

THE CHALLENGE OF TRAVEL MEDICINE: THOUGHTS FOR THE FUTURE*

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THE SCOPE OF TRAVEL MEDICINE

Travel medicine is not just preparing travellers to visit apparently relatively risky locations around the world. In the first place the question to be asked is 'who is travelling?' Classically, travel medicine prepares persons moving from developed and industrialised nations to developing nations. In this role the travel medicine practitioner is preoccupied with ensuring that the traveller is protected against key diseases like malaria, is prepared to self-treat diseases like diarrhoea, and is protected by immunisation against as many diseases as is cost-beneficial for the type of travel and the destination. However, even this scenario includes important subtleties, not least because tourists come in many styles. The wealthy can easily afford all the medical preparations that may be required, but are sometimes minimally at risk because of the safety inherent in 'package deals' to relatively safe, if exotic, locations. This should be contrasted with young trekkers and 'back-packers' who barely have enough money to get them to their destination, who sometimes literally live off the land, and who probably most need travel medicine services but can least afford them. Business travellers are sometimes 'too busy' to avail themselves of services, yet at the other extreme corporate sponsors sometimes want the best for their executives including travel kits containing large amounts of 'goodies,' and immunisations that would not be considered cost-beneficial by an individual who might have otherwise had to pay the bill.

What about the traveller from a developing country who visits a developed country or who visits a location considered exotic by his or her own country's standards? Competent practitioners of travel medicine should also be versed in this aspect. Many travellers from developing countries are still susceptible to malaria, although they might be relatively immune to diseases like typhoid fever. In our clinic in Houston, Texas, we advise people from developing countries like Kenya, who came to study in the US: several years later they wish to return home and do not understand why they are recommended to take malarial prophylaxis during their one-month return home visit.

Logically, travel medicine should also include managing medical problems of travellers that arise and need to be treated in developing countries. Many countries are realising that clinics, which are conversant with the language needs of their ill visitors, are an essential aspect of the comprehensive approach to the needs of the traveller. Club Med has specialised in providing on-site medical care for its patrons. Clinics like that of Dr S. Chatterjee in Calcutta, India stand as a role model for how care of foreigners can be developed and even lead to research productivity. Regrettably, such clinics do not exist in all locations that tourists frequent. Organisations like the International Association for Medical Assistance to Travelers (IAMAT) certainly help tourists to obtain competent care in developing countries. However, certification and validation of skills in travel medicine are still lacking for physicians in developing and

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developed countries as well as for physicians listed in IAMAT. Diverse practitioners (e.g. infectious disease and tropical medicine physicians, internists, ER (Emergency Room) medicine experts, family practitioners and nurses from diverse backgrounds, to name just a few) purport to be travel medicine experts without having to take a qualifying examination or document any level of specific training. Efforts are underway to remedy this problem, but a major question would be to identify the impact and enforceability which such certifying examinations will have in each individual country, much less worldwide.

Travellers need to know to whom to turn if they return ill from a visit to a developing country. Some physicians who are competent to handle 'esoteric' tropical medicine problems also run travel medicine clinics, but many of the nurses who are very competent to prepare travellers for travel simply do not have the training to handle sick patients. Clients need to understand that they should expect to be prepared for travel and also be told where to go to alternatively if they become ill, both in developing countries and at home.

By definition, problems in host countries include not only the necessity to be able to care for ill travellers, but also the impact of travellers on the local health scene. We are beginning to understand how lovely touristic travel destinations sometimes have very flimsy infrastructures. A case in point is the devastation that occurred in Acapulco following the recent typhoon. Essentials like food and water were severely jeopardised. Handling such a crisis and maintaining the health of local citizens, much less the tourists, is a lot to expect of a public health system in any country. At issue is who should pay for the increased demands on the infrastructure that occur when a lush, tropical paradise is transmogrified into a theme park for the privileged.

