



ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)
AND EXPANDED PROGRAMMES ON IMMUNIZATION

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SUMMARY

While the Human Immunodeficiency Virus (HIV) continues to spread throughout the world, the number of African countries reporting to WHO has increased considerably during the last three years, totalling 34 in January 1987, including 16 countries reporting over 2300 cases since the beginning of the epidemic.

Contrary to what has been observed in the USA and in Europe, where most cases occurred among homosexual/bisexual males and in intravenous drug abusers, the infection in Africa is transmitted mostly through heterosexual contact. Women of reproductive age are therefore exposed to an increasing risk of infection by HIV while vertical transmission from mother to child, either in utero, or around birth, follows a similar trend.

In certain industrialized countries, the use of unsterile syringes and needles has been a very important factor in HIV transmission among intravenous drug abusers. This high-risk group does not seem to play any significant role in HIV transmission in Africa.

Nevertheless, frequent injections with unsterile equipment and blood transfusions from infected individuals to children and women of reproductive age are contributing to virus transmission in this Region. At a time when African countries are accomplishing much progress in the strengthening of their Expanded Programmes on Immunization (EPI), one must ensure that these programmes do not increase the risk of HIV transmission.

Following a brief review of the AIDS situation in the world and then more specifically in Africa, and after discussing the main modes of transmission prevailing in this Region, four questions are examined:

- (1) Do vaccinations of children and women of child-bearing age imply a risk of HIV transmission?
- (2) Should children and women infected with HIV be vaccinated?
- (3) Are immunizing staff exposed to a risk of HIV transmission when vaccinating infected persons?
- (4) What can be done so that the EPI does not increase the risk of HIV transmission?

The answers to these questions are based on epidemiological data which are still incomplete but at the present state of knowledge one can affirm that the risk of HIV transmission through vaccination is miniscule by comparison with enormous advantages drawn from an effective protection against the six target diseases of the EPI. Furthermore, with the exception of BCG which has been reported to have caused local reactions in a clinical case of AIDS, no adverse effect - whether clinical or biological - has been noted following the vaccination of HIV infected persons with inactivated vaccines, or with attenuated (oral) polio vaccine. The insufficient immune response to measles vaccine which has been observed in a group of HIV infected children must not be a deterrent against measles immunization of these children in regions of the world where measles remains a severe and frequent disease. There is no evidence either of HIV transmission from an infected vaccinated person to the vaccinator. The rare documented cases of HIV transmission by accidental needlestick injury have implied deep injections with thick needles.

A good sterilization of syringes and needles used by vaccinators is the most radical approach to reduce to zero the risk of HIV transmission through vaccination. This implies the regular supply of well-adapted injection and sterilization equipment, continued training of health staff, reinforced supervision and appropriate information of the public.

The risk of HIV transmission among women of child-bearing age and infants also calls for measures specifically aimed at interrupting other links of the chain of transmission, whether they are related to sexual behaviour and practices, to more stringent indications of injections and blood transfusions together with the screening of blood donors or donated blood. These activities, and several others, will form the main strategies of national prevention and control programmes on AIDS, which are being developed in a fast-growing number of countries.

RESUME

Alors que le virus d'immunodéficience humaine (VIH) continue à se propager dans le monde, le nombre des pays africains qui participent au système OMS de surveillance du SIDA s'est accru substantiellement durant les trois dernières années, atteignant le nombre de 34 en janvier 1987 dont 16 d'où l'on signalait plus de 2300 cas depuis le début de l'épidémie.

Contrairement à ce qui a pu être observé aux Etats-Unis d'Amérique et en Europe, où la majorité des cas est survenue chez les hommes homosexuels et les toxicomanes, la maladie se transmet en Afrique surtout par voie hétérosexuelle. Les femmes en âge de procréer sont donc exposées à un risque accru d'infection par le VIH alors que la transmission de la mère à l'enfant, soit au stade intra-utérin de la gestation, soit au moment de l'accouchement, subit la même tendance.

