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TWENTY-FIRST WORLD HEALTH ASSEMBLY

Technical Discussions

REPORT OF THE TECHNICAL DISCUSSIONS AT THE TWENTY-FIRST WORLD HEALTH ASSEMBLY ON "NATIONAL AND GLOBAL SURVEILLANCE OF COMMUNICABLE DISEASES"

I. INTRODUCTION

1. Preparatory work for the Technical Discussions

During 1967, a preliminary document (ESR 69.7) in the form of a suggested outline for use by countries in discussing the subject was prepared and forwarded by the Director-General to Members and Associate Members (C.L.30.1967 dated 21 August 1967). The letter was also sent to non-governmental organizations in official relations with WHO. Replies were received from 77 Member States and Associate Members, and from 16 non-governmental organizations. These replies were used in the preparation of a background document (A21/Technical Discussions/1) which formed the basis for the Technical Discussions, and were available for reference.

2. Programme of work

The Technical Discussions on "National and global surveillance of communicable diseases", were opened on 10 May 1968 by the General Chairman, Dr Adetokunbo O. Lucas, Professor of Preventive and Social Medicine, University of Ibadan, Nigeria, who was nominated by the President of the Twentieth World Health Assembly and appointed by the Executive Board (resolution EB38.R11). After the General Chairman had delivered his opening address, the first plenary session adjourned to re-assemble later for group discussions, which took place during the morning and afternoon sessions. The 186 participants who registered for the Technical Discussions were divided into eight groups. The group discussions were summarized in eight reports which were distributed to participants on Saturday, 11 May 1968. The final plenary session took place in the morning of 11 May 1968.

II. CONTENT OF THE TECHNICAL DISCUSSIONS

1. The General Chairman's Introductory Address

In his opening speech, the General Chairman reviewed the evolution of the modern concept of the surveillance of communicable diseases. He observed that in essence, surveillance implies the systematic collection and use of epidemiological information for the planning, implementation and assessment of control of communicable disease; in short, it is "INFORMATION FOR ACTION". The deliberations at the Technical Discussions would aim at methods by which the quality of epidemiological data can be improved, the processing and analysis can be speeded, the interpretation of the information can be made more precise and the communication of the findings can be rendered more effective - locally, nationally and internationally.

2. Summary of discussions

The discussions which took place are summarized under the following headings:

(a) The concept of epidemiological surveillance;

(b) The elements of surveillance;

(c) The organization of epidemiological surveillance;

(d) The dissemination of information;

(e) International surveillance;

(f) The role of WHO in surveillance.

2.1 The concept of epidemiological surveillance

Evolution

The traditional use of the term "surveillance" in public health was limited to certain restrictive actions directed to individuals. International quarantine procedures often called for placing contacts of plague under surveillance for the duration of the incubation period, in order to detect first symptoms of disease in time to institute treatment and isolation when indicated. Surveillance thus involved systematic observation, rational interpretation of findings and responsibility to see that appropriate action was instituted.

More recently the term "surveillance" was applied to certain disease problems as distinct from individual patients or contacts. It became appreciated that additional efforts and more sophisticated methods than were then in use, were necessary to chart the decline and to ensure the eradication of malaria, yaws, smallpox, urban yellow fever and other diseases which were by then rapidly disappearing in certain geographical areas. Prompt and competent field investigations of all suspected as well as definite cases became essential. Accurate and readily available facilities for laboratory confirmation of presumptive diagnoses were needed. Knowledge of vector distribution and insecticide susceptibility was vital. Awareness of the levels of vaccination in the population and of the quality of control measures, also entered into the decisions public health authorities had to make. The term "surveillance" was employed to summarize all of these epidemiological functions related to guiding communicable disease control programmes.

Prior to this time most of this information was known or available, but it often was compartmentalized into separate elements among different administrative and professional groups. Surveillance programmes serve the useful purpose of collecting and consolidating these separate elements in one central location where they can be evaluated and where the results can then be made available to those with authority for making decisions.

