executive committee of the directing council

PAN AMERICAN HEALTH ORGANIZATION

working party of the regional committee

WORLD HEALTH ORGANIZATION

78th Meeting
Washington, D.C.
June 1977

CE78/INF/1 (Eng.)
1 June 1977
ORIGINAL: ENGLISH

REPORT TO THE DIRECTOR

OF

THE WORKING GROUP ON INTERNATIONAL SURVEILLANCE OF AIR TRAVELLERS

21-23 March 1977

Washington, D.C.

Ref.: DCD-77-1

C O N T E N T S

I. INTRODUCTION

Because of the need for improved surveillance of air travellers expressed in Resolution XXXI of the 28th PAHO Directing Council, the Director convened a small work group of experts in the international control of communicable diseases to develop general guidelines for consideration by Member Countries. The work group met from 21-23 March 1977 at PAHO Headquarters in Washington, D.C. The agenda (Annex I) and list of participants (Annex II) are attached.

The work group considered the main purposes and objectives of Resolution XXXI (Annex III) as follows:

a) To take steps to maintain and expand the system of disease surveillance and the rapid exchange of information between Member Countries of the Region.

b) To urge and back the governments to liaise with airlines to get from them accurate and opportune information related to passengers who have been exposed to communicable diseases during travel.

c) To provide guidelines to be used by the governments to prevent the spread of dangerous diseases by air travellers and to identify resources of personnel and infrastructure.

d) To deal with not only the new diseases as Lassa fever and Marburg virus-like infections, as well as arena virus disease indigenous to the West Hemisphere, but malaria, cholera, typhoid fever, meningococcal disease and influenza, etc.

The meeting was opened by Dr. Eusebio del Cid Peralta, Assistant Director, PAHO whose remarks are attached (Annex III). Dr. Alfredo Bica (Brazil) was elected Chairman with Drs. José Manuel Borgoño (Chile) and David J. Sencer (United States of America) as Co-Rapporteurs.

II. COMMUNICABLE DISEASES OF PARTICULAR IMPORTANCE TO SURVEILLANCE OF INTERNATIONAL AIR TRAVELLERS

A. Lassa Fever

The first cases of Lassa fever to be recognized occurred in North-Eastern Nigeria in 1969. However, there is some evidence that the disease existed well before that time. It is noteworthy that no cases were recognized clinically or exported during this period.

The virus belongs to the genus Arenavirus and is related to other dangerous pathogens such as the lymphocytic chorio-meningitis virus and the agents of Bolivian and Argentinian hemorrhagic fever.

The disease is mainly characterized by an insidious onset with fever and malaise. During the first week, chest and abdominal pains occur and a toxic state develops leading to prostration. Ulcerative pharyngitis is predominant in 80% of cases. In 35-50% of hospitalized cases, the disease may progress during the second week to a severe form with persistent high fever, signs of increasing toxicity, vomiting, diarrhea, diffuse capillary leakage, a hemorrhagic diathesis, central nervous system involvement, respiratory distress, oliguria and shock. Capillary leakage is manifested by the appearance of serous effusions, oedema of the face and neck, petechiae and hemodynamic instability. Such cases tend to have a fatal outcome. However, there are also mild and subclinical forms of the disease which are recognized only by serological tests. Differential diagnosis must be established with: typhoid, malaria, early infectious hepatitis, influenza, yellow fever, dengue, infectious mononucleosis, leptospirosis, relapsing fever, typhus, and bacterial septicemias.

Lassa fever exists only in Africa. The multimammate rat, Mastomys natalensis, has been shown to be a natural reservoir. This rodent is widespread in Morocco and south of the Sahara and is found both in houses and in fields. The zoonotic infection of Mastomys may be localized to certain areas. Other rodents may possibly be implicated as adult mice and guinea-pigs are susceptible to experimental inoculation.

Laboratory diagnosis is by isolation of the virus and serological tests. The virus was isolated from 82% of blood samples and 50% of throat washings or throat swabs taken from cases within 14 days of onset of the illness. Viruria is less frequent but has been observed up to 32 days after onset of illness. Inoculation of Vero cell cultures and characterization of the virus by electron microscopy or indirect immunofluorescence may provide a positive response in 2 to 5 days. The virus is relatively thermostable, withstanding normal temperature in specimens for a short time. It may withstand 30 minutes at 56°C during decomplementation of sera. In one occasion the virus survived in sera at ambient temperature for 5 days.

Complement fixation is not satisfactory for an early serological diagnosis. Only 10% of sera were positive before the 14th day and only 68% between days 15 and 28. The indirect immunofluorescence technique may detect antibodies as early as 7 to 10 days after onset of illness. Antibodies may be detected in some cases for periods up to 5 years or more. Post-mortem liver specimens show focal histopathological signs of necrosis with Councilman bodies and the virus may be detected by electron microscopy.

Initially the virus is most probably transmitted from M. natalensis to man by direct contact (hunting) and possibly by indirect contact as an aerosol infection or through food or water contaminated by urine. Subsequently person to person transmission has been more frequently documented. The titre of virus in the pharynx and urine may very from traces to 1.75 TCD 50/ml. Hence, contamination may originate from the pharynx through respiratory droplets, or saliva. It may also occur from urine through direct contact, aerosols, or pollution of water and food.

Heavy exposure by contamination during the taking of blood, surgery or autopsy may result in severe forms of the disease. The attack rate in nosocomial infections was as high as 27% compared to 2.2% in rural communities where the disease was endemic.

From 1969 to January 1975, only 114 cases of Lassa fever have been officially recorded (1). Localized epidemics have occurred in Nigeria (1970, 1974, 1975) in Sierra Leone (1970-72, 1973-75) and Liberia (1972). The epidemics were characterized either by household and/or nosocomial transmission.

There is also serological evidence of the presence of the virus in Senegal, Guinea, Central African Empire and Mali.

On several occasions, persons with Lassa fever travelled by air from Africa to Europe or North America. In most instances the nature of their infection was not known at the time of travel. Eight such incidents have been documented (to date) and acutely ill or convalescent patients have flown from Nigeria or Sierra Leone to the UK, the USA or the Federal Republic of Germany. Except for one evacuation in a specially equipped aircraft, all other patients travelled by commercial flights. No cases are known to have occurred among fellow passengers as a result of their contact with these patients. Intensive surveillance was initiated following some of the evacuations.

In 1975 and 1976 there was more complete tracing of contacts with hospital personnel or contacts which had occurred on aircraft during stop-overs.

The activities associated with three independent evacuations resulted in some 100 to 300 contacts being kept under surveillance but no evidence could be obtained of resulting overt disease or serological conversion.

