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WHO/GPA/ESR/89.3
Original: English
Distr.: General

GLOBAL
PROGRAMME
ON
AIDS

REPORT OF THE MEETING ON
HIV-2 DIAGNOSTICS AND PRIORITY AREAS
FOR HIV-2 EPIDEMIOLOGICAL RESEARCH

GENEVA
14 -16 FEBRUARY 1989



WORLD
HEALTH
ORGANIZATION

REPORT ON
THE MEETING ON HIV-2 DIAGNOSTICS AND PRIORITY AREAS FOR
HIV-2 EPIDEMIOLOGICAL RESEARCH

Geneva, 14-16 February 1989

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1. BACKGROUND

Since the first report describing the HIV-2 virus in 1986, infection has been reported from Africa, the Americas, and Europe. The epidemiology of HIV-2 infection is being studied in several countries, and there have been conflicting reports on the natural history of the infection as well as confusion in the interpretation of laboratory screening and confirmatory test results.

The World Health Organization (WHO) held its first meeting on newly identified HIV-related viruses in 1987¹. To discuss the status of HIV-2 research, an informal meeting of HIV-2 laboratory, clinical and epidemiology investigators was convened by the WHO Global Programme on AIDS (GPA) in Arusha, Tanzania, in September 1988 during the Third International Conference on AIDS and Associated Cancers in Africa. At this meeting the objectives of current HIV-2 studies and the preliminary results were discussed. The group expressed concern about the interpretation of the laboratory results, and identified the need for coordination, standardization and facilitation of HIV-2 epidemiological research in the following areas:

- the standardization of surveillance/reporting criteria
- the development and evaluation of better diagnostic methods
- the standardization of reagents
- the identification of HIV-2 research priorities and methodologies
- protocol development, training and funding for HIV-2 epidemiological research
- support to countries where HIV-2 is believed to be present but research is not being conducted.

The group felt that GPA could play a major role in supporting these activities. Accordingly, GPA convened a meeting on HIV-2 diagnostics and priority areas for HIV-2 epidemiological research in Geneva from 14 to 16 February 1989. A total of 27 participants from 20 countries participated in the meeting, including laboratory experts, clinical specialists, and field epidemiologists. A list of participants is provided in Annex 1.

The objectives of the meeting were:

- (1) to develop priorities and plans for the standardization of HIV-2-related reagents and diagnostics
- (2) to develop priorities and plans for the promotion and coordination of priority epidemiological research, including HIV-2 serosurveillance, the natural history of the disease, and transmission studies
- (3) to develop priorities and plans for the promotion and coordination of priority clinical research

¹Report of the meeting on newly identified HIV-related retroviruses (1987). Unpublished WHO document WHO/SPA/RED/87.1.

- (4) to achieve agreement on the need for the coordination of HIV-2 research to ensure the development of effective prevention and control,
- (5) to achieve consensus on an organizational mechanism to promote HIV-2 research coordination.

Dr D. Heymann, Acting Chief of the Epidemiological Support and Research unit (GPA) and Dr J. Esparza, Acting Chief of the Biomedical Research unit (GPA) opened the meeting. Dr S. Mboup (Senegal) and Dr F. Brun-Vezinet (France) co-chaired the meeting. Dr G. Van der Groen (Belgium) and Dr M O'Shaughnessy (Canada) acted as rapporteurs.

To provide a global overview of the range of HIV-2 infections, country presentations were made on the geographical distribution and epidemiological pattern of HIV-2 infection. Laboratory and field evaluations of HIV-2 diagnostics were then presented. The natural history of HIV-2 infection, the epidemiology of HIV-2, and the interaction of HIV-2 and other retroviruses were described. Finally, a discussion took place on a recent WHO survey of AIDS-related research projects in Africa, and three working groups were established to consider specific issues and make recommendations regarding HIV-2. One group dealt with clinical studies and approaches (chairman Dr R. Soudre); a second with epidemiological studies and approaches (chairman Dr P. Kanki); and a third with diagnostic methods (chairman Dr Gershy-Damet). The discussions were summarized during the meeting and recommendations made to WHO.