Other travelling populations such as the military should also be included under the general definition of travel medicine. Troops sometimes need to be specially prepared when a destination is identified and we learned from the Gulf War about how to prepare such mobile populations. We also learned about routes of infection among the troops, for example in leishmanial disease: such infections, occurring in adverse conditions among highly trained and disciplined persons, underscore the need to reduce risky behaviour. If this is difficult to achieve in the military, behavioural modification is a quantum more difficult to achieve among travellers who may throw caution to the wind in the name of relaxation.

While gainfully employed expatriates, as a group, currently receive good health care, usually in government or corporation clinics of the adoptive country, retirees are frequently left to their own devices when they relocate. We are only beginning to understand some of the problems of people who have lived for extended periods in foreign cultures when they repatriate. Not only should such people be subjected to prosaic 'de-worming' and tuberculin skin testing, but their emotional adjustment should also assume high priority.

Migrants have varying health needs. In some instances such as the Hajj in Mecca, the management of a large multi-ethnic migration of people is handled professionally, with a mind to the prevention of disease. Problems with persons moving across borders for jobs (e.g. migrant workers along the Texas/Mexico border) are more entrenched and have only recently received the attention they deserve.

Finally, immigrants must be included under the definition of travel medicine. Co-operation between the country supplying the immigrants and the receiving country is the ideal. An example is the co-operation of China PRC (People's Republic of China) and the CDC (Centers for Disease Control) to create workable vaccination and health assessment centres for the relocation of healthy Chinese orphans to the United States:

China is a major source of immigrants of this sort, having successfully metamorphosed their Bureau of Quarantine, which was responsible for keeping illness out of China, into a thriving system of clinics that serves travellers as well as immigrants. Furthermore, not all clinics are accepted into the new system just because they existed during the closed period of China; admirably, a conscious effort at quality control helps to ensure that these clinics will be reasonable sources of quality care for the ill foreigner as well.

RISKS ON TRAVEL

Travellers come to clinics to prepare themselves to avoid real and perceived risks of travel. That they are at different risk than natives in a developing country is almost self-evident,¹ and is spelled out in Table 1.

TABLE 1
Comparison of native and tourist by factors related to the risk of acquisition of disease and effective treatment thereof.

Factor	Native	Tourist
Duration of exposure	++++	+
Natural immunity	+++	-
Diet, culture, sunlight, etc.	-	+
Ecological exposures	+++	-
Access to health care	++	++++
Data reliability	++	++++
Predisposing illness	++	+/-
Malnutrition	++	-

Regardless of the nature of exposures and lack of pre-existing immunity among travellers, the assessment of added risk requires the comparison of problems that arise during travel with problems averted by not being at home. An interesting analysis of diseases and deaths averted by troops taking part in the Gulf War is provided by Berger² in Table 2.

TABLE 2
Diseases and deaths averted by young adults participating in the Gulf War.

DISEASE	CASES AVERTED*
Gonorrhoea	2377
Syphilis (1° or 2°)	165
HIV Infection	67
Hepatitis A	31
Hepatitis B	23
Chancroid	13
Lyme disease	12
Lymphogranuloma venereum	1.8
Rocky Mountain spotted fever	0.8
Tularemia	0.2
Arbovirus encephalitis	0.2
CONDITION	DEATHS AVERTED*
Unintentional injury	89
Homicide	50
Vehicular accidents	49
Suicide (not drug related)	36
Interpersonal violence	26
Employment-related accidents	25

*For 50,000 young American adults per six months in 1991.

He makes the point that travel can avert much disease and even death. The issue is really that medical risk shifts to different diseases and concerns when one travels. Properly prepared to prevent common travellers' diseases, the average traveller might assume from this kind of analysis that travel represents a truly healthy experience. Of course, extrapolating from troops at war to the average tourist is fraught with hazard. In the analysis, unintentional injury and vehicular accidents, which might be expected to be major events among the military at war, were actually averted by not being at home. Is driving an automobile in a developing country less dangerous than driving during a war? Tourist drivers add major variables not present as often among troops, such as drunk driving and not knowing the local traffic rules. Similar data need to be collected from travellers to place their comparative health risks in proper perspective.