B. Marburg Virus Disease

Only 2 outbreaks of Marburg virus disease have been reported in the medical literature and collectively involved a total of 34 persons. There were differences in the basic epidemiology in these 2 situations; the first was a typical common source exposure and the second a classic person-to-person episode.

Outbreak No. 1

Between 20 July and 10 August 1967 four shipments of African green monkeys totalling 500-600 animals were sent from Uganda to Europe via London's Heathrow Airport. The shipments went to institutions in Marburg and Frankfurt, Federal Republic of Germany and Belgrade, Yugoslavia where the animals were to be used in laboratory studies and vaccine production. Subsequently, over a 34-day period in August-September 1967, 31 humans involved in handling monkey blood and organs developed an illness characterized by sudden onset of high fever, headache, conjunctivitis, myalgias, malaise, nausea, vomiting, profuse watery diarrhea, a maculopapular rash which progressed to a diffuse erythema and hemorrhagic complications. Important laboratory findings included leukopenia, thrombocytopenia and elevated liver enzymes. Seven of the 31 patients died. In fatal cases, the liver showed focal hepatic necrosis (not mid-zonal as in yellow fever) which was sometimes massive and confluent and eosinophilic cytoplasmic degeneration. In the kidneys there was acute tubular necrosis with fibrin thrombi. The lungs showed pulmonary edema with alveolar macrophages. Incubation periods in primary cases were 3-7 days and in secondary cases were 5-8 days. Persons at greatest risk (20/29) were those with responsibility for surgical removal of organs. Persons working with tissue culture material were at less risk of illness (5/15) and 6 cases occurred in contacts of primary cases. The clinical course appeared milder in secondary cases. Transmission of infection was believed to have occurred by inoculation of virus through skin lesions, mucous membranes or conjunctiva. Pharyngeal spread and viruria were considered to be not important since virus was present in throat washings and urine in only low titers. One patient transmitted disease to his spouse 12 weeks post-onset and virus was recovered from his semen. This suggests that in some patients a latent or prolonged infection may develop.

Control was achieved by avoidance of contact with contaminated material, cleaning and washing contaminated equipment, and proper use of protective clothing.

Outbreak No. 2

In February 1975 there occurred a classic person-to-person outbreak of Marburg virus disease in Johannesburg, South Africa which affected 3 persons, one fatally. The first case was a young adult male who had onset of his disease 3 days following completion of a hitchhiking tour of Rhodesia. The only pertinent historical fact was that he had sustained multiple insect and/or arthropod bites on that tour. There had been no contact with African green monkeys. The patient died 8 days later following massive gastrointestinal hemorrhage and cardiac arrest. Seven days after onset of the first case, his travelling companion became ill. She recovered after a rather stormy hospital course. Case No.3 was the hospital nurse who had had contact with case No. 1 using

protective clothing but perhaps more importantly had had close direct physical contact with case No. 2 on the day before she fell ill and then had provided her nursing care subsequently. The nurse also survived but developed a unilateral uveitis two months later and virus was recovered from the anterior chamber of that eye.

The outbreak was contained using strict hospital isolation procedures and barrier nursing with protective clothing.

The Marburg virus structurally seems to resemble the rhabdoviruses which include vesicular stomatitis and rabies viruses but careful morphological and immunologic studies indicate it to be distinct from this group and therefore it remains unclassified. Electron microscopy of tissue culture material or human and animal blood and tissues reveal cylindrical particles approximately 65-90 nanometers in diameter which vary in length from less than 200 to more than 2000 nanometers; these particles become helical in shape and acquire a membrane as they mature in the cytoplasm. Biochemical and biophysical studies indicate that Marburg is most likely an RNA virus. It is inactivated by heat (60°C for 30 min.) ether, chloroform, deoxycholate, 1% formalin for 60 min. and B-propriolactone. Susceptable animals include guinea pigs, vervet and rhesus monkeys; hamsters and newborn mice can be infected with material previously passaged in guinea pigs or monkeys. Monkeys in separate cages but in direct physical contact with inoculated animals become ill and other monkeys were infected via experimental aerosolization studies. Primary monkey kidney and VERO cell lines can support growth of this virus.

Immunity ensues following infection and was sufficient to protect guinea pigs to a second challange. All human cases have been between 18-64 years of age and no second episodes have occurred. Neutralizing, complement fixing (CF) and immunofluorescent (IF) antibodies develop during the infection. IF antibodies develop about 2 weeks after onset and persist up to at least 8 years at relatively high titers. CF antibodies appear later (around 3 weeks after onset) and although they persist, do so at much lower titer than IF antibodies.

C. African Hemorrhagic Fever (Ebola Virus) in the Sudan and Zaire

During the 5-month period July-November, 1976 the countries of Sudan and Zaire experienced outbreaks of a viral hemorrhagic fever caused by a Marburg virus-like agent which had not been previously identified.

In the Sudan the outbreak was centred on the townships of Nzara (20.000 inhabitants) and Maridi (15.000 inhabitants) in Western Equatoria, Southern Region (5°N and 29°E). In Nzara, the first probable case fell sick on 27 June and died on 6 July 1976. Two other possible cases died on 14 and 27 July. A retrospective study showed that the outbreak in

Nzara, which was not recognized at once, lasted from 15 August to 15 September. A total number of 70 cases could be traced with 33 fatalities (attack rate 3.5 per 1.000 in a population of 20.000).

A patient was evacuated from Nzara to Maridi hospital where he died on 17 August with a diagnosis of enteric fever. During the first two weeks of September several cases occurred in Maridi with 9 deaths. The epidemic which was first thought to be typhoid or enteric fever suddenly grew in proportion on 15 September. During retrospective investigations it was found that the number of cases during the last two weeks of September reached 76 of which 42 were fatal. The outbreak seemed to subside by mid-October but peaked again during the last two weeks of October and the last deaths occurred on 20 November 1976. The total number of cases in Maridi was 229 of which 117 died. The attack rate based on a population of 15.000 was 15.3 per 1.000. The case fatality ratio was 51 per cent. The disease was predominant in the population over 20 years of age (177 cases with 94 deaths) and more males than females were affected. Seventy-six members of a staff of 230 in the hospital were infected and 41 died. The overall number of cases in Nzara and Maridi was thus 299 of which 150 died. Four cases were evacuated from Maridi to the regional hospital in Juba and caused only one nosocomial case. One case from Nzara and one from Maridi were evacuated to a hospital in Khartoum where they died before it was known that the outbreak was caused by a Marburg-like virus. There were no secondary cases in Khartoum.