2. GEOGRAPHICAL SPREAD AND EPIDEMIOLOGY OF HIV-2

2.1 Current state of knowledge

Presentations on the numbers of persons with serum containing antibody to HIV-2 or HIV-1 or double reactive to HIV-1 and HIV-2 were made by researchers from the following countries:

Africa

Burkina Faso
Central African Republic
Côte d'Ivoire
Gambia
Guinea
Guinea-Bissau
Mali
Mozambique
Senegal

Europe

France
Germany, Federal Republic of
Italy
Portugal

Americas

Brazil
Canada
Cuba

Participants who had been invited to present information from Angola and Cape Verde were unable to attend the meeting. The tables in Annex 2 summarize the seroprevalence among population groups in most of the countries represented and provide information about the study site and the tests used for screening and confirmation.

HIV-2 infection has been confirmed in three WHO Regions - Africa, the Americas, and Europe - though most cases in the Americas and Europe appear to have been imported. In some countries where HIV-2 infection is present the prevalence of HIV-1 infection is very low; in others, however, both HIV-1 and HIV-2 infection are reported in varying proportions. The frequency of serological cross reactivity in different geographical regions is unequal. HIV-1 and HIV-2 double reactive sera, as well as indeterminate sera, constitute a problem for type-specific diagnosis and a challenge for clinical and epidemiological studies.

2.2 Research priorities

2.2.1 HIV-2 seroprevalence and surveillance

The need for HIV-2 surveillance and research differs in various regions of the world. In the terminology applied to HIV-1 infection epidemiological patterns, West Africa and Southern Africa are Pattern II areas for HIV-2 infection, transmission being mostly due to heterosexual contact, whereas most of the rest of the world falls into Pattern III, HIV-2 having been recently introduced and all modes of transmission having been documented. In Pattern III areas for HIV-2 infection, routine screening of selected groups such as blood donors is unlikely to be a useful tool for surveillance because of the low prevalence of HIV-2 infection. If HIV-2 infection is introduced into such countries, it cannot be assumed, unless further research proves otherwise, that it will affect the same risk groups as are affected by HIV-1 infection. In Pattern III countries individual case investigation may be considered, with appropriate attention to ethical considerations.

In Pattern II regions, data from different countries vary greatly. It should be noted that little or no information is available on the prevalence of HIV-1 and HIV-2 infection in some African countries. This deficiency needs to be rectified. There is also a need for data on the presence of HIV-2 infection in Latin America.

2.2.2 HIV-2 transmission

HIV-2 transmission routes are believed to be identical of those for HIV-1, but this subject is largely unstudied.

(a) Virological studies are required to demonstrate from what body sites and from what body fluids HIV-2 can be recovered, and how the findings compare with the findings for HIV-1.

(b) Sexual contact is presumed to be the dominant mode of HIV-2 transmission. Among the relevant questions are:

- (i) What is the relative efficiency of HIV-2 transmission from male to female and from female to male?
- (ii) What are the incidence and risk of HIV-2 infection in selected exposed groups (e.g., female prostitutes and their clients)?
- (iii) Are sexually transmitted diseases (STD), especially genital ulcer disease, a risk factor for the acquisition and/or transmission of HIV-2 infection?

(c) Because of a number of concordant maternal and child infections, perinatal transmission of HIV-2 infection is believed to occur. Among the relevant epidemiological questions are:

- (i) What is the rate of perinatal transmission of HIV-2 infection?
- (ii) What factors (e.g., maternal health status) affect the rate of perinatal transmission of HIV-2 infection?
- (iii) How can HIV-2 infection be diagnosed in the infant?
- (iv) What are the kinetics of maternal HIV-2 antibody in the infant?
- (v) What is the serological course of HIV-2 infection in the infant?
- (vi) What is the role of newer diagnostic techniques (e.g., Polymerase Chain Reaction, salivary IgA antibody) in diagnosing a perinatal HIV-2 infection?
- (vii) What is the outcome of perinatally acquired HIV-2 infection?

