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## International travel and HIV infection

C.F. von Reyn,<sup>1,2</sup> J.M. Mann,<sup>1</sup> & J. Chin<sup>1</sup>

*Although human immunodeficiency virus (HIV) infection is a worldwide problem, its prevalence and pattern vary from country to country. Accordingly, the risk to international travellers of acquiring HIV infection also varies widely in different parts of the world, and depends principally on their behaviour. The risk of sexual acquisition of HIV infection can be virtually eliminated by avoiding penetrative sexual intercourse with intravenous drug users and persons who have had multiple sexual partners (such as prostitutes) or reduced by the use of condoms. The risk of parenteral exposure to HIV can be reduced by avoiding parenteral drug use and behaviour that is likely to lead to injury (with its attendant risk of requiring blood transfusion) and by seeking medical facilities with adequate capabilities to screen blood donors for HIV and to sterilize instruments. HIV screening of international travellers is an ineffective, costly, and impractical public health strategy for limiting the worldwide spread of HIV infection. Travellers infected with HIV require specialized advice regarding health precautions, prophylactic medications, and immunization.*

The pandemic of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) has raised a variety of issues related to international travel. Individual travellers ask about the risk of acquiring HIV infection during travel; national governments consider whether entering travellers should be screened for HIV infection; and tourist organizations and international transport companies attempt to prevent fear of AIDS from disrupting the travel industry.

This article summarizes the current global epidemiology of AIDS and HIV infection, considers the risk of acquiring HIV infection during international travel, addresses the issue of HIV screening of international travellers, and offers advice for preventing HIV infection during international travel. Finally, recommendations are provided for medical

counselling of the prospective traveller who is HIV-infected.

### Global epidemiology of AIDS and HIV infections

A total of 222 740 cases of AIDS had been reported to WHO from 153 countries by 1 March 1990 (Table 1). Cases have been reported from every continent. These data should not be interpreted to indicate that countries that have reported no AIDS cases, or those that have reported few cases, are either free of or have