Steffen and DuPont³ have listed the relative occurrence of medical problems and diseases among travellers, and these are shown in Table 3.

TABLE 3
Relative incidence of diseases or health problems among travellers.

Disease or problem	Rate/100,000/month					
	≤.001	>.001-.01	>.01-.1	>.1-1	>1-10	>10
Travellers' diarrhoea						X
Malaria					X	
Acute, febrile URI					X	
Hepatitis A				X		
Gonorrhoea				X		
Animal bite (rabies risk)				X		
Hepatitis B (ex-pats.)			X			
Typhoid (India, Africa, Peru)			X			
HIV infection		X				
Typhoid (other areas)		X				
Legionella	X					
Cholera	X					
Any health problem						X
Subjectively ill						X
Consulted doctor (home or abroad)					X	
Stayed in bed					X	
Could not work post-trip					X	
Hospitalised abroad				X		
Air evacuation			X			
Died abroad (Peace Corps)		X				
Died abroad (usual tourist)	X					

Many of the diseases are preventable (e.g. Hepatitis A and malaria) or so easily treatable that immunisation or chemoprophylaxis is not often necessary (e.g. travellers' diarrhoea). The other disease groups that occur with regularity are respiratory tract infections and sexually transmitted diseases (STD). Unfortunately, little in the way of prevention except influenza and pneumococcal vaccines exist to prevent respiratory infections other than avoidance of crowded situations, and being coughed and sneezed upon. STDs on the other hand can be prevented by abstinence during travel or safe sex practices in this context. STDs, probably more than any other disease risk on Steffen and DuPont's chart, require the practitioner to be persuasive in attempting patient education and behavioural modification. HIV is clearly a major concern.

ACCESS TO INFORMATION

In order to be educated consumers, travellers must have access to accurate information about travel risks and their avoidance. A number of sources of travel information exist aside from the usual books and pamphlets that a traveller can buy or find in a library. Practitioners are also a source of information.

The CDC and other governmental agencies around the world provide access to information via fax. This is too expensive for many parts of the developing world, but e-mail offers great potential. China demonstrates how rapidly a country can leapfrog from barely having introduced the fax machine to the successful introduction and routine use of e-mail, including a home page for their practitioners to access information about travel medicine. Computers allow practitioners access to databases and services, and also make it possible for these resources to be kept up to date.

The travel industry itself is a source of information. Unfortunately, too often travel itineraries are not accompanied by warnings that travel to a particular location might be associated with a medical risk such as malaria. Efforts are underway through organisations like the International Society of Travel Medicine to have travel agents remind their clients that a chosen location might carry risks for which a visit to a travel medicine expert is advisable. Well-meaning practitioners need to be sensitive to the financial concerns of the travel industry. No travel medicine practitioner wants to frighten potential travellers into not visiting exotic locations - rather our job is to facilitate a safe visit.

In the face of ever more available information, the challenge to the travel medicine practitioner will be to know as much as, and perhaps substantially more than, the interested client.

WHOSE RESPONSIBILITY?

Individuals must have the primary responsibility for their own welfare. They must be willing to seek travel advice and willing to consider amending risky behaviour if they are serious about maximising their safety. The primary-care physician is often the first person a traveller might contact about exotic travel. In the USA and other countries with similar health care systems, practitioners of travel medicine need to educate the primary-care physician that it is reasonable and cost-effective for the patient to be referred to the travel medicine practitioner for services that might not be paid for by a health care plan. Even in the UK, where there may be no financial disincentives to referring to another specialist, primary care physicians still need to be educated about the need for special skills and knowledge in travel medicine. Specialist physicians or general practitioners with similar expertise should be the obvious choice for such referrals and the delivering of travel medicine services. Certification of the discipline

could ensure that all practitioners of travel medicine, including infectious disease and tropical medicine experts, have the specialised knowledge needed to advise travellers properly.