In Zaire, the outbreak occurred in the Equateur Region, Mangala Sub-Region, affecting the Bumba and Mobaye areas, representing 13.000 km2 in a radius of 120 kms from Yambuku Mission 90 km north of Bumba (near Yandongi villange) (2.5°N and 22°SE). A retrospective study indicated that a probable case was admitted to theYamabuku Mission hospital on 5 September and died on 7 September 1976. During the next five weeks 39 members of the Mission became sick and 37 died. However, in some villages around Yambuku the first case appeared at the same time as the first one at the Mission and the outbreaks might in fact have started in August. The outbreak reached a peak during the last week of September and was first thought to be typhoid or yellow fever. At least 43 villages located within 50 km of Yambuku were involved (from 1 to 20 cases). The attack rate in the Yondongi community was 8 per 1.000. The total number of cases was first estimated at 358 with 325 deaths. However, during a re-evaluation to eliminate duplicate recordings, figures of 262 cases and 245 deaths were established. The last death occurred in Bongulu village 35 km east of Yambuku on 5 November 1976. Persons of all ages and both sexes were taken ill with the disease and the case fatality ratio was 89 per cent. Males and females were represented in equal numbers except in the 15 to 29 age group where females outnumbered males two-fold. In Kinshasa one patient, a nurse, was evacuated from Yambuku on 25 September and died on 6 October. A companion caring for this patient fell ill on 8 October and died on 14 October. A nurse at the hospital where these 2 cases were treated became ill on 13 October and died on 20 October. Intensive control measures in Kinshasa included quarantine in hospital of 24 primary contacts for 21 days.

The incubation period ranged from 4 to 16 days with an average of 7 days. During the first two days, patients had fever and complained of frontal and occipital headache with weakness, arthralgia of the large joints and pain in cervical and lumbar musculature. Gastro-intestinal symptoms developed after about 2 days (range 0-9 days) in most cases (96%) and diarrhoea was most common on the 5th day. Vomiting was also common as well as oral dryness, pharyngitis, chest pain and dry cough. Rash appeared on the 5th day but was sometimes difficult to see. Fatal cases developed bleeding tendencies from multiple sites on the 5th day but some loss of blood was common even in mild cases. Abortion and massive metrorrhagias were frequent in pregnant women. Patients were often agitated. No jaundice was observed. Death occurred between the 4th and 10th day. Recovery was slow with a persistent, complete loss of appetite giving the patient a ghost-like appearance. The symptomatology was similar in the two outbreaks. In the Sudan mild cases with minor or no bleeding were demonstrated by serological test to be almost as frequent as fatal cases.

The following definitions were adopted for the epidemiological investigations:

a) confirmed case: a person with acute clinical symptoms with isolation of the virus and/or presence of specific antibodies;

b) probable case: a person with headache for three days, lumbar pain, high fever, abdominal pain, nausea, vomiting and hemorrhage without any other specific diagnosis and no response to anti-malaria and anti-biotic treatment; knowledge of a contact with a confirmed case or another probable case was essential;

c) possible case: a person with three days of fever and headache without any other diagnosis and not responding to treatment as above and contact with a confirmed or probable case three weeks previously;

d) contact: a person having had direct contact with a), b), or c), i.e. sharing the same room or meals, having given care either two days before onset or during the disease, or participated in burial immediately after death.

Transmission of the disease from person to person was not common and required extremely close contact. Infection resulted from contact with blood or body fluids with high virus concentration especially those containing blood. Entry probably was through skin abrasions or mucous membranes. Transmission through droplets seemed unlikely, but this cannot be ruled out. Some persons shared the same room as patients but were not infected. Nursing, either at home or in hospital was by far the most common means of contact. Syringes insufficiently sterilized are believed to have played a role in the dissemination of infection among patients attending the hospital in Yambuku. No biting insect could be incriminated.

The secondary attack rate was about 15 per cent in Zaire. In the Sudan active cases documented showed a secondary spread of 13 per cent, a tertiary spread of 14 per cent and a quaternary spread of 9 per cent. Transmission seemed to stop spontaneously after four generations, but in exceptional circumstances at least eight generations could be documented.

Specimens for virological examination were shared by laboratories at the Microbiological Research Establishment, Porton Down, England, the Institut de Médecine Tropicale, Antwerp, Belgium and the Center for Disease Control, Atlanta, Georgia, USA. On 14 October, all three laboratories reported they had isolated a virus which by electronmicroscopy looked like Marburg virus.

The virus grew on VERO cells and was infectious for guinea-pigs but not for baby mice. Reciprocal indirect fluorescent antibody tests at the Center for Disease Control, Atlanta, showed that the virus had no antigenic relationship with the strains of Marburg virus isolated in the Federal Republic of Germany and Yugoslavia in 1967 and in South Africa in 1975 (Table 1).

Table 1: Immunofluorescence tests for identity of new haemorrhagic fever virus, Zaire 1976

Antisera	Marburg Virus	Zaire Virus E*
Marburg (human)	1:128	<1:10
Marburg (guinea-pig)	>1:640	<1:10
Zaire (human)	1:4	1:256
Zaire (guinea-pig)	1:2	1:256
Sudan 1976 (human)	1:2	1:16

*Identification initial of the patient. The virus has also been named Ebola from the name of a river in the epidemic area in Zaire.

Out of 10 specimens collected from acute cases in Zaire, eight were found positive at the Center for Disease Control laboratory. At Porton Down, 4 isolates were obtained from 6 sera received from Antwerp and one from about 12 samples from Zaire. Blood specimens collected as early as the second day or as late as the thirteenth were positive.

To date 850 sera from convalescents and contacts or controls in Zaire have been tested for antibodies by the Center for Disease Control. The indirect immunofluorescence method (IFA) on inactivated infected VERO cell cultures was used. 25 had titers $>$ 1:64, 19 had titers $\geq$ 1:8 $\leq$ 1:64, 13 had titers of 1:4 and 793 had no detectable antibody. The 25 patients with IFA titers of $>$ 1:64 were distributed clinically as follows: 10 had classic hemorrhagic fever, 4 had atypical disease but history of contact with a typical case, 5 had no illness but a history

of contact, 4 had no illness and no contact and 2 could not be located. Antibodies tested by immunofluorescence in Zaire peaked at 1:128 by the 30-40th day and were still $\geq$ 1:64 on the 90th day.

Liver specimens fixed in formalin were used for electron microscopy and ordinary microscopy. Ebola virus could be seen by electron microscopy. In ordinary microscopy the necrosis of liver caused by Ebola virus cannot be differentiated from that caused by Lassa virus but is clearly different from the classical picture of yellow fever.

Immune plasma was not available during the major part of the outbreak. Plasmapheresis was started as soon as possible in Zaire, first in Kinshasa then at Yambuku where a centrifuge and a generator were installed. The 17 identified survivors were selected as donors in the Yambuku area and gave two units of plasma (250 ml) per week. Over two hundred units (25 litres) were collected by the last week of January 1977. Convalescent plasma was also collected from convalescents in the Sudan.

