

World Health Organization
Technical Report Series
No. 19

YELLOW-FEVER PANEL

Report on the First Session

Geneva, 1-6 December 1949

	Page
1. Delineation of endemic yellow-fever areas in America and Africa	3
2. Measures recommended for the international control of yellow fever	6
3. Co-ordination of research on yellow fever	9

WORLD HEALTH ORGANIZATION
PALAIS DES NATIONS
GENEVA
AUGUST 1950

YELLOW-FEVER PANEL

First Session

Members :

Dr W. S. Sá Antunes, Director, National Yellow Fever Service, Ministry of Education and Health, Rio de Janeiro, Brazil

Dr G. L. Dunnahoo, Medical Director, Chief, Division of Foreign Quarantine (US Public Health Service), Washington, D.C., USA

Dr A. F. Mahaffy, formerly Director, Yellow Fever Research Institute, Entebbe, Uganda (*Chairman*)

*Médecin-Général Inspecteur Peltier, ex-Directeur général de la Santé publique en Afrique-Occidentale Française, Dakar, Sénégal

Médecin-Colonel G. Saleun, Adjoint technique du Directeur du Service de Santé colonial, Ministère de la France d'Outre-Mer, Paris, France

Ex-officio Member :

Dr F. L. Soper, Director, Pan American Sanitary Bureau ; Director, WHO Regional Office for the Americas, Washington, D.C., USA

Secretariat :

Dr Y. M. Biraud, Director, Division of Epidemiology, WHO

Dr G. Stuart, Chief, Sanitary Conventions and Quarantine Section, WHO (*Secretary*)

The report on the first session of this panel was originally issued in mimeographed form as documents WHO/YF/4, 5 December 1949, WHO/YF/4 Rev. 1, 7 December 1949, and WHO/YF/4 Rev. 2, 30 March 1950.

* Indicates member unable to attend.

YELLOW-FEVER PANEL

Report on the First Session ¹

The members of the Yellow-Fever Panel with special experience in the epidemiology of yellow fever met in Geneva from 1 to 6 December 1949, at first as a separate body and later in joint session with the Expert Committee on International Epidemiology and Quarantine, to which the panel acted in an advisory capacity.

The panel elected as Chairman for the session Dr A. F. Mahaffy. The agenda of the session was adopted.

1. Delineation of Endemic Yellow-Fever Areas in America and Africa

1.1 The experts studied extensive documentary material (statistics, diagrams, and maps), presented by Dr Sá Antunes and complemented by Dr F. L. Soper, regarding the epidemiology of yellow fever in Brazil and in other countries of America. They also considered a survey ² concerning the French Somali Coast and Djibouti in their relation to the yellow-fever "endemic" area as defined by the United Nations Relief and Rehabilitation Administration (UNRRA) in 1946,³ as well as material prepared by WHO.

¹ The Executive Board, at its fifth session, adopted the following resolution :

The Executive Board

- (1) NOTES the report of the Yellow-Fever Panel on its first session, and
- (2) AUTHORIZES its publication ;

Taking into account the recommendations of the expert committee in considering relevant items on its agenda,

- (3) TRANSMITS the report to the Third World Health Assembly ; and
- (4) POINTS OUT that recommendations of expert committees which concern WHO policy and operations remain recommendations unless and until they are implemented by the Executive Board or the World Health Assembly in adopting and putting into action the annual programme of WHO.

(*Off. Rec. World Hlth Org.* 25, 5)

² Unpublished working document WHO/YF/3

³ *Wkly epidem. Rec.* 1948, 23, 365, 375, 412

1.2 America

The experts recommended, on the evidence made available, that as regards America the 1946 UNRRA delineation should be maintained, with the following exceptions:

1.2.1 that the continued exclusion from the "endemic" area of the ports of Belem in Brazil, Cayenne in French Guiana, Paramaribo in Surinam, Georgetown in British Guiana, the Caribbean ports of Colombia and Venezuela, and of the city of Caracas in Venezuela, be contingent on the maintenance in these ports and city of an *Aedes aegypti* index not exceeding 1%,⁴ and on their submission to WHO of a quarterly report on this index;

1.2.2 that the port of Manáos in Brazil, be excluded from the "endemic" area, this exclusion being contingent on the maintenance in that port of an *A. aegypti* index not exceeding 1%,⁴ and on its submission to WHO of a quarterly report on this index;

1.2.3 that the rural areas of the Republic of Panama and of the Panama Canal Zone be included in the "endemic" area (ports of the Republic and of the Canal Zone remaining outside the "endemic" area, as long as their *A. aegypti* index does not exceed 1%,⁴ and is reported quarterly to WHO).

