term austerities" have had lasting detrimental effects on the health of some of the poorest people on the planet.

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Book Reviews

High Altitude Medicine and Physiology
5th edition
JB West, RB Schoene, AM Luks, JS Milledge.

Published by CRC Press, 2013
ISBN 978-1-4441-5432

This is the 5th edition of what is generally considered to be the definitive textbook of high altitude medicine and physiology. Early chapters cover historical and geographical aspects, the properties of the atmosphere and relevant areas of genetics. Then follows a detailed account of the mechanisms of acclimatisation and cardiopulmonary, renal, metabolic and central nervous functions at high altitude, including problems of sleep, nutrition and high altitude exercise. There is, of course, a full account of acute mountain sickness and high altitude cerebral and pulmonary oedema, with equally detailed information on other altitude-related conditions and the effects of heat and cold. Finally the book covers various types of high altitude travellers, including women, older people, children, athletes and the military.

It is well laid out, with helpful diagrams and interesting illustrations and is comprehensively referenced, with a detailed index. There is little to criticise and I can think of no major omissions. The casual or inexperienced reader may find that there is, if anything, more information than he or she needs; this is not a simple primer or introduction to its subject matter but a comprehensive reference book. It should be on the bookshelf of anyone with a serious interest in the problems of high altitude and can be relied upon to answer most if not all the questions that may arise, whatever the reader's level of knowledge or experience. I cannot recommend it too highly.

M Townend

Searching Skills Toolkit-finding the evidence
2nd Edn.
De Brun, C Pearce-Smith.

Wiley-Blackwell BMJI Books. £19.99

This second edition of a popular pocket-sized book, has new chapters on searching for sources to support evidence based management and decision-making.

It has been up dated to include current web sources and open source reference management. It is a very handy reference aid for health professionals, managers, researchers and students Access to its contents would have saved many wasteful hours seeking data and citations when I was engrossed in research studies. The appendix with ten top tips for effective searching is a time saver and would be particularly valuable for the student or those new to data retrieval, such a vital part of the early research process and fundamental in the application of evidence based medical practice. Searching the data bases is competently dealt with using flow charts and examples. My main gripe is that due to the small book size, illustrative examples have minute point size and a magnifying glass is needed to script and they lose much of their potential impact. There is much well-presented and useful information in the book which I commend to students and novice professionals facing the daunting prospect of literature, on-line and open source searches for the first time.

IBM

Challenges in managing chronic disease in low resource settings: Type 1 diabetes in sub-Saharan Africa

S Kong

Abstract
Non-communicable chronic diseases are rapidly emerging as a new priority in developing countries due to urbanisation, lifestyle changes and improvements in health care. One of the major non-communicable diseases is diabetes mellitus and type 1 diabetes is one of the most common chronic diseases seen in children and young adults. Although accurate figures are scarce, it is clear from the limited literature that many individuals are diagnosed with type 1 diabetes across sub-Saharan Africa.

Management of type 1 diabetes in the low resource setting of sub-Saharan Africa is challenging and complicated by factors such as a lack of insulin, syringes and glucose testing equipment. Type 1 diabetes is an expensive disease to manage and its burden is magnified in resource-limited sub-Saharan Africa. A lack of specialist healthcare workers to provide diabetes education to individuals compounds the challenge. Consequently, sub-optimal management of type 1 diabetes is common and increases the risks of immediate dangers such as diabetic ketoacidosis, as well as amplifying the onset of long-term complications such as retinopathy and nephropathy.

Several projects have been initiated in sub-Saharan Africa to improve availability and access to insulin and the other supplies imperative to managing type 1 diabetes. Additionally, initiatives have been implemented to assist in educating healthcare professionals in diabetes management. Despite the initiation of such schemes, there is still a long road ahead to ensuring all people with type 1 diabetes in sub-Saharan Africa receive appropriate care and, consequently, do not face unnecessary premature mortality and long-term morbidity due to mismanagement of the condition. Challenges in managing chronic disease in low resource settings:

Non-communicable diseases are becoming increasingly important all over the world, particularly in developing countries. Traditionally, communicable diseases have dominated the health picture of low resource countries, especially that of sub-Saharan Africa. Today, with urbanisation, lifestyle changes and improvements in health care, non-communicable chronic diseases are rapidly emerging as a new priority, causing increasing numbers of morbidity and mortality and adding a huge financial burden to already stretched health care systems.

One of the major non-communicable diseases is diabetes mellitus. Present figures indicate that 14.7 million people in Africa have diabetes and the number is expected to increase dramatically over the next twenty years[1], mainly due to an increase in cases of type 2 diabetes. Of the current figure, estimates of the proportion of individuals with type 1 diabetes vary from 10%[2] to 25%.[3] The current diabetes epidemic is huge. On the contrary, the Millennium Development Goals, established by the United Nations in 2000, omit non-communicable disease from their objectives, instead focusing heavily on communicable disease such as HIV and malaria, child mortality and maternal health.

Worldwide, type 1 diabetes is one of the most common chronic diseases seen in children and young adults.[4] Unfortunately, in sub-Saharan Africa, with limited resources and lack of expertise regarding type 1 diabetes, a diagnosis can still carry a death sentence.[5]

This article looks at type 1 diabetes in sub-Saharan Africa. Firstly, the scale of the problem is discussed, followed by examination of the barriers to the management of type 1 diabetes in sub-Saharan Africa such as the lack of resources and expertise in managing the condition. Finally, interventions being undertaken to improve the situation is discussed.

Type 1 diabetes appears to be less common in sub-Saharan Africa compared to Europe and North America.[6] Epidemiological data on type 1 diabetes in sub-Saharan Africa is very limited[1,7]; epidemiological studies are costly, labour intensive, and African populations often do not have accurate census data.[6] Additionally, the lower the incidence of a condition, the larger the surveyed population must be to obtain accurate figures.[8] In a systematic review by Hall *et al*,[9] only four studies estimating the prevalence and/or incidence of type 1 diabetes in sub-Saharan Africa were found to be published between 1990 and 2011. Type 1 diabetes prevalence was reported to be low, ranging from 4 per 100,000 in Mozambique to 12 per 100,000 in Zambia.[9] The large difference in rates in different sub-Saharan Africa countries could be due to differences in methodological collection, or due to true disparities in the ethnic composition of populations.[7] A literature search revealed no new epidemiological studies since 2011 and the International Diabetes Federation (IDF) state there is '*an urgent need for further epidemiological research and improved data collection systems in the region*'.[1]

For unknown reasons,[6] the onset of type 1 diabetes is reported to be typically ten years later in people of native African origin compared to other populations, the average age of onset being 22 to 29 years.[7] Nonetheless, many children are diagnosed with type 1 diabetes in sub-Saharan Africa and the IDF estimate

Challenges in managing chronic disease… *continued*

stands at 39,100 children under the age of 14 years living with type 1 diabetes.[1] Considering the average age of onset of type 1 diabetes in African individuals has been documented as 22 to 29 years and the IDF do not state the breakdown by type of diabetes in their statistics for adults in their comprehensive Diabetes Atlas,[1] it is reasonable to presume this number to be only a small fraction of the total of individuals diagnosed with type 1 diabetes in sub-Saharan Africa.

Type 1 diabetes is seen as a rare disease in sub-Saharan Africa, but this is likely related to the inevitable mortality if the condition is left untreated.[10] Another problem confounding the statistics could be misdiagnosis; patients presenting with symptoms such as weight loss, dehydration, polyuria, lethargy and sepsis, all of which can be seen in hyperglycemia and diabetic ketoacidosis, can be misinterpreted for more common conditions in sub-Saharan Africa such as HIV[11] or malaria.[12,13] Ultimately, this may lead to delays or omission of appropriate treatment and, when untreated, the life expectancy of type 1 diabetes is around one year.[14] Even when diagnosed with type 1 diabetes, few individuals have access to sufficient insulin, syringes and blood glucose monitoring equipment and die as a result.[1] Consequently, the low prevalence of type 1 diabetes in sub-Saharan African may be due to the fact that many individuals are dying very prematurely.

Even when a diagnosis of type 1 diabetes is made, in resource-poor settings, achieving good blood glucose control, which is essential to reduce the risk of long term complications such as retinopathy and nephropathy, is difficult. Again, recent analyses are limited. In a study carried out in Sudan,[15] glycaemic control was unsatisfactory in 86% of 147 children with type 1 diabetes, with the most frequent pre-meal blood glucose being 9mmol/L or higher. In Tanzania, only one type 1 diabetic from a cohort of 99 achieved 'good' glucose control (HbA1c <7.5%) and average HbA1c was 12.6% ± 3.5%, deemed to be 'very poor'.[4] Even in South Africa, it was shown that individuals had poor diabetic control with an average HbA1c of 10.62% in African natives.[16] Given that these studies were undertaken in urban regions and are representative of urban healthcare rather than the situation in resource-limited rural areas, it is reasonable to presume that the figures for rural sub-Saharan Africa may be even worse.

Poor glucose control in type 1 diabetes leads to an accelerated onset of the complications of diabetes and an overall negative impact on health. High rates of diabetic nephropathy[16] and diabetic retinopathy,[4] as well as detrimental effects on academic performance[15] have been reported in sub-Saharan type 1 diabetics. Hospital admissions are frequent[15] and diabetic ketoacidosis is a common diabetic emergency often leading to mortality, with death rates ranging from 25% in Tanzania to 33% in Kenya.[17] In a study undertaken in the DR Congo analysing mortality rates over a 10 year period, 17.4% of young diabetics died, most within five years of diagnosis, and over a third of the deaths were due to diabetic ketoacidosis.[18] It has been suggested that, in at least some countries in sub-Saharan Africa, life expectancy is improving,[17,19] however the trend is far from clear and evidence incredibly limited.

Why is managing type 1 diabetes in sub-Saharan Africa fraught with so much difficulty? Insulin is the drug vital to sustain life in type 1 diabetes. Relative to the total healthcare budget available in sub-Saharan Africa, insulin is expensive,[12,19] and a regular supply of insulin is unaffordable for many.[9] The insulin supply can also be erratic in sub-Saharan countries,[4] Lack of insulin due to availability and affordability is a major obstacle to individuals with type 1 diabetes in sub-Saharan Africa.[20]

In many countries, no medical insurance or free national health service is available and patients have to pay for all their medical care.[7] Elrayah *et al*[15] highlight, in their study in urban Sudan, that the costs of diabetes management constituted a large portion of the total household financial outgoings, and 65% of the family's health expenditure was required for the diabetic child. Of this, more than a third of the money was spent on insulin. In Tanzania, the monthly cost of an average insulin treated patient is equal to 25% of the minimum wage.[21] It has been estimated that in the world's 34 poorest countries, the direct cost of diabetes care per affected person is nearly 125% of the gross national income per head.[22] Type 1 diabetes is an expensive disease to manage and its burden is magnified in developing countries. Chronic self-underdosing with insulin occurs to economise and make supplies last for longer.[19] Underdosing of insulin leads to dangerous hyperglycaemia, and, if an individual is unable to pay for treatment, the untreated diabetes will be fatal.

Management of diabetes also requires syringes to administer insulin, blood glucose testing strips and meters, all of which also have intermittent availability in sub-Saharan Africa.[23] Majaliwa *et al*[4] report that no children in their study of 99 type 1 diabetics in Tanzania had capability to monitor glucose levels at home. Even in hospitals, especially in more remote settings, blood glucose measurements cannot be routinely performed due to a lack of facilities; in Mozambique, only 21% of health care facilities were found to have a blood glucose meter.[24]

In recent years the issue of access to medicine has emerged into the public spotlight, however much of this attention has focused on drugs to treat communicable diseases such as HIV, malaria and tuberculosis. The International Insulin Foundation (IIF), founded in 2002, has investigated the issues regarding the affordability and accessibility of insulin as well as the barriers to proper diabetes care in several countries in

sub-Saharan Africa including Mali, Mozambique and Zambia.[12,19,23,25] Multiple problems were found including inadequate assessment of needs, distribution difficulties and poor knowledge in the health care system on insulin and how it should be utilised.[19] A single price for insulin was not set within each country and prices were found to be dependent on location of the purchase, the supply chain, and the method of purchase.[25] Syringes and glucose testing equipment also had varying prices and limited availability.[23]

Just as important as the availability and affordability of diabetes medication and equipment is the presence of specialist healthcare workers to provide diabetes education as well as multidisciplinary support teams. In most African communities, the notion of a specific diabetes care team is uncommon.[7] Investment and research have been slow to respond to the burden of chronic diseases such as diabetes and health systems still remain heavily focused on infectious diseases.[1] Correspondingly, Elrayah *et al*[15] point out that '*the present organisation of diabetes care does not give the patient empowerment, knowledge and self-care ability*'.

Despite the evitable challenges faced in improving the situation for type 1 diabetics in sub-Saharan Africa, small steps are being made and initiatives have been implemented. As aforementioned, insulin alone will not improve the lives of type 1 diabetics; instead, many factors are necessary which accumulate to build a 'positive diabetes environment'[23] (see appendix 1). The IIF, with it's focus as the *'universal availability of insulin for those with type 1 diabetes as a basic human right*'[19] has developed the 'Rapid Assessment Protocol for Insulin Access', a scheme which has analysed the situation for type 1 diabetes in three sub-Saharan countries. The resulting documentation has acted as a catalyst in driving better access to diabetes care, including the improved availability of insulin and diabetes equipment, and in bringing diabetes to the attention of health authorities.[26]

An equity pricing system by the world's two major pharmaceutical companies producing insulin (Novo Nordisk and Eli Lilly) has been implemented in the world's 50 least developed countries which has significantly lowered the price of insulin,[12] however, the scheme only applies to the limited amount of insulin purchased by governments and not that bought by private pharmacies.[19] Some countries, such as Mozambique and Mali, have systems in place for patients to receive free or subsidised insulin from government health facilities when available.[25]

The organisation 'Insulin for Life'[27] was founded in 1999[1] and is a not-for-profit organisation which obtains excess insulin, syringes, glucose testing equipment and other diabetic supplies (that would otherwise be wasted) from developed nations, and distributes these supplies to low income countries, saving the lives of significant numbers of individuals with type 1 diabetes. The International Diabetes Federation 'Life for a Child' initiative,[28] established in 2000, provides funding and support to established diabetes clinics across the developing world, including 17 countries in Africa. British charity Diabetes UK's twinning program with Mozambique has, amongst it's initiatives, improved insulin availability at hospitals from 20% in 2003 to 100% in 2009, and trained 265 healthcare professionals in diabetes over a three-year period.[29] Many other smaller scale projects within sub-Saharan countries are increasing awareness of diabetes among healthcare professionals and improving health care facilities.[13]

A steady rise in type 1 diabetes has been reported in many countries.[1,5] Whether the same is true for sub-Saharan Africa lacks a solid evidence base and further studies are imperative to determine the scale of the problem. Nonetheless, it is clear that people are dying and facing unnecessary morbidity due to unsatisfactory care and treatment of type 1 diabetes. Improving access to insulin, syringes and blood glucose monitoring equipment is a vital step necessary to improve the lives of type 1 diabetics in sub-Saharan Africa, but this alone will not solve the dilemma. The omission of non-communicable disease from the Millennium Development Goals has caused difficulties in securing funding for non-communicable disease development programmes,[30] however, many promising initiatives are proving successful in facilitating improved diabetes care in several sub-Saharan countries. Without a doubt, there is still a long road ahead to ensuring all people with type 1 diabetes in sub-Saharan Africa receive appropriate care and do not face unnecessary premature mortality and long term morbidity.

Appendix 1

Requirements for a 'positive' diabetes environment
1 organisation of the health system
2 Data collection
3 Prevention
4 Diagnostic tools and infrastructure
5 Drug procurement and supply
6 Accessibility and affordability of medicines and care
7 Healthcare workers
8 Adherence issues
9 Patient education and empowerment
10 Community involvement and diabetes associations
11 Positive policy environment

Table adapted from Beran & Yudkin (2010).

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Challenges in managing chronic disease… *continued*

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Ron Raab, the founder and President of 'Insulin for Life', began collecting and distributing insulin himself in 1984, before the organisation was founded.

In the News

Chikungunya in the Caribbean
In December 2013, the World Health Organization (WHO) reported local transmission of chikungunya in Saint Martin. Local transmission means that mosquitoes in the area have been infected with chikungunya and are spreading it to people. This is the first time that local transmission of chikungunya has been reported in the Americas.

Local transmission of chikungunya is now being reported in other countries in the Caribbean.

CDC recommends that travellers to the Caribbean protect themselves from mosquito bites. The mosquito that carries chikungunya virus can bite during the day and night.

Saudi Virus
The death toll in Saudi Arabia from the Middle East Respiratory Syndrome (MERS) has topped 100. There has been a rapid rise in fatalities – 39 in one month alone out of 102 registered since the virus emerged in April 2012. A coronavirus, there is no vaccine available.. It is considered a deadlier but less transmissible cousin of the SARS virus. It has infected over 500 people world wide and 245 patients have died. All active cases are currently in the Middle East.

The first American case of MERS has been confirmed by CDC when there has been spread from one person to another within the USA. Symptoms are flu-like signs, fever, cough, chills and breathing difficulties.

Jet Lag
Jet lag could be overcome with the help of an app designed by mathematicians. The app, called Entrain, is built around the premise that light, particularly from the sun and in wavelengths that appear to our eyes as the colour blue, is the strongest signal to regulate circadian rhythms.

The app allows users to input their air travel schedule and, using proven mathematical formulas that describe circadian rhythms, it calculates exactly when the traveller should expose themselves to bright light, or avoid it, to minimise jet lag.

Angels for Beijing doctors
Hospitals in Beijing are to recruit 1,500 "guardian angels" to protect their doctors from violent attacks by patients. Doctors and nurses in hospitals are violently attacked every two weeks on average, by patients angry at long waiting times, high medical bills and haughty or uncaring doctors. The head of the Beijing Municipal Administration of Hospitals said the "guardian angels" would provide "hospital guidance" and "psychological intervention".

Ebola Outbreak
An outbreak of Ebola haemorrhagic fever has spread to three countries in West Africa.82 people have already died in Guinea and Liberia and another 56 patients are suspected to be carrying the virus, including in Sierra Leone. Ebola can take up to three weeks to show symptoms. Nine in 10 of those infected die. Epidemic of this magnitude has never before been seen in terms of its spread across Guinea.It is the first outbreak in West Africa for nearly 20 years and the first time that Ebola has been confirmed to have crossed international borders.

Isolating infected people is the only way to stop the spread of the virus, which has no vaccine and no cure. Transmission is not airborne. It is passed from wild animals to people, and then between human populations, by direct contact with someone who is infected, or with their body fluids.

CRUISE SHIPS
The world's biggest cruise ship is coming to the Mediterranean in 2015. Allure of the Seas, one of Royal Caribbean International's two 6,300 passenger ships, will be sailing seven night cruises from Barcelona between May and October next year.

Ships Medical Department.
This comprises a Doctor's office, treatment room, pharmacy and laboratory, as well as an ITU room and a ward.Most cruises have one doctor and two nurses. In addition to clinic hours, the nurses provide a 24-hour on call emergency service and are First responders to all emergency calls.

All nurses have the ALS certification and are from an A&E or an ITU background. Emergency and trauma skills are frequently required for the accidents, respiratory and cardiac events.

Skiing
There is no reliable evidence that safety helmets reduce the risk of injury. About 80 per cent of skiers in North America now do so. The increasing use of helmets, now worn by more than a third of skiers in French resorts, is controversial There are those who believe that they make skiers more likely to take risks. Even an intermediate skier reaches speeds of 30mph however.Some ski insurance companies will now provide cover only for skiers who wear a helmet.

The risk overall ofski injury has remained unchanged in recent years, at about 2.5 skiers per

In the News *continued*

1,000. In simple terms this means that of every 1,000 skiers on the mountain two or three of them will require some form of medical treatment. The chances of dying in a skiing accident remain very low – for every 1.4 million people who buy a lift ticket and spend part of the day on the mountains, one death can be expected. The average skier can only expect to be injured around three times for every 1,000 days on the slope, while death is even less probable.

In terms of avalanches, the biggest risks are faced by those who venture off piste. After 15 minutes under the snow the chances of survival drop sharply. Number of off-piste skiers has doubled in the past 20 years.

Changes in the design of skis have encouraged greater risk-taking. Now they are shorter and wider, so rather than sinking deeply into the snow pack when off-piste, they "float" nearer to the surface.