Dans certains pays industrialisés l'emploi d'aiguilles et de seringues non stériles a été un facteur très important pour la transmission du VIH parmi les drogués s'injectant des stupéfiants par voie veineuse. Ce groupe à haut risque ne semble toutefois pas jouer de rôle important dans la transmission du virus en Afrique.

Il n'en reste pas moins que les injections fréquentes avec du matériel mal stérilisé et des transfusions de sang à partir de sujets infectés par le VIH à des enfants et des femmes en âge de procréer contribuent sensiblement à la transmission du virus dans cette Région. Au moment où les pays africains accomplissent des progrès notables dans le renforcement de leurs programmes élargis de vaccination (PEV), on doit s'assurer que ces programmes n'entraîneront aucun risque supplémentaire de transmission de l'infection par le VIH.

Après une brève revue de la situation du SIDA dans le monde, puis plus particulièrement en Afrique, et après avoir évoqué les modes de transmission du VIH prépondérants dans cette Région, les quatre questions suivantes sont examinées :

1. La vaccination des enfants et des femmes en âge de procréer implique-t-elle un risque de transmission du VIH ?
2. Doit-on vacciner les enfants et les femmes porteurs d'anticorps VIH ?
3. Le personnel des programmes de vaccination court-il un risque lorsqu'il vaccine des sujets séropositifs ?
4. Que peut-on faire pour que le PEV n'accentue pas le risque de transmission du VIH ?

Les réponses à ces questions reposent sur des données épidémiologiques encore incomplètes mais dans l'état actuel des connaissances on peut affirmer que le risque de transmission du VIH par la vaccination est infime comparé aux avantages énormes tirés d'une protection efficace contre les six maladies cibles du PEV. D'autre part, à l'exception du BCG qui a pu provoquer des réactions loco-régionales chez un sujet présentant des signes cliniques du SIDA, on n'a relevé aucune conséquence clinique ou biologique néfaste attribuable à la vaccination par vaccins inactivés ou par vaccin atténué antipoliomyélitique chez les sujets infectés par le VIH. La réponse immunitaire insuffisante qui a été observée dans un groupe d'enfants infectés par le VIH ne doit pas dissuader de vacciner ces enfants contre la rougeole dans des régions du monde où la maladie demeure sévère et fréquente. Il n'existe non plus aucune évidence de transmission du VIH d'un vacciné porteur du virus au vaccinateur. Les rares cas documentés de transmission du virus par piqûre accidentelle ont impliqué des piqûres profondes par aiguilles de très gros calibre.

Une bonne stérilisation des aiguilles et seringues employées par les vaccinateurs est la solution la plus radicale pour réduire à zéro le risque de transmission du VIH par la vaccination. Ceci implique un approvisionnement régulier en matériel d'injection et de stérilisation bien adapté, une formation continue du personnel de santé, une supervision renforcée et une bonne information du public.

Le risque de transmission du VIH chez les femmes en âge de procréer et des nourrissons appelle aussi des mesures spécifiquement destinées à interrompre les autres maillons de la chaîne de transmission, qu'ils soient en rapport avec le comportement et les pratiques sexuelles, les indications plus parcimonieuses des transfusions et injections et le dépistage des anticorps VIH parmi les donneurs de sang ou dans le sang prélevé. Ces activités, parmi d'autres, formeront les stratégies principales des programmes nationaux de prévention et de lutte contre le SIDA, lesquels se mettent en place dans un nombre rapidement croissant de pays.

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)
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The virus responsible for the Acquired Immunodeficiency Syndrome (AIDS) was independently identified by Professor Luc Montagnier of the Institut Pasteur in Paris and then by Dr Robert Gallo of the National Institutes of Health, Bethesda, USA. The syndrome is caused by a retrovirus previously designated "lymphadenopathy-associated virus/human T-cell lymphotropic virus, type III" LAV/HTLV-III, which the International Committee on Taxonomy of Viruses has recommended be called the "human immunodeficiency virus" (HIV). That name has been adopted by WHO and is therefore the one that will be used in this document.