1.3 Africa

The experts recommended:

1.3.1 that the territory of the French Somali Coast, including the port of Djibouti, be excluded from the "endemic" area as originally delimited by UNRRA, provided that the *A. aegypti* index in that port does not exceed 1%,⁴ and is reported quarterly to WHO;

1.3.2 that the continued exclusion from the "endemic" area of the port of Massawa in Eritrea, and of an area ten kilometres in radius from the centre of the town of Asmara in Eritrea, be contingent on the maintenance of an *A. aegypti* index not exceeding 1%,⁴ and on their submission to WHO of a quarterly report on this index;

1.3.3 that the following be added to the existing "endemic" area:

(1) Nyasaland, and

(2) the territory to the South of Barotseland lying between the 23rd and 25th East meridians of longitude down to the 21st South parallel of latitude.

⁴ While recommending 1% as the maximum level permissible, the experts considered that a zero index was to be regarded as desirable; this had in fact been attained in most ports and cities of South America.

1.4 Criteria for determination of yellow-fever "endemic" areas

The above recommendations regarding the delineation of "endemic" areas are based :

1.4.1 as regards America, on reports of clinical cases, on results obtained from routine viscerotomy (i.e., examination of liver specimens taken from all persons dying after a febrile illness lasting ten days or less) and from immunity surveys of human and animal sera, and on the reporting of low *A. aegypti* indices ;

1.4.2 as regards Africa, chiefly on the results of immunity surveys.

1.4.3. The experts strongly emphasized the need for more research work, particularly as regards central and southern Africa, to determine the distribution in time and space of the virus — in the immunity surveys full account must, of course, be taken of the immunity developing as the result of inoculation—and also the distribution of *A. aegypti*.

1.5 Definition of the *A. aegypti* index

The experts defined the *A. aegypti* index as the percentage of dwellings in which larvae of *A. aegypti* are found breeding—a dwelling being any habitation occupied by a single family. Computation of the index is to be based on an examination of all dwellings in a port, city, or area.

1.6 Definition of yellow-fever areas

1.6.1 In the light of many years' epidemiological observations in South America, it is known that, in regions in which *A. aegypti* is not present, jungle yellow-fever may prevail among forest animals and cause accidental human infection without the production of outbreaks based on man-to-man transmission.

On the basis of the mammalian reservoir, of the vector species, and of the persistence of the infection, it is possible to distinguish between :

(1) enzootic yellow-fever areas, free from *A. aegypti* and in which the virus is present and persists among animals over long periods of time, with the production of accidental human infections (among woodcutters, hunters, etc.) ;

(2) epizootic yellow-fever areas, free from *A. aegypti* and in which the disease occurs periodically among animals for short periods of time ;

(3) endemic yellow-fever areas, with *A. aegypti* and in which the virus is present and persists among animals over long periods of time ;

(4) epidemic yellow-fever areas, in which cases caused by transmission of the virus by *A. aegypti* are found.

1.6.2 As appears from the above definitions, the difference between the endemic and epidemic area is that transmission from man to man by *A. aegypti* is potential in one and observed in the other.

Since there may be failure to observe transmission by *A. aegypti* for considerable periods of time, measures to be applied against arrivals from endemic and epidemic areas will be identical.

1.6.3 Measures may be applied permanently against arrivals from endemic areas, but the application of measures in epidemic areas may be restricted to one year after the last diagnosed human case or to two months after the reduction of the *A. aegypti* index to 1% or less.