The travel medicine curriculum includes many topics that are not infectious (e.g. jet lag, the effects of sun and altitude) or even non-medical in nature (e.g. insurance). Other specialists can also be useful, for example a pulmonary specialist should probably be consulted if someone with severe lung disease wants to fly. Likewise, the renal specialist should be able to advise people on dialysis about how to visit relatively remote and developing regions, and still be able to achieve satisfactory control.

Corporate sponsors have a major role in fostering the safety of their workforce when it travels to risky locations. The cost of repatriating an employee outweighs prophylactic treatment, and permits corporate sponsors the luxury of considering even marginally useful vaccines and other interventions, which might not be considered beneficial enough when contemplated by or for a tourist travelling to the same location. Good outcome studies which could provide the cost bracket analysis are needed for rational decisions in this area.

Should travel agencies assume responsibility for protecting their clients? Aside from being the ethically correct thing to do, education carries with it the potential negative of frightening the client into changing the itinerary to a less expensive trip with less profit for the agency. Travel medicine practitioners need to be creative and realistic, approaching this key aspect of patient education. Travel medicine services can be advertised in such a way as to create a quality service and image for the travel agencies for their corporate clients.

BASIC INFORMATION FOR THE TRAVELLER

In our clinic there are a number of issues about which we try to educate every traveller. While as guilty as others in not yet having tracked outcome data to know whether the educational effort of the physician and/or nurse is worthwhile, our attitude is that health education is a fundamental aspect of care.

Malaria

With every traveller the issue is addressed whether or not there is a risk of malaria, and personal protective measures are stressed that are consistent with the kind of travel which is planned. Many clients are business people, staying in high-quality, screened-in hotels. For them, using mosquito nets and insect-killing sprays are not necessary. We generally recommend the use of a 20-30% diethyltoluamide (DEET)-containing spray or cream for repelling insects - aiming at dual malaria protection from dusk to dawn and dengue fever protection throughout the day. Chemoprophylaxis is encouraged for trips that have substantial risk. Possibly one of the most important benefits of a visit to a travel medicine expert is that such a trained person should be able to advise where chemoprophylaxis is not needed. Many areas of the world, once considered high risk for malaria, are now understood to be low risk and do not require chemoprophylaxis, for example, Bangkok. Less well known, because the data are awaiting publication, is that most tourist areas of China PRC are risk-free for malaria.

Diarrhoea

Travellers' diarrhoea is a ubiquitous risk in developing countries and a moderate risk in countries bordering the Mediterranean. While some literature suggests that health education does not really lower the risk of travellers' diarrhoea, it is felt that the problem

is that education is attempted in hurried fashion without stressing the simple algorithms that might result in behavioural changes. Even if it does not effect changes in behaviour, the effort is worth it because of the public relations benefits. We focus our efforts on the main risks of diarrhoea; namely, food and water. Our approach to dietary advice is outlined in Table 4.

TABLE 4
Dietary advice for avoiding travellers' diarrhoea.

	SAFE	PROBABLY SAFE	UNSAFE	
FOOD	<p> piping hot peeled fruit</p> <p> processed/ packaged cooked vegetables</p>	<p> dry jelly/syrup</p> <p> washed vegetables</p>	<p> cold salads</p> <p> uncooked/cold sauces</p> <p> hamburgers</p> <p> unpeeled fruit</p>	<p> some cold desserts fresh soft cheese raspberries/ strawberries</p>
BEVERAGES	<p> carbonated juices</p> <p> boiled water</p> <p> iodised water irradiated milk</p>	<p> fresh citrus</p> <p> packaged, machine-made ice</p> <p> bottled water</p>	<p> tap water</p> <p> uncarbonated, bottled fruit juices</p> <p> chipped ice</p>	<p> alcohol with chipped ice</p> <p> unpasteurised milk or butter*</p>
DIETARY PRACTICES		<p> recommended restaurants</p> <p> judicious alcohol intake</p>	<p> adventuresome local foods</p> <p> street vendors</p>	<p> buffet food at room temperature</p> <p> excessive alcohol intake</p>

*Brucella risk.