Barrier nursing was recommended by the Sudanese and Zairian epidemiologists as soon as the high potential of man-to-man transmission was recognized. Protective clothing for the personnel consisted of: gowns, caps, mask (different types: surgical, face masks, goggles, respirators), gloves and overshoes or boots. Nursing staff were trained in barrier nursing techniques, proper use of protective clothing (specially its removal) and disinfection of patient's excreta. Disposable material was used whenever available. The efficacy of protective clothing was proved when a shortage of this material caused a second outbreak of cases in Maridi hospital. Nondisposable clothing and instruments were immediately boiled or plunged into disinfectant before washing. Ten per cent Hypochlorite of reliable concentration was used as disinfectant. A bath was used to boil clothes and a petrol drum made an improvised incinerator.

The isolation unit in Kinshasa consisted of a pavilion with single rooms. Trays with disinfectant were placed in front of doors. The staff were trained to dispose of contaminated material carefully. Corpses were wrapped in sheets treated with disinfectant and immediately buried to avoid contacts within the community. Those handling corpses wore protective clothing.

In Kinshasa, contacts of patients were collected from their homes and quarantined in a special pavilion (cohort isolation) for a duration of 21 days according to the date of contact.

Active surveillance was undertaken throughout the epidemic area for 4 to 6 weeks after the last case was received before declaring the area free of infection. As far as possible all families were visited. Passive surveillance of the entire region was recommended for about six months.

A suspected case (not confirmed) was evacuated by Land Rover from Yambuku to Bumba (4 1/2 hours), by a Fokker aircraft to Kinshasa and by a military C141 aircraft to Johannesburg. The whole operation from the time it was decided to evacuate to arrival at the hospital took almost 48 hours. This was an opportunity to test a plastic capsule specially designed to evacuate highly contagious patients. Two physicians accompanied the patient. One difficulty was to maintain the intravenous drip of immune plasma during take-off, landing and turbulence. Such a capsule which can fit into different types of aircraft or ground vehicles is a very practical way of moving patients under isolation.

D. Malaria

Malaria is one of the tropical diseases that is frequently observed now in countries of the world where transmission was interrupted or where the disease had never existed.

The possible importation of cases of malaria can produce at least five situations in which we are interested from the clinical, epidemiological point of view.

1) there is a danger for the patient who often does not have any immunity;

2) the patient has been infected with one of the strains of P. falciparum resistant to chloroquine;

3) in the differential diagnosis the doctor does not think of malaria;

4) although diagnosed as malaria, there has been inadequate treatment and;

5) the danger represented by importation of a case of malaria and the reestablishment of transmission in areas which had once been free of the disease.

Of the many examples which exist concerning effects of imported malaria, and its clinical and epidemiological aspects, a few deserve mention.

. The work of Dr. Myron Schultz of CDC presented in the WHO Symposium on Malaria Investigation held in Rabat, 1974 where he analyzed the experience of the United States including the surveillance methods for malaria utilized in that country.

. The reference of Dr. Bruce-Chwatt concerning the occurrence of malaria in England during the period 1970-73 with very high mortality produced by P. falciparum.

. The studies of Dr. Zulueta which demonstrated a high mortality of P. falciparum malaria in cases imported into Europe during the period 1967 to 1972.

. The pilgrimage to India of a religious sect Hare-Krishna with participants from many Latin American countries. In 1976 India reported five million cases of malaria with a considerable number of these cases due to P. falciparum resistant to chloroquine.

. The II World Festival of Negro-African Art and Culture was held in Nigeria, at the beginning of 1977 with the participation of various countries from the Americas, principally from the United States and the Caribbean Area.

The latter was brought to the attention of PAHO by the CDC which took immediate action to discover cases of malaria in participants from the United States.

Also recently there was a soccer team from Argentina, which returned from Zaire, Africa with three players suffering from malaria. One of these was diagnosed post-mortem as malaria.

In the Region of the Americas there are countries which have been certified free of malaria, countries which are in the stage of favorable progress in eradication, countries with areas where there exist only imported cases or small circumscribed foci and countries with persistance of transmission. This classification is closely related to possibility of importation or exportation of cases of malaria.

This brief summary emphasizes the importance of malaria and the need to promote epidemiological surveillance which maintains the interest of private doctors and health officials in order to make the diagnosis and provide the appropriate treatment for malaria.

PAHO/WHO and CDC distribute information periodically concerning the risk of malaria for international travellers. The most recent information from WHO has been distributed and includes the standards of treatment of serious infections with P. falciparum whose significance increases each day in importance resulting from the evolution of chloroquine resistance.

III. SURVEILLANCE PRINCIPLES FOR AIRLINE AND AIRPORT AUTHORITIES

While health workers are aware of the dramatic changes in the world epidemiological situation resulting from smallpox eradication, improved surveillance procedures, better airport sanitation, and improved international cooperation in public health matters, this has not always been reflected in actual public health control procedures applied at airports. As a result, port authorities tend to apply traditional restrictions and continue routine controls which are no longer justified by the epidemiological situations.

As the actual number of cases and deaths is minimal in relation to total number of travellers and other causes of morbidity and mortality, undue emphasis on air transport is to be avoided.

There is no proven merit in collecting and maintaining routine papers for public health purposes, such as the general declaration of health. The small percentage of cases which occur cannot justify the retention of routine overall health checks.

However, there is a need for health authorities to be prepared for the exceptional case, and to have an emergency procedure which can be followed in the rare event of an imported case or suspect.

In such situations a variety of information sources are available and should be used so as to establish the best possible picture and to identify contacts, e.g. governmental clearance documents used in the country of arrival, airline records and news media. One single source may not always be sufficient to provide the required information.

If airlines are to provide passenger data, it is important to make such requests at the earliest possible moment. The quantity and quality of passenger information goes down rapidly within a matter of days.

There is a need for better health education of the travelling public and travel agents, so that potential hazards e.g., malaria can be avoided.

While "classical" and "emerging" diseases may not present an immediate danger to air transport, certain gastro-intestinal diseases (food and water-borne infections) may constitute a serious health or safety hazard if the crew becomes affected. Therefore, all involved in air transport should be aware of the dangers inherent in food and water contamination.

Statistics show that despite the many hundreds of millions of persons travelling by air each year cases of infectious diseases are extremely rare. Consequently health resources should not be wasted on superfluous controls but should be concentrated on matters affecting safety and health of crew and air passengers.

There is room for improvement in the information management and procedures related to shipments of etiologic agents.

An essential basic requirement is that good communications exist at the national level between public health and airline operators. At the international level there has been long and fruitful cooperation between ICAO and the World Health Organization, which has sent observers to each Session of ICAO's Facilitation (FAL) Division. Conversely, experts from the ICAO Secretariat have attended meetings of the WHO Committee on International Surveillance of Communicable Diseases, thus ensuring a consistent approach by both Organizations to matters of mutual interest.