Spread of the AIDS epidemic

Although the origin of the epidemic has not been established, the first cases of AIDS were identified in 1981 in the United States, mostly among homosexual/bisexual males. Between June 1981 and 1 December 1986, 28 246 cases of AIDS and 15 853 deaths were notified in the USA.¹ These figures included 403 cases and 241 deaths among children less than 13 years old (Table 1), 72.2% of whom were children whose parents were suffering from AIDS or had been exposed to that risk. The incidence of AIDS continues to increase at a high rate in the USA. The United States Public Health Service estimates that 270 000 cases will have been notified in the USA by 1991,² which is roughly 10 times the number of cases so far notified. Most of these cases should be among individuals who are already HIV carriers.

AIDS cases have been reported in all regions of the world since 1981 (Table 2).

In Europe, where the epidemic is affecting most countries, the highest rates (number of cases per million inhabitants) have been reported in Switzerland, Denmark, Belgium and France, where the cumulative total of cases relative to the population ranges from 18 to 26 per million. In the light of the current trends, it is estimated that there could be between 25 000 and 30 000 recorded cases of AIDS in Europe by the end of 1988. Here again, the majority of the cases are primarily male homosexuals and drug abusers, and the number of cases associated with drug abuse is increasing rapidly.

The same transmission pattern of "western" type predominates in Central America and Latin America. In Haiti the male/female case ratio has shifted from 10:1 to 3:1, which emphasizes the growing contribution of heterosexual transmission to the overall problem.

The reported cases in Asia and the Western Pacific region are almost exclusively from Australia, New Zealand, Japan and Thailand. Once again, the predominant epidemiological picture is of "western" type. The number of cases reported in Asia is low and most of the confirmed cases had been in contact with blood products from western countries or with persons coming from those countries. Nevertheless, serological tests have demonstrated the existence of HIV antibodies in male and female prostitutes. Thus, as Dr H. Mahler recently said, AIDS "is knocking on the door of Asia".

AIDS in Africa

The number of African States to have notified AIDS cases to WHO has increased substantially during the last three years. As at 16 January 1987, 34 African States were participating in the AIDS monitoring system set up by WHO. Sixteen of these States had not reported any case at that time. A total of 2324 AIDS cases had been reported in Africa. In contrast to the transmission pattern of the disease described above, the available data for Africa suggest that homosexuality and drug abuse play a quite minor role in this part of the world. In Africa it is heterosexual relations, blood transfusions and vertical transmission from mother to fetus and to the newborn child that occupy the foreground. Repeated injections for medical purposes given with non-sterile equipment also appear to play a part in this transmission. Two-way heterosexual transmission (from man to woman and from woman to man) is, however, acknowledged to be predominant in the epidemiology of AIDS in Africa. Although the epidemiological data on the spread of the disease in this region remain incomplete, it does appear that Central Africa, East Africa and some parts of Southern Africa are the most affected. West Africa and North Africa are less affected. One HIV retrovirus (or more than one) has been isolated in West Africa. A virus identified by French

researchers as "adenopathy-associated virus, type 2 (LAV-2)" has been isolated from individuals coming from West Africa who have the clinical and immunological signs characteristic of AIDS. A virus identified by research workers in the USA under the name "human T-cell lymphotropic virus, type 4 (HTLV-4)" has been isolated from symptom-free individuals in West Africa. Some seroepidemiological studies suggest that a small percentage of individuals in good health in several West African States are carriers of LAV-2 or HTLV-4 antibodies.