Jet lag

Jet lag is always discussed with anyone planning to pass through time zones quickly. Emerging data strongly support the rational use of melatonin and light to minimise the effect of jet lag. Only small doses of melatonin are necessary to reset the biological clock. Timing of doses depends on the number of time zones traversed, as does the timing of exposure to bright light. Currently, routine recommendations include exposure to bright sunlight (approximately 3,000 lux) as opposed to room light (300 lux) at prescribed times. Under investigation are lighted visors capable of delivering light bright enough to suppress melatonin production in the pituitary gland and effect changes in the biological clock.

Vaccination protocols

There are explicit written vaccination protocols to ensure compliance with the official guidelines. Fortunately, only a few vaccines require more than one dose in order to achieve lasting protection (e.g. Hepatitis A and B, Japanese B encephalitis and rabies). Some vaccines require routine boosters to maintain protection for the frequent traveller (e.g. influenza, tetanus, diphtheria, yellow fever).

Sex

Sex might be one of the least discussed topics in the travel medicine curriculum for patients; however, Steffen and DuPont's data show this is a topic worthy of attention. We routinely bring up the subject, especially for the younger, single traveller. In our experience most people claim a strong desire to remain abstinent during travel. Occasionally someone obviously desires more information, and we are glad to have raised the issue. Once again better outcome data are required to know whether our concern expressed during the client visit results in meaningful protection or behavioural modification.

Sun and altitude

Other topics that are stressed on the basis of the client's itinerary are exposure to sun and altitude. Most clients do not appreciate the limitations of the SPF (sun protective factor) categorisation of sunscreens. They do not realise that optimally for a sun screen to be effective it must be applied a full 30 minutes before exposure, and that SPFs above 15 help to ensure that protection against UVA is included in the preparation. While UVB is the primary energy to cause skin burn, UVA at high noon is quite capable of generating risk to skin. Likewise, clients might be contemplating travel to cities at a high altitude such as La Paz and have not considered whether use of acetazolamide might be indicated to protect against altitude sickness.

Trauma

Perhaps the most common malady experienced by travellers is trauma. We suspect most travel clinics do not warn clients enough about the risks of trauma. Anyone contemplating driving an automobile in a developing country should be aware of the potential problems, including foreign traffic rules and signs in a foreign language. Drivers should understand that in certain countries, the wealthier driver would be assumed to be at fault in an accident: deeper pockets determine culpability in such instances. One might be guilty until proven innocent. A firm understanding of these concepts leads even the most seasoned travellers not to drive in certain developing countries.

This curriculum for client education is stressed, because the data show that few clinics do a good job of educating travellers. The future of travel medicine should include a truly educated client. The challenge to all of us is to how best to achieve this presumably worthy goal.

Other preparation issues

For many, travel in aeroplanes is far from a comfortable experience. Many recent reports document the increased incidence of venous thrombosis during prolonged air travel. Studies are required to determine whether low-dose aspirin, for instance, should routinely be recommended for certain high-risk travellers. At the very least, travellers on long flights are probably well advised to get out of their seats occasionally in order to exercise and reduce the likelihood of venous stasis. The possibility of a sudden change in altitude, and resultant injury if the traveller was not strapped into the seat, is probably not more important than judicious exercise timed for periods when the captain has turned off the seat-belt sign.

We are beginning to understand the relationship between stress and immunity. Studies now clearly show that stressed persons suffer more upper respiratory infection and their IgA levels drop, presumably placing them at higher risk for enteric diseases. How stress relates to risk of disease, when risk is otherwise ubiquitous (e.g. travellers' diarrhoea in developing countries), is a fertile area for future research.

Immunisation

Many new developments in vaccination promise new opportunities for protection in the near future. So-called DNA vaccines promise the development of vaccines against disease that heretofore have eluded effective vaccine development.⁴ More importantly, DNA vaccine technology portends cheap vaccines that might finally be within the financial reach of developing countries.