ICAO's Facilitation Division makes recommendations which, after processing through the Air Transport Committee and Council, are reflected in the International Standards and Recommended Practices of Annex 9 to the Convention on International Civil Aviation. Those of particular interest to this meeting were concerned with procedures for disinsecting of Aircraft (paras. 2.20 to 2.28 of Annex 9, 7th Edition) disinfection (2.29), public health requirements for inbound passengers (paras. 3.11 and 3.12), food and water supplies for consumption at airports and onboard aircraft (para. 6.45) and free pratique (para 8.15). (Annex V).

Guidelines have been developed by ICAO on National Facilitation Committees since 1959. Recommendations by various Facilitation Division Sessions, subsequently adopted by the Council of ICAO, were published in ICAO Circular 119 - AT/31 (pp. 27 to 30) and one on Airport Facilitation Committees is found on pp. 30-31 of the same document. Such Committes are useful where properly established and operated in accordance with these guidelines, for solving public health and other clearance control problems. Essential elements in the successful operation of National FAL Committee meetings were, firstly, that they were attended by officials of sufficient seniority to initiate any necessary changes in national regulations and practices and, secondly, that they were held at regular intervals, at least twice a year and preferably more often.

Several measures had been developed and implemented in the past which had proven to go a long way towards ameliorating problems in the public health field. These are proper sanitary controls of international airports so as to keep them as free as possible from insects, and rodents and provision of safe food and water, dissemination to air travellers of information concerning States' public health requirements, cooperation by airline operators in tracing suspect passengers, the use of public media for the same purpose, greater reliance on surveillance and, last but not least, the use of National and Airport FAL Committees as mentioned above.

IV. SURVEILLANCE AND PREVENTION BY NATIONAL HEALTH AUTHORITIES

The meeting considered that the most important concept for Member Governments to adopt is that: diseases will continue to be imported in spite of whatever precautions are taken and such imported diseases will only be detected by an adequate national surveillance system not at the airport.

Regarding this concept, the meeting attempted to put into perspective the extent of the problem. No documented cases of diseases subject to the International Health Regulations have been introduced through air transport. In two known instances of infectious cases of Lassa fever being transported on commercial aircraft and where extensive surveillance has been instituted, no secondary transmission has been confirmed. Malaria has caused the greatest mortality in air travellers and with malaria the problem is one of non-diagnosis, inappropriate therapy, or insufficient prophylaxis taken by the traveller.

Adequate surveillance is not merely collecting information, but also in sharing that information. Disease control programs of all sorts are hampered by late or inaccurate international reporting of suspected or confirmed disease outbreaks. While this maxim has been stated many times, some Governments still have fears of informing international organizations. This fear has frequently lead to misinformation in their own national media. An open approach to international organizations and the media will, in the long run, lead to a better informed and educated public. It was noted that the PAHO has representatives in all Member Countries and part of their duties should be encouragement of reporting by the government.

It must be emphasized that until adequate public health laboratory support is available for the more common and important diseases, governments should not attempt to develop diagnostic services for the exotic viral diseases such as Lassa fever.

In this context PAHO should disseminate information on the laboratory facilities that can safely accept such specimens; the conditions under which such specimens will be accepted; and the methods by which they should be shipped. Also the Organization should know of the existance and availability of stocks of immune plasma or sera for specific exotic diseases.

Detailed recommendations for surveillance and prevention are given in the attached references, but a few general principles can be stated:

1. Patients with known communicable disease which have no known specific treatment or prevention should not be transported on commercial planes with other passengers;

2. Patients with such diseases should receive the best possible medical care with the best available isolation techniques;

3. Disinfection procedures for hospitals and means of transport for such diseases need not be different than those for other diseases of known infectiousness;

4. Contact surveillance should be based on the epidemiologic situation, e.g., nursing staff and family members should receive more attention than mere casual contacts, and quarantine or isolation measures are not indicated in healthy contacts;

5. In general, isolation of patients should continue for a week after the patient becomes asymptomatic.

The meeting emphasized that national plans should be developed rather than different local plans for different airports; general national guidelines can then be adapted to local situations.

As mentioned in the preceeding comments, surveillance must be a national program. Likewise liaison with the air transport industry and governmental and nongovernmental organizations involved with air travellers

must also be conducted at the national level. On occasion, health authorities should take the initiative in instituting such liaison, preferably within the framework of National Facilitation Committees, where in existence, to make known their specific requirements. As mentioned earlier, it is important that health authorities be represented at meetings of National FAL Committees by appropriate decision makers and that such meetings be held regularly so that all parties can be kept informed of changing conditions. This is particularly true with regard to interpreting changing immunization requirements, specimen handling and the management of ill passengers. By developing rapport at airports, air carriers are more likely to use "radio pratique" (the early alerting of illness aboard), so that the ill passenger can be expeditiously managed, and other passengers not be detained. In this regard it was discussed that the rarity of this situation was such that the full time stationing of physicians at airports was inappropriate. They might better be utilized to improve national surveillance programs.

A suggestion was made that periodically the health authority in conjunction with air carriers and others concerned have practice drills in locating arrived passengers, so that in the unlikely event of a traveller becoming ill with a serious communicable disease after arrival, the health authorities will have had experience in dealing with the problem.

V. AVAILABLE GUIDELINES AND RECOMMENDATIONS FOR NEW TECHNICAL MATERIAL

The group drew attention to the existence of many excellent guidelines that have been developed by WHO, IATA, ICAO, and several national health authorities. The need for new guidelines will be limited to those diseases, such as African Hemorrhagic Fever for which no information exists at present, or for procedures in which there is sufficient agreement to permit international standards to be set forth.

The group reviewed the Memorandum on Lassa fever prepared by the U.K. Health Authorities, the WHO document (VIR 75.1, VIR 73.11), Guidelines for the Diagnosis and Care of Patients with Lassa Fever and the description of the Management of imported Lassa fever prepared by the CDC. They recommended that these be distributed to PAHO Member Countries as examples to be used in preparation of national plans and guides. In addition, the Organization should consider preparing a synthesis of this information, translated into Spanish and Portuguese, covering those parts of the guides which can be uniformly adopted. Such guide should include a list of special laboratories in the Region where specimens may be sent for diagnosis of exotic disease.

The problem of collection and transport of specimens for laboratory diagnosis was considered of high importance. While recognizing on the one hand that routine laboratory exams for the common febrile disease

should not be discouraged or impeded, the group emphasized the necessity to consider all laboratory specimens from outbreaks with high case fatality rates as potentially harboring highly infectious viral agents. Such specimens should only be handled by high security labs and the location of these should be widely publicized.