(d) Transmission of HIV-2 infection by blood transfusion or by mucosal or percutaneous exposure to blood raises two separate issues:

- (i) Surveillance for cases related to blood transfusion in Pattern III countries; and
- (ii) Blood transfusion and exposure to blood as a route of transmission in Pattern II countries.

2.3 Natural history of HIV-2 infection

Among the relevant questions are:

- (i) What is the pathogenicity of HIV-2 compared with that of HIV-1?
- (ii) How does the latency period of HIV-2 compare with that of HIV-1?
- (iii) What are the clinical manifestations of HIV-2 disease in adults and children? Are they the same as for HIV-1 associated disease?
- (iv) Is HIV-2 infection associated with other diseases, e.g., tuberculosis?
- (v) What is the significance of double reactive (HIV-1, HIV-2) sera and what is natural history of HIV-1 and HIV-2 double infections?

3. CLINICAL ASPECTS OF HIV-2 INFECTION

3.1 Current state of knowledge

Studies of the natural history of HIV-2 infections suggest a longer latency period for HIV-2 than for HIV-1 and, in some cases, a longer survival time for persons with HIV-2 AIDS.

Initial analysis of small numbers of persons with HIV-2 infection suggests that the clinical syndrome and opportunistic infections associated with HIV-2 disease are similar to those associated with HIV-1 disease.

The clinical case definitions used by countries to describe HIV-2 AIDS have varied in specificity and usefulness.

Treatment of opportunistic infections in persons with confirmed HIV-2 infection has been carried out with the same medications as for those with HIV-1 infection, but specific therapeutic trials of their efficacy in persons with HIV-2 infection have not been conducted. In addition, persons with HIV-2 AIDS have been treated with zidovudine (AZT), but standardized trials have not been conducted.

Clinical interactions of HIV-2 with other pathogens have been examined cross-sectionally but require further study. Finally, the clinical significance of HIV-1 and HIV-2 double reactive sera requires study.

3.2 Research priorities

3.2.1 Clinical aspects of HIV-2 infection

Clinical manifestations of HIV-2 infection require more detailed study among HIV-2 infected cohorts, with specific emphasis on age group, mode of transmission, associated opportunistic infection, and mortality. Once a broad base of information about clinical manifestations has been established, a clinical case definition of HIV-2 AIDS will become feasible.

3.2.2 Clinical interactions of HIV-2 with other infections

Clinical interaction with other infectious and parasitic agents, including the mycobacteria, *Salmonella*, *T. pallidum*, *H. ducreyi*, HBV, HIV-1, HSV, HTLV-I, and *P. falciparum*, requires further investigation in carefully designed prospective and case control studies.

3.2.3 Evaluation of the immunological status of HIV-2 infected persons

Evaluation of the immunological status of HIV-2 infected persons, including those with clinical manifestations, should be undertaken in cohorts of HIV-2 infected persons and among seronegative controls.

3.2.4 Interaction of HIV-2 with childhood diseases and routine immunization

The severity of childhood diseases such as measles, poliomyelitis, and tuberculosis among children with HIV-2 infection and the safety and efficacy of immunization in the same population should be studied, with appropriate control populations.

3.2.5 Clinical manifestations in persons with HIV-1 and HIV-2 double reactive sera

The research suggested above for persons with HIV-2 infection should be complemented by studies of persons with HIV-1 and HIV-2 double reactive sera. The results of such studies could then be compared with those of singly reactive HIV-1 and HIV-2-infected cohorts.

4. HIV-2 LABORATORY DIAGNOSTICS

4.1 Current state of knowledge

Presentations were made on HIV testing, the GPA programme on comparative evaluation of HIV diagnostic assays², and on practical experience in the use of tests in laboratories in both developing and developed countries. At present individual screening

²Report of the WHO meeting on criteria for the evaluation and standardization of diagnostic tests for the detection of HIV antibody (1987). Unpublished WHO document WHO/GPA/BMR/88.1.

tests for HIV-1 and HIV-2 are being utilized but there is considerable cross-reactivity among them. The group considered the current need to use HIV-2 immunoblot for confirmation, and the possibility of future confirmatory tests based on either recombinant proteins or synthetic peptides. It also considered the differences in test results that depend on the time factor in the infection, persons at the time of seroconversion having different test results from those later in the infection. The cost constraints of confirmatory tests, particularly as they affect developing countries, and research into the application of tests involving the detection of antibodies to HIV-1 and HIV-2 specific epitopes was reviewed.