Until recently communicable diseases have been looked upon as caused by a single factor - the infectious agent. It is now widely accepted that although the presence of a single agent is necessary in order to produce infection the presence of the agent does not necessarily result in the development of disease and further spread of the infection. Other factors, such as dosage of the infection, type and duration of exposure, physiological and nutritional status of the host, host behaviour and a number of environmental characteristics, are at play, and consequently infections clearly have a multi-factorial causation. Plans for successful control action in communicable diseases have to be based not only on knowledge of these factors, but also on an understanding of their interrelationships. Full account, therefore, has to be taken of all observable factors related to the agent, the host and the environment, that together create suitable conditions for the dissemination of the infectious agent and the development of disease.

Definitions

A number of definitions for epidemiological surveillance of communicable diseases have been written. Three examples are quoted:

1. "- The Exercise of continuous scrutiny of and watchfulness over the distribution and spread of infections and factors related thereto, of sufficient accuracy and completeness to be pertinent to effective control".[1]

2. "- The epidemiological study of a disease as a dynamic process involving the ecology of the infectious agent, the host, the reservoirs and the vectors, as well as the complex mechanisms concerned in the spread of infection and the extent to which this spread occurs".[2]

3. In malaria eradication, influenced by the specific aim of the programme, the term "surveillance" has been given a very extended meaning, the individual functions of which are - "case detection, parasitological examination, antimalarial drug treatment, epidemiological investigation, entomological investigation, elimination of foci by either residual spraying or mass drug administration, case follow-up and community follow-up".[3] Thus, some aspects of control are embraced in this definition of malaria surveillance.

The Technical Discussions elicited other variations in the definition of this term. These reflected mainly differences in emphasis for particular programmes, variations in administrative practices from country to country and subtle differences in the meanings of terms in various languages. In spite of these variations, three main features of surveillance are identifiable:

(a) the systematic collection of pertinent data;

(b) the orderly consolidation and evaluation of these data;

(c) the prompt dissemination of the results to those who need to know, particularly those who are in a position to take action.

Purpose

Surveillance of communicable diseases has two distinct purposes:

(i) The recognition of acute problems which demand immediate action. The classical example of effective surveillance is the recognition and prompt control of a quarantinable disease when it first appears in a formerly uninfected area. Similarly, the occurrence of an outbreak of any serious communicable disease calls for immediate study, determination of sources and mode of infection, and the provision of guidance regarding appropriate control measures.

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[1] Suggested outline for use by countries in discussing "National and global surveillance of communicable diseases", page 4.

[2] Raska, K. (1966) National and international surveillance of communicable diseases, WHO Chronicle, vol. 20, No. 9, pp. 315-321.

[3] Terminology of malaria and of malaria eradication, WHO Geneva, 1963.

(ii) The broad assessment of specific problems in a particular country or region. By the systematic collection of relevant and sensitive information, it is possible to discern long-term trends and epidemiological patterns. Surveillance provides the scientific basis for ascertaining the advisability and extent of mass vaccination (for example, against poliomyelitis, measles, pertussis or diphtheria) and assessing its effectiveness. In some diseases it can give valuable information on changes in the distribution and properties of the infective agents (streptococci, shigellae, influenza virus, etc.). Surveillance also permits the early recognition of changes in disease patterns and a prompt adjustment of control measures. Competent surveillance is essential for the establishment of priorities.

Wider application

Human society is increasingly centred in urban, densely built-up areas, where a healthy existence depends on a number of well-organized public services. This is especially true with regard to environmental health. Good water supplies and efficient sewage disposal are almost taken for granted in many big cities in the world, but it is well to remember that these systems may facilitate the spread of infections such as typhoid fever, viral hepatitis and dysentery. An effective working relationship between the environmental health authorities and those responsible for epidemiological surveillance is therefore essential.

An increasingly important problem is posed by the extensive trade in food and animal feed and their international distribution through commercial channels, with insufficient control of contamination by biological and chemical agents. Because of the important economic interests behind this trade it will take stringent legislation to rectify the situation. The chance of such action at the present time in any large number of countries is small, and the problem therefore will require epidemiological surveillance for a long time to come.

The concept of surveillance is now being applied to public health problems other than the communicable diseases, such as atmospheric pollution, the hazards of ionizing radiation, and automobile accidents. Surveillance techniques may also prove useful in the study of such non-communicable diseases as cancer, mental illness, atherosclerosis and other degenerative diseases; and to social problems - drug addiction, juvenile delinquency and prostitution.

Whilst noting these other applications of surveillance, the discussions were mainly restricted to the use of surveillance for communicable diseases.