Vaccines that require refrigeration or injections are unlikely to effect major changes in developing countries that simply cannot afford such luxury. New vaccine delivery systems (e.g. vaccine incorporated into the genetic material of a banana) promise simple and cheap delivery systems that could result in inexpensive and effective vaccination of the developing world. Obviously, eliminating diseases in the developing world by vaccination removes the threat to the traveller regardless of the traveller's immunity. An example is the control of polio in the Western Hemisphere; the result is a polio booster is simply not necessary for travel to this part of the world.

Practical new developments include the equivalence of the hepatitis A virus (HAV) vaccine preparations. Inactivated polio vaccine (IPV), not the oral preparation, is now recommended for boosting polio immunity. Some experts are also convinced that oral Ty21a vaccine might afford better protection than the injectable Vi typhoid vaccine. Use of the emerging oral cholera vaccines is being promoted for cross protection against enterotoxigenic *E. coli* (ETEC), a main cause of travellers' diarrhoea. This vaccine, however, will probably take second seat to an actual ETEC vaccine.

Cost

Who pays for the health education and preventative medicine of travellers? The individual will probably continue to pay in many health care systems, when risk is individually assumed for the purposes of vacation travel. If private medical insurers or governments presently do not cover the luxury of preventative travel medicine, they are unlikely to be persuaded in the short term to incur these costs. They will insist on carefully performed cost-benefit studies to show that expenditures on totally elective travel might, in fact, more than pay for itself in the savings realised through prevention of hospital admissions. There are subtle benefits for private insurers and governments that are not presently factored into analyses, such as the direct revenues to industry by the travel itself and 'luxury' taxes tacked onto such travel. Private insurers could realise that clauses in their policies can cover costs of medical preparation for travel, giving the insurer control over the rational prevention of subsequent diseases. Another approach would be to roll together preventative care with coverage for medical care needed in the visited country. Finally, the cost-effective alternative for government would be to ban leisure travel - an option fortunately repugnant to most modern day governments.

Corporations should continue to absorb the costs of preventative health care when travel is a work requirement.

REDUCING RISKS

What does it take to modify the behaviour of travellers? Most commentators are pessimistic that effective health education can be achieved. The vacation mode of the leisure traveller seems to largely overrule common sense, and unusual risks are taken. Data are emerging that show that business travellers do better than holiday-makers in modifying risk behaviour. Leisure travellers will likely seek services and modify behaviour based on perceived risk. How can we achieve reminders to travellers about risky behaviour without being unduly frightening? A frivolous thought was to urge travellers to test the temperature

of food before ingestion as a means of preventing travellers' diarrhoea. On the other hand, as computers become ever smaller and powerful, one can imagine powerful programs that travellers could easily access to remind them of risky issues. Protection could be made into a game. Doing the right thing might earn the traveller credits toward lower travel insurance for instance. However, one wonders if any system that attempts to modify behaviour through active participation by the traveller is doomed to failure. Throwing caution to the wind during leisure travel seems to be an integral part of the vacation.

The alternative approach to decreasing risky behaviour is to remove the risk. This translates to better public health care services in developing countries. But a country that achieved better public health would probably no longer be classified as a developing country, and likewise might no longer be as appealing as a tourist destination. One answer might be in building microenvironments of improved public health in which hotels and restaurants that cater to tourists might be held to much higher standards than the rest of the country. Independent verification of compliance would be required, and these services would need to be subsidised by the travel industry (eventually the individual traveller) and perhaps the developing country government through luxury taxes. Attempts to construct safe tourist enclaves have occurred in places like Cancun, Mexico. In Cancun a safe water supply has been constructed and the pipes serving hotels are relatively new. However, the infrastructure of food services is basically the same as in other parts of Mexico. The prevalence of travellers' diarrhoea is not obviously lower in Cancun than the rest of Mexico. The template for the safe tourist enclave appears to be Club Med, where the costs of safety are built into the costs of participation. The substituted risk is loss of spontaneity and a failure to sample the local culture as thoroughly as many tourists might desire.