Women and children at risk of AIDS

HIV has been detected in blood, sperm, cervical mucus, urine, tears and saliva. Male-to-female sexual transmission has been shown to exist in the USA and in Europe, but it has been difficult to establish the extent of female-to-male transmission in these regions because the number of female HIV carriers is still low. In Africa, on the other hand, "two-way" transmission of the disease, i.e. from man to woman and vice versa, has been shown to exist. It has been established that the prevalence of anti-HIV antibodies in heterosexual males attending STD clinics has increased and that the number of sexual partners and consorting with prostitutes were among the most important risk factors. This two-way heterosexual transmission is revealed by seroconversion in women of child-bearing age. The seropositive rate in pregnant women in some Central African States is between 5 and 15%. Whether or not she has shown clinical signs of AIDS, a mother who is a carrier of the virus may pass it on to the fetus or to the newborn child at a later stage in gestation, including at birth. In one town in Central Africa, 27 (61%) of 44 young children between one month and 24 months old who were HIV seropositive had a mother who was herself positive.³ In a neighbouring country, a study was made of 49 children admitted to hospital for AIDS. The seropositive rate for the mothers of these children was 74%.⁴ Despite the difficulty of differentiating between children who are carriers of maternal anti-HIV antibodies and those who are carriers of the virus in infants less than nine months old, the already high and continuously rising rate of seropositive mothers means that increased infant and juvenile mortality is to be feared in the most affected countries.

Other risk factors than those arising from the seropositive state of the mother are involved for children: in many African countries, intramuscular injections and blood transfusions are frequent practices. The seropositive rate of blood donors ranges between 5 and 18% in some Central African and East African States. Among 238 children in hospital in a Central African town, 59% of the 16 who were seropositive although their mothers were seronegative had been given a blood transfusion. Only 7.1% of the seronegative children had had a transfusion.

In those regions of Africa where malaria is prevalent, especially where it is resistant to ordinary treatment, the disease may be involved in two ways in the risk of parenteral HIV transmission. On the one hand, children whose health is precarious through malaria are more likely to be given deep intramuscular injections of antimalarial drugs, or injections for the treatment of other opportunistic conditions, than are healthy children. On the other hand, the anaemia that follows repeated attacks of malaria may prompt the physician to carry out blood transfusion when no machinery exists for checking donors for HIV. It should, however, be recalled that there is as yet no proof of the possible transmission of HIV through bites from blood-sucking insects.

AIDS and the Expanded Programme on Immunization

Now that it has been established that the prevalence of HIV antibody carriers is increasing in a good many African countries and that women of child-bearing age and newborn babies also exhibit this trend, there is a need to raise the problem of AIDS in relation to the continuing expansion of national immunization programmes. Before making such an analysis, we shall emphasize that around 1 million deaths from measles, tetanus and whooping cough are annually avoided in developing countries, but that there are, tragically, still 3.5 million deaths every year from these diseases among non-immunized children.

That having been said, the topic of AIDS/EPI is reduceable to four key questions:

1. Is there any risk of HIV transmission involved in the immunization of children and women of child-bearing age?
2. Should children and women who are HIV antibody carriers be immunized?
3. Are the staff of immunization programmes at risk in immunizing seropositive individuals?
4. What can be done to prevent EPI strengthening the risk of HIV transmission?

1. Is there any risk of HIV transmission involved in the immunization of children and women of child-bearing age?

The transmission of AIDS by non-sterile intravenous injection equipment has been shown to be considerable among drug abusers, who accounted for 25% of the cases of AIDS in the USA⁵ and for 11% of the cases in Europe.⁶ While this mode of transmission does not appear to play a very large part in Africa, can the same be said of the many intramuscular, intravenous, subcutaneous and hypodermic injections that are given in hospital departments and in state or private dispensaries? A study of children in hospital revealed that the average number of injections received by each child in a group of 16 HIV seropositive children with an average age of 10.6 months was 44.³ In a control group of 222 seronegative children with an average age of 11.4 months, each child had received an average of 23 injections since birth. These figures are in contrast to the limited number of immunization injections, an average of 2.8 in the first group and 3.2 in the second. There was no connection between the immunization status of the children and their HIV serology.