2.2 The elements of surveillance

There are many and varied sources of surveillance data. They differ from country to country and from disease to disease. For the purpose of the Technical Discussions these sources have been termed "the Elements of Surveillance", and they are summarized under the following headings:-

(a) mortality registration;

(b) morbidity reporting;

(c) epidemic reporting;

(d) laboratory investigations;

(e) individual case investigation;

(f) epidemic field investigation;

(g) epidemiological surveys;

(h) animal reservoir and vector distribution;

(i) biologics and drug utilization;

(j) demographic and environmental data.

As emphasized earlier these elements are discussed under separate headings but effective surveillance depends on the synthesis of the observations and data contributed by all of the elements pertinent to the particular problem.

(a) Mortality registration

The potential value of mortality registration is widely acknowledged but its limitations are recognized:

(i) incomplete registration;

(ii) inadequate or inaccurate medical certification;

(iii) delayed tabulation of statistics.

In some countries death registration has been compulsory for over 100 years and is essentially complete. In other countries deaths are registered only in major cities. The accuracy of medical certification is admittedly inadequate in all countries. The proportion of deaths certified by physicians varies. In some countries only deaths occurring in government controlled hospitals are registered. The lag in collection and analysis of mortality statistics is a common complaint. In some countries the main purpose of death registration is for inheritance, and other judiciary, rather than medical reasons. Reporting of deaths could be made more useful to the health authority if all deaths certified as due to a communicable disease were immediately reported.

The extent to which deaths are subjected to post-mortem examinations has a profound effect on the usefulness of mortality data. Not only do post-mortem examinations provide much more reliable information on the primary causes of death, but also they serve as an index of the prevalence of other non-lethal but important infections and their sequelae.

One notable use of mortality data for current surveillance purposes is the regular tabulation of weekly or monthly deaths from pneumonia, influenza, bronchitis and other acute respiratory conditions. With epidemic influenza there is usually a sharp increase in mortality from these causes and often a measurable increase in total mortality. The excess mortality from pneumonia and influenza is probably the most useful measure of the extent and severity of epidemic influenza.

(b) Morbidity reporting

Essentially every country utilizes reporting of notifiable diseases for surveillance. In some countries reporting is required only for major infections such as malaria, cholera, smallpox, plague and haemorrhagic fever. In other countries forty or more diseases are notifiable.

The sources of reports are primarily practising physicians but other sources are important such as hospitals, dispensaries, school authorities and industrial establishments.

The incompleteness of the morbidity reporting systems is widely recognized. In some countries, reliance is placed on the governmentally supported dispensaries and hospitals. In others, private physicians are legally required to report but enforcement is admittedly difficult. Those countries having well organized, officially controlled medical services

are able to achieve better reporting than equally well developed countries having largely private systems for medical care.

One interesting development, used in several countries, is to select a sample of co-operating physicians who agree to report regularly and completely. This system is most applicable to those diseases, such as influenza, acute diarrhoeal diseases, and the contagious diseases of childhood, which occur in high incidence, at least during epidemic periods, and do not usually require hospitalization.

Furthermore, organized groups such as schoolchildren or industrial employees may provide valuable information on the incidence of certain common infections in the general population.

The necessity for prompt reporting is generally recognized. For the usually rare but serious diseases immediate reporting by telephone or telegraph, even on suspicion, is essential. For the more common diseases, daily or weekly reporting by mail usually suffices.

The simplicity of the data to be submitted facilitates morbidity reporting. For the uncommon diseases of major importance the information should consist of the name, age, sex and residence of the patient, the diagnosis and the date of onset. This permits individual case investigation. For the more common diseases, reporting can be limited to the numbers of new cases seen during the preceding week. This much simpler method of reporting is applicable to such diseases as influenza, dengue, and the common contagious diseases of childhood. This system is used not only by busy practising physicians but also lends itself to routine reporting at a dispensary or hospital.