4.2 Research priorities

4.2.1 Definition of HIV-2 seropositivity

The group endorsed the criteria for HIV-2 Western blot positivity set out in the report on the WHO meeting on criteria for the evaluation and standardization of diagnostic kits for the detection of HIV antibody, held in Stockholm on 7-8 December 1988 (WHO/GPA/BMR/88.1). These were:

Positive: sera with antibodies recognizing one of the following patterns of gene products):

env + gag + pol
env + gag
env + pol
env alone (with minimum of 2 env antigens recognized)

Negative: absence of antibodies to all three classes of antigen

(env, gag, pol)

Indeterminate: presence of antibodies to one of the following patterns (to be of gene products; gag + pol retested) either gag or pol alone

These reactions may be seen in early infections with HIV-2 and may represent cross reactions with HIV-1 or be nonspecific. Additional testing by radioimmunoprecipitation assay (RIPA) will usually give conclusive results. If RIPA is not available, repeat testing of specimens after some time may give valuable additional information.

The group further noted that a serum that according to the above criteria is positive for both HIV-1 and HIV-2 should be defined as a double reactive serum. A double reaction may be due to cross reaction, dual infection, double exposure, or a variant. Testing of double reactive sera by assays based on synthetic peptide antigens specific for HIV-1 or HIV-2 may help discriminate between HIV-1 and HIV-2 infection.

4.2.2 Serum bank

There is an urgent need for serum banks containing well characterized HIV-2-positive sera as well as negative sera from different HIV-2 endemic areas. A bank should also contain sera from individuals early in the process of seroconversion as well as from asymptomatic infected persons and persons with varying degrees of immunodeficiency. A GPA coordinated effort in this direction is under way.

4.2.3 Test requirements

(a) The proper evaluation of kits purporting to detect antibodies to both HIV-1 and HIV-2 is of paramount importance.

(b) A long-term goal must be to replace the viral lysate immunoblot with confirmatory assays based on either recombinant proteins or synthetic peptides. The consecutive use of different antibody screening assays (also based on the use of recombinant proteins or synthetic peptides) in confirming antibody positivity must also be explored as an alternative to the expensive existing confirmatory assays. Particular attention must be paid to the sensitivity of such tests in early detection of seroconversion.

(c) The significance of HIV-1 and HIV-2 double reactivity needs to be elucidated.

4.2.4 Reference centres for HIV-2 laboratory diagnosis

Reference centres for HIV-2 are needed in Africa, one in an area with a high prevalence of HIV-2 and one in an area with a high prevalence of both HIV-1 and HIV-2. These centres should collaborate with other reference centres recognized for their expertise in HIV-2.

5. RECOMMENDATIONS

5.1 Geographical spread and epidemiology of HIV-2

5.1.1 The questions regarding HIV-2 transmission in section 2.2.2 should be the subject of specific studies.

5.1.2 There should be consistency in the methodology of epidemiological serosurveys that would make geographical comparisons more meaningful. The value of population-based randomized seroprevalence surveys as opposed to sentinel group surveys (e.g., in blood donors and pregnant women), is a subject of debate. In some situations sentinel group studies may indicate the need for population-based seroprevalence studies. Trends in the prevalence of HIV-2 infection may be examined in cross-sectional seroprevalence studies repeated at intervals.

5.1.3 To address some of the issues concerning perinatal transmission two study designs should be considered: (i) a case control approach examining maternal HIV-2 infection as a risk factor for infection in the child; and (ii) longitudinal cohort studies of seropositive and seronegative mothers, with follow-up of their infants.