According to Medecins de Montagne, a group of French Alpine doctors, the proportion of serious injuries in France has climbed, with those "heavily wounded" representing 5.2 per cent of all injured skiers last year, compared with 3.95 per cent in 2001, meaning more than 1,000 more skiers were hospitalised by an accident last year than 12 years ago. A Helicopter rescue costs 7,000 euros (£5,800).

Telemedicine apps aim to replace non-emergency visits in USA.

Telemedicine – or soliciting live medical expertise from afar – is becoming increasingly mainstream, thanks to apps like Doctor on Demand, which is backed by Dr Phil, and HealthTap, which touts more than 1 million users .For patients, telemedicine apps are a cheap, easy alternative to non-emergency consultations. Asking text-based questions on HealthTap and AskMD is free, and a 15 minute appointment via Doctor on Demand costs $40. For hospitals they are a means to streamline care for existing patients. Using HealthTap, people can ask medical questions (general and specific) to a pool of 50,000 U.S. doctors.

INSURANCE

Pregnant travellers

Travel insurers are telling women who fall pregnant after booking a holiday either to travel or bear the entire cost of cancelling the trip – regardless of whether the area is medically safe.

A woman was denied a claim when she became pregnant ahead of visiting Ethiopia, where there is a heightened risk of malaria. Major companies would refuse payouts in this situation, even though travelling would endanger the unborn child. People think that when they buy travel insurance, they buy peace of mind. Thist is not the case, they are buying a payout in certain situations as stipulated in the terms and conditions. The Post Office said a traveller would be able to make a claim if she was not aware of the pregnancy when the holiday was booked. Aviva runs a similar policy if a doctor has advised against travelling. The Association of British Insurers (ABI) said that since travel insurance is primarily designed to cover the cost of emergency medical treatment for unexpected events, a normal pregnancy and childbirth would not be covered.

Pregnant women should not travel to malaria endemic countries, because they are twice as likely to contract the disease as non-pregnant women. Malaria infection in pregnancy carries significant risk to mother and baby. Women of child-bearing age should either not book holidays to countries endemic of malaria in case they fall pregnant, or they should ignore the advice their doctors and risk the many complications of travelling.

Travellers with cancer

Finding good insurance at a sensible price can be a challenge for cancer sufferers, or anyone who has what the insurance industry calls a "pre-existing medical condition". Even if prepared to pay extra for proper cover, they may end up with restrictions in the small print, or a policy which excludes anything connected with the condition. Complications can also arise when it comes to a terminal or incurable prognosis. Many people have conditions that may be life limiting, but not in the short-term, and so can continue to travel. It is worth gathering quotes from specialist insurers.

Insurers who are prepared to help travellers with cancer or other serious pre-existing medical conditions:
Avanti Travel Insurance; (0800 222 9141; avantitravelinsurance.co.uk); All Clear Insurance (0845 250 5250; allcleartravel.co.uk); Insurancewith (0845 322 4527; insurancewith.com); InsureCancer (0125 278 0190; insurecancer.com); Staysure (0844 692 8444; staysure.co.uk); World First (0845 908 0161; worldfirst.co.uk).

Poliomyelitis

India has been declared polio free. It is three years since the last person in the country caught the disease. More effort is still needed to eradicate the disease in its last, stubborn heartlands of Nigeria, Afghanistan and Pakistan – not least due to the superstitious fear of vaccination in many rural areas, and the targeting of medical staff by Islamists. Three decades ago polio claimed 150,000 victims in India in a single year.

Dr Hamid Jafari, the head of the Global Polio Eradication Initiative at the World Health Organisation, said many had believed it impossible to

stop the disease's transmission in India.He co-ordinated the work of local doctors, district magistrates and charities to immunise more than 170 million children in 2011 and continued the project over the next three years. The campaign will turn to Nigeria, where the number of polio cases were halved last year and Afghanistan, where infections fell from 30 in 2012 to 11 last year.

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Book Reviews

Understanding Clinical Papers 3rd Edn
D Bowers, A House, D Owens, B Bewick.

Wiley-Blackwell, Chichester £32.99

Much weight is now placed on evidence-based practice which drives the health professional to literature and data base searches in an endeavour to confirm the value and efficacy of procedures and management. This can prove a tedious task and the resultant trawl of papers can provide a confusion of conflicting information of high and poor quality. Sifting results to determine their value is time consuming and far from an easy task. One has to develop skills in understanding and evaluating research papers and the ability to discard inferior reports and dubious results.

This book can ease entry into the potential minefield of raw data, statistics, bias, and possibly cooked findings of a scientific paper and steer the reader on a simplified course to a sound critical appraisal of its value. The authors have succeeded in presenting chapters which are pictorially easy on the eye, with contents which could be turgid, but are quite easy to assimilate. It is well suited to the student but will speed on their way, any health professional new to searching for the evidence base to practice and making a first contact with the tricky task of evaluating clinical papers. Establishing the facts, analysing data and making an informed decision on pertinence, veracity and personal benefit will come easier to readers who apply the information provided in literature and data searches.

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Regression Methods for Medical Research
Tai BC Machin D.

Wiley-Blackwell £45

This book is directed at researchers primarily in the medical field, working either in the laboratory, clinic or community, as an introduction to the extensive range off regression techniques which can can be used in the design, analysis and reporting of research studies. The contents will be of value to health care professionals in all disciplines involved in patient care. The conducting of worthwhile studies in many areas of research requires the use and understanding of statistical models. In many cases this involves specification of the model, defining population regression parameters and then determining the way these are to be estimated from the accumulated data from the sample studied. This process can intimidate new researchers but this book can help assimilation of the knowledge required in the use of simple and complex statistical tools.

The first chapter encourages the learner to consider the simple linear regression model and associated statistical methods such as the null hypothesis, estimating means and standard deviations, with examples of statistical computer packages to facilitate analysis. Examples from the medical literature illustrate a wide range of applications for regression techniques. Ensuing chapters cover multiple linear , logistic, poisson,time to event regression and regression trees. Model building is also well covered in a non-technical manner with emphasis on the understanding and application of concepts and methods.

Many would-be researchers and clinicians are dissuaded from embarking on studies fearful of the minefield of statistics which may engulf them before their work can bring publishable findings. This book is not one to be dipped into, but demands that the reader works steadily and progressively through the chapters. The conscientious and committed will gain much from perusing the pages and be well prepared for a wide range of research in the medical field.

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UPDATE

Chikungunya Fever

Chikungunya is an illness caused by a virus spread via mosquito bites. The mosquito that carries chikungunya virus bites during the day and night, both indoors and outdoors, and often lives around buildings in urban areas Travellers to Africa, Asia, and islands in the Indian Ocean and Western Pacific are at risk, as the virus is present in many of these areas. In 2013. World Health Organization (WHO) reported local transmission of chikungunya in the Caribbean islands, the first time that it has been reported in the Americas. The islands are a favoured winter destination for cruise ships, with many retirees aboard escaping the British winter. The following Caribbean countries have reported cases:

Anguilla
British Virgin Islands
Dominica
Dominican Republic
French Guiana
Guadeloupe
Martinique
Saint Barthelemy
Saint Kitts
Saint Martin/ Sint Maarten
Saint Vincent and the Grenadines

Symptoms – The most common symptoms of chikungunya are fever and joint pain. Other symptoms may include headache, muscle pain, joint swelling, or skin.

Treatment – There is currently no vaccine or medicine to prevent chikungunya.

Prevention – Travellers can protect themselves by:
- preventing mosquito bites.
- covering exposed skin.
- wearing long-sleeved shirts, long pants, and hats.
- using an insect repellent containing DEET.
- applying sunscreen first and insect repellent second.
- using permethrin pre-treated clothing and gear.
- staying and sleeping in screened or air conditioned rooms.

Deep venous thrombosis and pulmonary embolism

Deep venous thrombosis and pulmonary embolism is associated with prolonged sitting, immobility and long distance air travel. Air journeys of over 8 hours are considered to be long haul and involve flights over North and South America, to Asia and the Antipodes. Thromboembolic disease can be either arterial or venous.

In the former, thrombus forms in the left heart or arteries which may occlude the artery or disintegrate into emboli and cause ischaemia in an organ or limb). In venous thromboembolism (VTE), the thrombus forms in a vein.[1] On long haul flights or after or during long distance coach or car travel, this may occur in deep veins of the legs or pelvis with resultant deep vein thrombosis (DVT). The thrombus may then embolise to pulmonary arteries as a pulmonary embolism (PE). Occasionally it may pass through the systemic circulation causing a systemic embolism, -a thrombotic stroke.[2] VTE can be fatal and non-fatal VTE can cause post-thrombotic syndrome. This can result when damage to the deep veins and valves occurs following a DVT.[3]

Risk factors
Age over 60 years, pelvic surgery, obesity, acute illness, pregnancy, active cancer, limited mobility or immobilisation of a lower limb following major surgery and previous DVT, long haul flights.

Presentation
Patients and doctors may not relate symptoms to a recent flight and it is often some days after flying that a presentation is made to a casualty unit or gp when leg swelling, leg and chest pain and dyspnoea is acute. A detailed history should be taken with questions on recent long distance travel and limb immobility: Physical examination should be performed.[1]

The clinical probability of DVT should be assessed using the two-level DVT Wells score (Table). A probable DVT score,should trigger a proximal leg vein ultrasound examination within four hours. If the ultrasound is negative, a D-dimer test should be performed. If early scan is not possible and there is a high probability of DVT, a parenteral anticoagulant should be administered before the scan.[1] Patients with a Wells score indicating that DVT is unlikely should have a D-dimer test before referral for ultrasound scan (Table 1). If there is both a negative D-dimer and ultrasound, a DVT is unlikely.[1]

If a recent traveller presents with signs and symptoms of a PE – chest pain, breathlessness or haemoptysis – the two-level PE Wells score should be used.[1] With a high score, the patient should have an immediate CT pulmonary angiogram (CTPA). If

unavailable, parenteral anticoagulation should be started before the scan. If a CTPA is unsuitable, a ventilation/perfusion (V/Q) scan is an alternative.[1]

TREATMENT
NICE guidelines recommend starting patients with proximal DVT or PE on unfractionated or low molecular weight heparin (LMWH) as soon as possible. This should be continued until the INR is ≥2, when warfarin or another vitamin K antagonist, such as phenindione or acenocoumarol is started.[1,4] Treatment should be reviewed after three months and may be continued in those with an unprovoked DVT.[1] Patients with active cancer and a proximal DVT or PE should be offered LMWH, which should be continued for at least six months.[1] Rivaroxaban, an oral factor Xa inhibitor, can also be used in adults to treat DVT and prevent recurrent DVT and PE after an acute DVT.5Below-knee compression stockings are recommended from one week after the diagnosis of DVT for two years in the affected leg.[1]

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Hypothermia

Hypothermia is a potentially fatal condition which occurs when body temperature falls below 95°F (35°C). Hypothermia can happen in any environment, not just extreme cold , so must also be considered with prolonged exposure to milder low temperatures. Travellers to high altitude and extreme cold environments are at risk. Tympanic membrane thermometers do not accurately reflect low core temperatures, but they do provide a useful guide. Rectal thermometers, can be useful and should be carried in mountaineers first aid kits.

Signs and symptoms
Patients may complain of feeling cold but awareness can be reduced in the elderly and the significance is often ignored.
Cold, pale skin (especially over abdomen).
Shivering.
Confusion.
Problems with gait, co-ordination and speech.

Predisposing factors
Prolonged exposure to cold.
Inadequate clothing or room temperature.
Chronic disease, for example, diabetes, heart failure, Parkinson's disease, malnutrition, dementia.
Acute illness, for example, pneumonia, sepsis.
Drugs, such as alcohol, sedatives, opioids.
High altitude can increase the risk of hypothermia.[1]

Assessment
Symptoms can help to grade severity.
Mild hypothermia:

- Shivering.
- Complaining of feeling cold.
- Possibly muddled thinking, but consciousness normally unaffected.
- Appropriate behavioural responses, such as putting on extra clothing.
- Tachycardia, tachypnoea, diuresis.

Moderate and severe hypothermia:

- No shivering.
- Confusion and reduced consciousness.
- Patient may feel warm and start to remove clothing or open windows.
- Bradycardia, arrhythmia, reduced respiratory rate.

Management
Mild hypothermia can be managed by replacing wet clothing with multiple warm and windproof layers, and using external sources of heat, such as heaters or hot-water bottles. Exercise (where practicable) will also help to warm the patient. The danger of warming the patient too quickly by immersion into hot water can be dangerous.[2] During rewarming, the patient's temperature can be slow to increase, or may even drop (known as the 'after drop') because cold peripheral blood is circulated to the body core.

Patients with symptoms or signs of moderate or severe hypothermia should be managed in hospital where possible. Initial management is the same as for mild hypothermia, but severely hypothermic patients should be handled gently and kept flat, to minimise risk of precipitating VF. The guideline for rewarming is 1 degree C per hour[3] priority in initial management should always be to reduce heat loss and promote

Update *continued*

heat gain.[4]

Travellers exposed to high altitude, wind chill and low temperatures and cold weather immersion at high risk of suffering from potentially fatal hypothermia.

Companions should look out for early signs and institute rearming whenever mild hypothermia presents. Health professionals should advise people at risk to take precautions and be aware of the insidious onset of a potentially fatal condition.

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Scenarios from the NaTHNaC Telephone Advice Line

A Stillwell

The National Travel Health Network and Centre (NaTHNaC) is funded by the Department of Health, England and operates in partnership with the Hospital for Tropical Diseases (London), the Liverpool School of Tropical Medicine, London School of Hygiene and Tropical Medicine and the Travel and Migrant Health Section, Centre for Infectious Disease Surveillance and Control, Public Health England. The telephone advice line service provides detailed advice for health professionals advising travellers with special needs or complex itineraries. Queries are answered by the team of specialist nurses, with medical cover provided. Opening hours are available on the website at: **www.nathnac.org**

Scenarios from the queries to the advice line might prove informative to health professionals and so a selection has been included below. With all travellers it is essential to complete a risk assessment. This involves finding out some details about a) the traveller, including; past/current medical history, previous vaccines/malaria chemoprophylaxis and b) the trip, including; date of departure, length of time away, the countries to be visited and the areas within those countries (i.e. urban, rural, coastal, altitude), type of accommodation and any planned activities (i.e. adventure sports, disaster relief/aid work, visiting family and friends). Advice for health professionals on how to conduct a pre-travel health risk assessment is available at:
http://www.rcn.org.uk/publications/pdf/travel_health_medicine.pdf

Health professionals are responsible for checking resources for up-to-date advice in case of any change to recommendations.

Scenario One

A 25-year-old female is travelling to the Maldives with her husband on their honeymoon. He is registered at a different GP practice so the caller is only seeing the wife. They leave in three weeks and will be away for two weeks.

She is 14 weeks pregnant with her first pregnancy. One month ago she had a three-day episode of an odorous vaginal discharge, which resolved with a course of antibiotics from the GP. Her past medical history includes stable asthma and anaphylactic reaction to nuts. Her medication includes ventolin inhaler and epipen for use when necessary.

The Maldives islands are located in the Indian Ocean about 700 km southwest of Sri Lanka and 400 km southwest of India. Flights from the UK are about 10 hours in duration; generally flights longer than 6 hours are defined as long haul.

According to the Official Travel Guide for the Maldives.[1]

'The country is made up of 1,190 coral islands formed around 26 natural ring-like atolls, spread over 90,000 square kilometers. Ninety-nine percent of the Maldives is made up of sea. The people of the islands are widely dispersed across the atolls, with about 200 inhabited islands. About 90 islands are developed as tourist resort and the rest are uninhabited or used for agriculture and other livelihood purposes.'

Male' is the capital island and the location of the international airport. In order to get to their resort island tourists then need to make a transfer by ferry (which can take several hours) or by seaplane (which makes a lagoon landing next to the island and tourists walk through the sea to their beach huts. There are two hospitals, both on Male' island, so access from some islands in the archipelago may be difficult to arrange in a medical emergency. The point of providing this information is to demonstrate how knowledge of the geography of a country is useful to inform the pre-travel risk assessment. The risk assessment for this traveller shows that this location may not be a suitable destination for an individual who has complicated medical problems, due to the remoteness of the location and long distance of some resort islands from hospital facilities. It may be that the traveller is not aware of these issues.

General advice for pregnant travellers is available[2] including;

- recommendations to prevent travel-related venous thromboembolism
- vector borne diseases; dengue fever is presumed to be present in the Maldives[3] and could involve complications to the pregnancy
- access to medical facilities; the recent history of infected vaginal discharge may mean an increased risk of pregnancy complications.
- food and water hygiene and the management of traveller's diarrhoea
- recommended vaccines, if not already up to date, would include diphtheria/tetanus/polio and hepatitis A. Typhoid is generally not recommended for those who have access to safe food and water and will exercise care. She may want to consider a course of hepatitis B in case of the need for emergency medical treatment as the Maldives is classified at intermediate risk where 2-7% of the population is infected.[4]
- travel health insurance where she will have to declare pre-existing medical conditions

Additionally she may want to consider carrying ample supplies of medication to manage her asthma and in case of an anaphylactic episode. A medical letter identifying these items[5] may be useful to show

NaTHNaC *continued*

customs officials in the Maldives, to prevent any confusion as to why she is carrying them and in case of the need to seek medical advice during the trip. Medical identification that she has an anaphylactic reaction to nuts should be considered.

Scenario Two

A 9-month-old boy is travelling to Islamabad, Pakistan with his family for his first visit to see grandparents and extended family for 6-8 weeks, leaving in one week. He is breastfeeding, fit and well and up to date with routine vaccines appropriate for his age. He weighs 7.34kg. The caller is calling because of they are unsure concerns if malaria tablets are needed for their destination and if so which dose of should be recommended.

Detailed advice on malaria risks in different countries and malaria chemoprophylaxis choices is available,[6] including specific recommendations for special needs groups such as children. This is an essential resource for all health professionals advising travellers on malaria.

Measles/mumps/rubella vaccine should be considered for this child before this trip.[7] Early administration of the vaccine from six months of age can be recommended if the child is felt to be at risk.

Scenario Three

A 60-year-old male and female couple is travelling to South America on a cruise. They are not sure about the itinerary. The caller is a Practice Nurse, but the clinic is not a registered yellow fever centre. The travellers came because they want a medical exemption letters as they have heard from their friends and travelling companions that the yellow fever vaccine is dangerous for older people. The male is fit and well and on no medication, the female is diabetic and taking metformin, pyroglitazone and ataglitone.

Health professionals who do not work at registered Yellow Fever Vaccination Centres are not obliged to provide advice to travellers on the risks of yellow fever disease or the requirements for a certificate under International Health Regulations as they are not trained to do so. The travellers should be directed to the Yellow Fever Vaccination Centre database[8] which is available on the NaTHNaC website where they can search for a centre in their local area. They can then call around to arrange an appointment. There is currently a shortage of yellow fever vaccine in the UK[9] so it is advised that they make arrangements as soon as possible in case they have difficulty locating a centre which has supplies in stock.

In order for the health professional at the yellow fever centre to complete a risk assessment for these travellers they should take with them details of their cruise itinerary, dates of travel, previous and current medical history, medications and past vaccinations. If yellow fever vaccine has previously been given the International Certification of Vaccination or Prophylaxis (ICVP) is what is needed to prove that vaccine was indeed given, unfortunately travellers' recall of events can be unreliable.

The Amazon Basin area of South America is known to have a risk for yellow fever disease,[10] travelling to that area unvaccinated would be considered unwise. Older individuals who have never received vaccine previously are known to be at greater risk of serious adverse events than the general population;[11] however this is not a contraindication to receiving vaccine rather a precaution. Travellers who are visiting known endemic areas should be made aware of the risks of the disease and the vaccine so that they may make an informed choice.

Other recommendations for their trip can be found on the Country Information Pages once their itinerary is known.

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CASE STUDIES

Travel Vaccinations for Infants: a case study

E Pine

Introduction
This article is based on the vaccination part of the workshop *'Vaccination and Malaria Prophylaxis for Infants'* which was presented in March 2014 at the BGTHA conference: *Maternal and Infant Health from Global and Travel Health Perspectives*.[1]

Background
Travelling children present a particular challenge to Travel Health professionals, a lot of advice is needed to ensure the children and parents remain healthy – both physically and psychologically.[2] This article will focus specifically on vaccinations for infants (up to one year old). With regard to vaccinations, knowledge is needed of both the normal childhood vaccination schedule as well as knowing which country specific vaccinations are suitable for very young children. This case study draws on the author's clinical experience of working with travelling development and missionary families at InterHealth, as well as with infants visiting friends and relatives (VFRs) at Nomad Travel (both clinics located in London).