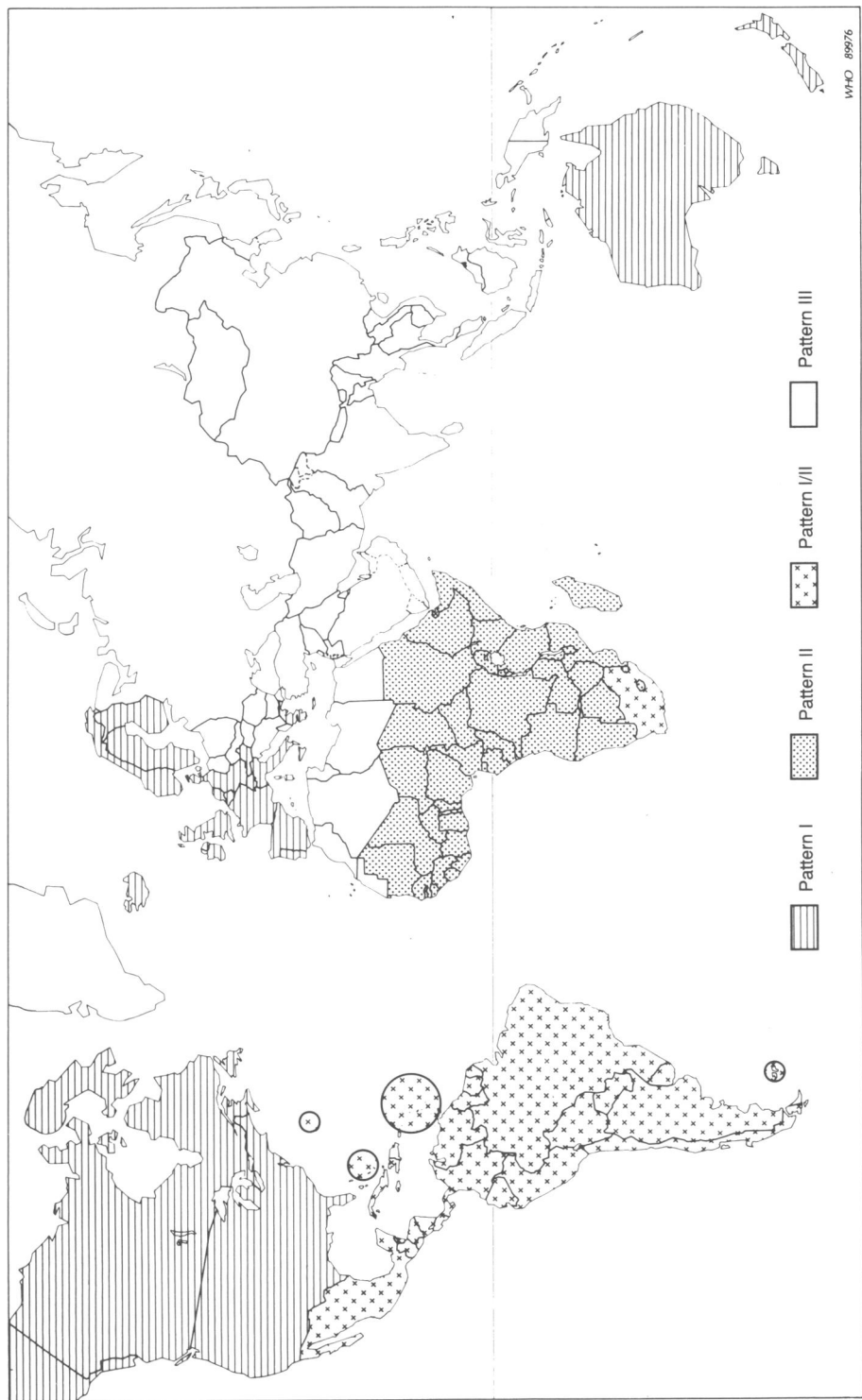
Table 1: Number of AIDS cases reported to WHO by 1 March 1990

	No. of cases	No. of countries or territories reporting:		
		to WHO	0 cases	≥ 1 case
Africa	41 518	52	4	48
Americas	147 159	44	0	44
Asia	588	37	12	25
Europe	31 581	30	1	29
Oceania	1894	14	7	7
Total	222 740	177	24	153

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Fig. 1. Global patterns of HIV/AIDS, as of 1988 (see text for details).



a low prevalence of HIV infection. Few seroprevalence studies have been carried out, and there is also significant underrecognition, underdiagnosis, and underreporting of AIDS in many areas of the world, especially in developing countries with limited laboratory and clinical facilities.

Available data on reported AIDS cases and HIV seroprevalence information permit a reasonable description of the current global patterns of AIDS and HIV infection (Fig. 1). Distinct patterns have been observed, and are presumably related to the different times of introduction or extensive spread of HIV and to different social and behavioural characteristics (1, 2).

In Pattern I countries, where HIV appears to have spread extensively in the late 1970s or early 1980s, most AIDS cases are due to sexual transmission among homosexual and bisexual men, with only a small percentage of cases being due to heterosexual contact. Parenteral transmission is due principally to intravenous drug use. Data from volunteer blood donors indicate that the overall population seroprevalence in such countries is less than 1%, although in some groups with high-risk behaviour (homosexual or bisexual men with multiple sexual partners, and intravenous drug users), seroprevalence may be 50% or higher. This pattern is observed in North America, western Europe, Australia, New Zealand, South Africa and many urban areas of Latin America.

The epidemiological pattern in many Pattern I countries is still evolving. For example, in many Latin American countries HIV transmission among heterosexuals who have had multiple sexual partners has increased since the mid-1980s, to the extent that this mode of transmission has become the predominant one. As a result of this shift, Latin America has been reclassified as Pattern I/II (2).