5.1.4 In studying the question of transfusion as a risk factor for HIV-2 infection in selected groups such as West African patients with sickle cell disease, the case control approach should be considered.

5.1.5 Studies of HIV-1 and HIV-2 infection should be carried out among patients and health care workers to examine the possibility of nosocomial transmission.

5.1.6 Cross-sectional studies could be considered to compare the strength of the association between certain symptoms and signs of disease and HIV-2 seroreactivity, but definitive prospective studies also need to be carried out.

5.1.7 HIV-1 and HIV-2 incubation periods could be studied in children infected perinatally, although the results obtained may not be directly applicable to adults.

5.1.8 Despite the potential difficulty of defining the duration of HIV-2 infection, cohort studies in adults should be conducted to assess its significance.

5.2 Clinical aspects of HIV-2 infection

5.2.1 Case control, cross-sectional, and prospective studies should be conducted of persons infected by HIV-2 and of those with HIV-1 and HIV-2 double reactive sera, to define the clinical spectrum of infection and interactions with other infectious agents.

5.2.2 Collaborative or independent studies in child and adult populations should be given priority.

5.3 HIV-2 laboratory diagnostics

5.3.1 The creation of serum banks should be a high priority for GPA.

5.3.2 Initial evaluation of test kits should take place in WHO Collaborating Centres on AIDS, and subsequent field evaluation should be undertaken in regions with varying rates of HIV-1 and HIV-2 positivity.

ANNEX 1

LIST OF PARTICIPANTS

- Dr F. Barin, Assistant Professor, University F. Rabelais, Tours, France
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Annex 1

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Tables on HIV-2 epidemiological information

1. Burkina Faso, study site Ouagadougou
2. Central African Republic, study site countrywide (mainly Bangui)
3. Côte d'Ivoire, study site Abidjan
4. Côte d'Ivoire, study site CHU Cocody, Abidjan
5. Côte d'Ivoire, study site Hôpital protestant, Dabou
6. Cuba, study site countrywide
7. Gambia, study site Banjul, Fajara
8. Guinea, study site Conakry
9. Guinea Bissau, study site National Public Health Laboratory and National Hospital Simao Mendes, Bissau
10. Italy, study site Genova, Padova, Milan, Rome
11. Mali, study site countrywide
12. Mozambique, study site countrywide
13. Portugal, study site Lisbon
14. Senegal, study site seven regions

Seroprevalence

- 15(a) Seroprevalence of HIV-2 in Brazil
- 15(b) Seroprevalence of HIV-2 in Brazil, 1988, Galvao-Castro et al., WHO Collaborating Centre on AIDS, Fundacao Oswaldo Cruz, Rio de Janeiro
16. Cape Verde - HIV-1 and HIV-2 seroprevalence in selected clusters
17. Praia - Santiago - HIV-2 seropositivity in tuberculosis patients

Annex 2

Table 1

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Burkina Faso STUDY SITE: Ouagadougou

PRINCIPAL INVESTIGATOR: Soudre B R

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Others (specify)
No. tested	387		2064					
No. WB HIV-1 confirmed	77		142					
No. WB HIV-2 confirmed	8		24					
No. double reactive	148		65					
WHO case definition + but serological -	154							

Antigens used:

- 1 : Elavia 1 & 2 2 : Lavblot 1 & 2 3 :
- 4 : 5 : 6 :

Annex 2

Table 3
HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Côte d'Ivoire
STUDY SITE: Abidjan
PRINCIPAL INVESTIGATOR: De Cock, K.M.

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons *	STD	Blood donors	Pregnant women	Hospital patients **	Prostitutes	Prisoners	Others (specify)
No. tested	265				1236			
No. WB HIV-1 confirmed	133				173			
No. WB HIV-2 confirmed	12				12			
No. double reactive	120				161			
WHO case definition + but serological -								

Antigens used:

- 1 : Genetic system HIV-1 and HIV-2 2 : WB Biorad/Dupont HIV-1 3 : Lavblot II
4 : 5 : 6 :
* Case definition of AIDS used = EIA and WB positive patients meeting WHO or CDC case definition
**Patients listed in column 1 (AIDS persons) are not included here.