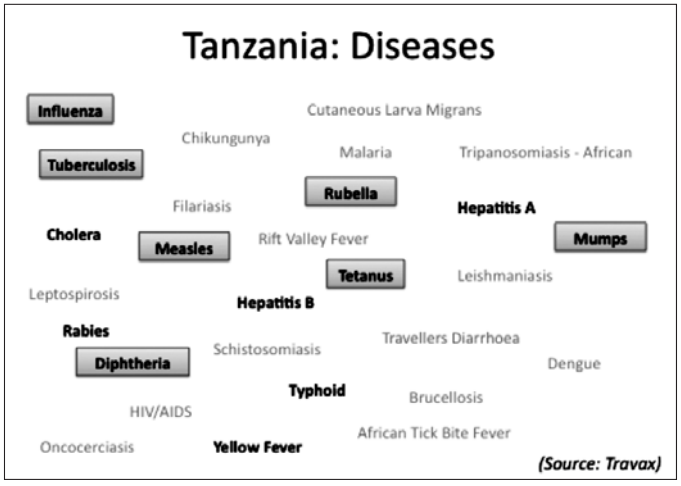
Case Study
A missionary couple have been living in Tanzania for 2 years. They recently returned to the UK to have their first baby, which is due soon. They get in touch to ask for advice on how soon it will be safe to return to Tanzania with their baby… (Please note this is an illustrative example, not an actual couple seen in clinic)

Given the high rates of maternal and infant mortality we continue to see around the world, many expatriate women choose to return to their home countries to give birth, so this scenario is not uncommon at the InterHealth clinic in London. According to World Health Organization (WHO) statistics an estimated 287,000 women died due to pregnancy or childbirth-related complications in 2010 and 6.6 million children under-five died in 2012, of which 44% occurred in their first 28 days of life.[3]

When thinking about how to advise these soon-to-be parents it is useful to cover the following issues:
- What diseases will the baby will face in Tanzania;
- Which of these diseases are vaccine preventable;
- Which vaccines are normally given in the childhood vaccination schedule;
- Which are available as travel vaccinations; and
- What is the minimum age a child can receive the various vaccines.

Databases such as Travax[4] and NaTHNaC[5] can be consulted to find out what travel health issues there are in Tanzania. As demonstrated in Figure 1, many of the possible health issues are not preventable with vaccination, highlighting the importance of travel health advice such as insect bite avoidance and food and water hygiene. Of those vaccinations that are indicated for Tanzania, some are usually given as part of the routine childhood immunisation schedule (Figure 1). The routine childhood immunisation schedule varies around the world but the current UK schedule can be found on the UK government website.[6]

Figure 1
Vaccinations for Tanzania – this figure shows many of the diseases present in Tanzania. Those in Bold are vaccine preventable and those also in boxes are available on the routine childhood immunisation schedule.



Vaccinations advised: UK schedule
- Tuberculosis – the BCG vaccine is given as soon as possible after birth to 'at risk' babies in the UK, so could be requested in this case.
- Tetanus and Diphtheria are given at 2, 3 & 4 months in combination with Polio, Pertussis and Haemophilus influenzae type b (Hib). It would be better if they could wait until after these are completed to move back to Tanzania.
- Measles, Mumps and Rubella (MMR) is not due until 12 months. It can be given from 9 months if necessary but this early dose would be regarded as potentially ineffective due to maternal antibodies so two more doses would still be offered at 12 months and 3 years according to the routine schedule to ensure full protection.[7]
- Influenza – New nasal vaccine available for children over two years old. Injection can be given from 6 months, usually just for high-risk babies.

Travel Vaccinations for Infants: a case study *continued*

Vaccinations advised:
Additional vaccines for travel to Tanzania

- Hepatitis B – Unlike some other countries this vaccine is not currently given routinely to children in the UK, though it can be given from birth if requested. Tanzania has much higher carriage rates of the virus in the population[4] therefore vaccination would be recommended. The parents may have to pay for this vaccine.
- Hepatitis A – Child must be over one year old (food and water advice needed)
- Typhoid – Child must be over 2 years old (food and water advice needed)
- Rabies – Can be given any age if necessary. The decision as to whether or not to give the pre-exposure vaccination course to an infant would depend how easily the child could get to medical attention if an incident occurred (e.g. a bite/scratch from a mammal). If they were going to be based in a main city with clinics close by then the course could possibly be deferred until the child is over 12 months old. Children are at high risk of being bitten by dogs so Rabies vacci nation is a good idea in general,[2] but children under one year may be less at risk of coming into contact with animals as they are often not walking yet and remain close to their parents.
- Yellow Fever – Can be given from 9 months old (6-9 months if high risk). Technically Tanzania is generally not a risk area for Yellow Fever,[5] however families living there may well travel into other countries such as Kenya where the vaccine would be indicated. In this case it may be better to advise the family not to travel into Yellow Fever risk areas until the baby is old enough to have the vaccine safely.
- Cholera – Can be given to children over 2 years but is less effective in children so additional doses are required (food and water advice needed)
- Meningitis ACWY – Although not usually indicated for Tanzania, a child going to live in Africa may travel to risk areas or be exposed to people from endemic regions, therefore vaccination may be considered. The conjugate vaccine Menveo can be given to infants and can replace the single Meningitis C vaccination usually given at 3 months (2nd dose would be needed 1 month later).[8]

Practicalities of Vaccinating Infants:
Parents need to be warned about common side effects such as soreness at injection site, 'flu-like' symptoms, increased irritability and/or tiredness following vaccination. Informed consent must always be gained from the child's parent or carer. Vaccinations are administered into the thigh muscle (anterolateral aspect) of infants up to one year old (Figure 3) and spaced 2.5cm apart if more than one vaccine has to be given in one site.[10] It is vital that the parents are cooperative and help to hold the child still as it is natural for the child to want to recoil away from the needle. Some parents may need to be shown how to hold the child securely. Reassurance should be given to both the child and the parent so that both remain as calm as possible during vaccination.

Figure 2
Table showing the lowest recommended age for vaccinations (from InterHealth Childhood Vaccinations information sheet)[9]

Vaccine	Lowest Recommended Age
Chickenpox (Varicella)	12 months old
Cholera	2 years old
Hepatitis A	Can be given from 1 year old
Hepatitis B	Birth, though often in practice at 6 weeks
Meningitis ACWY	2 months old (Menveo used 'off label')
Influenza	6 months old (at-risk category only)
Japanese Encephalitis	12 months old (unless risk is high)
Measles	12 months old (as MMR) though can be given earlier if high risk *
Pneumoccocal	2 months old
Rabies	12 months old, unless high risk
Rubella	12 months old (as MMR)
TB (BCG)	Birth
Tick-borne encephalitis	12 months
Typhoid	2 years
Yellow fever	9 months (can be considered from 6 months if high risk)

Figure 3
Preferred site for intramuscular and deep subcutaneous injections in infants under one year of age (Green Book p 28)[10]

Possible answer to case study question:
So how soon it will be safe to return to Tanzania with their baby…

As with most of travel health, there is not a definite right or wrong answer to this question. The couple just need advice about what aspects to think about so that they can make an informed decision and plan ahead. Ideally the couple would wait until the baby is over 4 months so that he/she will have had all of the standard childhood immunisations given at 2, 3 and 4 months old as well as the BCG at birth and started the Hepatitis B course. Meningitis ACWY could be given instead of Meningitis C at 3 months old with a booster dose at 4 months old.[8] General travel health advice must also be given to help the baby avoid all of the diseases that there are no vaccinations for.[2]

Whatever age they choose to take the baby back to Tanzania it is vital that the couple find a local clinic there to continue the childhood vaccination schedule, such as the MMR at 9-12 months depending on local schedules. They should be reminded not travel into Yellow Fever risk areas until the baby is old enough to have the vaccination. Hepatitis A vaccine can be given once the child is one year old, and then typhoid vaccine once the child is two years old, emphasise the importance of food and water hygiene. The Rabies pre-exposure vaccination course (0, 7, 28 days) can be given at any time depending on the accessibility of medical care where they will be living in Tanzania.

Although preparing to start a family while based in a country different to your home can be challenging, with sound advice and preparation this couple and their baby can hopefully stay healthy and enjoy the experience.

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Community Participation and Maternal Health: Case Studies from Peru and Malawi

N Vidal, I W Uny

Abstract
This article examines the role of community participation in improving maternal health outcomes in low and middle income countries. Global interventions emphasising facility-based care and institutional deliveries have undoubtedly resulted in maternal health improvements in many regions. Despite some of these advances however, maternal mortality remains a significant problem among poorer disadvantaged communities. In settings where socio-cultural and systemic barriers affect the accessibility and quality of maternal health services, facility-based care is still largely inaccessible to many women. The lack of progress towards improving maternal health services in these areas indicates possible gaps in such approaches. The role of community participation in the development and implementation of maternal health interventions is thus explored as a complement to facility-based interventions. Drawing on the authors' respective on-going research in Peru and Malawi, this article examines the role of community participation in support of maternal health. The

Community Participation and Maternal Health: *continued*

country examples highlight the importance of communities taking part in the development and implementation of activities designed to meet their health needs. Collaboration between communities and health professionals is identified as an essential component to improving the accessibility and quality of maternal health services. Accordingly, community-level providers of care can be a valuable resource to their communities provided they receive sufficient support from the health system.

Introduction

For women in developing countries, pregnancy and childbirth can carry much greater risks than for women in high income settings. Every year, more than 287,000 women die as a result of pregnancy or childbirth related complications. Approximately 99% of these largely preventable and avoidable deaths occur in low and middle income countries. With relatively limited access to maternal health services, the risk is even higher for women living in rural areas and among poorer communities.[1]

Most of these maternal deaths result from complications which develop during pregnancy and are usually exacerbated by a high prevalence of undernutrition, infection, and diseases such as malaria and HIV/AIDS.[1] A number of systemic and socio-cultural factors such as geographic isolation, poor infrastructure, and cultural appropriateness affect the accessibility and quality of maternal health services. As a result, in many low and middle income countries, pre- and postnatal pregnancy care and childbirth often occur in the community rather than in health facilities, heightening the risk of complications.[2]

Global approaches to improve maternal health have concentrated on ensuring skilled care before, during and after childbirth and promoting facility-based deliveries. However, despite the emphasis on skilled attendance and institutional care, many women are still reluctant or unable to use formal health services. This article examines this problem and reflects on the social context underlying barriers to the access and use of maternal health services. Drawing on the authors' respective doctoral research in Peru and Malawi, this article critically examines the ways in which community participation can serve as an important component of maternal health service delivery and utilisation. The regional case studies provided illustrate both bottom-up (Peru) and top-down (Malawi) examples of how the successes or failures of community initiatives to improve maternal health are influenced by the degree of support received from the formal health system. The argument is made that providing formal support to community-based care providers plays a crucial role in improving the accessibility and quality of maternal health services.

Facility-Based Care

Although maternal mortality rates have fallen by nearly half since 1990, maternal health remains a significant public health concern among many disadvantaged communities.[3] Strategies to improve maternal health generally focus on the clinical treatment and prevention of complications, such as ensuring women receive proper care throughout the pregnancy and postpartum period, and that all childbirths are attended by skilled health professionals.[1] Regardless of these known health care solutions, many women in low and middle income countries still face challenges when seeking or receiving care. Barriers impeding the use of services, for example often include avoidance of health facilities due to differing cultural expectations over the way services should be carried out, or perceived discrimination towards health seekers on the basis of gender, ethnicity or class.[4] This lack of progress towards maternal health among some communities indicates possible gaps in the strategies used. In settings where pregnancy care and delivery may at times be community-based, understanding the role of community involvement in the planning, organisation and implementation of health care interventions merits further analysis.

Community Participation

Previous studies have shown that involving communities in the development of activities geared to meet their own health needs can be of benefit to the communities involved.[5,6] Contributing their knowledge, expectations and experience into health care interventions can, for instance result in health seekers feeling greater trust in the health services offered to them, potentially resulting in increased utilisation of services and greater accountability among providers.[7] Despite this awareness, community-based approaches have shown poor sustainability when taken to scale, resulting in decreased emphasis on community-led interventions.[2] In the past, community mobilisation initiatives aimed at improving maternal health, such as nutrition training for caregivers[8] or breastfeeding promotion[9] were generally designed with community members acting as passive recipients of targeted outcomes.[2] In contrast, an active community participation approach focuses more on the process of health improvement, rather than just the outcome. More recent successful interventions have demonstrated that empowering individuals in poorer households to be involved in the development, implementation and evaluation of activities designed to improve their health grants a greater chance of participation and thus sustainability.[2]

Case Study: Community Health Workers in Peru

Community participation plays an integral role in Peru's national primary health care programmes.[10] One such example of community health improvement

initiatives involve Community Health Workers (CHWs) who are trained and equipped to provide valuable maternal health support to rural communities.[11] Despite its status as a high middle income country, Peru has the second highest maternal mortality rate in South America.[4] Characterised by extreme levels of inequality, nearly one third of the population lives below the national poverty line.[12] The hardest hit are among the indigenous population, in particular those living in remote Andean communities where access to basic health services remains a problem. The main underlying causes of Peru's high maternal mortality rate can be attributed to a number of social and systemic barriers, including poverty, shortages of equipment and services, poor employment incentives for medical staff, and language, culture and ethnic divisions. Consequently, many indigenous women are reluctant to visit health facilities, fearing poor treatment from health professionals or being charged fees for services which are meant to be free.[13]

Elected within and by local communities, CHWs are trained by local health professionals to provide basic health promotion and medical support. They come from the communities they serve. For that reason, they understand the varying hardships their neighbours face when seeking health services.[11] CHWs are thus often the first point of contact for rural pregnant women needing care. The relatively frequent contact between CHWs and health professionals during training provides a means for mutual collaboration to ensure the needs of the communities are being met. This can be beneficial for identifying ways to strengthen the quality of care and increase utilisation of maternal health services. In fostering such relationships, CHWs can provide a vital link between rural community members and health professionals, thus constituting a valuable community-level resource for enhancing facility-based care.

Case Study: Traditional Birth Attendants in Malawi

In Malawi, where half the population lives below the national poverty line, and 85% live in rural areas, maternal mortality is still high.[14] A woman in Malawi for instance has a 1 in 36 chance of dying in childbirth during her lifetime. This stands in stark contrast to the UK, where the odds of a woman dying during labour are 1 in 4700.[15] Malawi's high maternal mortality rate is often attributed to health system related factors such as the lack of skilled birth attendants and the scarce availability of emergency obstetric care,[16] as well as other social determinants such as poverty and gender inequity.

Traditional Birth Attendants (TBAs) are traditional community-based providers of care independent from the formal health system who attend to women during pregnancy, childbirth and the postpartum period.[17] In the past they were trained and played an important part in providing services to undeserved communities. However, from the mid-1990s onwards, the large-scale training of TBAs was abandoned in favour of policies seen as more effective for the reduction of maternal mortality; namely the promotion of skilled birth attendance and the availability of 'enabling environments'.[14] Consequently, in 2007 the Malawian government redefined the TBA role, preventing them from conducting deliveries, and tasking them with referring patients to health facilities. This new policy has led to a lack of linkages between TBAs and the formal health sector. In the context of a decreasing but persistent shortage of skilled birth attendants and of available and adequate facility-based care, this new TBA policy has proven problematic for the 29% of Malawian women still delivering outwith facilities[15] either alone or with the help of a family member. TBAs, if properly linked with the formal health system, could still form a valuable resource for the most isolated women in Malawi's rural communities.

Discussion

The above case studies portray two different examples of community-level approaches in support of maternal health needs. The CHWs working in Peru's rural communities represent an active community-led support network capable of providing valuable care to their own communities. However, because they are trained and overseen by health professionals, they are also linked to the health system. Having ties with both the communities as well as the formal health system places CHWs in a unique position to increase collaboration between each, thus developing mutually beneficial responses to community health needs. Interventions aimed at promoting facility-based care and institutional deliveries can therefore be enhanced through a bottom-up approach in which communities play an active role. This case demonstrates that involving the community in the process of developing and implementing maternal health support activities can have a positive influence on the accessibility and quality of maternal health services.

The Malawi case, in contrast highlights the negative ramifications of the lack of health system support. The redefined role of TBAs in Malawi as implemented by the government has resulted in disassociation from the health system. The lack of consultation at community level, and the inadequate way in which the government guidelines were communicated to community actors such as TBAs appears to have led to confusion, uneven compliance and reluctance to partake in the country's new safe motherhood initiative. A top-down blanket ban on TBAs, where the necessary conditions for women to receive adequate facility-based care, has not yet been uniformly met has thus appeared to have some problematic side effects at the community-level.

Community Participation and Maternal Health: *continued*

Conclusion

Maternal mortality remains a leading public health concern in low and middle income countries. Improving the accessibility and quality of maternal health services is a widely known solution to preventing and treating complications which may occur during pregnancy and childbirth. This article has explored the role of community involvement in interventions aimed to increase the utilisation of facility-based care. The examples from Peru and Malawi suggest that given sufficient support from the health system, community-level care providers can foster links between communities and health facilities, thereby increasing collaboration between each. Maternal health interventions in which health and development professionals provide support to local communities to address their own health needs should thus be considered a valuable resource.

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BGTHA Conference Report 2014

E Pine and M Townend

This was the 16th Annual Scientific Meeting of the British Global and Travel Health Association (BGTHA). For the first time this conference ran in conjunction with the Institute of International Health and Development at Queen Margaret University and the student global health organisation Medsin. It was interesting sharing experiences and ideas between the 'Travel Health' and 'Global Health' worlds. The theme of the conference this year was on *Maternal and Infant Health from Global and Travel Health Perspectives*.

Although much of the conference material was not directly 'travel health' related, it is increasingly recognised that the Travel Health community should be taking more interest in the realities faced by local people in countries visited by UK based travellers, as health threats to travellers are inseparable from health threats to the local population.

The first plenary talk was by Mary Hepburn, a Consultant Obstetrician from Glasgow who has extensive experience working overseas as an obstetrician and gynaecologist. Her lecture was titled ***'Women's reproductive health – inequalities and challenges in providing services'***. This was a fascinating talk, which highlighted the impact of huge inequalities in maternal healthcare provision both at home in Glasgow and overseas.

Poverty has a direct impact on health leading to higher rates of adverse outcomes, and higher rates of drug and alcohol abuse, violent relationships etc. This situation is perpetuated generation after generation. Mary highlighted that investing in maternal health is the best investment to make as it can break the cycle by helping to raise a new generation of healthy children.

Women's needs are the same world over. For disadvantaged women to access healthcare and make positive changes to their life in pregnancy they need:

- Non-judgmental services
- Understanding and compassion
- High standards of care

Pregnant women actually change their behaviour more than any other group in society but often instead of being praised for what they do achieve, they are often criticised for not being perfect. Health care professionals need to recognise the realities of people's lives and provide compassionate support instead of judging and expecting unrealistic objectives to be met, balancing the needs and rights of the unborn child with needs and rights of the mother.

There were three workshops:

'Breast-Feeding practices – African and UK comparisons' led by Rosie Shields (pharmacist and medical student) discussed the challenges related to the promotion of breast-feeding and the rates of breast-feeding in various countries, with the UK coming bottom of the list! WHO recommends exclusive breast-feeding up to 6 months, then the introduction of solids but continuing to breast-feed until the age of 2 years.

Percentages of children still being breast-fed at 6 months of age: Rwanda 85%, Malawi 72%, Norway 15%, USA 14% and UK 1%!!

Rosie talked about the impact of the availability and promotion of formula milk, and the fact that in many countries, like the UK, breast-feeding has become 'abnormal' and continues to be not accepted in many public areas like restaurants. Apparently Scotland has now made it illegal for a mother to be asked to leave a location for breast-feeding her baby in public. In many countries such as in Africa where there may be limited access to clean water and sterilising equipment, breast-fed children are 6 times more likely to survive.

Rosie gave the example of Ghana as a illustration of how things can be turned around. In Ghana it was tradition to give newborns a sugary liquid at birth, but this was most likely made with unclean water, contributing to diarrhoea disease and infant death. Colostrum was seen as 'dirty', so not given to babies. Also breast-feeding had gone out of fashion with rates as low as 2% in 1993. The government tackled this by re-educating and also media campaigns aimed at fathers that told them 'if you want strong, healthy babies encourage your wife to breast feed'. By 2008 rates had increased to 63%!