In Pattern II countries, where extensive spread of HIV probably began in the 1970s, most sexual transmission occurs among heterosexuals and the male-to-female ratio is approximately 1:1. Parenteral transmission occurs in areas where blood may not be routinely screened for antibodies to HIV and from use of unsterile needles, syringes, and other skin-piercing instruments. The overall population seroprevalence among adults, especially in urban areas, is usually over 1% and may range as high as 5–25%. Pattern II has been observed in central, eastern, western, and southern Africa and in some areas of the Caribbean.

In Pattern III countries, where HIV appears to have been introduced in the early to mid-1980s, information about AIDS cases is either incomplete or the number of reported cases is insufficient to identify the predominant modes of transmission. The pre-

valence of HIV infection among persons who practise high-risk behaviours (e.g., male or female prostitutes) is generally as low as HIV seroprevalence rates among blood donors in the USA and Europe (i.e., 1 per several thousand), but these levels are increasing, especially in south-east Asia. Pattern III occurs in North Africa, the Middle East, eastern Europe, Asia, the Pacific, and rural parts of Latin America.

## Risk of acquiring HIV infection during international travel

### *Sexual transmission*

The risk of acquiring HIV from sexual activity depends on: the risk that a sexual partner is infected; and the type and number of sexual contacts with the infected partner. Although the probability that a partner is infected may be higher in some countries than others, it is clear from the preceding summary of the epidemiological situation that there is a risk of exposure to HIV infection from sexual contact throughout the world.

In areas described as Pattern I, sexual contact with homosexual or bisexual men, intravenous drug users, or persons who have had many sexual partners (e.g., prostitutes) poses the highest risk of exposure. In Pattern II areas, sexual contact with heterosexuals who have had multiple sexual partners (especially prostitutes) presents a substantial risk of exposure (3–6).

In areas where HIV infection has been documented, prostitutes (male or female) and other persons who have had many sexual partners have the highest rates of HIV infection. In the USA, HIV infection rates among female prostitutes are 0–30% in Las Vegas and south Florida, where the rate of intravenous drug use is 0–7%, and 19–57% in Miami and Newark, NJ, where most have a history of intravenous drug use (7, 8). In Europe, infection rates are 0–2% among female prostitutes in Paris and London, 1% among registered prostitutes in the Federal Republic of Germany, and 30–78% among prostitutes in Italy, Switzerland, and the Netherlands who are intravenous drug users (8–10).

In urban areas of central, eastern, and southern Africa, rates of HIV-1 infection among female prostitutes range from 6–90% (11–13). Among female prostitutes in West Africa, rates of HIV-2 infection range from 4–39% (14, 15). Studies of female prostitutes in Asia and the Pacific indicate HIV infection rates of 0–6% (16–19).

Among sexually active homosexual or bisexual men, rates of HIV seropositivity are 49–70% in urban areas in the USA (20, 21), with the following rates in various cities in other Pattern I areas: Stock-

holm, 30% (22), Sydney, 39% (23), Buenos Aires, 29% (24), and Mexico City, 31% (25). Although the incidence of new HIV infections among homosexual or bisexual men has decreased markedly in recent years (26), the prevalence remains relatively high because of past infections.

### ***Parenteral transmission***

**Blood and blood products.** Although transfusion of unscreened blood remains associated with a substantial risk of HIV transmission in some areas of the world, the likelihood that a blood transfusion would be required during international travel is low, and measures to protect the blood supply are being increasingly implemented in developing countries, especially in large urban areas.

In the USA, approximately 1 million persons are transfused annually, with each person receiving an average of 2.9 units of blood (27). If these figures are applied to a typical international trip, the number of persons requiring transfusion would be 1.3 per 10 000 per 2-week period. Among 1746 Swedish International Development Agency (SIDA) personnel who were working in rural Africa, the incidence of illness that required immediate hospitalization was 10 per 10 000 per 2-week period. Accidents or surgical operations that created a potential need for transfusions accounted for less than half of these cases, i.e., a maximum of 5 per 10 000 per 2-week period (J. Stenbeck, personal communication, 1987).