The recently published WHO Manual on Collection and Transport of Virological Specimens should serve as a useful guide. It should be translated into Spanish and Portuguese, simplified where necessary, and adopted as a standard PAHO procedure. The list of all virus diagnostic labs in the Americas should be added as an appendix, with appropriate address and telephone contact information.

As many specimens will be sent to the CDC international reference centers for diagnosis, the Organization should assure that all countries know the USA regulations for shipment of specimens with potentially dangerous microbiological agents. The regulations of international and private air authorities, such as those adopted by ICAO* IATA, ALPA, etc. should be provided by the Organization to all national health authorities. Where routine procedures for transport of bio-hazardous material have been developed such as in the Caribbean, these should be disseminated to other areas for possible adoption. The group emphasized, however, that in practically all instances where successful international shipment of specimens has occurred, there has been frequent and detailed contact between the shipper and receiver by phone or cable regarding exact procedurs to be followed.

The group called attention to the already existing excellent material on international spread of malaria and the prevention thereof. In terms of numbers and severity, this was considered as the highest priority problem in international spread of disease by air travellers. The existing guidelines need only wider distribution and assurance they are read and understood by travellers, and those responsible for the health of travellers.

Guidelines have been developed, such as the Comprehensive Action in a Smallpox Emergency (USA) or the Guide to Laboratory Diagnosis of Smallpox (PAHO) which should be re-directed to the attention of a new generation of health officials. Many of the procedures for isolation, transport, quarantine, surveillance of contacts, terminal disinfection etc. developed in these guides are applicable to the newer highly contagious viral diseases. The redistribution of these guides could thus serve a dual purpose.

Finally, the group considered that a new guide in African Hemorrhagic Fever may be useful for the Americas. The material presently under preparation by WHO should serve as the basis for such a guide (VIR 77.1). It should include a section on the epidemiology and clinical feature of the disease, the method of transmission, laboratory diagnosis and treatment, the special facilities needed for care of suspected or proven cases (hospitals, ambulances, laboratories) the procedures to be followed for handling introduced cases or suspects, the definition of contacts and

*Expected to be available by the end of 1978.

their classification into high risk or low risk groups, the type of clinical surveillance to be maintained, the type and number of laboratory specimens required from contacts, and the procedures for terminal disinfection, post mortens, and disposal of human remains.

The guide should include a list of hospitals in the area equipped to handle such cases, and laboratories (or laboratory) where specimens should be sent for virological diagnosis.

The Group considered there is presently no need for a guide on the disinfection of aircraft, as the present procedures used for known pathogens of human or animal origin are quite adequate for any of the newer diseases.

VI. SPECIFIC RECOMMENDATIONS

1. The diagnosis of suspected cases must be promptly confirmed through laboratory examinations done either in country or in designated international reference laboratories. The selection of the international reference laboratory will be determined by the suspected clinical diagnose(s). At the present time the Center for Disease Control (CDC) in Atlanta, Georgia, is the only recommended high security reference laboratory in the Americas.

2. Prompt and proper handling and shipment of laboratory specimens must be carried out with consideration for the safety of people who will come in contact with the package and preservation of the material so that the receiving laboratory can make a reliable diagnosis. Of particular importance for international shipment of specimens from suspected highly communicable and fatal diseases are appropriate packaging, labelling, and essential information regarding the case(s), and compliance of the applicable government aerial regulations, such as IATA restricted articles regulations. The shipping laboratory should be responsible for cabling to the receiving laboratory the date of shipment, flight number, and airway bill number. Telephone or cable consultation between laboratories prior to shipment is frequently necessary and should be encouraged.

3. Two types of contacts can be defined for epidemiologic purposes. The high risk contact has had intimate exposure to the patient; the low risk contact has had only casual exposure to the patient. The epidemiology of the individual diseases will determine the precise definition of what constitutes a high or low risk contact. Experience to date has shown that productive and efficient surveillance efforts have concentrated on the high risk case contacts.

4. Effective observation of both high and low risk contacts can be done by daily clinical surveillance, without interfering with the contacts normal activities. Where feasible, this may involve a daily telephone call from health authorities. In only a few special cases is there a need for physical or laboratory examination of asymptomatic

contacts. This clinical surveillance should commence as soon as a case becomes suspect and while confirmatory laboratory tests are pending, and must last at least as long as the longest documented period of incubation for the suspect disease(s).

5. The primary responsibility for these public health problems belongs to the national health authorities. However, collaboration with the airlines and government authorities at airport and tour organizer is essential to obtain passenger's names, addresses, and telephone numbers. The sooner the collaboration begins, the higher the chances of reconstructing a complete passenger list. As a general rule, this information is difficult to obtain one week after flight arrival.

6. Member Governments should give airport and national health personnel sufficient authority to carry out their duties with regard to international surveillance.

7. The general experience has been that medical officers are not needed in airports to carry out effective international surveillance. Several countries have effectively utilized health personnel previously assigned to airports in surveillance activities elsewhere in the country.

8. PAHO should continue to advise Member Governments on further developments in the international surveillance of highly communicable and fatal diseases. As soon as possible, recommendations and manuals should be developed to provide the technical basis for national guidelines which will take into account the actual surveillance situation in each country.

VII. SELECTED BIBLIOGRAPHY

Lassa Fever and Marburg Virus Disease: Guide to their Diagnosis, Management and Control in Africa. T.P. Monath, WHO VIR/73.11.

Guidelines for the Diagnosis and Case of Patients with Lassa Fever. T. P. Monath and Jordi Casals, WHO VIR/75.1.

Memorandum on Lassa Fever. Dept. of Health and Social Security and the Welsh Office, London, Her Majesty Stationary Office, 8/76

Report of the Informal Consultation on the Marburg virus-like disease authorities in the Sudan and Zaire, 1976 held at the London School of Hygiene and Tropical Medicine. 4-5 January 1977, WHO VIR/77.1

Treatment of Severe Cases of Falciparum Malaria. Technical Document PAHO/WHO, D-DC/ME-N 3 March 1976.

Disinfection Methods and Procedures in International Air Transport. Richard S. Mark, WHO SSH/70.2

Guide to the Collection and Transport of Virological Specimens. C.R. Madeley, WHO, Geneva, 1977

Comprehensive Action in a Smallpox Emergency. U.S. Dept. of Health Education and Welfare, Center for Disease Control, Atlanta, Ga. 1974

WHO/NIH Consultation on Facilitation and Safety in International Transfer of Research Materials, WHO, 1976

Collection Handling and Shipment of Microbiological Specimens. U.S. Dept. of Health, Education and Welfare. Center for Disease Control. Pub. DHEW (CDC) 75-8263 Revised July 1974

Le Transport en Avion Commercial des Malades Contagieux. M. Perin Concours Médical 1-5-1976 pp 2779-2782

Information on Malaria Risk for International Travellers. WHO Weekly Epidemiological Record No. 3. 1973

Information on the World Malaria Situation. Jan-Dec. 1975. WHO Weekly Epidemiological Record No. 3. 1977.