Health care for migrants and refugees

Ann MacDonald led this workshop. Children develop and grow in a safe and stable environment. When asylum seekers flee their countries due to war, persecution and civil unrest, they may face barriers in trying to rebuild that environment for their children in a new country.

The aim of this workshop was to provide an interactive session to consider and discuss the health and social care needs of families seeking asylum. It also addressed some of the issues around providing culturally sensitive and competent care for families seeking asylum with babies and young children.

The global challenge of infections which can pass from mother to baby

In this workshop Eric Walker considered the numerous infections that can be transmitted through the placenta or during and shortly after birth. In countries with high infant mortality rates often related to complications of pregnancy, low birth weight and prematurity the consequence of these infections may not even be noticed or seen as a low priority. The problem is compounded by lack of

BGTHA Conference Report 2014 *continued*

resources and diagnostic facilities.

The next plenary talk was titled ***'Mind the Gap: Connecting Maternal and Child Health'*** by Wendy Graham, Professor of Obstetric Epidemiology in Aberdeen. This was an interesting talk that opened with a photo of a hospital sign-post in Africa showing the mortuary, maternity and paediatrics wards all in the same building, which is apparently common because those groups have the highest death rates!

She discussed the Millennium Development Goals, and highlighted that although there has been some progress since 2000, the reduction in infant and maternal mortality goals will not be achieved by 2015. She highlighted some of the bottleneck issues that have been slowing the progress and encouragingly suggests ways that the gaps can be bridged so that progress can be made:

- *Equality* – large gaps between the 'risk of dying' in different countries. Highest risk of maternal deaths is in India, Nigeria, Pakistan, with the poor at highest risk.
- *Gender* – Maternal deaths are much more than a medical issue; there are huge social determinants, especially when women's services are disadvantaged. Women need to be empowered through women's groups, microcredit etc to have freedom of choice and control of their reproductive lives.
- *Services* – Disjointed; care is not joined up or continuous. E.g. if a mum has to trek for 6 hours to bring her child to have vaccines, it would make sense to run wellbeing clinic for mum at the same time rather than expect her to make the journey again another day. Also the issue of vertical interventions with constraints of how money is spent; Wendy gave the example she has seen of Oxytocin injections not being allowed to be kept in the fridge with vaccines in a rural clinic as they were from separate funding, so were left on the shelf and no longer effective. Care needs to be safe, effective and a good experience for the patient.
- *Quality* – the quality of care can be improved by working with local providers. Find local solutions that are locally owned.
- *Sector* – huge disparity between where money is spent e.g. there has been a big push to provide clean piped water into hospitals to improve sanitation but not so frequently provided into labour wards.
  (see www.soapboxcollaborative.org)
- *Evidence* – Wendy talked about how long it takes to get evidence into practice. Apparently there was an article written by A. Gordon in 1795 stating that 'poor hygiene at the time of delivery leads to increased infection rates in mum and baby', this was later confirmed by Pasteur and Germ Theory in general, yet clean water and basic hand-washing facilities are still often not available during delivery in many countries. She joked that this must be the longest evidence gap in history. Apparently one million mums and babies die just because of unclean birth.

Rather than constantly asking for more funding for overseas development, there is huge scope for better use of existing funding to get more health for the money – think and work locally. There needs to be appropriate care for appropriate needs, there is now a situation where the rich have over-medicalised births and the poor have no interventions available when they are needed during delivery complications.

Three further workshops covered:
'Maternal Health: Health Systems and Community Mobilisation' by Isa Uny and Nicole Vidal, who are PhD candidates researching the roles of Traditional Birth Attendants in Malawi and community approaches to improving maternal health services in the Peruvian Andes respectively. Both Isa and Nicole gave a brief talk about the research they are doing followed by two discussion groups.

Malawi: Traditional Birth Attendants such as experienced grandmothers who help with the delivery of babies in remote villages have now been banned by the government in Malawi. Fines are imposed if they are found to be helping with childbirth unless 'unavoidable'. Women in Malawi have a 1:36 chance of dying in childbirth (here is 1:4700) with a ratio of 1 doctor for every 2000 births.

Peru: Nicole discussed the role of community health workers in remote villages in the mountains in Peru. New government stipulations state that that women must come down from the mountains to urban centres or towns with hospital facilities to give birth. However this means leaving behind other children, family support, jobs on farms and in the home etc. Also means having to trek for hours down steep slopes while in labour and with a huge bump in front of them!!

The workshop then discussed the pros and cons of the two approaches such as safety and cleanliness in hospitals and disease risks to the traditional birth attendant as they are without gloves etc to protect themselves. On the other hand women may make the journey to the hospital only to find that the staff are absent and have to give birth with no support. Lack of money for transport to hospital with 20-40km to walk, or lack of the husband's permission to leave the village, disrespect from medical staff if they do go to hospital, are other barriers to attending hospital. It was suggested that in the past TBAs would report a maternal death, however now that they would get fined for being illegally involved, the death may go unreported and falsely contribute to the reducing maternal mortality statistics.

Child health:
the case of the Pulse Polio Initiative in India
This workshop was led by Professor Patricia Jeffery, assisted by Anuj Kapilashrami. In the post 1945 era, child immunisation programmes have been a central part of global and national efforts to improve child health. From 1988, polio was the focus on the Global Polio Eradication Initiative, which became a national programme in India under the Pulse Polio Initiative in 1995. India was deemed to be 'polio-free' in 2011. The PPI, however, has been surrounded with controversy that suggests a need to temper the WHO's triumphalist accounts of polio eradication in India with considerable caution. Critiques of the PPI range across numerous issues: the choice of vaccine (live attenuated oral vaccine rather than inactivated injectable vaccine); ethical concerns about vaccine efficacy and safety (the connection between oral vaccine and VAPP or vaccine associated paralytic polio and acute flaccid paralysis more generally); the statistical basis for claims that PPI has successfully eradicated paralytic polio from India; concerns about single-issue campaigns (that PPI diverts staff effort and other resources from other arguably more pressing health-related activities); wider socio-political issues (informed consent, immunisation programmes and minorities, low priority of polio compared with other childhood ailments for local people, origins and drivers of the GPEI from global north rather than global south).

Understanding mortality in unregistered populations: developing health surveillance and participatory methodologies for health systems strengthening in resource-poor settings.
This session, led by Lucia d'Ambruoso and Bregje de Kok, examined the relationships between evidence and policy in the field of maternal health. The session considered the strengths and limitations of conventional analytical approaches to monitor progress towards global maternal health goals, and the potential of holistic and participatory methods for more robust renditions of complex problems. Drawing on applied research using health surveillance and community-based participatory research to study maternal mortality and severe obstetric morbidity in Indonesia and Burkina Faso, the session worked through the limitations of conventional analytical approaches and explored developments that aim to provide integrated explanations of the individual, structural and health systems mechanisms of causation. Participants were shown the value of interdisciplinary perspectives in applied research, and on the implicit and potentially limiting assumptions regarding knowledge and responsibility for its production.

After lunch the focus shifted to travel health with Fiona Genasi leading the final plenary talk on ***'Pregnancy and Travel'***. She started by pointing out that pregnancy is not a disabling condition and that many women, herself included, travel when pregnant. Then to demonstrate the point she asked women in the audience to put up their hands up if they had travelled abroad while pregnant, many hands went up.

Many of the minor problems in pregnancy are the same whether at home or abroad, they can just sometimes be more difficult to manage away from home, requiring careful thought and planning. Miscarriage is not more likely with travel but is harder to manage and cope with abroad. Ectopic pregnancy can be potentially life threatening. Premature labour at 24-26 weeks requires access to expert care and facilities that may not be available in the country. If medical interventions are needed there are often some good facilities in urban centres but not in rural areas. Facilities may be inaccessible, equipment may be unsterile, gloves etc may not be available, drugs used may be counterfeit – either ineffective or dangerous, and medical skills may be lacking with an over-enthusiasm for surgical interventions.

Preparing the pregnant traveller. If travelling while pregnant it is advisable to check out the local medical facilities if possible or seek advice about where the good facilities are located e.g. ISTM clinic finder. It is useful to carry obstetric notes in case follow on care is needed abroad. Ideally travelling should be done in the 2nd trimester at 18-24 weeks: morning sickness would usually have passed by then, scans have been done to check for ectopic pregnancy etc, the 'bump' is not so big yet and the delivery date is not imminent with less risk of giving birth abroad.

Airline restrictions in later pregnancy must be considered and the woman may need to carry a doctor/midwife letter stating the due date in case of questions by airline staff. Insurance is important, needs to cover outcomes of pregnancy e.g. premature birth, miscarriage etc which may require medical interventions. Insurance often does not cover the baby, which is costly if it is born early and ends up needing services like neonatal intensive care.

Vaccination in pregnancy is always a balance of risk vs. benefit. Ideally one would prefer not to give anything to pregnant women, but if they are travelling and at risk of a disease then it is better to give the vaccine as we know there is very little chance of any harm to the baby compared to what the disease would do to mother and baby. Inactivated or killed vaccines are generally felt to be safe. Ideally one should avoid live vaccines in pregnancy, although there is very little evidence of live vaccines causing harm to the baby, so they can be considered in high risk cases, but always seek further advice. For example: Yellow Fever; apparently in the USA YF antibody levels are checked if the woman has had the YF vaccine in the past to decide if further vaccines are really necessary during

BGTHA Conference Report 2014 *continued*

pregnancy. An exemption certificate could also be given if the woman has had the vaccine in the past as WHO believe the protection is long lasting from one vaccine.

Deep vein thrombosis is a higher risk in pregnancy so there is a need to give advice about staying hydrated, mobilising frequently etc. (see Travax advice sheet on DVT).

Final three workshops:
Emley Pine led a session on ***'Vaccines and Malaria Prophylaxis in Infants'***. This workshop focused on vaccine and malaria options for infants. Although the standard advice is not to take young children to malaria regions because of the dangers to their health, in reality many parents do. Drawing from experience of advising families visiting friends and relatives in malaria regions, as well as aid and missionary families moving overseas, this workshop explored the practicalities of protecting infant travellers. This includes discussing which vaccinations may be suitable for infants, UK national schedule vaccines, minimum ages that vaccinations can be given, and the suitability and practicalities of the malaria medication options for very young children.

Travelling with young children. Using her personal experience of travelling as a VFR to Pakistan with her own children, Margaret Umeed addressed the practical problems of travelling with infants and young children up to the age of 2 years. A wide range of issues were discussed, to including infant feeding – both breast and bottle –, maintaining adequate hydration and hygiene, coping with diarrhoea and vomiting, weaning and mixed feeding, recognising challenging behaviour, prevention of animal and insect bites and coping with illness.

Peter Barry**,** ably assisted by his two children, led a session on ***Infants at high altitude.*** Using a selection of case studies, this workshop discussed the problems of travelling with an infant to high altitude. In the absence of 'high quality' information, much rested on the application of common sense, evidence supported decision making, and the interpretation of data from other situations, primarily adult data and infant data from paediatric and neonatal intensive care. The session discussed the medical and physiological problems of infants born at low altitude who are then taken to high altitude, and compared and contrasted these with the problems of those born at high altitude.

Book Reviews

Prostate Cancer. Diagnosis and Clinical Management Ed
K Tewari, P Whelan, J Graham.

Wiley-Blackwell, Chichester

Prostate cancer is the most common non skin cancer diagnosed in males and a leading cause of death. 5 year survival rates have been increasing as a result of earlier detection and more purposeful treatment. The state at which the cancer is identified is a major contributor in determining survival. Screening over-diagnosis of preclinical cancers which may never progress clinically is however a major concern. Mortality rates vary between countries and regions of UK, dependent in part on screening procedures, management and treatment.

This multi-authored book provides a comprehensive review of all aspects of the disease, screening and treatment. Authors have international status and are drawn from many countries. Identification, screening procedures, management of localised and metastatic disease is considered in detail. The hope is that the condition can be turned into a chronic rather than a terminal condition. This book will update practitioners on the many therapeutic approaches available and their limitations. With this knowledge they can guide patients through the bewildering number of treatment options available, including non-treatment with active monitoring.

It includes current, evidence based guidance on diagnosis, treatment and management and is practical with key issues discussed by experts in their field. The need for a strong accurate biomarker for screening is highlighted with new ones under investigation. Best practice in clinical care includes topics on counselling newly diagnosed patients, localised disease options, radical surgery and management of metastases and terminal care. The epidemiological chapter is biased towards US statistics and there is undue emphasis on state of art management and philosophies in North America in some chapters, but there is much within to promote better awareness of the disease, its identification, screening and treatment for the UK urologist, family doctor and specialist nurse.

IBM

Minor Injury and Minor Illness at a Glance
Ed Morris, F Wardrope, J Ramlakhan S

Wiley Blackwell Pub Chichester £25.99

This book is part of the At a Glance series recognised by their concise, succinct presentations of content and excellent illustrations. The large format ensures that the many pictures which support the text are clear and add value to script which covers the most common presentations encountered in gp surgeries, pharmacies and minor injury units. The material provides a valuable aid for the inexperienced health professional in identifying and managing conditions and separating wheat from chaff in seriousness. Double page spreads provide quick, access to information with important diagnoses flagged for special attention. Short answer questions test the readers learning with access to on-line flash cards for review. This is a useful support tool for students, gp trainees, pharmacists and inexperienced health professionals.

Journal Watch

Edited by M Townend & J Moore

Travel to Brazil: analysis of data from the Boston Area Travel Medicine Network (BATMN) and relevance to travellers attending World Cup and Olympics.
Iliaki E, Chen LH, Hamer DH et al.
Journal of Travel Medicine DOI: 10.1111/jtm.12117

Of 599 travellers to Brazil over a two year period, the participants in this study found that 71% were given yellow fever vaccine, 58% typhoid vaccine and 50% hepatitis A vaccine. Only 14% were given influenza vaccine and 11% hepatitis B vaccine. 60% travelled during the peak influenza season and around 25% during peak dengue transmission.

Comment
This study highlights the importance of adequate risk assessment and pre-travel advice for travellers to the 2014 World Cup and the 2015 Olympic Games. Appropriate travel vaccinations, including influenza, antimalarial prophylaxis and precautions against mosquito bites must be discussed.

Hepatitis A vaccine for immunosuppressed patients with rheumatoid arthritis: a prospective, open-label, multi-centre study.
Askling HH, Rombo L, van Vollenhoven R et al. Travel medicine and Infectious Disease 12 (2): 134-142, March 2014

Patients being treated with tumour necrosis factor inhibitors (TNFi) and/or methotrexate (MTX) for rheumatoid arthritis are immunosuppressed. In this study 53 non-immune patients being treated with one or both drugs (n = TNFi 15, TNFi + MTX, MTX 21) were two doses of hepatitis A vaccine at six month intervals. Serological tests for HAV-IgG were carried out post-vaccination. One month after the first dose 10% seroprotection was achieved, rising to 33% at six months. One month after the second dose 83% seroprotection was achieved, but this had fallen to 72% after six months. After 24 months 84& showed protective levels of antibodies.

Comment
Immunosuppressed patients clearly have increased susceptibility to infection but their response to vaccination, depending as it does on the function of the immune system, is also likely to be reduced. This study demonstrates that, although one dose of hepatitis A vaccine is inadequate to protect this particular group of immunosuppressed patients, a satisfactory response is achieved after two doses of vaccine.

Single-dose radical cure of Plasmodium vivax: a step closer.
Price RN, Nosten F. Lancet 3831020-1021, March 2014

In this Lancet editorial the authors cite a paper by Llanos-Cuentas A, Lacerda MV, Rueangweerayut et al describing the use of a single-dose of tafenoquine to eliminate hypnozooite stages of Plasmodium vivax from the liver, thereby achieving a radical cure. Six months after this treatment along with chloroquine to treat erythrocytic stages, 89.2% of patients were free of Plasmodium vivax compared with 37.5% who received chloroquine alone.

Comment
It remains to be seen whether or not tafenoquine is more effective than primaquine, which was not fully addressed in this paper. Also it should be noted that tafenoquine, like primaquine, increases the risk of haemolysis in patients with G6PD deficiency. However, in this study the mean fall in haemoglobin levels a week after treatment was 0.6% compared with 2.2% after chloroquine alone and 1.4% after chloroquine plus primaquine, though patients with G6PD activity below 70% were excluded from the study.

Illness and injury to students on a school excursion to Peru.
Shaw MTM, Harding E, Leggat PA.
Journal of Travel Medicine. DOI: 10.1111/jtm.12105

The second author of this paper acted as physician to a group of 29 schoolgirls (mean age 16 years) and 6 accompanying adults. She diagnosed and recorded all illnesses and injuries during the trip, which lasted for 21 days. In all, 32 (91%) of the group sought medical advice at least once, with a total of 371 consultations and 153 separate diagnoses. Conditions recorded were: gastrointestinal 37%; respiratory 16%; altitude problems 12%; genitourinary 5%; dermatological 7%; trauma 7.5%; neurological 7.5%; anxiety or adjustment problems 7.5%; adverse drug reactions 3%; musculoskeletal 3%. The most commonly used medications were antidiarrhoeals and antiemetics. Six accidents occurred, all resulting in minor soft tissue injuries. There were no deaths, major accidents, emergency evacuations or hospital admissions.

The authors concluded that the health problems encountered were consistent with those reported by other specialised tours or expeditions, but point out that altitude problems need to be planned for in those tours travelling to high altitude destinations. They also point out that the inclusion of a physician with appropriate medical supplies increased the independ-

Journal Watch *continued*

ence of the group, and suggest a medical kit for such trips.

Comment
The findings in this paper are broadly consistent with your reviewer's own experience as a doctor and/or leader of similar trips, albeit with adult participants. The importance of having a doctor or other suitably qualified medic as leader or as a member of the group is not fully appreciated by all tour operators sending groups to long-haul or high altitude destinations, though at least one such operator uses only medically qualified leaders for this type of trip. The importance of pre-expedition planning and the use of a medical kit appropriate to the activities being undertaken are rightly stressed.

Incidence and spectrum of health problems among travellers to Laos.
Watcharapong P, Catporn K, Saranath L et al.
Journal of Travel Medicine. DOI: 10.1111/jtm.12107

A questionnaire was administered to 1205 Thai nationals (median age 43 years, average stay 3.8 days) and 1191 foreign nationals (median age 32 years, average stay 16.1 days) at border crossing between Thailand and Laos. 66.6% of foreign nationals were from Europe, 19% from Asian countries other than Thailand and 7.1% from North America. 47.8% of non-Thai travellers were individual backpackers, but the majority of Thais were package tourists. 24.9% of foreign travellers experienced health problems, most commonly diarrhoea, cough, animal exposure and fever, but only 6.1% of Thais reported health problems, most commonly cough and diarrhoea. The occurrence of health problems was associated with younger age groups, non-Asian nationality, length of stay and participation in adventurous activities.

The authors conclude that health problems are more frequent among non-Thai travellers compared to those of Thai nationality, and that there were significant differences in risk profiles and health problems between these two groups.

Comment
Travel to Southeast Asian countries such as Laos has become more accessible to travellers from Europe and North America in recent years, and many tour operators now include Laos in their brochures, often in conjunction with visits to other countries such as Thailand, Cambodia and Vietnam. Thailand has long been popular with individual travellers, backpackers and gap year students, many of whom also now include Laos in their itineraries. This paper highlights the increased health risks to non-Asian travellers to Laos, especially in the younger age groups with higher risk profiles. Pre-travel advice to minimise these risks is of great importance, but unfortunately experience shows that it is less likely to be sought by those travellers who need it most.

Measles outbreak on a cruise ship in the Western Mediterranean February 2014, preliminary report.
Lanini S, Capobianchi MR, Puro V et al.
Eurosurveillance 19(10), 13 March 2014

27 cases of measles were reported amongst crew members on a ship sailing on regular 7 day cruises in the western Mediterranean. The ship carries a crew of 1000 of mixed nationality and up to 3750 passengers and calls at ports in France, Italy and Spain. Crew members originated from 4 continents with a majority from Asia, and others from Europe, South America, the Caribbean and Africa. Passengers originated mainly form France or Italy, and the remainder from Germany, Britain, Austria and Spain. 22 or the reported cases were laboratory confirmed and the remaining 5 were classified as probable cases.