During the Technical Discussions, various practical measures were suggested for ensuring prompt, more accurate and more complete reporting:

(a) simplifying the reporting system. For example, notification may be obtained by using cards of different colours; each colour representing a particular disease. There is a need for simple standard reporting systems;

(b) using auxiliary personnel and voluntary workers such as school-teachers and village heads in notifying specific communicable diseases, reporting epidemics, and gathering other useful epidemiological data. It is necessary to provide qualified personnel who will verify cases of serious conditions that are reported by auxiliary and lay personnel;

(c) reviewing the number of notifiable diseases; excluding those which are not considered essential or practicable at the particular stage of the development of health services. The list should however include:

(i) those diseases which warrant immediate action and for which effective prophylactic action is possible, and

(ii) diseases for which major control programmes or eradication schemes are in operation or are contemplated in the near future;

(d) emphasizing the value of morbidity reporting during the basic training of doctors and other health workers. In addition, through in-service training programmes and reorientation courses, all the members of the health team should be made aware of the relevance of their activities in reporting diseases to the important decisions about control measures;

(e) developing standard epidemiological techniques including the use of simple standard reporting systems, so as to ensure comparability of data from area to area;

(f) maintaining facilities, clinical and laboratory, for the accurate diagnosis of communicable diseases which have become rare or have been successfully eradicated; this would ensure that fresh outbreaks or imported cases can be quickly recognized and controlled;

(c) Epidemic reporting

Most countries require epidemic reporting not only of the known epidemic diseases but also of unknown or undiagnosed conditions. All possible sources of information are used, including reports from physicians, dispensaries, hospitals, schools, and industries. Often epidemics are first detected when an increased number of specimens is sent to a laboratory or when an excess mortality is noted, or when an account in the newspapers is reported.

Certain diseases cannot be readily distinguished as individual, sporadic cases, nor do they in such form constitute a significant health hazard. In epidemic form, however, they may be serious. Examples include influenza, rubella, dengue, salmonellosis, shigellosis and other types of acute diarrhoea and food poisoning. An organized system for the reporting of these types of epidemics is an important aspect of surveillance.

The effectiveness of the reporting of all types of epidemics depends not only on the alertness of the local health authority, but also on the promptness and manner with which the central health authority responds. This implies that there is rapid efficient communication between the various departments and units. With adequate consultative services immediately available, including the staff, equipment and necessary supplies, reporting of epidemics can lead to effective control. If on the other hand the reporting of epidemics results in severe restrictive measures, such as economic embargoes, quarantines or charges of negligence, then suppression of reports will occur.

(d) Laboratory investigations

Adequate public health laboratory services are essential for effective surveillance. Such services are essential not merely for the verification of the diagnosis in individual patients but also for the tracing of the sources of the epidemic and the mode of spread of infection in a population.

The wide range of essential services provided by the laboratory, include the identification of the etiological agent either by isolation or by demonstration of a significant change in antibody titre between paired specimens of serum. Also the laboratory methods give a description of important biological properties. Examples are the specific typing of micro-organisms, e.g. salmonella, shigella, streptococci, staphylococci, Neisseria, viruses of influenza, poliomyelitis, etc. or testing for resistance to antibiotics, or the demonstration of the carrier state, or long-term latent persistence of the etiological agent in the body. The epidemiologist depends not only on microbiological support, but also on histopathology and biochemistry, as well as on ecological knowledge of the vector-borne diseases. For many problems the veterinary laboratory makes a vital contribution (multidisciplinary approach).

Laboratory services do not necessarily have to be elaborate. Simple techniques such as microscopy for malaria or enteric parasites, can be learned by auxiliary personnel. Thus, even in countries with limited resources, simple laboratory services can be provided in remote areas. These simple laboratory techniques should be standardized so as to ensure comparability from area to area.

(e) Individual case investigation

In many countries both suspected and confirmed cases of the quarantinable diseases receive first attention. In some countries additional diseases are followed up, depending upon the availability of epidemiologically trained personnel. The particular diseases chosen for field investigations vary widely from country to country.

For some diseases field investigations of cases are performed by local personnel, such as public health nurses or sanitary inspectors, particularly when a standard form is to be completed, or prescribed specimens need to be collected in an established programme. Other

times more sophisticated field investigations by medical officers, epidemiologists or special consultants are necessary when a problem of diagnosis exists or an epidemic is feared.

When a disease is endemic at a moderate to high level of incidence, individual case investigation is not practicable. As various diseases come under effective public health control, the importance of this element of surveillance increases. As these diseases approach the state of eradication, intensive investigation of all reported cases, including suspects, becomes imperative.