Annex 2

Table 4

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Côte d'Ivoire

STUDY SITE: CHU Cocody

PRINCIPAL INVESTIGATOR: Gershy-Damet Guy Michel

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women ville de Man	Hospital patients	Prostitutes	Hotel workers	Others (specify) TB
No. tested		92	300	58	344	80	127	296
No. WB HIV-1 confirmed		28	15	0	27	7	13	35
No. WB HIV-2 confirmed		0	8	2	15	2	2	13
No. double reactive		16	5	0	52	0	4	27
WHO case definition + but serological -								40

Antigens used:

1 : Abbott recom. HIV-1

2 : Elavia 2

3 : WB Biorad 1

4 : Lavblot 2

5 : RIPA

6 : Peptide synthétique Pasteur (Peptilav)

Annex 2

Table 5 HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Côte d'Ivoire STUDY SITE: Hôpital protestant de Dabou
PRINCIPAL INVESTIGATOR: Quattara A.S.

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Others (specify)
No. tested	212	109	471	246		210		
No. WB HIV-1 confirmed	128	18	36	6		29		
No. WB HIV-2 confirmed	15	2	13	2		16		
No. double reactive	61	5	9	1		27		
WHO case definition + but serological -	8							

Antigens used:

- 1 : Elavia 1
- 2 : Elavia 2
- 3 : WB Dupont HIV-1
- 4 : Lavblot 2
- 5 : Peptides LAV 1 & 2
- 6 :

Annex 2

Table 7
HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET
COUNTRY: Gambia
STUDY SITE: Banjul Fajara
PRINCIPAL INVESTIGATOR: Greenwood B.M. Njie Hatib

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Serosurvey
No. tested	NG	NG	NG	NG	NG	NG		NG
No. WB HIV-1 confirmed	24	1	1	0	0	3		6
No. WB HIV-2 confirmed	38	10	19	0	17	64		88
No. double reactive	0	0	0			2		
WHO case definition + but serological -								

Antigens used:
1 : Wellcozyme 1
2 : Wellcozyme 2
3 : Fujirebio gel agglutination
4 : Elavia 2
5 : WB Dupont
6 :

NG = NOT GIVEN

Table 8

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Guinea STUDY SITE: Conakry

PRINCIPAL INVESTIGATOR: Kourouma K.

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Others (specify)
No. tested	32		3855	130	123			
No. WB HIV-1 confirmed	15		7	0	2			
No. WB HIV-2 confirmed	7		9	0	2			
No. double reactive	5		1	0	0			
WHO case definition + but serological -	5							

Antigens used:

1 : Elavia 1 & 2

2 : Lavblot 1 & 2

3 : Peptilav 1-2

4 :

5 :

6 :

Annex 2

Annex 2

Table 9 HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Guinea Bissau STUDY SITE:
 PRINCIPAL INVESTIGATOR: National Public Health Laboratory and National Hospital Simao Mendes, Bissau

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Others (specify)
No. tested		362 ^a	253 ^b	2945 ^c				
No. WB HIV-1 confirmed			7					
No. WB HIV-2 confirmed	50	59	197	179				
No. double reactive								
WHO case definition + but serological -								

Antigens used:

- 1 : ELISA HIV-2 SBL 6669 2 : Wellcozyme 3 : WB HIV-2 SBL 6669 a: studies in Bissau, Bafata, Catio, Casheu, and Gabu
 4 : Elavia-2 5 : WB HIV-1 Dupont 6 : b: Blood Centre, Bissau
 c: studies in Bissau, Canchungo, Farim, Bafata, Catio, and Gabu

Annex 2

Table 10

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Italy

STUDY SITE: Genoa, Padua, Milan, Rome

PRINCIPAL INVESTIGATOR: E. Varnier

POPULATION SAMPLED FOR INVESTIGATION

	Children born to HIV-1+ mothers	STD	Blood donors	Haemo-philicacs	Hospital patients	Homosexuals	Drug Addicts	Others (specify)
No. tested	73		8*	142		24	1103	
No. WB HIV-1 confirmed	73		0	84		9	796	
No. WB HIV-2 confirmed	0		0	0		0	0	
No. double reactive	0			0		0	0	
WHO case definition + but serological -								