Comment
There has recently been a resurgence of measles in the UK. In 2013 there were 1413 laboratory confirmed cases, but reporting fell from a peak of almost 300 in April of that year to only 8 in November.[1] Although the estimated vaccine coverage in 10-16 year olds was around 95%, the resurgence was considered to be due to pockets of relatively low vaccine coverage in some areas.[2] In this report of the outbreak on a cruise ship it is of interest that cases were found only amongst crew members, who originated from countries where vaccine coverage may not be as high as it is in most areas of the UK. No cases were reported amongst passengers, who all originated from European countries which are likely to have higher rates of vaccine coverage.

Measles vaccine may not usually be thought of as a travel vaccine, but this outbreak draws attention to the possibility of infection with measles in non-immune travellers, especially within the relatively close confines of a cruise ship.

References:

1 Health Protection Report Volume 8 Number 8. 28 February 2014.
2 Evaluation of vaccine uptake during the 2013 MMR catch-up campaign in England: Report for the national measles oversight group. Public Health England 28 February 2014.

A multi-stage malaria vaccine candidate targeting both transmission and asexual parasite life-cycle stages
Michael Theisen, Will Roeffen, Susheel K. Singh, Gorm Andersen, Linda Amoah, Marga van de Vegte-Bolmer, Theo Arens, et al.
Vaccine, Volume 32, Issue 22, 7 May 2014, Pages 2623-2630

Effective control and eventual eradication of malaria drives the imperative need for clinical development of a malaria vaccine. Asexual parasite forms are responsible for clinical disease and death while apathogenic gametocytes are responsible for transmission from man to mosquito. Vaccines that combine antigens from both stages may provide direct protection and indirect benefit by reducing the force of infection. We constructed a chimeric antigen composed of a fragment of the Plasmodium falciparum (Pf) glutamate-rich protein fused in frame to a correctly folded fragment of Pfs48/45. The chimera was produced in Lactococcus lactis and induced robust antibody responses in rodents to the individual components. Specific antibodies showed strong transmission blocking activity against multiple Pf-strains in the standard membrane feeding assay and functional activity against asexual stages in the antibody dependent cellular inhibition assay. The combined data provide a strong rationale for entering the next phase of clinical grade production and testing

Deep Accidental Hypothermia with Core Temperature Below 24°C Presenting with Vital Signs.
Pasquier, Mathieu, Zurron N, Weith B, Turini P et al. High Alt Med Biol.15:58–63, 2014

The authors describe a patient presenting with stage III hypothermia with vital signs but a core temperature of <24°C, and a literature search for similar patients. MEDLINE was used to search for cases of deep accidental hypothermia (<24°C) and preserved vital signs.

22 cases were found in addition to the index case (*n*=23). Median age was 44 years (IQR 36; range 4–83) and median core temperature 22°C (IQR 1.7; 17–23.8). Vital signs were often minimal. Seven patients developed ventricular fibrillation (VF). Twenty patients survived with excellent neurological outcome. The authors conclude that vital signs can be present in hypothermic patients with core temperature <24°C. They recommend that in deeply hypothermic patients, a careful and prolonged check of vital functions should be made, as vital signs may be minimal.

Comment
The authors point out that according to the Swiss hypothermia clinical staging, patients with stage III are unconscious with preserved vital signs, with core temperature usually between 24° and 28°C. With stage IV, vital signs are absent with core temperature <24°C. Although the Swiss staging scale remains a useful guide in the field these cases show that even in deeply hypothermic patients.

Prevalence of Acute Mountain Sickness at 3500m Within and Between Families: A Prospective Cohort Study
Kriemler S, Bürgi F, Wick C, Wick B et al. High Alt Biol Med. 15:28—38, 2014

This paper investigated symptoms, prevalence and associated factors of acute mountain sickness (AMS) in families upon a fast ascent to 3450?m. 87 children, 70 adolescents, and 155 parents (*n*=312) were assessed for AMS 8–10 and 20–24 hours after fast passive ascent by the Lake Louise Score (LLS). Pain sensitivity and oxygen saturation (SO_2) were measured and familial clustering was assessed.

AMS prevalence was significantly lower in children (21%) compared to adolescents (34%) and adults (39%) on day 1 ($p<0.05$), but not on day 2 (18% vs. 19% and 25%). Cumulative prevalence of AMS was 30, 37, and 45% in children, adolescents, and adults, respectively ($p<0.001$). Familial clustering of AMS was consistent and explained 25%–50% of variability in AMS. Pain sensitivity significantly increased from low to high altitude and was higher at low altitude in those with compared to those without AMS. SO_2 at high altitude was not related to the presence of AMS. The authors conclude that since AMS prevalence was lower in children than in adolescents and adults after fast ascent to 3500m on day 1, but not on day 2, children may travel at least as safely to an altitude of 3500?m as adolescents and adults, even if risk factors (pain sensitivity and heredity) are present.

Comment
Over the years there has been considerable discussion about whether children are more or less susceptible to the effects of altitude. The general view currently is that children are no more susceptible than are adults, and this paper supports that view.

A case study of three US adults with Japanese encephalitis, 2010-2012
Hills SL, Stoltey J, Martinez D et al. J Trav Med. DOI: 10.1111/jtm.12127, May 2014.

The authors describe three cases of Japanese encephalitis (JE) in adults from the United States. The first made a ten day trip to mainland China and took part in outdoor activities in a rural area, and the sec-

Journal Watch *continued*

ond had lived in Taiwan for four months. Both survived the illness. The third was an expatriate living in South Korea, in whom the illness proved fatal.

Comment
It is common practice in the UK to recommend vaccination against JE for those travellers intending to spend a prolonged period, i.e. more than a month, in South or Southeast Asia, staying in rural areas, predominantly in the wet season. Two of the subjects in this study fulfilled the criteria for length of stay, and at least one of them fulfilled the criteria regarding rural areas, but it is worthy of not that one of the subjects stayed for only ten days in a rural area. Whilst the advice given to UK travellers is, for the most part, valid, it is worthwhile bearing in mind that occasional cases of JE do occur in circumstances that do not fulfil the usual criteria, i.e. in urban areas or in shorter stays.

***Plasmodium knowlesi*: Clinical presentation and laboratory diagnosis of the first human case in a Scottish traveller**
Cordina CJ, Culleton R, Jones BL et al. J Trav Med. DOI: 10.1111/jtm.12131

Plasmodium knowlesi is a species known to cause human malaria in Southeast Asia. This paper describes the first imported case of *P knowlesi* malaria in Scotland in a 33 year old female who had travelled to Borneo and had stopped antimalarial prophylaxis after 4 days of a 10 day visit. Thirteen days after her return to the UK she presented with fever, rigors, vomiting and diarrhoea. Malaria antigen testing by means of Optimal-IT and Binax-NOW was negative, but unusual trophozoite-like structures were observed on microscopic examination. *P knowlesi*was identified by PCR testing.

Comment
Malaria should always be suspected in a patient who presents with fever, with or without diarrhoea, after a visit to an area where malaria is known to be present, especially if chemoprophylaxis has not been taken or has not been taken correctly. In travellers returni9ng from Southeast Asia the possibility of *P knowlesi*infection must be borne in mind, and examination of peripheral blood and other investigations such as PCR must be carried out, even in the absence of a positive antigen test using a malaria testing kit. As this case shows, testing kits may well not give a positive result in *P. Knowles* infection.

Incidence of potential rabies exposure among Japanese expatriates and travellers in Thailand
Kashino W, Piyaphanee W, Kittitrakul C et al. J Trav Med. DOI: 10.1111/jtm.12124

This study compared Japanese subjects living as expatriates in Thailand with Japanese short term travellers to Thailand with regard to their knowledge, attitude and practice towards rabies risk. Travellers had a higher incidence of potential rabies exposure from animal bites, scratches or licks than did expatriates. Travellers also had less accurate knowledge of rabies than did expatriates, and were less likely to have had pre-exposure rabies vaccination. In addition the authors found that 55.0% of expatriates and 88.9% of travellers who were bitten would not seek appropriate treatment.

Comment
This study shows a worrying lack of knowledge, and consequently of appropriate precautions and reactions, on the part of Japanese travellers to Thailand and, though to a lesser extent, on the part of Japanese expatriates living in Thailand, as far as the risk of rabies is concerned. One is led to wonder whether the results would have been very much different had the knowledge, attitudes and practice of travellers from other countries, including the UK, been investigated. It behoves all travel health advisers to make sure that travellers to countries where the risk of rabies is relatively high are made fully aware of the level of risk acquiring rabies from animals, the precautions that are available in the form of pre-exposure vaccination, and the actions necessary if a potentially rabies-prone incident occurs.

A Global and Travel Health Experience in Malawi

J Moore

The past 20 years has seen an explosion in long haul school trips abroad. A simple Google search will return hundreds of companies willing to help us part with hard earned cash in return for 'a life changing experience' in places 'off the beaten track', 'get under the skin' of Africa/South America /South East Asia.

Part of my role as both a specialist travel medicine nurse and expedition medic involves working closely with school expeditions. This normally takes the form of travel health advice, vaccinations, provision of first aid kits and medical support. Last summer I accompanied thirty-eight 14-15 year olds on a three week school expedition to Malawi, a country to which I had travelled 13 years previously.

St Peters Church of England School in Exeter has been raising money and supporting a school in Mtunthama, Malawi. This link was developed by one of the teachers who, with his family, spent several years working in a nearby school. Recognising the benefits that relationships between the schools brought to both parties, Mr Hubbard organised yearly visits. For eight years pupils, parents, builders, electricians and teachers have been returning to the same village contributing to the life of the community.

Unlike many projects delivered by gap-year organisations, because of repeated trips, it has been possible to see the impact that has been achieved. They now not only have new school buildings, but also a regular supply of books, solar powered lamps so children can do their homework and clothes for children at the village orphanage. Local teachers receive support and continual professional development, whilst some pupils have received educational funding through to university level.

Travel Health and Global Health

Taking thirty-eight teenagers to the centre of one of Africa's poorest countries is not a small undertaking. Seeing parents tears when waving good-bye on the station platform was a stark reminder as to the responsibility teachers (and in this instance a medic) has when children are entrusted into care. One controversial scenario is worth mentioning.

Part of the trip involved crossing the border from Malawi into eastern Zambia (South Luangwa National Park) and back again. There is no yellow fever in Malawi, nor is there in eastern Zambia. However regulations stipulate that YF vaccination certification is required from anyone entering the country from another country with a risk of YF. A quandary that arose was whether to vaccinate 44 individuals against a disease they will not contract, with a vaccine with known adverse drug reactions, or to give them an exemption certificate based on the premise 'violate fit non indura' and hope border officials will not question the 44 individuals past medical history?

Malaria

Malaria is a significant issue in Malawi, causing thousands of deaths a year. There is good evidence that younger people backpackers, and backpackers in particular, often ignore the **ABC** of malaria prevention/ But if this is true and if so, why? During consultations, when we reel off our individualised 'malaria mantra', I wonder how much of an impact we have on those who, like myself once felt indestructible. However I'm not convinced issues with 'chemoprophylaxis concordance' boil down to mere recklessness.

Being team medic served as a personal reminder that people forgetting or foregoing malaria tablets do so not 'because they are teenagers' or 'irresponsible', but more often because having to take tablets every day can just be annoying! There is no discernable benefit from taking them. It's a bit like eating fruit and veg as a child. Personally, I find habits the best behaviour for staying healthy on adventures and I'm convinced this is one key to concordance. Each morning every meal table was reminded by staff to ensure pills had been taken, a habit soon so entrenched individuals would respond in a Pavlovian manner to staff just making eye contact.

Previous trips have seen a number of pupils diagnosed with malaria. Knowing rates of over diagnosis in African countries, I was sceptical of their findings. Within a fortnight signs and symptoms started appearing, raising concerns in the teachers. However, in the absence of a fever, I was sceptical once more, deciding not to use the valuable rapid diagnostic test kits (RDT's) and watch and wait. Needless to say, all of 'the sickies' responded well to a bit of TLC and some paracetamol (I would have a used a homeopathic preparation as a placebo remedy, if water wasn't such a valuable resource in Africa). Towards the end of the trip one RDT was used – there was a personal momentary panic of clinical confidence whist waiting for the test to react, but it was as expected – negative.

Global Health

The school project was based in the community of Mtunthama. Within this community there is an orphanage, a school and the hospital of St Andrews. The hospital was built from scratch with the support of Medic Malawi, a charity based in the UK, and serves a community of many thousand. Starting as small clinic, it has grown to include two operating theatres with associated surgical wards, medical and paediatric units, a maternity unit, an HIV clinic and a feeding station. This all sounds very grand, until you walk through the door and receive a stark reminder of the conditions East African medical facilities.

A Global and Travel Health Experience in Malawi *continued*

Electricity is intermittent, resources scarce and the workload high. I longed to take a couple of demanding UK patients and drop them into this environment for a reality check. What the hospital lacks in resources however it makes up for with staff enthusiasm and talents. Clinical officers rush between trauma patients, to the chronically sick or malnourished. Whilst there, I was involved in a neonatal resuscitation complicated by a lack of equipment and diagnostic facilities. The results were unsuccessful and, another stark reminder of everyday African life, the deceased baby was returned to its mother with a bill for treatment. She also faced the prospect of a mournful and lonely bus-journey home.

That local experience

Following the support of a local pupil through college, the village chief had given the parents who had sponsored the child a plot of land to build a house. A group leader, Ben, and myself had the privilege of being guests in that village overnight. Ben arrived caked in dust from riding in the back of a pick-up truck. Novelty transport experiences wore off along time ago and the family motto 'stulti sunt possunt esse incommoditas' (any fool can be uncomfortable) dictated I sat in the passenger seat. On arrival we were greeted by children too numerous to count, all with beaming smiles, snotty noses and fly ridden. We donated to them a supply of treated bed-nets, a gift that could have significant health impact.

That evening we sat enjoying Tusker beer as the sun slipped behind the hills, whilst listening to drums, laughter and dancing from a nearby village, a memory that lingers.

A dose of the 'inevitable's'

A number of the team succumbed to Malawian "slimming water". Fortunately this occurred at the R&R phase of the trip, when based at Nkotakota Bay, a place made famous through the negotiations of Livingstone and the local chief on the subject of slavery. Sunshine, western style accommodation and plenty of soup rapidly had the team back on their feet.

Conclusion

One cannot fail to return from a trip like this without some fantastic stories such as: tears of laughter whilst trying to release an (accidentally) hand-cuffed teacher from a veranda; pigs in car boots; snakes falling from rafters onto dinner-plates; lions fighting over a kill and elephants squashing tents, to mention just a few. Perhaps the most pertinent story occurred on the return journey to Mtumtamba. After the night in the village I commented on the staggering number of children present. Our host agreed and without emotion added "…but of course not all will make it through this winter as the harvest has been poor", before returning to a conversation about football. This is the reality of life in much of Africa.

Others in the travel medicine world, have been privileged to walk first-hand within these stories. We return unscathed but never un-moved by the sights we see, the grubby little hands we hold, the laughter we share and the hope that it will, one-day, be different. Personally I know experiences such as these make me a better practitioner.

There are without question, inextricable links between travel/expedition medicine and the health of global host countries. I hope those of us privileged enough to experience both will continue to help others understand these links, introducing new generations to the possibility of both parties having a 'life-changing' experience.

James Moore, Director, Travel Health Consultancy.

RESEARCH

Infectious Diseases on Cruise Ships: A Systematic Review from 1973-2013

L Jun, H Xiaohui, Q Jia

Background. With the rapid growth of the cruise travel industry, the prevention and control of infectious diseases on cruises is becoming a new public issue which is highly valued.

Methods. All related articles published since 1973 and the data announced by VSP (the Vessel Sanitation Program) were reviewed, and factors of cruise related infectious disease were analysed.

Results. Our analysis showed that gastrointestinal infectious diseases and respiratory infectious diseases are the two main kinds of cruise related infectious diseases, with gastrointestinal infectious disease more often occurring. Norovirus, shigella and enterotoxigenic Escherichia coli (ETEC) are the most commonly detected pathogens in gastrointestinal infectious diseases, whereas the pathogen with highest incidence for airborne disease is influenza virus, followed by varicella and legionella. Disease occurrence rate in tropical waters is significantly higher than that in temperate and cold waters.

Conclusion. This review demonstrates that gastrointestinal infectious disease and airborne infectious disease are the main kinds of infectious diseases threatening cruise ship travellers, in addition there are geographic variations of disease outbreaks.

Implementation of proper preventive measures and effective education to passengers are recommended to avoid and control the outbreaks. The identification of cruise related infectious disease may serve as a good foundation for disease rapid diagnosis and control management.

Introduction

Travelling by sea is one of the earliest forms of transportation, although it is not the primary option of passengers for fast travelling any more, it is still widely used in many areas, and cruise ships are where long distance travel by sea still occurs for example. Nowadays, cruise ships serves not only as a travel means but also as a way of leisure. Usually, most cruise ships become a gathering place for travellers of all age groups from different countries and cultures. It is also noteworthy, most of the passengers and crew come from those countries where mandatory vaccination have not been completed, in which cases this population are more susceptible to suffer and transmit infectious diseases. Furthermore, many factors may contribute to the exposure and transmission of infectious diseases on cruise ships, such as closed environment, close contact between passengers and crew, as well as common source of food and water. Since it is easily to spread and difficult to control, infectious diseases on cruise ships present a new public health concern. Among these, gastrointestinal and airborne infections pose the greatest risk of transmission.

1 Materials and Methods

All studies on cruise ships in related disease listed by Pubmed and Medline Ovid since 1973 were reviewed using the following key words: cruise, cruise ship. Additionally, data announced by the Vessel Sanitation Program (VSP) of CDC was also reviewed. (website: http://www.cdc.gov/nceh/vsp/surv/gilist.htm)

Inclusion criteria of the articles reviewed: 1) infectious diseases presented on cruise ships; 2) etiology studies of the infectious diseases; 3) number of passengers infected.

Items studied: Year of occurrence, times of occurrence on a specific year, number of passengers infected, maritime space, pathogen type.

Data were analysed using SAS version 9.2 (SAS Institute, Cary, NC, USA). Chi-square tests were used to compare proportions.

Results

Year of disease occurrence and number of passengers infected

In 38 published studies between 1973-2013, there were 136 incidents of infectious disease reported on cruise ships, the total of infected passengers was 7763. In Table 1, individual studies and references are divided and summarised by decade in which infection rates were found to gradually increase with years.

TABLE 1

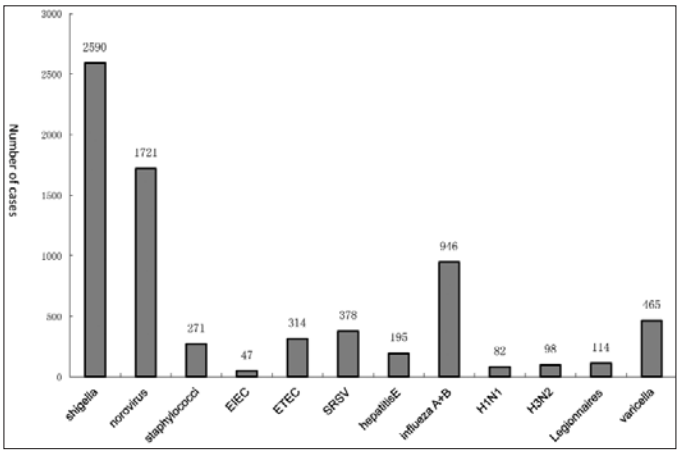
Summary of 38 published studies demonstrating etiology of infectious disease in 7763 passengers and times of occurrence by decade, 1973-2013

Year of study	Number of patients	Times of occurrence	References
1973～	1211	2	1,2
1980～	1688	10	3-9
1990～	1530	24	10-18
2000～	2408	61	19-32
2010～	926	39	33-38

Infectious Diseases on Cruise Ships: *continued*

Etiology analysis
Cases of infection for the associated pathogens are shown in Figure 1. Among all gastrointestinal infections, norovirus, shigella and enterotoxigenic E.Coli(ETEC) are the three main pathogens. The total number of passengers infected by norovirus, shigella and ETEC is 1721, 2590 and 314, respectively. In addition, the pathogen with the highest incidence of airborne infections is influenza virus, followed by varicella virus and legionnella.