At least four points must be taken into consideration regarding the possible risk of HIV transmission through immunization:

- (1) The sterilization of immunization equipment has been one of the key points of expanded programmes on immunization in most countries for a good few years past. Large quantities of injection and sterilization equipment have been made available to health personnel and the giving of injections with sterilized reusable syringes or with disposable syringes has been widely popularized, as was found in many in-depth examinations of immunization programmes. The vast majority of immunizations are given by health workers who have been trained in the correct procedures for the sterilization of needles and syringes. Nevertheless, the rigorous application of these methods calls for constant effort and an awareness that there is no risk at all of HIV transmission from sterile needles and syringes.
- (2) As suggested above, it may be estimated that a child may receive 10 injections of drugs for treatment purposes during the first year of life to every one immunizing injection. Consequently, the relative risk arising from immunization is very much less than that arising from injections for treatment purposes.⁷ Furthermore, it should be noted that immunization is carried out with slender needles that do not generally pick up blood.
- (3) The prevalence of HIV infection is lower among children than among adults. Consequently, the danger that a child may constitute a source of infection for other children at immunization sessions should non-sterile equipment be used is relatively low.
- (4) Many injections for treatment purposes are given in the private sector, where it is often more difficult to observe the rules of sterility than in well-established and well-equipped health facilities. Nor should we overlook the part played by practitioners who have no medical training, but who nevertheless give injections and perform scarifications with scant respect for the sterilization methods usually recommended. Such individuals do not usually take part in the Expanded Programme on Immunization.

Small as the risk of the transmission of AIDS by immunization may be, it does exist, at least theoretically, which is an additional reason for strengthening all activities for the supply of immunization and sterilization equipment, personnel training, and the development of self-destroying equipment for single use. More than ever, the basic rule "one injection, one sterile syringe, one sterile needle" must be followed.

2. Should children and women who are HIV antibody carriers be immunized?

In dealing with this question, use will be made of information assembled by Laforce in a document shortly to be published by the Expanded Programme on Immunization at WHO headquarters (WHO/EPI/Gen/86.6).

There are two different ways of looking at the question: (1) do HIV seropositive children, whether or not symptoms of infection are present, respond to vaccines? and (2) do these vaccines constitute a particular threat to these children?

There is little information on the response of seropositive children to vaccines. It could be possible for these children to have all the immunological deficiencies found in infected adults and research has shown that their response to vaccinal antigens may be inadequate.⁸

Seroconversion in response to vaccines has been investigated in the children of seropositive and of seronegative mothers;⁹ no difference was noted between these two groups. Four of the children concerned were HIV antibody carriers. Two of these children had lost immunity to measles; seroconversion took place following immunization. No incident connected with immunization was noted in these children. On the other hand, anti-measles antibody levels were measured in 10 seropositive children who had been immunized.¹⁰ No seroconversion to measles vaccine occurred in four of the 10 children studied, who had been immunized at 18 months.

The second aspect of the problem is the risk that immunization may constitute for the VIH carrier. *In vitro* tests have shown that active T4 lymphocytes are more prone to infection by VIH than resting T4. In theory, an opportunistic infection activating these lymphocytes could trigger such a mechanism and result in sudden multiplication of the virus, increased vulnerability of the T4 and the appearance of clinical signs. Continuing to think along the lines of this theory, might not immunization with attenuated live vaccine or with inactivated vaccine trigger a similar mechanism? Such a risk remains hypothetical at the present time and must be weighed against the risk of the triggering of HIV multiplication in the event of the disease against which the vaccine should protect.

As a general rule, live vaccines are not given to children whose immune system is endangered, but the decision is one that must weigh the risk entailed by immunization against that created by the communicable disease against which the vaccine is employed. Measles in Africa is a disease that illustrates this dilemma: without immunization, the measles mortality rate in children is of the order of 1%, whereas the risk of using the vaccine on children infected by HIV is purely theoretical. There is as yet no evidence of any risk associated with the administration of (oral) attenuated poliomyelitis vaccine to children infected by HIV; no case of poliomyelitis attributable to vaccination with attenuated poliomyelitis vaccine has as yet been reported among HIV antibody carriers.