1.6.4 For the purpose of international quarantine, the African area delimited and labelled "endemic" by UNRRA in 1946, together with later additions to this area, should be regarded as an endemic yellow-fever area, as defined above.

1.6.5 It is to be expected that long-term epidemiological observations will eventually permit the breaking-down of the African yellow-fever zone into areas as clearly defined as in America, thus making it possible to adapt quarantine measures to the true degree of risk.

2. Measures Recommended for the International Control of Yellow Fever

2.1 Measures regarding sanitary conditions at airports

2.1.1 *Mosquito-proofing and mosquito control of buildings at international airports*

The experts recommended that in countries or areas where *A. aegypti* is present, the buildings for the accommodation of passengers, crew, and ground staff should be mosquito-proof.

Such mosquito-proofing should be obligatory in yellow-fever endemic areas, until the *A. aegypti* index is reduced to and maintained at zero.

Spraying of the buildings and of possible water-containers with an insecticide with residual action should be regularly carried out.

2.1.2 *Building-free zone around perimeters of international airports*

2.1.2.1 A building-free zone, 400 metres wide, around the perimeters⁵ of international airports should be established and maintained.

⁵ The perimeter of an airport is the line which encloses the area containing the airport buildings and any land used or intended to be used for the parking of aircraft.

2.1.2.2 The obligation of establishing such a zone should be strict as regards new airports.

2.1.2.3 At existing airports, where the establishment of such a zone presents insuperable difficulties, a 400 metres' safety zone should be maintained constantly free from *A. aegypti* (by regular spraying, with an insecticide with residual action, of walls and possible water-containers).

2.1.2.4 The 400 metres' building-free zone mentioned under 2.1.2.1 should likewise be kept free from *A. aegypti*.

2.1.2.5 In countries and areas where *A. aegypti* exists outside the safety zone, this mosquito should be brought under control and if possible eradicated.

2.1.2.6 Persons residing or working within the 400 metres' safety zone established around airports situated in countries and areas where *A. aegypti* exists outside the safety zone should be inoculated against yellow fever.

2.1.2.7 In such countries and areas where yellow fever is present, the population residing near the airport should be inoculated against yellow fever.

2.1.2.8 In such countries and areas where yellow fever is not present but where conditions favour its introduction and development, inoculation against yellow fever of the population residing near an airport is advisable as a precautionary measure.

2.2 Measures applicable to aircraft, ships, and other vehicles

2.2.1 Vehicles, before their departure from a yellow-fever area, shall be subjected to disinsection. Disinsection may be repeated in the country of arrival if in the opinion of its health authorities such further procedure is necessary.

2.2.2 Certificates showing that such disinsection has been effected should be issued.

2.3 Measures applicable to travellers (passengers and crew)

2.3.1 All travellers leaving endemic or epidemic yellow-fever areas should undergo the necessary quarantine measures prior to their departure. These travellers should be in possession of a valid certificate of inoculation against yellow fever or have undergone quarantine detention for a period of 6 days.⁶

⁶ Had this recommendation been accepted by the Expert Committee on International Epidemiology and Quarantine it would have necessitated a redrafting of the last paragraph of Article 65 and the deletion of paragraphs 2 and 3 from Article 67 of the draft International Sanitary Regulations as presented in unpublished working document WHO/Epid/22; however, it was not accepted.

2.3.2 It is only in cases where the provisions of section 2.3.1 have been evaded that the health authorities of the country of arrival may impose measures other than medical examination of the passengers and crew, a search for *A. aegypti* on board, and, where necessary, disinsection of the aircraft, ship, or other vehicle.

2.3.3 *Valid certificates of inoculation against yellow fever*

The experts unanimously agreed that for purposes of quarantine the certificates of inoculation against yellow fever should be considered valid as from the tenth day to the end of the sixth year following inoculation. They stressed, however, the fact that there was considerable evidence to show that effective immunity was established as early as the seventh day following inoculation and persisted for a number of years beyond the six recommended.

2.3.4 *Certificates of immunity against yellow fever*

The experts recommended the abolition of this certificate in view of the fact that it was practically never asked for and that it was impossible for laboratories to distinguish between the immunity following inoculation and that following the disease. It was realized that there was no contra-indication to the inoculation of immune persons.