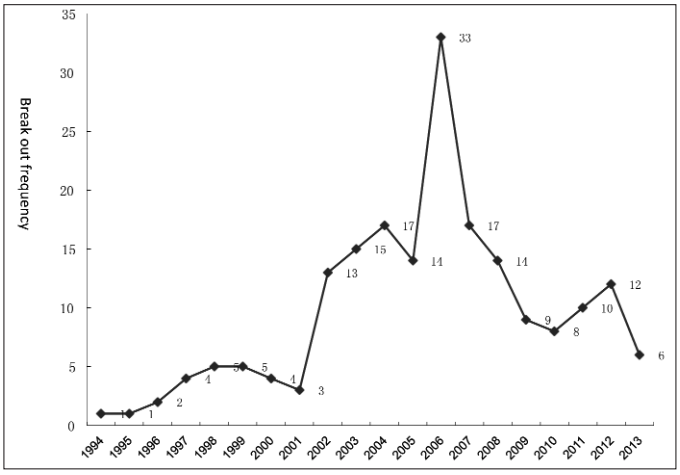
Figure 1
Cases of infection for different pathogens



Announcement of norovirus outbreak by the Vessel Sanitaton Program (VSP) of CDC
CDC established the Vessel Sanitation Program?VSP) in 1975, the VSP mainly focuses on the outbreak of gastrointestinal disease on cruise ships. Data are announced on the website (http://www.cdc.gov/nceh/vsp).

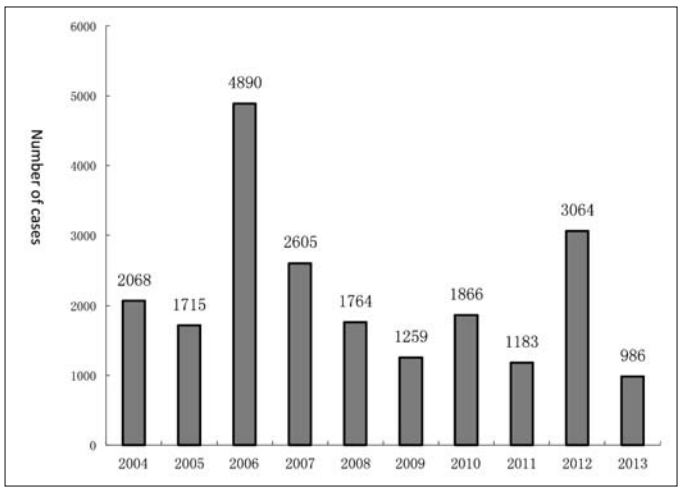
Figure 2 reveals the frequency of norovirus infection on cruise ships every year. It can be concluded that there is an increase in frequency from year 1994 to 2006, with a downward trend afterwards.

Figure 2
2 yearly break out frequency of novovirus announced by VPS from 1994-2013



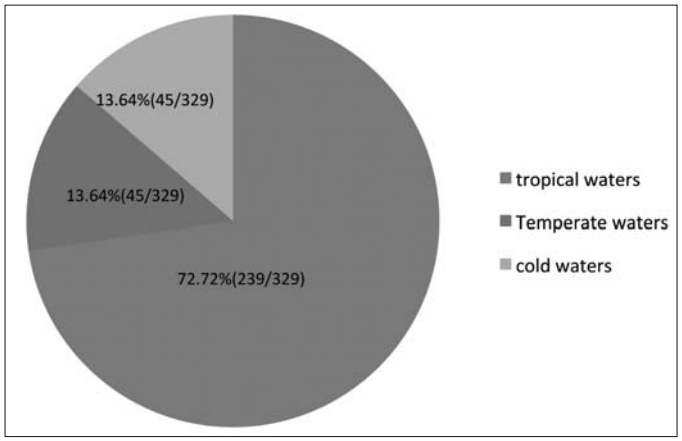
Number of passengers infected by norovirus from 2004 to 2013 is shown in Figure 3. The total number analysed is 21400, which far exceeds the numbers reported in published articles.

Figure 3
Number of passengers infected by novovirus every year from 2004-2013 (from VPS)



Maritime space distribution of outbreaks
Figure 4 summarises the distribution of outbreaks on different maritime space where the cruise voyaged. It shows that the percentage of tropical waters where the disease occurred is much higher than that in temperate waters and cold waters ($p<0.05$).

Figure 4
Maritime space distribution of outbreaks on cruise lines



Discussion:
Geographic distribution
Close relationship between infectious disease outbreak and maritime space is demonstrated in this study (Fig. 4). The underlying mechanism, however, is still not clear and needs further scientific investigation. Based on the pattern of these outbreaks on cruise lines, we hypothesised that infectious disease is more likely to occur in tropical waters, in particular,

temperature might be the main factor affecting infectious disease prevalence. Prolonged high water temperatures (>25°C) throughout majority of the trip may promote growth of some strains of bacteria or viruses that grow optimally at temperatures of 23 to 25°C.[39] In addition, when cruise passengers cross hemispheres they may not have had their influenza vaccine so exposure to seasonal diseases can be high. For instance in August 1997, a group of Australian passengers, who came from the area where flu season typically runs from May to September, boarded a cruise ship in New York, where flu is more prevailing in opposite seasons. The Australian passengers were disproportionately represented in an initial attack of acute respiratory illness that subsequently spread through the ship, suggesting that they may have been infected before boarding.[40] Similarly, a summer-time influenza in Alaska's Yukon Territory between May and September of 1998 was linked to an infusion of cruise ship passengers and crew into the area.[41] This cruise, up the inside passage along the coast of Canada, seeded influenza into communities along its route during summer, where flu is off-season in the northern hemisphere.

In summary, this study for the first time provides description in association of infectious disease on cruises and geographic distribution. However, our conclusions may be limited since the analysis was made only based on published and announced data. Therefore, we cannot exclude the possibility that total number of cruise line travelling to tropical waters is larger in fact.

Outbreaks of gastrointestinal Infections

Outbreaks of gastrointestinal disease on cruise ships occur at a rate of approximately 1 to 6 in 1000, and the estimated possibility of developing gastroenteritis on an average 7-day cruise is less than 1%.[42] Factors that contribute to gastrointestinal infection include inadequate heat treatment, infected food handlers, contaminated raw food, cross-contamination and so on. Centralised preparation and serving of meals, many varieties of food as well as a large number of people all increase the risk of contamination. Infected food handlers served as a major source of infection in many outbreaks, which is especially apparent in outbreaks due to noroviruses and *Shigella*, since both could be transmitted via hand contact and directly from person to person. Critical points in controlling food-borne outbreaks appear to be thorough cooking of raw ingredients with appropriate storage before and after cooking, as well as maintaining a high level of personal and galley hygiene.[43]

The Centres for Disease Control and Prevention's Vessel Sanitation Program Web site lists over 21400 cases of norovirus infection since 2004 and a sharp increase in 2006, suggesting that such infection is a continuing problem.[44] However, the numbers of *Norovirus* infection reviewed in our study is less than *Shigella*, which may be related with the mature research and few published articles. Apart from that, we can still conclude that norovirus is the primary pathogen of gastrointestinal infections on cruise ships. A review between 1990 and 2000 showed that the incidence of gastrointestinal illness per 100,000 cruise ship passenger days decreased from 29.2 to 16.3, and the overall incidence increased to 25.6 between 2001 and 2005, largely due to a single organism – norovirus.[45]

The large number of outbreaks on cruise ships revealed that how easily norovirus can be transmitted from person to person in a closed environment.

Bacterial pathogens that are associated with gastrointestinal disease on cruise ships reported include *Shigella* species, *enterotoxigenic Escherichia coli, Salmonella typhi, Vibrio species, Campylobacter jejuni, and Staphylococcus aureus enteritis.* These infections often appeared to be more severe than those caused by *Noroviruses*, and have led to sporadic deaths in passengers on cruise ships. Seasonal occurrence of these infections is not so obvious on cruise ships, and it happens more frequently in regions with poor levels of health facilities and sanitary conditions. Since 1990, the CDC has investigated 10 cruise ship outbreaks of ETEC infection, among which, investigation of three outbreaks in 1997 and 1998 revealed that in all cases, ETEC was transmitted via contaminated water obtained by ships at overseas ports.

Cyclospora cayatenensis , a parasite which could cause prolonged watery diarrhoea, has been detected on cruise to Asia, Latin America, and the Caribbean. The parasitic causes of diarrhoea reported on cruise ships include *Cyclospora species*, which were implicated in a large outbreak on a cruise ship where the passengers may have acquired the infection from eating raspberries.[46]

Outbreaks of respiratory Infections

The main pathogens of airborne infections on cruise ships are influenza virus, legionella and varicella, in which the most common one published is influenza virus. Prevention of airborne infection outbreaks on cruise ships will continue to be a challenge. Interactions of passengers and crew in confined space easily facilitate the spread of respiratory disease, and ports of call may include areas with high endemicity rates of respiratory illness.[47] Crew on ships may also act as reservoirs and transmit infection from cruise to cruise. In addition, presence of gathering places and close interaction between individuals greatly increase the risk of passengers being exposed to many respiratory secretions and probable infectious respiratory viruses. An epidemiology study of injuries and illnesses among passengers on cruise ships revealed that respiratory tract infections were the most common reason that seeking medical attention by passengers and crew members aboard.[48]

Infectious Diseases on Cruise Ships: *continued*

An outbreak of influenza A in 1998 among passengers in Alaska and the Yukon Territory as well as that of influenza B in 2000 on a ship cruising the Baltic underscore the risk that when passengers aboard cruise ships ill, disease spread may be promoted.[49,20]

Brotherton and colleagues[26] also reported an outbreak on a cruise ship sailing between Australia and New Caledonia involving 37% of the passengers, in which both influenza A and B viruses were extensively circulated on the ship.

Since 1997, seven reports of influenza outbreaks on cruise ships in the northern hemisphere were documented. It is recommended that passengers at high risks for complications of influenza (eg, persons aged above 50 years old, immunocompromised persons, and those with pulmonary or cardiovascular systems chronic disorders), and who were not vaccinated with influenza vaccine during the preceding fall or winter, should consider receiving influenza vaccine before travel with large tourist groups at any time of the year, to the tropics, orto the Southern Hemisphere from April through September (the time of increased influenza activity in that hemisphere).[50] It is also recommended that cruise lines should consider achieving at least an 80% vaccination rate among crew members on each ship every year.[51] However, even though vaccination has been implemented for years, influenza outbreaks still occur on cruise ships, which may reflect infection with strains that are new or incomplete effectiveness of the vaccine. Thus, vaccination may provide protection to some extent, but may not be enough to prevent all outbreaks.

Cramer EH[32] reviewed cases of varicella on cruises between 2005-2009 and found that most people infected were crew members, with 278 in total. Another airborne viruse that has caused outbreaks among cruise ships is rubella, although the list is probably underrepresented.[17] Thus far, outbreaks of rubella have been limited to crew members on cruise ships. In 1997, two clusters of rubella infections were reported on separate cruise ships in which approximately 4% and <1% of the crew were infected respectively, and a large proportion of infected crew were asymptomatic.[52] In summary, a vaccination combined with measles, mumps, rubella and varicella vaccines are essential to protect the susceptible population.

Outbreaks of legionnaire's disease on cruise ships has been reported. L. pneumophila (Legionella pneumophila) was first recognised as the cause of Legionnaire's disease among attendees of an American Legion convention in 1976, and was then continued to be associated with travel, including travel on cruise ships.[53] In total, there have been over 50 different incidence of legionnaires' diseases found to be associated with cruise ships,[54,55] in which the largest outbreak occurred in the spring of 1994, when 50 passengers developed disease on nine separate cruises, but on the same one ship.[15,25] Legionnaire's disease is life-threaten for cruise ship passengers, and the risk for passengers may be higher due to older ages, worse physical conditions, or having underlying diseases. Legionella is widely spread in natural water and not pathogenic at a low concentration, however, it can adhere to the vessel wall and grow locally when getting into the water vascular system of the cruise. Biological membrane of Legionella will be formed under the proper environment which can dramatically facilitate pathogen growth and proliferation by escaping from disinfectors. People can be infected via many routes, such as air conditioning system, pools and spas on ships, and water supply systems. Thus, prevention of Legionella infections on cruise ships involves treatment of contaminated water by using proper disinfection and filtration, as well as proper cleaning and disinfection of spas and other devices that can disseminate the bacteria.[47]

In our review, there are 8 incidences of infection caused by legionella for a total of 114 cases. Old age, poor basic health status and underlying disease are the common features of this group. Infection of L. pneumophila on cruise ships is preventable and should continue to be an essential issue of guidelines implementing for the control of water supplies and spas on ships.

Since the major route of tuberculosis transmission is airborne, the confined environment on cruise ship may increase the risk of pathogen spread. The possibility of transmission is represented by a 50% positive skin test conversion rate among sailors aboard a U.S. naval submarine following exposure to seven shipmates with active pulmonary tuberculosis.[56] Tuberculosis transmission has not been documented on cruise ships yet, which may be due to the low attack rate and long incubation period of the disease.

Other infections

Cruise passengers may also suffer infectious diseases that are acquired on land before travel, which might break out on ships after certain incubation period. Cases of meningitis have been recorded on cruise ships. Stefanelli P[37] reported meningitis infections on a cruise ship in 2012, where 4 people were infected and one died. In addition, a single case of diphtheria was reported in an unimmunised woman who developed sore throat during a cruise.[55]

Health care practitioners need to be aware that these infections may be acquired on board. Prompt and proper diagnosis and vaccination are equally important to prevent and control diseases with low incidence on cruise ships.

3.5 Policies and regulations

In 1975, the Vessel Sanitation Program (VSP) of the Centres for Disease Control and Prevention was established to raise the standard of sanitation on cruise ships and lower the risk of infectious disease

outbreaks.[57,58] The VSP requires captains of ships with international itineraries to report the number of people who consulted the ship's medical staff because of diarrhoea 24 h before arrival at a U.S. port, and the VSP notifies the Centres for Disease Control and Prevention for further investigation if at least 3% of passengers or crew members had diarrhoea. This reporting system, along with other VSP components, has reduced and controlled the number of passengers and crew members aboard cruise ships with GI illnesses. The value of VSP is not only to report the outbreaks but also to reinforce the standard of cruise sanitation systems. Cruise ships are scored on a 100-point scale, and points are rated and deducted based on public health significance. A score of 85 or below is considered as a failing score. All scores are posted on the VSP website, and ships with lower average sanitation scores are more likely to have outbreaks than those consistently have high scores.[57,58]

The European Surveillance Scheme for Travel Associated Legionnaires' Disease (EWGLINET) was established in 1987 by the European Working Group for Legionella Infections (EWGLI). European guidelines for control and prevention of travel-associated Legionnaires' disease were introduced by EWGLI in 2002 and endorsed by the European Commission in 2003.[59] In April 2010 the scheme was transferred to the European Centre for Disease Prevention and Control (ECDC) and renamed as ELDSNet, retaining the original aims and objectives of the network.[60] All these measures were formed to ensure a consistent high standard for investigation in promoting protection of travellers from legionella throughout Europe.

There are several maritime laws across the globe in different countries. Maritime Law is defined as "that system of law which particularly relates to commerce and navigation, to business transacted at sea or relating to navigation, to ships and shipping, to seamen, to the transportation of persons and property by sea, and to marine affairs generally."[61] Maritime law is closely relevant to minimising rapid global spread of infectious diseases, and the definition of maritime law confirms such important linkage and relevance, which put in place an international policy and legal framework for effective control of emerging infectious diseases on cruise ships.

Conclusions

Infectious diseases on cruise ships present a new kind of public health concern. Proportional difference of pathogens and geographic variation of outbreaks exists. Identification of cruise related infectious diseases will serve as a foundation for rapid diagnosis and control management of diseases.

Our study is limited because all results are based on the published data and information.

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Is it what it says on the packet? ATR FTIR provides a rapid answer to counterfeit tablet formulations

G Lawson, E Turay, R Armitage, L Goodyer and S Tanna

1. Introduction

How many people would question the reliability of a packet of paracetamol or even atenolol bought whilst away on holiday?

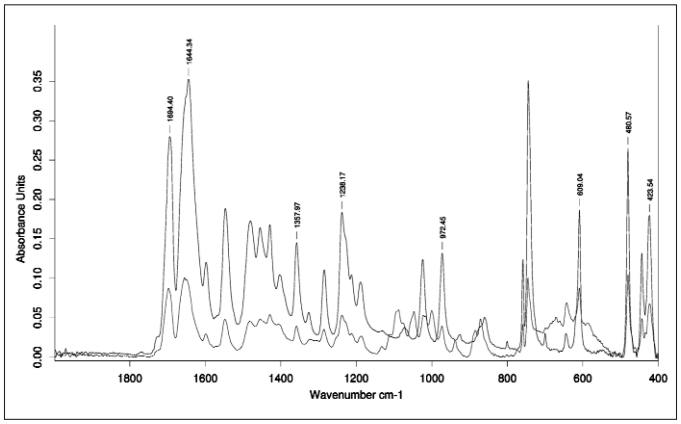
Counterfeiting of medicines is a global phenomenon that affects both developed and developing countries and especially in medicines sourced via the internet.[1] In the UK the level of counterfeit medicines is thought to be between 1 and 2% whilst elsewhere in the world figures as high as 40% are cited by the WHO. A counterfeit medicine is a medicine which is deliberately and fraudulently mislabelled in regards to identity and source which apply to both branded and generic products. Products may or may not have the correct excipients, exclusion of active pharmaceutical ingredient (API) or insufficient quantities of API or fraudulent packaging. The effects of counterfeit medicines on patients can range from the difficult to detect and quantify to an important cause of unnecessary morbidity, mortality and loss of public confidence in medicines and the health systems. In recent years more and more incidents of deaths resulting from sub-standard or counterfeit medicines have been reported. Recently in Pakistan, for example, more than 400 deaths were thought to have resulted from counterfeit cardiovascular medication. The identification of these materials causes problems for the regulatory authorities both in the Healthcare Supply Chain and also for Border Agency staff. The problem with international visitors is particularly acute for countries like Saudi Arabia, where large numbers of pilgrims often bring excess medicines with them which need to be rapidly assessed.

Rapid assessment implies a screening process rather than the time consuming in depth analyses offered by conventional laboratory equipment such as GC-MS or NMR.[2] The first step is a visual assessment of barcodes or more frequently now the use of two dimensional barcodes read by smart phones. This provides rapid communication between supplier, importer and the border agency but is however only limited to assessing the packaging rather than the contents. Chemical test kits are limited to specific active ingredients, a problem not faced by a portable Raman spectroscopy system which is being trialled in this area and can be programmed for many APIs.[3] Costs and concerns about the robustness of the system have raised some concerns.

In this paper an alternative spectroscopic system Fourier Transform Infra-Red (FTIR) spectroscopy utilising Attenuated Total Reflection (ATR) sampling[4] has been investigated. FTIR systems form the basis of compound identification in the British Pharmacopoeia (BP)[5] and the combination with the ATR sampling system removes the need for any prior solvent extraction to separate the API from the excipients. A tablet formulation would simply be finely powdered and a small sample of the API + excipients powder placed on the ATR window and the resultant spectrum produced. As can be seen from Figure 1 the spectrum obtained for caffeine from the tablet formulation is virtually indistinguishable from the spectrum obtained from the reference material.

Figure 1

Comparison of reference (red top) and tablet samples for Caffeine.



This approach therefore appears to provide a 'fingerprint method' to rapidly assess if the expected API is present in the dose format being tested. An assessment of the API dose level may also be made from the intensity of the peaks characteristic of the API of concern. This determination would be dependent on the detection capabilities of the ATR FTIR system and very low dosage levels may not be currently detectable.

2. Experimental

2.1 Instrumentation

The ATR FTIR spectra were recorded using a Bruker Alpha system equipped with a platinum diamond single reflection sampling station. Spectra of each sample were collected at a resolution of 2cm^{-1} over the range 400 – 4000cm^{-1}. Replicate spectra, a minimum of three, were collected for all calibration and trial samples. The BP based analyses were run on a Thermo Electron Helios Omega UV/Vis instrument using Vision Lite

Is it what it says on the packet? *continued*

2.2 software.

2.2 Chemicals and sample preparation
The reference samples: caffeine, atenolol and paracetamol were > 99% analytical grade, whilst the excipients used to prepare the calibration mixtures were all pharmaceutical grade. The excipients used included hydroxymethyl cellulose, titanium dioxide and magnesium stearate.

Reference spectra of the authentic APIs were produced from finely ground samples placed on the ATR sample station. The FTIR system was zeroed prior to each sample series.

For the quantitative calibration samples several single excipients were used for individual experiments since the excipients in the test samples would be unknown. Powder quantitative calibration and validation samples were prepared by mixing suitable amounts of the API and excipient to cover the normally encountered dosage range. These calibration samples are expressed as a percentage by weight of the API in the excipient. The anticipated ranges were: Paracetamol 30-80% w/w and Atenolol 10-40% w/w based on the tablets studied. After mixing using a pestle and mortar to ensure homogenisation powder samples were placed on the ATR station and replicate spectra were recorded. This process was repeated for several different samples taken from the calibration mixture to ensure reproducibility. Quantitative data was obtained from the Opus 6 software for spectral peaks characteristic of the target APIs to produce calibration data for the subsequent analyses.