Recognition of the need to screen donor blood for HIV is now widespread and has been implemented not only in the industrialized world, but also in many developing countries (WHO, unpublished data 1987). In Africa, for example, donor blood is now screened in one or more hospitals or clinics in the major cities of most countries. Also, in Latin America, HIV screening programmes for blood donors are widely available in large urban areas and capital cities where HIV is prevalent. In Asia, the seroprevalence of HIV is exceedingly low or absent among the blood-donating public, but countries are nevertheless beginning to implement HIV screening programmes.

### ***Needles and other skin-piercing instruments***

The sharing of needles by intravenous drug users is associated with a very high risk of HIV transmission in Pattern I countries (where other intravenous drug users are likely to be infected) (28). However, in other areas of the world, intravenous drug users may also incur substantial risk of HIV infection if they share drug injecting equipment. Such a risk has been realized in Bangkok, for example, where the preva-

lence of HIV infection among the estimated 60 000 intravenous drug users increased from approximately 1% in late 1987 to over 40% in mid-1989 (29).

Reusable medical instruments that have been contaminated with HIV-infected blood or body fluids and have not been adequately sterilized have been implicated in the transmission of HIV (30). For example, in a recent instance in the USSR, at least 41 children were infected with HIV through the reuse of syringes that were not sterilized between patients (31).

In non-medical settings, reusable skin-piercing instruments also create a risk of HIV transmission if they are not properly sterilized or disinfected after each use (e.g., tattoo or acupuncture needles, reusable ear-piercing devices, razors, and other cutting devices) (32). HIV is easily inactivated by standard methods of sterilization or disinfection, such as autoclaving or boiling for 20 minutes (33, 34).

### ***How HIV is not transmitted***

Studies from around the world have failed to corroborate that HIV is transmitted through casual contact (35, 36). There is no risk of acquiring HIV infection by travelling on the same public conveyance, sharing a bathroom or eating utensils, or shaking hands with an HIV infected individual, from coughing, sneezing, or sharing food or drink.

The following pieces of evidence indicate that HIV is not transmitted via insects (37): the age-specific rates of HIV infection and disease do not fit the pattern for arthropod-borne diseases (i.e., which have high attack rates in young children) (1); rates of HIV infection in Africa are higher in urban than rural areas (1); serological studies of humans have failed to show a relationship between the presence of antibody to HIV and antibody to arboviruses (38); and HIV does not replicate in cell lines derived from arthropods (39).

## **HIV screening of international travellers**

According to the WHO International Health Regulations, the only health document that can be required from international travellers is a valid vaccination certificate against yellow fever (40). Nevertheless, some countries have considered also requiring from entering travellers proof of their HIV-negative status or of screening them for HIV infection. At least 40 countries have abandoned such proposals after more careful consideration of the issues and consultation with WHO. However, at least 50 countries have policies that discriminate against travellers and migrants with AIDS or HIV infection (41).

Since HIV infection is now present in every

WHO Region and most countries of the world, even total exclusion of foreign travellers would be unlikely to prevent its introduction and spread within a country. This would be especially true for those countries where large numbers of international travellers are returning nationals. Since some individuals with early HIV infection cannot be identified with currently available serological tests (42, 43), no screening programme, even if applied to all entering travellers, could completely prevent introduction of HIV. Also, the screening of low-risk groups, which cover the majority of travellers, would be likely to identify more false positive than true positive persons (44).

In addition, the logistic problems that would be posed by programmes to screen travellers for HIV infection would be enormous (45).<sup>b</sup> These include decisions about whether to screen at entry or several months afterwards (to exclude false negatives during the early stages of infection); what to do with the traveller while awaiting the test results; and a series of complex data management, laboratory control, legal, and ethical issues.