2.4 Reports on the prevalence of *A. aegypti*

2.4.1 In those parts of the world where *A. aegypti* exists, health authorities of international ports and airports should report to WHO quarterly, by airmail, the *A. aegypti* index in such ports.

In the event of the index exceeding 1% in ports excluded from the "endemic" yellow-fever delineated areas, WHO should be informed by telegram and should disseminate this information by appropriate means.

2.4.2 The experts were informed of the progress made in South America in *A. aegypti* eradication; not only most ports and cities but even most of the territory of this continent had been freed.

2.4.3 The experts stressed the desirability of similar eradication programmes being undertaken in Africa and other areas in which yellow fever constituted a menace. They recommended that WHO render technical and/or financial assistance to the health administrations concerned, should they so desire, in the planning and carrying-out of such programmes.

The carrying-out of such a programme may, however, be feasible only where *A. aegypti* is not a forest mosquito.

3. Co-ordination of Research on Yellow Fever

3.1 The experts agreed on the desirability of the co-ordination by WHO of yellow-fever research. The methods recommended for such co-ordination include :

3.1.1 Technical and, if necessary, financial assistance to yellow-fever laboratories serving a number of countries as regards vaccine production, immunity surveys, examination of pathological specimens, etc., and the setting-up of such laboratories where needed.

3.1.2 Liaison between these laboratories and the health authorities and institutions concerned with yellow-fever problems throughout the world, by means of a travelling consultant and by exchange of personnel.

3.1.3 Collection and distribution by WHO of technical information on yellow fever.

3.1.4 The setting-up of an expert committee on yellow fever.

3.2 Among the points calling for international co-operation and clarification, the experts mentioned that of determining the presence of *A. aegypti* in the forests of Asiatic countries, because of the influence of such forest infestation in making more difficult the eradication of this species.

PUBLICATIONS OF THE WORLD HEALTH ORGANIZATION

WORLD HEALTH ORGANIZATION TECHNICAL REPORT SERIES

(Separate editions in English and in French)

		Price
1. Expert Committee on the Unification of Pharmacopoeias : report on the fourth session	9d	\$0.10
2. Expert Committee on Biological Standardization : report on the third session	1/6	\$0.20
3. Expert Committee on Biological Standardization : report of the Subcommittee on Fat-Soluble Vitamins	9d	\$0.10
4. Expert Committee on Insecticides : report on the first session		<i>To be published</i>
5. Expert Committee on Health Statistics : report on the first session	9d	\$0.10
6. Active immunization against common communicable diseases of childhood	1/3	\$0.15
7. Expert Committee on Tuberculosis : report on the fourth session	1/3	\$0.15
8. Expert Committee on Malaria : report on the third session	2/3	\$0.30
9. Expert Committee on Mental Health : report on the first session	2/3	\$0.30
10. Expert Committee on Environmental Sanitation : report on the first session	2/-	\$0.25
11. Expert Committee on Plague : report on the first session		<i>To be published</i>
12. Expert Committee on the Unification of Pharmacopoeias : report on the fifth session	9d	\$0.10
13. Expert Committee on Venereal Infections : report on the third session	1/6	\$0.20
14. Expert Committee on Venereal Infections : report of the Subcommittee on Serology and Laboratory Aspects	2/-	\$0.25
15. Venereal-disease control in the USA : report of the WHO Syphilis Study Commission	3/6	\$0.45
16. Joint FAO/WHO Expert Committee on Nutrition : report on the first session	1/3	\$0.15
17. Joint OIHP/WHO Study-Group on Bilharziasis in Africa : report on the first session	9d	\$0.10
18. Joint OIHP/WHO Study-Group on Cholera : report on the third session		<i>To be published</i>
19. Yellow-Fever Panel : report on the first session	9d	\$0.10
20. Joint ILO/WHO Committee on the Hygiene of Seafarers : report on the first session	9d	\$0.10
21. Expert Committee on Drugs Liable to Produce Addiction : report on the second session	9d	\$0.10

Bulk Orders

A discount of 20% will be given to health organizations for orders of 100 copies or more. Such orders should be sent direct to the World Health Organization, Sales Section, Palais des Nations, Geneva, Switzerland.