Samples for the BP analyses were prepared as detailed in the British Pharmacopoeia 2010 modified for single tablet analysis.

Strips of tablets of both paracetamol and atenolol were obtained adventitiously from pharmacies in the UK, Pakistan, and India. These trial samples were identified as follows:

- Paracetamol – UK: 4 x 500mg and India: 5 x 500mg
- Atenolol – UK: 3 x 50mg, Pakistan 3 x 50mg + 1 x 100, India 2 x 50mg + 1 x 25mg

3. Results and Discussion
3.1 Identification of the API
The overlay spectra in Figures 2 and 3 comparing the spectrum of the neat API with that obtained from a typical pill formulation, show that the anticipated API can be readily identified to be present. The correlation between the spectra confirms that no other API is present at significant levels.

3.2 Determination of the dosage level
ATR measurements are affected by the degree of surface contact between the sample and the sampling diamond and a fine powder sample is therefore important for reproducible data. Furthermore, as seen by Mazurek,[3] increasing the number of samples analysed will improve the data as shown in Table 1 where the r^2 regression coefficient from different calibration diagrams demonstrates these effects.

Table 1
Methods to improve reproducibility

Mixing Time	No Spectra	r^2 Value
Short	1	0.8
Short	3	0.9
Long	3	>0.95

Figure 2
ATR-FTIR spectrum in absorbance mode of UK tablet (blue) and pure Paracetamol reference (red)

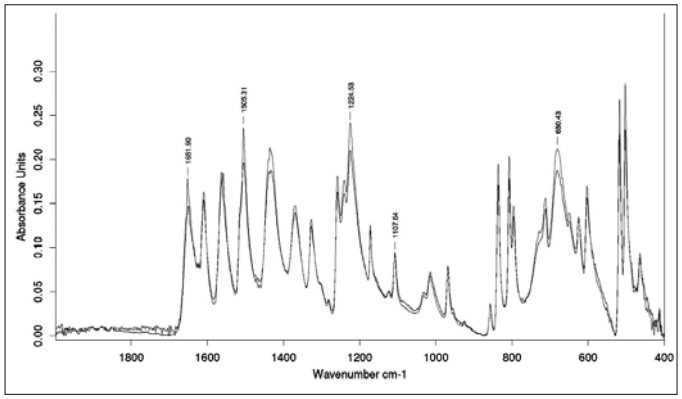
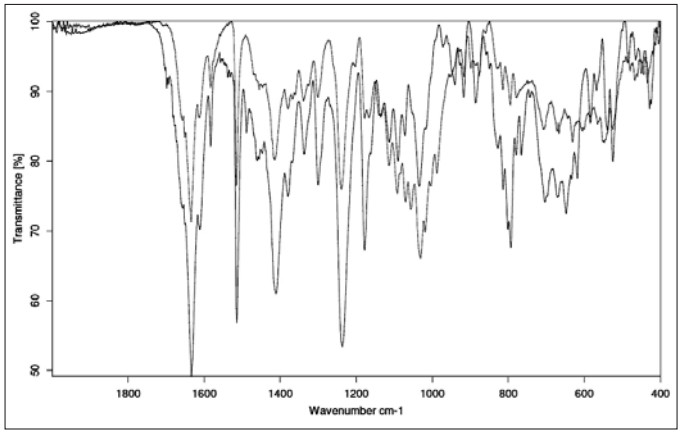


Figure 3
ATR-FTIR spectrum in transmission mode of UK tablet (red) and pure Atenolol reference (blue)



Once suitable calibration data has been obtained the percentage level in the tablet formulation can be derived and the actual dosage level calculated from the mass of the pill.

The results derived from this investigation are shown in Table 2.

Once the calibration data has been prepared the identification and quantification of the target API is

generally available within 5 minutes of opening the tablet packet. As can be seen the results for the UK tablets show good agreement. Two of the paracetamol samples from India are not as expected, one with a low dose 438mg vs 500 and more surprisingly one at 628 vs 500mg. The measured doses in all the atenolol samples from Pakistan were lower than stated on the packet and these samples were analysed using the BP method to confirm these findings. The results obtained for the Pakistan atenolol samples were #A 34mg and #B 61mg confirming the ATR data.

Table 2
Quantitative analysis results

		Paracetamol			Atenolol	
Dose		**Expected**	**Measured**		**Expected**	**Measured**
UK	#1	500	523	#A	50	45
	#2	500	490	#B	100	104
	#3	500	505	#C	100	98
	#4	500	512			
India	#1	500	438	#A	25	20
	#2	500	502	#B	50	42
	#3	500	525	#C	50	45
	#4	500	485	#D	50	30
	#5	500	628	#E	50	30
Pakistan				#A	50	40
				#B	100	58

Note all results subject to a 10% error.

3.3 Discussion

The results demonstrate the potential of the ATR FTIR approach to rapidly assess the actual components of a medicine against those stated. This approach provides a regulatory authority with the means to rapidly identify a suspect material using only bench top analytical equipment with no consumables other than electricity. Further analysis would be required to confirm the presence of either a substandard or counterfeit material.

The cardiovascular tablets were obtained from Pakistan shortly after the problems in this area were reported and the measured low levels of atenolol may be related to these incidences.

The substandard levels of paracetamol and atenolol may well be the results of poor mixing at the production stage and it is unlikely that these tablets would provide therapeutic levels of the relevant drug under the prescribed conditions.

The elevated paracetamol level found in one set of samples from India would be of concern for people prescribed 8 or more tablets a day where the total dose would be around 5024 mg rather than the 4000 expected.

This work provides further evidence regarding the poor quality of some of pharmaceuticals available in many developing countries.[6] It is quite likely that this is due to issues relating to poor quality control of the manufacturing processes and the impact on the health of the population in such countries is hard to quantify. For the traveller visiting such areas this data serves as a warning that wherever possible medicines should be purchased before departure, including items such as paracetamol used to treat minor conditions.

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Antibiotic prophylaxis of Traveller's Diarrhoea in Athletes

M Rossiter

Abstract
With the improved fitness and conditioning of athletes, the most common reason for an athlete to miss training or competing whilst abroad is illness.

Traveller's diarrhoea (TD) is one of the most common illnesses with athletes potentially unable to compete at all and/or perform at sub-optimal level following infection for several days

One of the most effective antibiotic prophylaxis group for TD is the fluroquinolones but due to the potential risk of tendon damage with long-term use of these, athletes have taken probiotics, bovine colostrum, and practiced avoidance measures such as alcohol hand gel, as well as good food hygiene, to prevent attacks of TD instead of a prophylactic antibiotic. Rifaxamin, due to its poor bioavailability (and thus non-systemic absorption) has been proposed as a prophylaxis for TD. This study examines the effectiveness of Rifaxamin in elite athletes travelling to areas of high risk for TD.

Statistics for TD were available in England Hockey athletes at The Hockey World Cup and The Commonwealth Games in 2010 in Delhi, India when athletes took no antibiotic prophylaxis but staff did. The same athlete group then travelled to South Africa and Malaysia, this time taking Rifaxamin as prophylaxis.

When no antibiotics were taken the incidence of TD was significantly higher in the group than when antibiotic prophylaxis was taken. Furthermore, there were no reported cases of tendon damage after taking *Rifaxamin.*

The results show that taking oral *Rifaxamin* as an antibiotic prophylaxis may be an effective addition in the prevention of TD in athletes.

INTRODUCTION

Travellers' diarrhoea (TD) is the most predictable travel-related illness ranging from 30-70%, depending on the destination. People can still contract TD despite reasonably good hygiene. Bacterial pathogens are the most common cause of TD (80-90%) with intestinal viruses accounting for 5-8% and Protozoa around 10%, but they manifest later.[1]

Enterotoxigenic *E Coli* is the most common pathogen, followed by *Campylobacter jejuni, Shigella* and *Salmonella*. Of the viruses, Norovirus, rotavirus and astrovirus have been isolated. Giardia is the main protozoal pathogen. High-risk areas of TD include most of Asia, the Middle East, Africa, Mexico and Central and South America.

Bouts of TD do not prevent against future attacks and more than one episode of TD can occur in a single trip.

Bacterial diarrhoea presents with the sudden onset of mild to moderate abdominal cramps, loose stools, fever, vomiting and possibly bloody diarrhoea. Untreated bacterial diarrhoea can last 3-5 days or longer (viral 2-3 days and protozoa weeks to months).

Several approaches can reduce (but not eliminate) TD:

- Food and beverage selection (avoid unwashed food, salads washed in nonpotable water, ice creams, undercooked meat, seafood and unpeeled fruit and vegetables)
- Drinking bottled water only
- Probiotics (*Lactobacillus* and *Saccharomyces boulardii*)
- Bovine colostrum (no good trial evidence)

Prophylactic antibiotics are effective and have been shown in controlled trials to reduce TD from 40% to 4%. However, resistance has occurred and so Trimethoprim-sulfamethoxazole and Doxycycline are no longer considered effective.[1]

The fluroquinolones (*Ciprofloxacin*) have been the most effective both for prophylaxis and treatment of TD (except Campylobacter)[1,3]. However, in the athletic population there is a *theoretical* risk of tendon rupture with this class of drug. As such, only non-athletes have used Ciprofloxacin as prophylaxis. The majority of tendon ruptures appear to take place in the Achilles tendon (between 1991 and 2002 the 90-day cumulative risk of Achilles tendon rupture was 17.7/100,000 in Ciprofloxacin users compared to 5/100,000 in the normal population).[2] The majority of patients were over 60 years old and either on corticosteroids or with renal or other chronic diseases. Even though the overall risk is very low, elite athletes have been reluctant to take *Ciprofloxacin* as a prophylactic drug although there have been no published cases of tendon rupture during or after taking oral *Ciprofloxacin* in elite athletes.

Rifaxamin has been proposed as a prophylaxis in elite athletes.[3,4]

Rifaxamin is a semi-synthetic antibiotic based on *Rifamycin*. It has poor bio-availibity and is therefore poorly systemically absorbed thus acting locally in the intestine. As such, it has few side effects and a very low risk of tendon rupture due to its non-systemic absorption. It has been licensed in the USA since 1998 for the treatment of TD and is has been licensed in the UK since 2011 for the same indication.

To date, there have been very few studies on the prophylactic use of *Rifaxamin* to prevent TD. One study observed adult US travellers to Mexico and found a 58% protection against TD when taking oral *Rifaxamin* compared to placebo.[5] There has also been

one small study in elite athletes (USA athletes in Beijing 2008) taking oral *Rifaxamin* as prophylaxis, which had very encouraging results but the numbers were very small (106 patients received *Rifaximin)*.[5]

Antibiotic Prophylaxis of TD in GB Hockey Athletes
With the improved fitness and conditioning of athletes, the most common reason for an athlete to miss training or competing, whilst abroad, is illness. Traveller's diarrhoea is the most common illness with an athlete potentially unable to compete for up to 3 days and after that not performing at optimum level for several more days.

Due to the potential risk of tendon damage with long-term use of *Ciprofloxacin*, athletes have taken probiotics, bovine colostrum and use alcohol hand gel, as well as employing good food hygiene to prevent attacks of TD. They do not take a prophylactic antibiotic.

METHODS

World Cup – Delhi 2010
In 2010, Delhi hosted the men's Hockey World Cup. The athletes were at risk of TD, not only from food but unclean water in the showers and on the pitch (which was watered with unclean water). As the players regularly dive on the pitch they were at risk of ingesting the water.

The athletes used the following to reduce the risk of TD:

- Bottled water to drink and brush teeth
- Alcohol hand gel to use before and after meals and after training/playing
- Washing of gum shields with bottled water prior to insertion into the mouth
- Good food hygiene (avoidance of unwashed and unpeeled fruit and vegetables, salads, ice cream and ice for drinks, as well as only eating in hotels and "safe"/clean restaurants)
- Daily probiotic capsule

Of the 18 athletes, none took a prophylactic antibiotic. Seven members of staff received a daily dose of 250 mg *Ciprofloxacin* as prophylaxis.

If anyone (athlete or staff) had symptoms and signs of TD, they were isolated and treated with 500 mg *Ciprofloxacin* twice daily for 2 days and fluid support with Dioralyte.

RESULTS *(TABLE 1)*
Over a 3 week period in Delhi, eight athletes contracted TD, missing an average of 2 days from training or competing. All were treated with oral *Ciprofloxacin* for 2 days and recovered well with no side effects from the medication (including tendon damage either immediately or weeks later).

Of the seven staff, all took prophylactic antibiotics and only one contracted TD.

Commonwealth Games – Delhi 2010
The Games were held in the same venue as the men's World Cup although the athletes and staff stayed in the athletes' village for the majority of the time rather than in a hotel. A total of 38 athletes and 14 members of staff applied the same preventative measures. All staff were offered a daily antibiotic prophylaxis with a daily dose of 250 mg *Ciprofloxacin*. All the female staff took a daily antibiotic. However two of the male members of staff declined.

RESULTS *(TABLE 1)*
Over a 3 week period, amongst the 20 male athletes there were ten cases of TD and two cases in 18 female athletes. An average of 2 days were missed from training or competing.

Amongst the 14 members of staff, 12 were taking *Ciprofloxacin* prophylaxis. Of these, three developed TD (two on no prophylaxis and one taking *Ciprofloxacin*).

TABLE 1

Venue			Number	No taking *Ciprofloxacin* Prophylaxis	No of TD Cases	Av Days missed from Training
World Cup, Delhi	Athletes	Male	18	0	8 (44%)	2
	Staff		7	7	1 (14%)	n/a
Commonwealth Games, Delhi	Athletes	Male	20	0	10 (50%)	2
		Female	18	0	2 (11%)	2
	Staff	Male team	7	5	3 (43%)	n/a
		Female team	7	7	0 (0%)	n/a

Antibiotic prophylaxis of Traveller's… *continued*

DISCUSSION

The results from the Commonwealth Games and World Cup clearly demonstrate that *Ciprofloxacin* is a good prophylaxis against TD but due to the risk of tendon damage, athletes are unwilling to take it. It could be speculated that women might have better hand hygiene than men and therefore have less risk of TD due to less risk of contamination with pathogens. The female athletes arrived in India 5 days later than the males and did not stay in a hotel prior to going to the athletes' village. Additionally, females dive on the pitch less than males and so are less likely to ingest contaminated water, which increases the risk of developing TD.

Future Study

As mentioned, there has been one small study on the use of *Rifaxamin* in athletes.[4] Due to its non-systemic absorption, it is considered safe for athletes to take and therefore further studies were conducted with the same group of male athletes that participated in the Hockey World Cup and Commonwealth Games.

Background

The men's Champions Trophy competition was due to be held in the same venue as the previous tournaments. Unfortunately, due to political reasons, the venue was changed to New Zealand, which was not considered to be a high-risk area for TD. However, the men's squad travelled to Malaysia for 2 weeks and South Africa for 3 weeks. Both of these venues have had high numbers of TD recorded on previous trips, leading to prolonged player and staff absence at times of competition. Therefore, it was decided to use these venues to study the effectiveness of *Rifaxamin* in the prophylaxis of TD.

Methodology

The first trip was to South Africa with 27 athletes and 10 staff for 3 weeks. All individuals were asked to give informed consent to taking the medication (daily dose of 200 mg *Rifaxamin*) – see Appendix 1. Athletes and staff followed normal non-medication preventative advice.

In Malaysia, there were 18 athletes and 10 staff. Again, all athletes gave informed consent to take the antibiotic.

RESULTS *(TABLE 2)*

South Africa

All 27 athletes and staff took *Rifaxamin* 200 mg daily for the duration of the trip. Two members of staff stopped taking it due to side effects. One stopped after one dose due to nausea and one stopped after four doses due to multiple side effects, including nausea, vomiting, dizziness and abdominal pain, which all resolved after cessation of medication.

There were no recorded cases of TD through the whole duration in either staff or athletes. There were also no recorded side effects amongst the athletes during the trip. There were also no recorded cases of tendon damage or rupture 6 months after stopping the medication.

Malaysia

All 18 athletes took a daily dose of *Rifaxamin*. Of the ten staff members, six took prophylaxis. The two members of staff who suffered side effects in South Africa declined and two new members of staff declined to take prophylaxis. One of those chose to administer a daily probiotic instead.

Amongst the athletes, there was one episode of TD (treated with oral Azithromycin and fluid management) and amongst the staff, there were no recorded cases of TD. After 4 months, there were no cases of tendon rupture or damage amongst athletes or staff.

TABLE 2

Venue			Number	Number taking prophylactic Rifaxamin	Number withdrawn due to side effects	TD Cases	Av days missed training	Cases of Tendon Rupture
Malaysia	Athletes	Male	27	27	0	0	0	0
	Staff		10	10	2	0	0	0
South Africa	Athletes	Male	18	18	0	1	2	0
	Staff		10	6	0	0	n/a	0

Discussion

Whilst in Delhi, both for the Hockey World Cup and Commonwealth Games, there were a significant number of cases of TD, amongst players and staff, which had an impact on player numbers both in training and competition. Although it would have been a better control to have gone back to the same venue, it is clear from the results that the introduction of prophylactic *Rifaxamin* has helped produce a significant reduction in the number of cases of TD when visiting areas which historically have had a significant number of cases of TD. The antibiotic was generally well tolerat-

ed (with only two individuals suffering enough side effects to stop taking it) and, to date, there have been no cases of tendon rupture, which has been the worry when taking oral *Ciprofloxacin*.

CONCLUSION

Although, the results would have been validated by the withdrawal of probiotics taken by some athletes at the same time and by visiting the same venue, the results still suggest that oral *Rifaxamin* should be considered as a useful prophylaxis against TD for elite athletes visiting high risk areas and therefore reduce the crucial number of days missed for training or competing. However, other non-antibiotic, measures should still be used in conjunction, including good food and water hygiene and alcohol hand gels. The use of oral probiotics and bovine colostrum still needs further evaluation.

What Are The New Findings?

- Illness, rather than injury, is now the most common reason for Hockey athletes to miss training and/or competing
- *Rifaxamin* may be a safe antibiotic prophylaxis for athletes in the prevention of TD
- *Ciprofloxacin*, as an antibiotic prophylaxis for TD, is still declined by athletes due to the very small risk of tendon rupture

How might it impact on clinical practice in the near future?

- When travelling abroad with athletes to countries of high risk of TD, *Rifaxamin* is a useful addition as prophylaxis
- *Rifaxamin* should be taken with other measures to prevent TD

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Competing Interests
The supplies of *Rifaximin* were provided by **NORGINE Pharmaceuticals Limited.**

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BGTHA members contribute to research published in the Journal of Travel Medicine

L Goodyer

The January/February 2014 *Journal of Travel Medicine* carried the following original paper which was supported by members of the BGTHA across the country, who recruited patients through their own travel health clinics.

Goodyer LI, Song J ***Bite avoidance attitudes and behaviors in travelers at risk of malaria Journal of Travel medicine 2014; 21: 31-38***

Abstract

Mosquito bite prevention is an important strategy to reduce the risk of contracting malaria and advice on the methods available should be offered in pre travel consultations. This study examines the attitudes of a cohort of UK travelers to the various bite avoidance strategies and the extent to which they are practiced when visiting malaria endemic areas. This was a retrospective cohort study of United Kingdom travelers over 18 years of age returning from malaria endemic areas. Those who agreed to participate were emailed a Web based questionnaire on their return to the UK. The questionnaire consisted of items relating to attitudes to bite avoidance measures and malaria and the use of bite avoidance measures whilst away.

132 travelers completed the questionnaire representing a 51% response rate. Frequent use of repellents (69%) was higher than covering the arms (49%) and legs (56%), or using insecticide vaporisers (16%), sprays (24%) and bed nets (32%). Those under the age of 30 tended to use bite avoidance less frequently. Gender, purpose and duration of travel were also found to influence the use of particular measures. A reliable 17 point attitude to bite avoidance questionnaire (Cronbach's alpha=0.70) was constructed and a sub scale score indicated that attitudes influenced the use of repellents.

The use of measures to avoid mosquito bites on retiring and covering arms and legs needs to be further emphasised to travelers. The attitude scales described could be a useful tool in practice and research into this area

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The study is amongst the first to offer an in depth investigation of bite avoidance behaviour by travellers. This is important from the point of view that a large proportion of infectious diseases that present a risk to the traveller are insect borne and the mosquito is foremost amongst all arthropods in this respect.