(f) Epidemic field investigation

The occurrence of an epidemic calls for a more thorough investigation, often by a multi-professional team. The primary function of such a team is to support the local health authority with the skilled clinical, epidemiological and laboratory services that may not be available locally. Working with the full authority of the central health authorities such field teams can conduct investigations on a broad base, extending some times to neighbouring health jurisdictions, thus permitting a prompt and full determination of the extent of the problem.

(g) Epidemiological surveys

Epidemiological surveys have wide applicability to all countries, regardless of the state of their economic development. In developing areas with limited health facilities, carefully planned surveys for malaria, yaws, tuberculin sensitivity, or various antibody levels are essential preliminaries to sound health planning. Surveys help to measure progress and assess the effects of control programmes. In areas where eradication may have been attained or be impending, surveys are needed to assure that important gaps in the control programmes have not arisen.

Serological surveys may have particular application in developing areas as a method of detecting the first evidence of the existence of a specific infection. Surveys are applicable in all areas to determine immunity status and they are essential for the assessment of the results of immunization programmes and for measuring the duration of artificial immunity.

Other forms of survey also should be noted as valuable for surveillance purposes. These include cultures of the throat and of stool specimens for virus and bacterial agents, surveys of the prevalence of specific vectors and their possible resistance to insecticides. Post-mortem surveys have been useful for determining past prevalence of certain infections such as trichinosis, or sequelae from infections, for instance, rheumatic heart disease.

As most surveys are both expensive and technically demanding it is particularly important that they are mainly undertaken if the results can be immediately and directly translated into action.

(h) Animal reservoir and vector distribution studies

The surveillance of the many zoonoses and the arthropod-borne diseases requires the collection and evaluation of extensive data on animal reservoirs of infection and vectors. This element of surveillance emphasizes the necessity for maintaining the closest collaboration among epidemiologists, public health veterinarians, medical entomologists, and other public health biologists.

In addition to maintaining surveillance over the occurrence of zoonoses and the arthropod-borne diseases, the same techniques have broad application in the expanding economy of many developing countries. For example, when a dam is being constructed to expand irrigation and to develop agriculture, or industry in once virgin areas, it is only prudent for advanced planning to include careful studies of the potential disease problems

that may be encountered. Also, at a later stage in the development of such areas, intensive surveillance of serious acute infections is of prime importance because when the ecology of an area is disrupted by large projects, new problems, some of serious degree should be anticipated.

(i) Biologics and drug utilization

Some countries have found that records on the distribution and utilization of vaccines, immunoglobulins, and chemotherapeutic and prophylactic drugs, provide useful information. For example, a country embarking on a mass vaccination programme against measles or poliomyelitis can obtain a rough estimate of the success of the programme through the systematic collection of records on the distribution of the vaccine. It is also useful to monitor the frequency and distribution of drug resistant strains of infective agents, especially in view of the widespread misuse of drugs, such as broad spectrum antibiotic agents. The surveillance of adverse reactions to drugs is recognized as an important process in guiding chemotherapeutic policies.

(j) Demographic and environmental data

The surveillance epidemiologist must have access to the latest and most complete census and demographic information, in order to determine rates and trends of disease. These data should ideally include economic and sociological factors, such as the conditions of housing and crowding, the general status of sanitation, the levels of nutrition, the accessibility and methods of use of water and storage of food, meteorological and climatic data to mention only some.

2.3 The organization of epidemiological surveillance

The surveillance system can be broken down into a basic chain of events as follows: identification of sources of data - field observations[1] - data recording - data analysis and evaluation - formulation of recommendations for the decision making authority - dissemination of information to all those who are responsible for control action and to those who play an active role at the various levels of the surveillance system. Surveillance also implies the responsibility of following up to see that effective action has been taken.

To make this chain of events function as a continued process requires a structure. The surveillance structure in turn can take many forms and degrees of complexity, depending on the socio-economic conditions, including medical facilities and personnel, and it also depends on the number of specified diseases that are being brought under surveillance at any given time. In its simplest form the structure will be designed for the surveillance of a single infection, under conditions where the sources of information will be lay people or semi-skilled technicians, reporting on a regular basis to a co-ordinating and evaluating authority. In its most complex form the structure will support a highly sophisticated network of medical monitoring units, dealing concurrently with problems related to a large number of communicable diseases that are amenable to control.