The immunization of HIV antibody carriers, whether they exhibit symptoms or not, with inactivated vaccines would not appear to raise any particular problem.

As regards BCG, there is a reported case of a loco-regional BCG reaction following the immunization of an adult sufferer from AIDS.¹¹ One could argue in favour of the administration of BCG to infants known to be HIV carriers but who present no symptoms, as is most usually the case during the first few months of life, but against its administration to symptomatic cases because of the fear of loco-regional complications.

To sum up, the theoretical risk of immunizing a child infected by HIV must be weighed in every case against the benefit to be derived from immunization, and in the present state of our knowledge the benefit far outweighs the risk.

The recommendations made in October 1982 by the Global Advisory Group of the Expanded Programme on Immunization are summarized in Table 3. The Group arrived at the following conclusion:¹²

"In countries where human immunodeficiency virus (HIV) infection is considered a problem, individuals should be immunized with the EPI antigens according to standard schedules. This also applies to individuals with asymptomatic HIV infection. Unimmunized individuals with clinical (symptomatic) AIDS in countries where the EPI target diseases remain serious risks should not receive BCG, but should receive the other vaccines.

In general, live vaccines are not given to immunocompromised individuals, but in developing countries, the risk of measles and poliomyelitis in unimmunized infants is high and the risk from these vaccines, even in the presence of symptomatic HIV infection, appears to be low".

3. Are the staff of immunization programmes at risk in immunizing seropositive individuals?

The risk of the transmission of HIV through the accidental injection of health staff would appear to be about 20 times less than for hepatitis B virus, i.e. not to exceed 1/100. This rough estimate is based on two studies of the matter,^{13,14} but it should be noted that in the two cases in which HIV appears to have been transmitted by needlestick injury, the accident involved deep injection with large needles.

No association between HIV seropositivity among hospital workers and several types of exposure to the risk of transmission, including needlestick injury, was established in a study conducted in an African general hospital with great experience of AIDS.¹⁵

Having regard to the very low risk of infection by this mode of transmission, to the recording of a very low HIV seropositive rate among immunized children and to the fact that, in practice, only micro-doses of the blood of the person immunized are picked up when injections of vaccine are given, it must be concluded that the risk of HIV transmission from the individual being immunized to the immunizer is extremely low, even should an accident occur.

4. Lastly, and to summarize, what can be done to prevent EPI increasing the risk of HIV transmission?

It is very clear that the immediate answer is to strengthen the sterilization procedures for immunization equipment, which implies greater supervision, an ongoing personnel training programme, and meticulous attention to the supply of equipment and vaccines to ensure that the availability is always satisfactory.

WHO and UNICEF advocate the use of reusable (and therefore sterilizable) syringes and needles in developing countries. Steam sterilization is the recommended procedure. The supply of disposable equipment is not a satisfactory solution to the problem because it is not always destroyed after use and heat sterilization is not always possible. The use of dermo-jets may also be considered, although most of the existing models are suitable for use only when a large number of children are to be immunized in a single session. Caution is also indicated in the use of these injectors, since they could, at least theoretically, transmit the virus were they to be imperfectly sterilized.

Another way to protect children against in utero and perinatal HIV infection is, of course, to prevent the mother becoming infected. Here we must briefly mention the strategies being instituted in an increasing number of countries to combat this scourge.¹⁶ The mode of transmission is heterosexual for most infected individuals in Africa. There must be a general public information campaign, of a type suited to the culture and religion of each country, to ensure that adolescents and young adults, in particular, have a better understanding of the causes of the infection, the ways in which it is transmitted, and how to avoid it. The most critical programme strategy will be to induce changes in sexual behaviour and practices: reduction in the number of sexual partners and the use of condoms are essential if AIDS is to be contained.¹⁷

Women of child-bearing age are also likely to be given blood transfusions, and the risk of HIV transmission in this way must be dealt with by the systematic screening of donors for HIV antibodies and the strengthening of blood banks.