The work investigates two aspects; the extent to which travellers follow strategies to avoid mosquito bites and also the validation of an attitude scale towards the methods commonly advised to minimise mosquito bites whilst in malaria endemic areas. The results clearly indicate that although repellents are quite widely used by such travellers, the other methods seem less well practiced. It is understandable that the wearing of long sleeved clothing and trousers when out at night would be poorly practiced in the tropics and it was also identified that not surprisingly woman in particular were less likely to wear trousers. One finding concerning gender that was very interesting was that women tended to report being bitten frequently more than men, though that difference did not reach statistical significance. However, a well cited study (Schlagenhauf 2010) seemed to indicate that men were much more likely to contract malaria than women and the authors offered an explanation that men were bitten more frequently than woman. Our study throws some doubt on that hypothesis.

It is particularly worrying that advice on avoiding bites on retiring is so poorly practiced, particularly as the African anopheles mosquito tends to be an indoor feeder. Practitioners should certainly encourage the use of knock down sprays and insecticide vapourisers to clear a room before retiring as well as bed nets when appropriate. The study also confirmed that as with many travel health related problems those aged 18 -30years are the least likely to follow advice.

The attitude scale developed is also another novel aspect of the study as it attempts to achieve a scoring system regarding how travellers might view the various bite avoidance strategies. For instance, they are presented with various statements concerning repellents that they have to score on a Likert scale of agreement e.g. I think that repellents are toxic and damage the skin. Such a scale could be used by practitioners to construct advice that contributes towards influencing negative attitudes to bite avoidance measures.

The study also serves as an example of how the BGTHA could usefully form a research network for the investigation of a variety of travel health related issues. We would like to thank the following organisations and individuals for their participation and help:

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Schlagenhauf **P. et al. Sex and gender differences in travel-associated disease.** ***Clinical infectious disease;*** **2010; 50(6); 826-832**

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Ethics and clinical responsibility on medical student electives in Africa - a mixed methods study

J Stewart & G Watt

ABSTRACT

Introduction

Electives are a popular aspect of undergraduate medical training, with many electives taking place in the developing world.[1] Glasgow university students undertake both junior and senior electives, presenting a unique opportunity to investigate experiences of students with differing levels of clinical competence and professional experience.

Methods

Quantitative and qualitative data included in elective reports, completed by students having returned from Africa between 2008-2012, were combined and analysed. Ten semi-structured interviews were performed with students who completed an elective in Africa in 2011 or 2012.

Results

In 2008-2012, 183 electives (7.4%) were undertaken in 16 African countries in a variety of locations and institutions. Students had opportunities to observe medicine in a resource-limited environment, different health practices and disease patterns, and the influence of cultural practices on health. Language barriers often meant that students could not communicate directly with patients. Many students undertook clinical procedures some of which they had not yet learned in their undergraduate training. Students were usually adequately supervised, but, at times were unexpectedly confronted with inappropriate levels of clinical responsibility, and often felt obliged to intervene.

Conclusions

Electives in Africa provide a wealth of experience. The clinical situations to which students are exposed have important practical and ethical considerations for both the student and the sending institution. How a student should respond when unexpectedly confronted with inappropriate clinical responsibility centres on the ethical principles of "beneficence" and "non-maleficence". Standardised briefing on how to handle conflicts between what may be asked of students and their level of competence would ensure that students travelling to Africa for electives are better prepared to respond appropriately.

Introduction

Medical electives are a popular part of undergraduate curricula with many students going overseas, particularly to developing countries. 40% of UK medical students undertook electives in developing countries in 2004.[1]

Although the benefits of international health electives are widely perceived,[7,16,17,18] there is little evidence concerning students' experiences on electives and the ethical and professional issues that they may face.[2] Existing literature concerning international health electives (IHEs) covers five main areas: preparation, clinical competence, ethical considerations, personal risk and benefits.

The British Medical Association (BMA) and General Medical Council (GMC) provide advice and guidelines considering the practical and ethical considerations for students on electives as well as the appropriate behaviours that students should adopt. The primary message is that students should not act out with their clinical competence.[3,4,5] Various papers affirm the role of the sending institution in preparing students adequately for IHEs.[2,6,7] One study assessed the effect of specific, pre-departure training.[8]

Analysis of qualitative data gathered from 12 students after completing an IHE concluded that ethical issues fell into five main themes: uncertainty about how best to help; perceptions of Western medical students as different; moving beyond the scope of one's practice; different cultures of medicine; and unilateral capacity building.[9] These issues are similar to the ethical challenges in humanitarian aid work described by Schwartz et al:[10] resource scarcity; historical, political, and social structures; aid agency policies; and perceived norms around health professionals' roles and interactions.

In the light of healthcare workers' heightened expectations of Western medical students in the Solomon Islands, Radstone argues that in more coordinated elective programmes students could fill human resource gaps in healthcare workforces, on the basis that some help is better than none.[11,12] There is increasing debate, however, about the role of medical students on electives in developing countries, where resource shortages may result in pressure on students to act beyond their competence or without the supervision experienced in the UK.[7]

Other issues which have been reported include student safety on electives, advice on HIV prophylaxis and coping with personal illness.[13,14,15]

This study analysed the feedback given following all African electives involving students from a single UK medical school over a five year period and used a mixed methods approach to describe and explain the experiences and views of medical students, with a particular focus on clinical activity and responsibility.

Methods

The Glasgow Elective Programme

Glasgow medical student electives consist of four

Ethics and clinical responsibility on medical student… *continued*

week's clinical experience during the summer break, are organised independently by the student, and can be taken anywhere if granted medical school approval. About 50% of electives are taken in the UK, and most overseas electives are taken in English speaking countries.

Glasgow students undertake both junior and senior electives, at the end of years 3 and 4 respectively, resulting in about 500 student electives per year. By definition, junior and senior students approach their electives with differing levels of clinical competence and professional experience.

On return from their elective, students fill out a report containing quantitative information on the context and content of their elective and 600 words of free text explaining the clinical and cultural setting, giving a reflective summary of their experience and describing any significant learning points or challenges faced. The data for this study were obtained from student elective reports in 2008-2012. The data were extracted, collected and analysed in two phases.

Phase 1
Data from African elective reports in 2008-2012 were analysed to produce a quantitative account of the electives, including the area of Africa and type of institution visited, and the clinical procedures performed by students. Data for junior and senior electives were analysed separately.

Themes commonly arising in the free text section of elective reports were noted and content analysis performed to quantify how often issues were highlighted by students.

Phase 2
The content analysis performed on the free text within student reports and the results of the previous literature review determined the questions used in semi-structured interviews conducted with ten students who undertook electives in Africa in 2011 and 2012 (i.e. those still at University at the time of the study). 37 eligible students were contacted by a third party, unrelated to the study, by letter and email. All ten students who replied were interviewed after providing informed consent.

The interviews were recorded, transcribed verbatim and analysed. Transcripts were broken down into the individual points made, which were then allocated to an appropriate theme. This process produced a total of 411 points divided between eight themes.

Ethics approval for this study was granted by the College of Medical, Veterinary and Life Science of the University of Glasgow.

Results
In 2008-2012 there were 2458 electives, of which 183 (7.4%) took place in Africa (70 junior and 113 senior electives). African electives took place in 68 institutions in 16 countries.

Phase 1:
Quantitative data from 183 African elective reports
Area of Africa visited
42 (23%) electives were in South Africa, 34 (19%) in Tanzania, 27 (15%) in Uganda, 37 (20%) in South East Africa (Madagascar, Malawi, Mozambique, Zambia, Mauritius), 23 (13%) in North East Africa (Ethiopia, Rwanda, Kenya, The Seychelles), and 20 (11%) in West Africa (Gambia, Ghana, Liberia, Nigeria).

Type of institution visited
50% of African electives took place in institutions previously visited by a Glasgow student.

43% of electives took place in teaching hospitals, 33% in large district hospitals, 10% in small community hospitals and 14% in "other" locations (e.g. Public health electives that were taken in conjunction with the charity Students for Kids International Projects that visit and undertake health promotion in orphanages in Malawi).

Clinical experience gained on elective:
Observational electives are defined as those that did not involve performing a hands-on clinical procedure (Table 1A). 36% of junior students had observational electives whilst 63% reported undertaking clinical procedures. For senior electives, these figures were 31% and 67% respectively. 83% (15 of 18) of students who visited small community hospitals reported undertaking clinical procedures.

43% of students reported performing "other invasive procedures" including suturing, paracentesis and chest drains (Table 1B).

Phase 1:
Analysis of free text from 183 elective reports
Issues reported by the majority of students were: resource limitations (81%); a significant learning experience (63%); different disease patterns to the UK (56%); differences in the doctor-patient relationship (54%); language barriers (53%) and opportunities to perform clinical procedures (52%);

Electives involving clinical responsibility were defined as those in which the student experienced clinical decision making responsibilities without appropriate supervision. 27% of students reported such clinical responsibility, including 44% of the students who visited small community hospitals. Few students reported organisational difficulties (8%) or personal illness (5%) (Table 2). One student reported sustaining a needlestick injury.

Phase 2:
Analysis of semi-structured interviews
Ten students (5 male, 5 female) were interviewed, comprising 9 junior and 1 senior electives in 6

countries. 8 of these electives took place in large district hospitals.

Clinical procedures and responsibility
Seven respondents undertook clinical procedures. They felt well supervised and never out with their competence, although some recognised that they were undertaking procedures they would not do in the UK or had been advised not to by the medical school. Two respondents who had observational electives believed they could have performed clinical procedures had they wanted to.

Five respondents reported being well supervised, three adequately supervised and two reported inadequate clinical supervision during their elective. No student reported having been pressurised into doing anything. However, six students reported situations where they felt obliged to intervene based on their principles or because no-one else would have acted:

> (D) "I never felt under pressure to do things. I just felt kind of obligated…from my own principles."
>
> (I)"...they left me in a nursery with premature babies ...said can you continue the ward round and then one of the babies in the ward was blue and wasn't breathing so then I was left to organise the resuscitation of the baby."

Different expectations of students
Nine respondents felt that the expectations were higher than they had experienced in their UK training. Differences included the amount of knowledge they were expected to have, being asked questions by healthcare staff and their answers being taken as correct, being asked to prescribe medication and the practical procedures they were capable of.

> (C) "...you got to do a lot more and they didn't really know what to expect of us like they wouldn't expect different things from a first or fifth year student…they could almost treat you like another doctor if you knew your stuff."

How students dealt with heightened responsibility or expectations
Seven respondents did not want to act beyond their competence. Most felt able to say no when this was the case:

> (A) "…it was okay if you said no, you didn't have to…I just said that I didn't think I was competent to make clinical decisions …I didn't feel it was safe."
>
> (I) "…I just needed to tell them I don't know… I learned quite quickly not to say anything because the things you said they would take as correct."

However, when respondents were unexpectedly given clinical responsibility, three felt it better to do something than to do nothing.

Language barrier
Six respondents experienced a language barrier between themselves and patients. Of these, five reported not being able to communicate with patients at all, often relying on a member of staff being available to translate.

Three felt that due to the language barrier they may have misinterpreted clinical situations whilst another questioned whether gestures that they considered normal were culturally relevant.

Doctor-patient relationship
Every respondent reported care as being more paternalistic than in the UK with some feeling that patients accepted this, doctors being highly respected:

> (I) " ...the patients in Malawi just didn't ask questions, they just were told and they just accepted it"

Four suggested that the differences witnessed were due to cultural differences. Two suggested that the language barrier meant they may have misinterpreted staff-patient exchanges.

What the medical school could do differently
Nine respondents stated that the information provided by the medical school was sufficient, with positive comments made about the elective website allowing access to previous elective reports, changes in the curriculum increasing clinical experience prior to undertaking an elective and provision of a contact at the medical school if something went wrong.

Some respondents highlighted that it is not a "one size fits all" situation and that countries visited by students are varied. Two found "minimal involvement from the medical school was fine" and that the freedom given to students is "fantastic".

Areas which respondents felt could be improved were advice on general safety, information on the risk of HIV transmission, how to say no and not act out with your competence.

Discussion
Strengths and weaknesses
This is the first systematic review of African electives in a UK medical student elective programme. The study is based on a complete sample of five years' elective experiences in Africa. A mixed methods approach allowed for a more complete analysis of student experiences. Whilst it was intended to have equal numbers of junior and senior electives in the interview sample, senior students' final exams made this impossible. The resulting focus on junior electives is helpful nevertheless, given the uniqueness of Glasgow electives at this stage in the curriculum and

Ethics and clinical responsibility on medical student… *continued*

the implications regarding clinical competence and responsibility. Semi-structured interviews with recently returned students allowed in depth investigation of individual experiences, generating information regarding respondents' reactions and thoughts surrounding issues, which are difficult to portray in written reports with word limits.

In elective reports, students may include a combination of what they feel is important and what they believe the medical school expects. There are varying degrees of openness in reports, which is important to consider when viewing these results. Further to this, individual students perceive and react to situations, exposures and observations differently as a result of their own cultural experience and values.

A larger sample of student elective reports would allow for more robust conclusions to be drawn, especially with regards to the small subgroups. The semi-structured interview sample could be increased until theme saturation occurred. The relationship between the interviewer and respondent may have altered responses given. Opinions on this matter are divided. Some suggest that previous acquaintance allows for greater rapport causing the respondent to more readily disclose information, while others believe that the absence of previous contact makes respondents feel safer to share some things as they will not see them again.[19] Neither the content analysis of the elective report free text, nor the semi-structured interview analysis, could be independently corroborated.

Findings

Electives in Africa present opportunities to observe medicine in a resource-limited environment, different health behaviours and disease patterns to the UK and the influence of cultural practices on health. Language barriers often mean students cannot communicate directly with patients, potentially providing different learning opportunities such as working through a translator and allowing close observation of professional behaviours and interactions. Language barriers may also impact upon a student's perception of cultural context. These opportunities and the associated benefits for students are consistent with the existing literature.[2,7,16,17,18]

Clinical procedures and responsibility

Large numbers of junior and senior students had opportunities to undertake clinical procedures, some of which they had not yet learned in their undergraduate training e.g. assisting in deliveries and arterial blood gases. Some procedures that students reported undertaking are not taught at an undergraduate level e.g. lumbar puncture, thoracentesis and chest drains (Table 1B). This supports the belief that electives in the developing world involve opportunities to improve clinical skills.[17] Performing procedures not yet learned at home has ethical implications especially concerning junior students who may be undertaking electives in specialities not yet covered in their undergraduate course. Most interview respondents felt adequately supervised and did not feel out with their competence. This finding was particularly true of students visiting larger institutions, where it is often the case that training and supervision are available in the same way as the UK. Where this is not the case, students need to be able to say no. Most felt able to say no if asked to do something they were uncomfortable with, indicating a strong ethical approach.

Analysis of free text and interviews revealed situations where students were unexpectedly confronted with inappropriate levels of clinical responsibility, corresponding to the opinion that resource limited settings can present ethical challenges.[7,9,10] 16 (23%) junior students and 33 (29%) senior students reported such an experience. How students should respond to this centres around the ethical principles "beneficence"-promoting benefit, and "non-maleficence" –minimising harm. The student should believe that the intervention will benefit the patient without posing risks at levels which outweigh the potential benefit. The BMA recognise that undertaking electives in resource poor countries can present ethical challenges and affirms that students have a professional duty to work within the limits of their competence.[20] The GMC state that, to demonstrate fitness to practise, students must ask for help when necessary and ensure that they are appropriately supervised for any clinical task they perform.[5] However, emergency situations may require a student to act beyond their competence, perhaps feeling obligated to intervene. The BMA advise that students act carefully and intervene only when they believe that the intervention would reduce or prevent serious harm to the patient.[20]

Students must remember their level of training and not allow heightened responsibilities of local students to alter their professional limits. Occurrence of such scenarios in a different cultural context to a student's own may mean that what the student believes to be right goes against local healthcare practices or protocols. This adds another dimension to the discussion - to what extent the ethical principles learned in the UK can and should be applied in different cultural and health system contexts.

A larger proportion of students visiting small community hospitals reported performing clinical procedures and having clinical responsibility, compared to the sample as a whole. This issue requires further investigation but could not be pursued in this study due to small numbers.

Preparation

A successful elective involves planning in advance.[20] The BMA provides toolkits covering the practical and ethical aspects.[3,4] Unexpected clinical responsibility can arise in many ways, however, making it impossi-

ble to prepare for every situation.

In response to these findings, Glasgow Medical School has introduced a debriefing procedure for students returning from overseas electives and increased the advice given to students before travel, especially those travelling to resource-poor countries. It is important that medical schools maintain a supportive role to safeguard and maximise benefit to all parties involved. As student reports are the only mechanism by which medical schools can learn of students' experiences on electives, it is important to maintain this communication channel as a vehicle for shared learning.

Conclusions

This study provides a complete description of the experience of African electives by medical students from one medical school, including students at different levels of clinical competence, which may be of interest and use to other medical schools, wishing to review this aspect of their own students' experiences.

This research highlights the need for greater awareness and consideration of the clinical situations to which students may be exposed when undertaking electives in Africa, and the resulting practical and ethical implications. Standardised briefing on how to handle conflicts between what is asked of students and their level of competence would ensure that students travelling to Africa for electives are better prepared to respond appropriately.

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Study carried out as an intercalated degree project

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Ethics and clinical responsibility on medical student… *continued*

Table 1A
Clinical procedures performed by junior and senior students whilst on elective in Africa between 2008 and 2012.

Elective	Clinical procedures	Clerking No. (%)	Venepuncture No. (%)	Lumbar puncture No. (%)	Other invasive procedures No. (%)	Assisting with deliveries No. (%)
Junior(n=70)	yes	40(57)	28(40)	16(23)	32(46)	24(34)
	no	27(39)	40(57)	52(74)	36(51)	44(63)
	missing data	3(4)	2(3)	2(3)	2(3)	2(3)
Senior(n=113)	yes	77(68)	42(37)	19(17)	46(41)	37(33)
	no	32(28)	67(59)	91(81)	62(55)	71(63)
	missing data	4(4)	4(4)	3(3)	5(4)	5(4)

Table 1B
Other invasive procedures performed by junior and senior students whilst on elective in Africa between 2008 and 2012.

**Procedures performed by less than five students were not included in the table. These were: pelvic examinations; wound debridement; removal of retained placenta; joint aspirate; fine needle aspirate; intubation; ventilation; resuscitation; bone marrow aspirate; stabilise open fracture; and central and arterial line.*

Other invasive procedure*	Junior (n=70) No. (%)	Senior (n=113) No. (%)
Assisting in surgery	11 (16)	13 (12)
Intramuscular injection	8 (11)	1 (1)
Suturing	13 (19)	15 (13)
Local anaesthetic	4 (6)	5 (4)
Paracentesis	7 (10)	7 (6)
Thoracentesis	5 (7)	9 (8)
Arterial blood gases	5 (7)	11 (10)
Urinary catheter	6 (9)	11 (10)
Nasogastric tube	3 (4)	5 (4)
Chest drain	3 (4)	9 (8)

Table 2
Issues highlighted in free text from 183 reports of electives undertaken in Africa between 2008 and 2012.

Feature of elective	Junior electives (n=70)	Senior electives (n=113)
Differences in the doctor-patient relationship*	40 (57%)	57 (50%)
Clinical procedures†	37 (53%)	58 (51%)
Clinical responsibility‡	16 (23%)	33 (29%)
Resource shortages	55 (79%)	93 (82%)
Significant learning experience	46 (66%)	67 (59%)
Personal safety	17 (24%)	25 (22%)
Illness whilst away	4 (6%)	4 (4%)
Organisational difficulties	6 (9%)	7 (6%)
More advanced disease or rare in UK	38 (54%)	66 (58%)
Language barrier	38 (54%)	59 (52%)
Cultural differences	31 (44%)	50 (44%)
Personal growth	14 (20%)	21 (19%)
Professional development	17 (24%)	24 (21%)

**Differences in the doctor-patient relationship were defined as reports that described care as paternalistic, mentioned issues relating to confidentiality, consent, and autonomy or described negative experiences of healthcare worker's attitudes towards patients.*

†Electives involving clinical procedures were defined as those in which the student performed an invasive clinical procedure.

‡Electives involving clinical responsibility were defined as the student being exposed to clinical decision making responsibilities without appropriate supervision.