Antigens used:

- 1 : ELISA Pasteur 1 & 2
- 2 : ELISA Dupont 1 & 2
- 3 : WB Pasteur
- 4 : ELISA Rec env HIV-1+
- 5 : Env peptide HIV-2 Dupont
- 6 : WB Dupont 1 & 2
- 7 : Peptilav Pasteur
- 8 : WB 2 Lab-made
- 9 : Peptide ELISA biochrom

* Sera selected on the basis of the presence of a P24 band only.

Annex 2

Table 11 HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Mali STUDY SITE: Countrywide

PRINCIPAL INVESTIGATOR: Maiga Y & Fofana O.

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	Others (specify)
No. tested	99							
No. WB HIV-1 confirmed	25							
No. WB HIV-2 confirmed	37							
No. double reactive	20							
WHO case definition + but serological -	154							

Antigens used:

- 1 : Elavia 1 & 2
- 2 : Lavblot 1 & 2
- 3 :
- 4 :
- 5 :
- 6 :

Table 12

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Mozambique

STUDY SITE: Countrywide

PRINCIPAL INVESTIGATOR: AIDS Reference Laboratory, National Institute of Health

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	TB patients
No. tested	27	192	2370					50
No. WB HIV-1 confirmed	11	5	18					
No. WB HIV-2 confirmed	10	2						1
No. double reactive	6							
WHO case definition + but serological -								

Antigens used:

- 1 : Elavia 1 & 2
 2 : Organon orthodiagnostics
 3 : Serodia (Fugirebio)
 4 : WB Dupont HIV-1 & Biorad
 5 : WB Biorad HIV-1
 6 : Lavblot 2
 WB Dupont HIV-2

Annex 2

Table 13

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Portugal

STUDY SITE: Lisbon

PRINCIPAL INVESTIGATOR: National Institute of Public Health

POPULATION SAMPLED FOR INVESTIGATION

	Europeans previously living in Africa	STD	Drug Addicts	Pregnant women	Homosexuals	Prostitutes	Heterosexuals contacts with sero+ or AIDS persons	Bisexuals
No. tested	287	595	1739	572	210	250	75	238
No. WB HIV-1 confirmed	7	6	113	3	60	3	12	47
No. WB HIV-2 confirmed	26	3	2	3	1/104	2	16	1/145
No. double reactive								
WHO case definition + but serological -								

Antigens used:

- 1 : Elavia 1 & 2
- 2 : Dupont
- 3 : Lavblot
- 4 : Dupont blot
- 5 :
- 6 :
- 7 :
- 8 :
- 9 :

Table 14

HIV-2 EPIDEMIOLOGICAL INFORMATION SHEET

COUNTRY: Senegal

STUDY SITE: 7 regions

PRINCIPAL INVESTIGATOR: M'boup S.

POPULATION SAMPLED FOR INVESTIGATION

	AIDS persons	STD	Blood donors	Pregnant women	Hospital patients	Prostitutes	Prisoners	TB patients
No. tested	44	404	4194	1103	583	1512	1241	782
No. WB HIV-1 confirmed	17	6	1	1	3	12	4	7
No. WB HIV-2 confirmed	9	6	24	8	4	239	8	11
No. double reactive	3	1	0	0	1	5	0	2
WHO case definition + but serological -	15							

Annex 2

Antigens used:

1 : Non-commercial WB

2 : Non-commercial miniblott

3: Combo Abbott

4 :

5 :

6 :

Annex 2

Table 15 (a)

Seroprevalence of HIV-2 in Brazil

1. VERONESI, R. et al. HIV-2 in Brazil. Lancet, 2: 402 (1987)

Sera	HIV-2	
	ELISA 11/73	Western blot 4*

* 2 HIV-1

2. CORTES, E. et al. Seroprevalence of HIV-1, HIV-2 and HTLV-1 in high-risk Brazilians. IV International Conference on AIDS. 1 5067; 331