Lastly, strict rules must be applied to ensure the sterility of injections given to women of child-bearing age and children, both in the case of tetanus toxoid immunization and in injections given for medical treatment.

TABLE 1. CASES OF AIDS BY CATEGORY OF TRANSMISSION NOTIFIED TO CDC ATLANTA
June 1981 - 1 December 1986

Categories of transmission ¹	Cumulative total of cases and deaths	
	Cases (%)	Deaths (% of cases)
<u>Adults/adolescents</u>		
Male homosexuals/bisexuals	18 229 (65.5)	9 941 (63.7)
Drug abusers (IV)	4 760 (17.1)	2 837 (18.2)
Male homosexuals and drug abusers	2 188 (7.9)	1 247 (8.0)
Haemophiliacs/blood clotting abnormalities	242 (0.9)	145 (0.9)
Heterosexuals ²	1 060 (3.8)	591 (3.8)
Transfusions/blood products	508 (1.8)	340 (2.2)
Not established ³	856 (3.1)	511 (3.3)
Subtotal	27 843 (100)	15 612 (100)
<u>Children</u>		
Haemophiliacs/blood clotting abnormalities	22 (5.5)	11 (4.6)
Parents suffering from/exposed to AIDS	319 (79.2)	181 (75.1)
Transfusions/blood products	52 (12.9)	40 (16.6)
Not established ³	10 (2.5)	9 (3.7)
Subtotal	403 (100)	241 (100)
TOTAL	28 246	15 853

SOURCE: Department of Health and Human Services, Public Health Service, Centers for Disease Control, Atlanta GA 30333, AIDS Weekly Surveillance Report, 1 December 1986.

¹ Cases for which there is more than one risk factor and that are not included in the associations of risks here given are placed in the first category to which they belong.

² This figure is made up of 488 individuals (80 men and 408 women) who had had sexual relations with AIDS cases or with persons at risk, and 572 individuals (462 men and 110 women) with no identified risk factor, but born in countries in which heterosexual transmission of AIDS is thought to play an important role, although it may not have been possible to establish the precise mode of transmission in these cases.

³ This figure includes cases for which the information on risks is incomplete (owing to death, refusal to reply, cases in course of investigation, men who state that they have had relations only with prostitutes, and cases for which no risk factor was found.

⁴ Children below the age of 13 at the time of diagnosis.

TABLE 2. AIDS CASES REPORTED TO WHO
TABLEAU 2. CAS DE SIDA NOTIFIES A L'OMS

16.1.1987

Continent	No. of cases No. de cas	Number of countries reporting Nombre de pays notifiant	
		Total	Zéro Cases/Cas
Africa/Afrique	2 324	34	16
America/Amérique	31 741	44	11
Asia/Asie	85	19	8
Europe	3 858	27	4
Oceania/Océanie	395	2	0
TOTAL	38 403	126	39

TABLE 3
TABLEAU 3

Recommendations on the use of EPI antigens in HIV-infected individuals
in countries where the EPI target diseases remain
important causes of morbidity

Recommendations sur l'administration des antigènes du PEV aux sujets infectés
par le HIV dans les pays où les maladies cibles du PEV sont encore
des causes de morbidité importantes

	Vaccine - Vaccin	Asymptomatic Asymptomatique	Clinical AIDS SIDA clinique
Infants - Nourrissons	DPT - DTC	yes/oui	yes/oui
	BCG	yes/oui	no/non
	OPV - VPO	yes/oui	yes/oui
	IPV - VPI	yes/oui	yes/oui
	Measles - Rougeole	yes/oui	yes/oui
Women - Femmes	Tetanus toxoid - Anatoxine tétanique	yes/oui	yes/oui

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