Screening international travellers for HIV might also have adverse public health consequences; to protect its travelling citizens, a country might fail to report AIDS cases; and travellers with "AIDS-free" certificates might engender a false sense of security (as of early 1990, no such "official" certificates were being issued by any government). Furthermore, the costs of screening programmes would be substantial. In 1985, close to 100 million travellers crossed international borders legally (World Tourism Association, unpublished data), while many millions more crossed land borders informally. Even at a conservative total cost of approximately US\$ 10 per test, the expense of screening all international travellers would be enormous. In addition to being ineffectual, HIV screening programmes for international travellers would therefore divert already scarce health resources from more effective control efforts.

A panel of experts convened by WHO in March 1987 concluded that HIV screening programmes for international travellers would "at best and at great cost, retard only briefly the dissemination of HIV both globally and with respect to any particular country".<sup>c</sup> In a statement made in 1989, the International AIDS Society also has taken a similar

position, arguing for freedom to travel for all persons with HIV infection.<sup>b</sup>

## HIV prevention for the international traveller

Much concern has been generated about the potential hazards of international travel to areas where there may be a high prevalence of HIV infections (i.e., New York, San Francisco, Zurich, central Africa, etc.). Advice about prevention of HIV infection should be offered to the international traveller regardless of their destination.<sup>c</sup> In addition, travellers may wish to consult their national embassy, mission, or consulate in the country of destination for advice in selecting health care facilities that provide adequate sterilization methods and screened blood. Plasma expanders (rather than blood) should be considered if urgent resuscitation is necessary.

## Consultation for the HIV-infected traveller

In 1988, the US Public Health Service estimated that 1–1.5 million Americans were infected with HIV (26). By 1989 WHO estimated that at least 5 million persons had been infected globally with the virus (29). Thus, increasingly, international travel of HIV-infected persons can be expected, and individual medical advice should be offered to such persons who are considering international travel. As with any traveller, the physician should first review the proposed itinerary to determine whether immunizations or prophylactic medications are recommended, and to assess whether other advice (food and water precautions, insect bite prevention, etc.) is necessary (46, 47). The physician should also determine whether the patient is immunosuppressed, since this will influence additional recommendations. If the patient is or may be immunosuppressed, special medical advice should be offered. This should include consideration of the possible increased risk of acquiring various infectious diseases (e.g., those caused by salmonella (48, 49) or cryptosporidia (50)), especially in developing countries, and possible increased morbidity or mortality should infection occur (54). In countries where these risks are significant or if recommended means of prevention might either be ineffec-

<sup>a</sup> World Health Organization. *Report of the Consultation on International Travel and HIV Infection 1987*. Unpublished document WHO/SPA/GLO/87.1.

<sup>b</sup> International AIDS Society. Press briefing, Geneva, 30 May 1989.

<sup>c</sup> See: *AIDS information for travellers*. WHO leaflet, 1987. Requests for single copies of this leaflet should be sent to: Director, Global Programme on AIDS, World Health Organization, CH-1211 Geneva 27, Switzerland.

tive or associated with significant side-effects, i.e., immunization with a live vaccine or use of a prophylactic medication, the traveller should be advised to consider avoiding some or all of these countries on the proposed itinerary.

### Medical care

Persons with symptomatic disease, e.g., AIDS or AIDS-related conditions, should consider the medical care facilities in areas they may wish to visit, insurance coverage, and the attitude of the host country to treating patients with HIV infection (current information may be solicited from the traveller's embassy, mission, or consulate in the destination country). Persons with overt HIV disease may be prevented from entering countries or deported if they are identified.

### Prevention of food-, water-, and vectorborne diseases

General recommendations for all international travellers to areas where standards of environmental or personal hygiene are low include the following: avoid water unless it has been boiled, chemically treated, or is bottled and carbonated; avoid ice unless it has been prepared from boiled water; and avoid vegetables and fruits that cannot be cooked or peeled (46, 47). Shellfish should be steamed for 4–6 minutes or avoided if such preparation cannot be assured (52); although this is a general recommendation for all individuals, an increased susceptibility to septicæmia from *Vibrio* spp. makes compliance with this guideline especially important for those who are immunosuppressed (53). Exposure to mosquitos can be reduced by the use of insect repellents and protective clothing (46).