Brazilian subjects	HIV-1	HIV-2	HTLV-I
AIDS patients	117/140(84%)	3/140 (2%)	5/88 (6%)
Homosexual men	31/132 (24%)	4/132 (3%)	4/131 (3%)
Female prostitutes	3/177 (2%)	1/177 (1%)	3/175 (2%)
Excluded blood donors	24/47 (51%)	1/46 (2%)	2/45 (4%)
Selected haemophiliacs	200/213 (94%)	pending	13/210 (6%)
Wives of haemophiliacs	5/13 (38%)	pending	1/13 (1%)
American HIV-1 positive	69/69 (100%)	0/69 (0%)	3/69 (4%)

3. Brazilian Ministry of Health* & CDC**, 1988

AIDS patients 496	ELISA	Western blot	
	HIV-1 105	HIV-2 5	HIV-1+HIV-2 27

*AIDS CONTROL PROGRAMME

** Centers for Disease Control

Table 15 (b)

Seroprevalence of HIV-2 in Brazil, 1988, Galbao-Castro et al.,
WHO collaborating centre on AIDS, Fundação Oswaldo Cruz,
Rio de Janeiro

Subjects	No of sera	HIV-1		HIV-2	
		positive ¹	negative	IIF ²	confirmed ³
Rio de Janeiro					
Beggars	240	15	225	1	0
Prostitutes	29	3	26	0	0
Blood donors	432	63	369	8	0
AIDS and AIDS- related patients	271	139	132	11	0
Tuberculosis patients	387	12	375	13	0
Salvador, Bahia					
Tuberculosis patients	233	3	230	0	0
AIDS and AIDS- related patients	32	16	16	0	0
AIDS patients from other cities	197	116	81	0	0
Total	1821	367	1454	33	0

¹ Confirmed as positive by ELISA, indirect immunofluorescence, and Western blot.

² Indirect immunofluorescence to HIV-2.

³ Confirmed by ELISA (HIV-2 recombinant antigen) and Western blot.

Annex 2

Table 16

CAPE VERDE

HIV-1 and HIV-2 seroprevalence in selected clusters

ISLAND	ZONE	ESTIMATED POPULATION	POPULATION TESTED	HIV-2 No - (%)	HIV-1 No - (%)
SANTIAGO	URBAN	60 000	900	13 (1.44%)	0
	URBAN	86 000	900	2 (0.2%)	0
S. VICENTE	URBAN	42 000	900	2 (0.2%)	1
STO ANTAO	SEMI-RURAL	42 000	900		
FOGO	SEMI-RURAL	30 000	900	1 (0.4%)	0
S. NICOLAU	SEMI-RURAL	13 000	450	1 (0.1%)	0
SAL	URBAN	7 000	210	0	0
BRAVA	SEMI-RURAL	68 000	210	1 (0.4%)	0
MAIO	SEMI-RURAL	4 000	210	1 (0.4%)	0
BOA VISTA	SEMI-RURAL	3 000	210	0	0
TOTAL		293 000	5 790	24	1

Antigens used: ELAVIA I, ELAVIA II, LAV Blot 1, LAV Blot 2, synthetic peptides from Genetic Systems, RIPA GEM GEM BRU, AND RIPA GEM ROD

Annex 2

Table 17

PRAIA (Santiago)
HIV-2 seropositivity in tuberculosis patients

- From November 1987 to November 1988
- N : 86 (48M, 38F)
- Mean age : 33.7
- HIV-1 : 0/86
- HIV-2 : 8+/86 (9.3%)
- Extrapulmonary manifestations
- 3/8 OF HIV2(+) patients
- 9/78 OF HIV2(-) patients
- In HIV2(+) patients tuberculosis was diagnosed within the last year
- HIV2 seropositivity was significantly higher ($p < 0.001$) in tuberculosis patients than in the general population (13/900) of Praia.

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