Most countries have surveillance activities based on a structure that is somewhat in between these two extremes. Shortage of skilled personnel and laboratory services frequently hamper the development of effective surveillance. Not infrequently a more closely co-ordinated structure could be accomplished through a more rational use of already existing facilities. Better use of available data would also strengthen the efficiency of the surveillance operation.

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[1] "Field observations" here denote any data and information reported to a central unit for epidemiological evaluation, whether of clinical, laboratory or any other pertinent nature.

This includes the bringing together of data from a wide variety of sources - hospitals, clinics, mobile health teams, physicians, pathologists, veterinarians (including slaughterhouse reports), sanitary engineers, vector control units, rodent and pest controllers and statistical agencies - so that they can be evaluated by competent epidemiologists. Detailed arrangements for the functioning of a surveillance system is to a great extent determined by the nature of the disease or infection against which it is directed. Whatever the complexity of the surveillance structure, an assessment and evaluation mechanism for regular control of the reliability and efficiency of the system must be undertaken.

Another, and fundamental process in the application or adjustment of the basic chain of events to a structure that is suitable for a given socio-economic situation, is that of formulating a rational approach to priorities. Essentially, there are two kinds of priorities involved, namely, (1) to give priority to selected diseases, when warranted by limitations of funds, personnel and facilities and (2) giving priorities in the recommendations for control action. The first kind of priority will have to take into account not only the degree of severity of various endemic diseases and their incidence or prevalence, but also the probability of successful control action, taking into account locally available facilities. The second kind of priority has to do with a rational assessment, in terms of epidemiological cost benefit analysis, where there is a choice of more than one course of action for the control of a given disease. In many instances it would here be appropriate and relevant to make use of mathematical programming techniques to predict the outcome in relation to costs of more than one course of action under a given set of epidemiological premises. This analytical approach to formulating recommendations is particularly important in many of the developing countries today where meagre resources make it imperative to be cost conscious and above all, avoid mistakes at the decision making level.

Epidemiological surveillance lends itself to modern methods of operational research for its refinement to achieve optimum performance under a given set of conditions. Work in this area is essential to the further development of efficient surveillance at varying levels of socio-economic development.

During the Technical Discussions attention was focused on the problems which confront many developing countries which have not as yet achieved adequate coverage of their areas with medical services. There was some reservation about the feasibility of some of the surveillance techniques in areas of the world where the basic health services are poorly developed. These difficulties were recognized but were not considered to be insuperable. The essential requirement is that all countries should make the best use of available resources; they should introduce surveillance techniques into their existing health services; and they should incorporate these ideas into the planning of new health programmes. Under the pressure of great needs which are not matched by the available means, some health authorities have shown great ingenuity in exploiting to the fullest, the limited resources at their disposal. Examples have been given of the use of various types of auxiliary personnel in surveillance programmes, and the employment of voluntary workers in reporting cases of specific communicable diseases or epidemics. A simple survey of vaccination scars may give a valuable assessment of the coverage in a smallpox immunization programme. Reference was also made to the use of simple laboratory techniques such as microscopy in the surveillance of malaria and various other parasitic infections. In this way, simple but useful information may be obtained in remote areas in which elaborate laboratory facilities cannot be provided. The use of auxiliaries and lay personnel can be made more effective, if simple standard techniques, clinical and epidemiological, are available.

2.4 The dissemination of information

Whatever the level of the surveillance activity, certain general principles apply. Once adequate information is collected and evaluated, the health authority should disseminate all pertinent facts and conclusions to those who submitted the basic data, and to all others who have a need to know (the decision makers).

In large measure surveillance information in an appropriately interpreted form should be issued on a regular basis to the public. Knowledge of the current status and trends of communicable diseases is of wide interest. Regular news releases constitute not only a major responsibility of the health authority, but a valuable opportunity for health education. During an epidemic or outbreak, appropriate information should be given to the public so as to allay their anxieties and to ensure their co-operation with any measures, such as mass vaccination that may be required to deal with the situation.

The purpose of the dissemination of surveillance data at local national and international levels is to stimulate and guide control action. It is clear that at least two main types of communication are involved: one is professional and technical for the use of physicians and other health workers responsible for control; and the other is expressed in lay terms for the public.

2.5 International surveillance

The whole history of the quarantinable diseases and the development of the International Sanitary Regulations illustrate the use of some basic principles of what is now termed surveillance but, of course, these principles were in world-wide application long before this term was being used. Another predecessor of international surveillance is the World Influenza Programme.