### Prophylactic medications

Routine chemoprophylaxis for traveller's diarrhoea is no longer recommended (46, 47); however, antibiotics are often provided to international travellers for 3–5 days' self-treatment of diarrhoea. The following drugs are used to treat such diarrhoea: trimethoprim-sulfamethoxazole, trimethoprim, doxycycline, and ciprofloxacin (47, 54). Ciprofloxacin and trimethoprim-sulfamethoxazole are perhaps to be preferred since they protect against salmonella. However, an increased rate of hypersensitivity to sulfa drugs has been described in patients with AIDS (55). Oral rehydration salts, such as those recommended by WHO, should be carried by travellers to treat diarrhoea associated with significant fluid loss (46). Antispasmodics, e.g., loperamide, should also be provided, but should be used judiciously to avoid

prolongation of symptoms, and should not be used if inflammatory diarrhoea, i.e., blood or mucous in the stool, is present (56).

Chloroquine may be taken for routine anti-malarial prophylaxis, although the possible immunosuppressive effect from this drug should be recognized (57). Standard reference works should be consulted to determine whether prophylaxis or presumptive treatment for chloroquine-resistant *Plasmodium falciparum* (CRPF) should also be provided (based on the traveller's itinerary) (46, 47). In consulting these references, the physician should be aware of additional considerations for persons with AIDS. Pyrimethamine-sulfadoxine should probably be avoided in situations where it is still recommended for prophylaxis (e.g., prolonged travel to areas with CRPF) because of the increased risk of side-effects in persons with AIDS. However, pyrimethamine-sulfadoxine can be used for presumptive treatment if an alternative is not available (58, 59). Where available (approval for use in the USA is pending), mefloquine is an alternative drug for prevention and treatment of CRPF and for *P. falciparum* that is resistant to sulfadoxine-pyrimethamine (46, 47). Doxycycline may also be administered to AIDS patients in areas where its use is recommended for malaria prophylaxis (e.g., rural Thailand) (47). Where available, daily doses of proguanil and weekly doses of chloroquine may be used for prophylaxis of CRPF in East Africa (47).

### Immunization

Decisions about immunizing HIV-infected persons, including those who travel, must weigh up the risks and benefits of immunization against the risk of acquiring the vaccine-preventable disease. Serological responses to both live and inactivated vaccines are generally diminished in HIV-infected individuals in proportion to their degree of immunosuppression, and adverse reactions to live vaccines (BCG and smallpox) have been reported in HIV-infected infants and adults (60, 61). Inactivated vaccines (e.g., those against diphtheria-tetanus or typhoid fever) are not associated with an increased rate of adverse effects in persons who are immunosuppressed, and may be administered to individuals with HIV infection (60).

Live vaccines, including yellow fever vaccine, are generally contraindicated for immunosuppressed patients, such as those with symptomatic HIV infection (62). For individuals with asymptomatic HIV infection, the risk of serious adverse reactions to live vaccines has not been documented but must be considered a possibility. For this reason, alternatives should be provided. In the case of yellow fever

vaccine, avoiding travel to areas where yellow fever is endemic represents one option. For poliovaccine, the inactivated rather than live attenuated vaccine should be administered. Although measles vaccine is a live attenuated vaccine, it has been given to persons with symptomatic HIV infection without leading to complications (60), and should be considered for nonimmune HIV-infected travellers to areas where measles is prevalent (e.g., developing countries) (63).

If vaccination against yellow fever is required by the host country but is contraindicated for the traveller, the physician should indicate on the International Certificate of Vaccination that the individual concerned has a medical exemption. However, it should be made clear to the traveller that such medical exemptions may not always be accepted by the host country.