International Symposium on Arenaviral Infections of Public Health Importance. Bull Wld Hlth Org 52, 381-766 (1975)

Viral Hemorrhagic Fever in Southern Sudan and Northern Zaire by Bowen ETW, Plott G.S. and Lloyd G. et al. Lancet 1:571-573, 1977

ANNEX I

A G E N D A

International Surveillance of Air Travellers

Monday
21 March 1977

AM

Welcome - Dr. E. del Cid
Introductory remarks - Dr. P. Acha
General surveillance concepts - Dr. K. Western

BREAK

New diseases of international importance:
- Lassa Fever - Dr. P. Brès
- Marburg Disease - Dr. J. Bryan
- African Hemorrhagic Fever - Dr. J. Bryan

NOON

PM

Surveillance for disease at the national level:
- Argentina - Dr. O. González Carrizo
- Brazil - Dr. A. Bica
- Chile - Dr. J. Borgoño

BREAK

- Mexico - Dr. A. Heredia Duarte
- Trinidad - Dr. R. Doug-Deen
- USA - Dr. D. Sencer
- Venezuela - Dr. A. Llopis

General Discussion

Tuesday
22 March 1977

AM

Malaria in international travellers - Dr. S. Palacios
Surveillance at the international level - Dr. I. Carter
The Role of Air Transportation Industries - Mr. R. Bonhoff
Activities of the International Civil Aviation Organization - Mr. H. Seidelmann

NOON

PM

Discussion of logistics in surveillance of air travellers
- a. Establishment of a diagnosis for suspected cases
- b. Definition of contact
- c. Locating and identifying air travellers in either of the above categories

d. Observation of contacts or suspects
e. Aircraft design related to exposure or disinfection
f. Delineation of areas of responsibility
    1. By national health authority
    2. By airline authority
    3. By airport authority

Wednesday
23 March 1977

AM Preparation of draft report

Adjournment

ANNEX II

LIST OF PARTICIPANTS

Dr. Alfredo Norberto Bica
Médico de Saúde Pública
Ministério da Saúde
Rio de Janeiro, RJ, Brasil

Mr. Robert W. Bonhoff
Director
Government and Public Affairs Facilitation
International Air Transport Association
Geneva, Switzerland

Dr. José Manuel Borgoño
Jefe de Protección de la Salud
Ministerio de Salud
Santiago, Chile

Dr. Paul L. Brès
Virus Unit
World Health Organization
Geneva, Switzerland

Dr. John Alexander Bryan
Director, Viral Diseases Division
Bureau of Epidemiology
Center for Disease Control
Atlanta, Georgia

Dr. Oscar Horacio González-Carrizo
Director of Border Health Services
Dirección Nacional de Sanidad de
Fronteras - PH Secretariat
Buenos Aires, Argentina

Dr. Ian Dan Carter
Epidemiological Surveillance
Medical Officer of Communicable Diseases
World Health Organization
Geneva, Switzerland

Dr. Roderick M. A. Doug-Deen
Principal Medical Officer (Epidemiology)
Ministry of Health
Port of Spain, Trinidad

Prof. L. Eyckmans
Director, Prince Leopold Institute
of Tropical Medicine
Antwerp, Belgium

Dr. Alfredo Heredia-Duarte
Director General de Epidemiología
e Investigación en Salud Pública
Secretaría de Salubridad y Asistencia
México, D.F., México

Dr. Alvaro Llopis
Adjunto al Director de Salud Pública
Ministerio de Sanidad y Asistencia
Social
Caracas, Venezuela

Mr. Arno Seidelmann
Chief, Facilitation Section
International Civil Aviation Org.
Montreal, Canada

Dr. David J. Sencer
Director
Center for Disease Control
Atlanta, Georgia

Dr. Ronald M. Zweighaft
Medical Epidemiologist
Viral Diseases Division
Center for Disease Control
Atlanta, Georgia

PAHO Staff

Dr. Eusebio del Cid Peralta
Assistant Director

Dr. Pedro N. Acha
Chief, Disease Control

Dr. Karl A. Western
Chief, Communicable Diseases

Dr. Silvio Palacios
Chief, Malaria and Parasitic Diseases

Dr. James O. Bond
Regional Advisor on Virus Diseases

Dr. Jacobo Finkelman
Epidemiologic Surveillance

Dr. James Rust
Surveillance Officer

Dr. Ciro Carlos Araújo de Quadros
Advisor on Immunization

DIRECTING COUNCIL | REGIONAL COMMITTEE

PAN AMERICAN HEALTH ORGANIZATION | WORLD HEALTH ORGANIZATION

XXIV Meeting | XXVIII Meeting | ANNEX III

RESOLUTION XXXI

NEED FOR INCREASED SURVEILLANCE OF AIR TRAVELERS

THE DIRECTING COUNCIL,

Considering the ever increasing volume of persons traveling by air and the expansion of air transport networks and interlinkage of local and international flights;

Cognizant therefore of the increased danger of the importation of new diseases, for which no preventive measures are taken at present, such as Lassa Fever into countries where the knowledge of these diseases is limited and urgent laboratory diagnosis may not be possible; and

Noting the recommendations of the Executive Committee contained in Document CD24/23 on the termination of compulsory smallpox vaccination for international travelers in the Americas,

RESOLVES:

1. To request the Director to take steps to maintain and expand the system of disease surveillance and rapid exchange of information between Member Countries of the Region, and to bring this matter of new diseases and their special problem for the countries to the attention of WHO's Committee on International Surveillance of Communicable Diseases.

2. To urge Governments to liaise with airlines to ensure the availability of necessary information relating to passengers who may have been exposed to communicable disease during travel and to improve the training of airline personnel regarding the importance of illness occurring among passengers.

3. To request the Director to provide updated guidelines and training manuals to enable Governments to revise their protection procedures and reorient their port-health personnel in order to reflect the new requirements which may be necessary to prevent the spread of dangerous diseases by air travellers.

(Approved at the fourteenth plenary session, 6 October 1976)

ANNEX IV

OPENING REMARKS

by

Dr. Eusebio del Cid Peralta

On behalf of Dr. Hector Acuña, Director of the Pan American Health Organization, it is a pleasure to welcome the participants in this working group on International Surveillance of Air Travellers. You have been invited to this Meeting as individuals with extensive experience related to international control of communicable diseases. We need your help as experts as we approach new problems in international travel related to emerging diseases such as Lassa fever and the Marburg-like illness. Although these have not yet appeared in the Western Hemisphere, the increasing daily traffic between Africa and our Region causes considerable concern.