WORLD HEALTH ORGANISATION INITIATIVES

Improving public health infrastructure in developing countries is the cornerstone of an initiative from the WHO. To understand this initiative, certain popular concepts are reviewed briefly.

Emerging and re-emerging diseases

How important are these to the average traveller? Some are real risks like *E. coli* O157-H7 contamination of hamburger meat even in developed countries and the necessity to thoroughly cook such meat. Others are merely perceived risks that can have disastrous financial consequences like the plague scare in India.

Newly-emerging and re-emerging diseases are diseases of infectious origin whose incidence has increased within the past two decades or threatens to increase in the near future. Newly-emerging diseases result from changes or evolution of existing organisms, or are known diseases that may spread to new geographic areas or new human populations, or are unrecognised infections that may appear especially among persons living or working in areas undergoing ecological changes like deforestation or reforestation that increase exposure to insects, animals or environmental sources. Re-emergence of disease results from development of antimicrobial resistance (e.g. gonorrhoea, malaria, pneumococcal disease), or breakdowns in public health measures for previously controlled infections (e.g. cholera, tuberculosis, pertussis), or occasional reappearance in man from animal reservoirs (e.g. monkeypox in West Africa).

Many of these problems result from changes in society and human behaviour. Examples include contact with animals resulting in zoonosis like hantavirus. Greed

appears to have motivated the lowering of the temperature in the pot that processed the carcasses for making feed for cattle, and this in turn allowed Bovine Spongiform Encephalitis to emerge. Housing of children in day-care centres, especially if toys and inanimate objects are not cleaned carefully and frequently, allows *Clostridium difficile* to emerge as a routine cause of diarrhoea in children. Rapid air travel combined with the importation of seafood allows cholera to emerge in developed countries. War and exposure of troops in the Persian Gulf led to the emergence of a previously unrecognised form of leishmaniasis. Changes in the environment can allow disease to emerge, for example the increase of *N. meningitidis* disease as the desert moves south in Africa. Deterioration or absence of public health services is a major factor in the emergence of disease. Ebola virus infected health care workers predominantly because of poor infection control practices. Cholera spread because of poor sanitary conditions. Diphtheria became epidemic because of loss of vaccination capabilities as the Soviet Union broke apart.

Examples of emerging and re-emerging diseases are listed in Table 5. New examples are reported on a regular basis. Organisations such as the CDC (Centres for Disease Control), WHO, and the International Society of Travel Medicine are giving high priority to surveillance for emerging and re-emerging diseases. With the availability of computer databases and commitment from local health care workers and public health experts, early recognition and intervention to prevent spread should be possible. Clearly infectious diseases remain a threat for both the developed and the developing world.

TABLE 5
Examples of emerging or re-emerging diseases.

<u>Bacterial</u>	<u>Viral</u>
Lyme borreliosis	HIV infection
Toxic shock due to Staphylococcus or Streptococcus	Hepatitis C virus
Diphtheria	Hantavirus
Plague	Dengue
Salmonella(MDR*)	Yellow fever
<i>Streptococcus innui</i>	Venezuelan equine encephalitis
Brucella	Reston virus
<i>E. coli</i> O157-H7	Ebola
<i>Streptococcus pneumoniae</i> (penicillin-resistant)	Equine morbillivirus
Vancomycin-resistant <i>Enterococcus</i>	Rift Valley Fever
MRSA [†]	<u>Parasitic</u>
Vancomycin-resistant <i>Staphylococcus aureus</i>	Malaria (MDR)
<i>Vibrio cholerae</i> O139	Cryptosporidiosis
<i>Shigella dysenteriae</i> , MDR*	<u>Fungal</u>
Mycobacterial such as <i>M. tuberculosis</i> (MDR)	Coccidioidomycosis
	<u>Prion</u>
	New Variant CJD
	<u>Dienflagellate</u>
	<u>Pfisteria</u>

*MDR = multi-drug resistant. [†]Methicillin resistant *Staphylococcus aureus*

WHO International Health Regulations in 1969 provided the legislative framework for the reporting of four diseases:

- Smallpox (this disease is now eradicated and, of course, no longer targeted).
- Yellow fever (vaccination has at least stopped the movement of the disease among populations. The only cases imported have been in non-vaccinated individuals).
- Plague (rat control is helping to contain the disease).
- Cholera (this disease is still periodically re-emerging and spreading).