BULLETIN OF THE WORLD HEALTH ORGANIZATION

The *Bulletin of the World Health Organization*, published quarterly, is the principal scientific organ of WHO, and is a successor to the *Bulletin mensuel de l'Office International d'Hygiène Publique* and the *Bulletin of the Health Organization of the League of Nations*. It is intended to bring to the knowledge of governments, health administrations, and the medical profession original articles in either the English or French language on scientific and public-health subjects of international significance, and bibliographical data.

Volume 2, number 4 of the *Bulletin* contains, in addition to a bibliographical section, the following main articles:

- Antibiotics and sulfonamides in the treatment of trachoma —
M. J. Freyche
- Lymphogranuloma venereum: a general review — *W. E. Coultts*
- Epidemiology of Q fever — *M. M. Sidky*
- Bilharziasis as a public-health problem in the Pacific — *W. H. Wright*
- Notes on a collection of fleas from Peru — *K. Jordan*
- Malaria along the Mexico-United States border — *L. Vargas*
- Observations on the density of phlebotomus populations following
DDT campaigns — *M. Hertig*
- Residual DDT content: a rapid method for the detection and
determination of small quantities of DDT on sprayed surfaces
— *Maria E. Alessandrini*
- Standardization of serological tests for the diagnosis of the typhus
group of fevers — *A. Felix*
- Standardization of diagnostic agglutination tests: typhoid and
paratyphoid A and B fevers — *A. Felix*
- Standardization of liver extracts — *E. Lester Smith*
- Third international digitalis standard — *A. A. Miles & W. L. M.
Perry*

and the following notes and reports:

- Control of plague in Taranto, Italy, 1945/1946: an account of a
successful programme of rodent extermination — *K. H. Schulz*
- Complement-fixation reactions with cardiolipin antigen compared
with Kahn reactions — *A. Bekierkunst & F. Milgrom*
- Survey of venereal diseases in Afghanistan — *J. C. Cutler*
- Detection of the tubercle bacillus: survey of current laboratory
procedures — *M. M. Cummings*
- Trend of infant mortality in Iceland — *J. Sigurjónsson*
- Contributions of statistics to world health — *P. Stocks*
- Psychiatric examination of offenders — *M. S. Guttmacher*

Subscription per volume 30/- \$6.00
Price per single copy 7/6 \$1.50

Supplements comprising works of too detailed a character for inclusion in the *Bulletin* itself are published from time to time.

CHRONICLE OF THE WORLD HEALTH ORGANIZATION

(Published monthly in English, French, Spanish, Chinese, and Russian)

The *Chronicle* contains general information on the Organization, its principal activities, and the meetings of its expert committees, and summaries of its main technical publications.

Subscription for 1950	10/-	\$2.00
Price per single copy	1/-	\$0.20

A specimen number will be sent free of charge on request.

INTERNATIONAL DIGEST OF HEALTH LEGISLATION

(Separate editions in English and in French)

The *Digest* contains reproductions of or extracts from national laws and regulations dealing with public health and related subjects, as well as a list of current legislation on such topics.

Subscription per volume	25/-	\$5.00
Price per single copy	6/3	\$1.25

WEEKLY EPIDEMIOLOGICAL RECORD

(Bilingual : English and French)

This publication, intended for national health-administrations and for health services at ports and frontiers, contains notifications concerning diseases designated as "pestilential" in the International Sanitary Conventions, as well as other information about the application of these Conventions.

It is not sold separately, but can be obtained in conjunction with the *Epidemiological and Vital Statistics Report* (see below).

EPIDEMIOLOGICAL AND VITAL STATISTICS REPORT

(Bilingual : English and French)

The *Report* is published monthly and contains statistics on infectious diseases and birth- and death-rates, and articles on epidemiological and demographic subjects.

Subscription for 1950	25/-	\$5.00
Price per single copy	2/6	\$0.50
Annual subscription, including the <i>Weekly Epidemiological Record</i>	£2	\$8.00