This concern came to focus in the XXIV Meeting of the PAHO Directing Council last October in Mexico. Several delegates mentioned their growing awareness of the possible introduction of diseases with which we are unfamiliar. The discussions resulted in the adoption of Resolution XXXI which asks the Director of the Pan American Health Organization to improve the system of disease surveillance and prepare updated guidelines or training manuals which will assist Member Governments in revising their protection procedures.

Many practical problems are involved. We first need to know more about the new diseases which can be spread by air travellers. I realize much knowledge is available but more remains unknown. Nevertheless we must start from whatever we have to instruct our Member Governments on the appropriate procedures to follow with air travellers. The logistics of air travel are becoming increasingly complex. We have representatives here from the Air Industry to emphasize this point. Locating and tracing contacts that may have been made aboard a Jet becomes a formidable procedure. We need to define the responsibilities of the national health authorities, the airlines, and the airport authorities. If new regulations at the international level are needed, we should have a general outline of their content. If nothing else can be done, we need to know this also, so that Member Governments will be properly aware of the risk.

We need better methods for communicating relevant information, not only among nations, but also between health authorities and airline or airport personnel involved in decision making. We need to know better ways of utilizing the mass media for obtaining and distributing information. The legal aspects of surveillance activities require attention if strict control measures must be instituted suddenly.

I know you cannot answer all these questions in three days. However, I am sure you will take the essential first steps. We will then continue with the search for solutions.

This year the Pan American Health Organization celebrates 75 years of service to hemispheric public health. This truly historical event once more emphasizes the spirit of cooperation between the peoples of this Hemisphere. Accordingly, the importance given to these new international public health problems will afford an opportunity for still further expanding international cooperation for the purpose of promoting the health of all.

ANNEX V

INTERNATIONAL STANDARDS AND

RECOMMENDED PRACTICES

FACILITATION

ANNEX 9

To the Convention on International Civil Aviation

G. Disinsecting of Aircraft

2.20 When disinsecting is required by a Contracting State as a public health measure, that requirement shall be deemed to have been met by discharging into those portions of the aircraft which may carry insects from one area to another, an insecticide of a strength, formula and method of dispersal recommended by the World Health Organization and acceptable to that State, such insecticide to be effectively discharged:

a) into the flight deck and into those portions of the aircraft which cannot be reached when the aircraft is moving, as near as possible to the time of the aircraft's last departure before entering the State and in sufficient time to avoid delaying such departure; and

b) into those portions of the aircraft which can be reached when the aircraft is moving, after the time of the aircraft's last departure before entering the State, either

i) by means of an aerosol spray, or any equivalent system, while the aircraft is taxiing from the ramp to the runway for take-off, or

ii) if the aircraft is suitably equipped, by means of an automatic dispersal of vapour while the aircraft is flying, but as far in advance as possible and at least thirty minutes prior to first landing, or

iii) by other equally effective means.

2.21 Recommended Practice - When disinsecting as a public health measure has been properly performed pursuant to 2.20 and has been recorded on the General Declaration, it should be accepted by all Contracting States as evidence that effective disinsecting has been carried out for preventing the spread of all insect vectors of human diseases for whose destruction the insecticide is effective.

2.22 When disinsecting as a public health measure has been properly performed pursuant to 2.20, passengers and crew on arrival shall, except in special circumstances, be allowed to disembark immediately from the aircraft.

2.23 Recommended Practice - Contracting States should ensure that all personnel in charge of disinsecting receive appropriate information concerning the way in which to perform such disinsecting effectively.

2.24 Recommended Practice - Disinsecting of an aircraft on a through-flight should not be required to be repeated on behalf of any insect vectors of human disease, against which the insecticide used is effective, except when live insect vectors of human disease have been found on board the aircraft, or when the aircraft is proceeding directly from an infected area of an insect-borne disease to a receptive area.

2.25 Recommended Practice - When a Contracting State requires treatment of the aircraft with an insecticide in the interest of agriculture or food conservation, a single treatment should be employed that also meets the requirements of public health.

2.26 Recommended Practice - When disinsecting or other remedial measures are required by a Contracting State for animal and plant quarantine purposes, such State should devise means to integrate its procedures in this field with other clearance procedures whenever this will expedite the clearance of aircraft and the loads that they carry, in so far as this does not detract from the safety of the aircraft and the effectiveness of the measures.

2.27 Conctracting States shall ensure that their procedures for disinsecting or any other remedial measure are not injurious to the health of passengers and crew and cause the minimum of discomfort to them.

2.28 Contracting States shall ensure that any insecticide or any other substance used to meet the requirements of public health, agriculture or food conservation is not inflammable and does not have a deleterious effect on the structure of the aircraft or its operating equipment.

2.29 Contracting States shall define the types of animals and animal products which, when imported by air, require that the aircraft be disinfected and shall normally exempt aircraft from disinfection when such animals or animal products are carried in approved containers. When aircraft disinfection is required, the following provision shall apply:

a) the application shall be limited solely to the container or to the compartment of the aircraft in which the traffic was carried;

b) the disinfection shall be carried out expeditiously;

c) inflammable chemical compounds or solutions likely to damage aircraft structure, by corrosion or other effects, shall not be employed.

IV. Public Health Requirements

3.11 In cases where evidence of protection against yellow fever or smallpox is required from persons travelling by air, Contracting States shall accept the International Certificates of Vaccination or Revaccination in the forms set out by the World Health Organization in Appendices 3 and 4 of the International Health Regulations (1969).

3.12 Recommended Practice - Medical examination of persons arriving by air should normally be limited to those disembarking and coming within the incubation period of the disease concerned, as stated in the International Health Regulations (1969), from an area infected with one of the four quarantinable diseases (plague, cholera, yellow fever and smallpox)*

C. Facilities Required for Implementation of Public Health Measures and Emergency Medical Relief

6.45 Recommended Practice - Contracting States, in co-operation with airport authorities and aircraft operators should take all steps to ensure that the preparation, handling, storage and service of food and water supplies intended for consumption both at airports and on board a craft are hygienically carried out in accordance with the recommendations and standards of the World Health Organization.

E. Implementation of International Health Regulations and Related Provisions

8.15 Recommended Practice - Operators should ensure compliance with any requirement of a Contracting State whereby illness, other than simple airsickness, on an aircraft is to be reported promptly by radio to health authorities in the Contracting State for which the aircraft is destined, in order to facilitate provision for the presence of any special medical personnel and equipment necessary for health procedures on arrival.

*meanwhile superseded by the latest IHR's.