These regulations have not maintained order when outbreaks or threats of the targeted diseases occur. It is estimated that Peru lost 770 million dollars because of a cholera outbreak. India lost an estimated 1.7 billion dollars due to a small plague outbreak. Perhaps the most telling statistic is that approximately 33% of deaths worldwide are attributable to infectious diseases, yet only three diseases are presently actively targeted by WHO.

Revised WHO international health regulations

WHO has determined that a fresh approach to control of infectious diseases worldwide is indicated. New standards are scheduled to go into effect in the year 2000. WHO plans to continue to require mandatory reporting; however, they will replace specific diseases with case definitions for syndromes of importance. These definitions will encompass five areas of concern: respiratory, gastroenterologic, neurologic, haematologic and unknown disease with any characteristics of previous categories. In each instance precise case definitions will be developed but in each case the syndrome will also be characterised by: high mortality; occurrence in a cluster; rapid growth or movement. These definitions encompass not only the concerns of WHO but also incorporate a concern for monitoring the results of biological warfare.

Absolutely critical to the projected success of this fresh approach is that standards for public health services will be defined, and approaches to implementation of better public health services will be elucidated for each country. All countries, developing as well as developed, suffer from inadequate public health services. Therefore, all countries will benefit in some degree from attempts to improve the services they presently provide. The challenge will be how to improve such services in a cost-effective way. While it might be viewed as idealistic, both host countries and the 'travelling countries' should share in the cost of a healthier world.

Co-operation among organisations

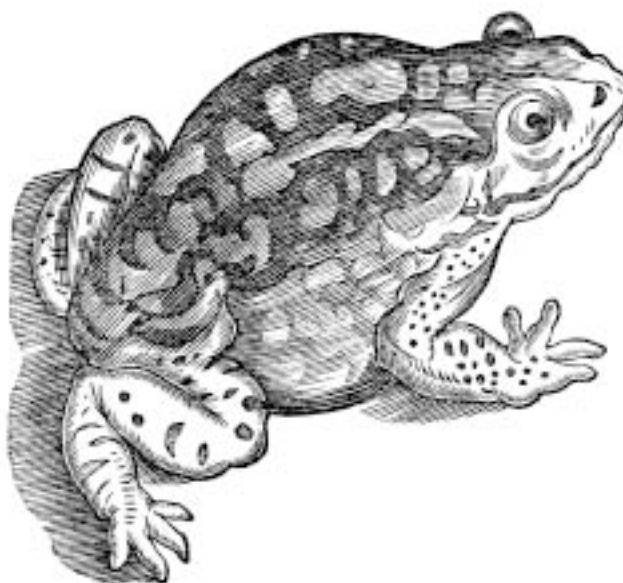
The travel industry must be willing to inform the public about risks of travel in such a way as not to frighten the public. The goal of the International Society of Travel Medicine is to have people travel confidently even to risky areas of the world with the assurance that they have optimised their chances of staying healthy. Conversely, travellers should know they will be treated efficiently and well in the event they do become ill in any country.

In any event, the issue is the reliable identification of physicians and services in developing and developed regions. Is IAMAT really doing what is necessary? Can the International Society of Travel Medicine or governmental agencies do a better job in establishing a network of reliable, perhaps even certified, physicians? We must have the help and co-operation of organisations around the world if the lofty goals set forward by WHO are to be realised.

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An illustration from the Book From The Collection. See p.454 for further details.