International surveillance at the present time takes many forms varying from simple, information arrangements between two neighbouring states, to more formal bilateral or multilateral conventions, to continental, hemispheric and global co-operative efforts. A great variety of activities are undertaken, such as annual conferences on malaria eradication with participants from two or more countries, assistance from one country to another in phage typing of Vibrio cholerae, assistance in poliomyelitis serological surveys, joint field investigations of selected diseases, etc., in border areas. But the most common form of international surveillance consists of regular exchange of reports and information between two or more countries. Usually, such arrangements are limited to a few diseases of particular concern to the participating countries. These diseases frequently are the concern of geographical regions but further development of regional surveillance is needed. In the discussions, a case was made for co-ordinating some surveillance programmes through WHO regional offices. In South-East Asia, cholera, haemorrhagic fever and malaria are of common interest. In tropical Africa, cerebrospinal meningitis, yellow fever, and trypanosomiasis are of most concern. In Europe, salmonellosis, poliomyelitis and rabies have received most attention. In the western hemisphere a variety of disease problems, such as viral encephalitis, vampire bat rabies and Chagas' disease, have led to international surveillance activities. In the world at large there is widespread interest in, and concern about smallpox, influenza, poliomyelitis, venereal diseases and tuberculosis. There is growing recognition of the importance of measles, infectious hepatitis, and the arthropod-borne viral infections.

2.6 The role of WHO in surveillance

Global surveillance was initially limited to the six quarantinable diseases (plague, cholera, yellow fever, smallpox, typhus, and relapsing fever), an activity now governed by the International Sanitary Regulations under WHO's direction. In recent years, surveillance has been extended to several other diseases of international importance. The influenza virus is being continuously surveyed by a network of WHO influenza centres in all parts of the world to ensure that if a new virus type emerges it is detected as early as humanly possible. Following extensive mass treatment campaigns against the endemic treponematoses, the effect of these control programmes is being assessed through clinical and sero-epidemiological surveillance. Malaria is under continuous surveillance as part of the malaria eradication programme. Tuberculosis surveillance is done extensively through a series of WHO-assisted tuberculosis control programmes, through the organization of case

reporting and tuberculin testing among children. In three countries of Europe and in Canada, research into the methodology of surveillance of tuberculosis as a rapidly declining disease is assisted by WHO. WHO-assisted surveillance is at present being expanded to include internationally important diseases such as dengue and haemorrhagic fever in South-East Asia and the Western Pacific, and salmonellosis in Europe. Development of a new approach to the surveillance of wild-life rabies is being actively undertaken, at the same time as means are sought to stop the present spread of these diseases in central Europe.

WHO-assisted surveillance programmes are not limited to infections and their sequelae, and to non-communicable diseases. Considerable emphasis is also being given to surveillance of vector populations both with regard to their distribution (mapping), density, resistance to insecticides and ecological factors of importance to their ability to transmit infectious agents.

Many participants expressed the view that WHO should exert a leading role in promoting and co-ordinating epidemiological surveillance, both at the national and international level. Many suggestions were made regarding the nature of such WHO contributions, i.e. convening conferences and seminars, making experts available for consultation and advice, and providing supplies and equipment for field work. WHO, it was also suggested, might play a useful role in helping countries to plan and execute sero-epidemiological surveys. Perhaps the most important single function emphasized in the comments was for the Organization to receive, consolidate and disseminate epidemiological information. Quick dissemination of information by WHO might be achieved by the use of computer analysis.

Participants noted that many of these suggestions are in line with current activity within the Organization, and in order to develop a programme capable of meeting today's requirements in the development of efficient epidemiological surveillance both at the national and international level, and in the context of WHO headquarters and regional activities, an Epidemiological Surveillance unit was established in the Division of Communicable Diseases. Selected and internationally important diseases are studied and methodology developed for surveillance including multi-purpose serological surveys. The latter are being conducted in some countries of the world where morbidity reporting is weak, and where consequently little is known about the disease problems in both urban and rural areas. In addition to giving information about the kind of infections that occur, and the relative risk of the different kinds of infection, these sero-epidemiological surveys give important data on the proportion of susceptible people in the population as a basis for formulating economic vaccination programmes.