### ***Preventing HIV transmission***

HIV-infected persons should: refrain from donating blood, semen, or tissue; notify potential sexual partners of their HIV status and observe safe sex practices; inform health care providers of the need for blood precautions; and avoid recreational use or sharing of needles.

## **Conclusions**

The global patterns and prevalence of HIV infections vary widely from country to country, but the routes of HIV transmission have been documented to be the same throughout the world. The behaviours that put persons at risk of being infected with HIV are therefore similar worldwide. Preventive measures against sexual transmission of HIV are also the same worldwide, regardless of whether the individual is a traveller or a resident of a given country. Health care providers need to be able to discuss sensitive issues, such as sexual behaviour, openly in clear and easily understood language in order to protect their patients, whether or not they are international travellers.

The risk of travellers acquiring HIV infection from infected needles or blood is greater in areas where HIV is prevalent and routine screening of blood for HIV antibodies has not been fully established. However, this increased risk can be minimized by seeking health care at facilities where such screening is carried out routinely.

International travel is as safe today as it ever has been, and it can also be safe from HIV infection if travellers are properly informed about how the virus is and how it is not transmitted, and if travellers adhere to simple precautions regarding sexual behaviour and receipt of injections or blood.

## **Acknowledgements**

We thank Dr M.E. Wilson for helpful comments, and K. Rose, P. Carter, P. Dyment, and A. Rolfe for assistance with preparing the manuscript.

## **Résumé**

### **Voyages internationaux et infection par le VIH**

La pandémie d'infection par le virus de l'immuno-déficience humaine (VIH) et du syndrome d'immunodéficience acquise (SIDA) a soulevé un certain nombre de problèmes liés aux voyages internationaux. Bien que l'infection par le VIH soit un problème mondial et que sa prévalence et ses modalités varient de pays à pays, les voies de transmission du VIH sont les mêmes dans le monde entier. Le risque de contracter une infection par le VIH peut cependant varier très largement dans différentes parties du monde. On trouvera ici un résumé sur l'épidémiologie mondiale actuelle du SIDA et des infections par le VIH, sur le risque de contracter une infection par le VIH pendant un voyage international, des conseils pour prévenir l'infection par le VIH pendant un tel voyage, et des considérations sur le dépistage du VIH chez les voyageurs internationaux.

Les mesures préventives contre la transmission sexuelle du VIH sont les mêmes dans le monde entier, qu'il s'agisse d'un voyageur ou d'un résident d'un pays donné. Le risque d'être infecté par voie sexuelle peut être éliminé en évitant les rapports sexuels avec pénétration, ou réduit en évitant d'avoir des contacts sexuels avec des utilisateurs de drogues par voie intraveineuse et des personnes qui ont eu des partenaires sexuels multiples (comme les prostituées), et par l'emploi de préservatifs. Le personnel soignant doit être en mesure de discuter de problèmes délicats, comme le comportement sexuel, de façon ouverte et dans un langage clair et facile à comprendre, de façon à protéger les patients, qu'ils soient ou non des voyageurs internationaux. Le risque d'exposition au VIH par voie parentérale peut être réduit en évitant l'emploi de médicaments par cette voie et des comportements susceptibles de provoquer des blessures (avec le risque concomitant de la nécessité d'une transfusion sanguine) et en s'adressant pour des soins médicaux à des établissements ayant les capacités voulues pour dépister les donneurs de sang pour le VIH et pour stériliser les instruments. Le dépistage du VIH chez des voyageurs internationaux est une stratégie de santé publique inefficace, coûteuse et non prati-



cable pour limiter la diffusion mondiale de l'infection par le VIH.

Un voyage international est aussi dépourvu de danger aujourd'hui qu'il l'a jamais été, et tout risque d'infection par le VIH peut être évité si les voyageurs sont informés de façon voulue sur la façon dont le VIH est et n'est pas transmis et s'ils observent de simples précautions dans leur comportement sexuel et s'ils évitent les injections ou de recevoir du sang.

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