Surveillance activities concerning specific communicable diseases and their sequelae are carried out by all units in the Communicable Diseases' Division, the Vector Biology and Control Unit, as well as other relevant units in closest co-operation and co-ordination with the regional offices.

To assist in the sero-epidemiological aspects of the WHO surveillance programme, two serum reference banks have been created, one in the Institute of Epidemiology and Microbiology in Prague, Czechoslovakia, and the other at Yale University School of Medicine in New Haven, Connecticut, United States of America. The purpose of these banks is to assist in planning and implementation of immunological surveys, to receive and store sera and undertake or to arrange for examination of serum specimens at suitable laboratories in the field of immunology, human genetics, haematology, biochemistry and nutrition. The directors of these serum reference banks are working in close co-operation with the epidemiological surveillance of WHO.

It was stressed that perhaps the most important aspect of the future role of WHO in surveillance is to help governments in formulating a rational approach to a better utilization of existing facilities and resources. This would require the prior development of a suitable methodology to be tested in a variety of socio-economic and cultural situations. Essentially,

what is needed here is a systems-analysis geared to surveillance which would ensure that scarce facilities and resources are being put to optimum use. As mentioned earlier, another important aspect in the planning of efficient surveillance is an analytical approach to both the allocation of priorities and the formulation of recommendations.

Epidemiological emergencies are the concern of any surveillance system; indeed the very existence of an emergency must be discovered and defined by the system and appropriate recommendations prepared for the decision making authority. WHO's role here is twofold:

(1) to help deficient national surveillance systems to become reorientated and strengthened to a degree that permits it to deal adequately with an emergency situation;

(2) to maintain sufficient flexibility and resources, to permit the Organization to move into an epidemiological emergency with assistance appropriate to the situation, on the request of a government whose services are not yet adequate to cope with a sudden disease outbreak.

Quick and efficient dissemination of information plays a prominent part in WHO's surveillance programme and is accomplished primarily through the Weekly Epidemiological Record. A special aspect of dissemination of information, namely that of storing essential information in an easily retrievable form, is of considerable importance to international surveillance. A computerized epidemiological data bank which will greatly facilitate this service is under development. This data bank will serve a variety of purposes such as providing a pertinent epidemiological framework for assessment of disease outbreaks, for evaluation of data collected in sero-epidemiological studies, and for giving meaningful background information for day-to-day news of interest to epidemiological surveillance.

During the Technical Discussions, a number of informal suggestions were made about the future role of WHO in surveillance. These included:

(i) The expansion of the existing practice of disseminating current information through the Weekly Epidemiological Record, not only for the present six quarantinable diseases but also for influenza, poliomyelitis, malaria, venereal diseases and other diseases of international concern. In addition other more technical epidemiological and laboratory information should be distributed from time to time to the health authorities and scientists involved in surveillance activities.

(ii) The encouragement of bilateral, multilateral and regional co-operation in surveillance. Some surveillance programmes should be co-ordinated through WHO regional offices.

(iii) Support for the training of key personnel for surveillance.

(iv) Organization of international seminars and courses on surveillance.

(v) On request, the provision of international surveillance teams to deal with emergency situations.

(vi) Assistance in strengthening of epidemiological and laboratory services, including the development of standard techniques and the provision of diagnostic reference materials.

(vii) The full use of the system of WHO expert panels in dealing with the problem of epidemiological surveillance, and other general or specific epidemiological problems.

List of the Officers of the Technical Discussions

General Chairman:	Dr Adetokunbo O. Lucas, Professor of Preventive and Social Medicine, University of Ibadan, Ibadan, Nigeria
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	Dr A. C. Saenz, Virus Diseases Unit, WHO
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Rapporteur:	Professor A. Omar, President of the Public Health Institute, Afghanistan
Secretary:	Dr H. Mahler, Chief, Tuberculosis Unit, WHO
Group 2	
Chairman:	Dr P. N. Burgasov, Deputy Minister of Health of the USSR, USSR
Rapporteur:	Dr T. T. Dizon, Chief, Disease Intelligence Centre, Department of Health, Philippines
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Group 3	
Chairman:	Dr William H. Stewart, Surgeon General, Public Health Service, Department of Health, Education and Welfare United States of America
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Secretary:	Dr A. Rossi-Espagnet, Chief, Epidemiology of Communicable Diseases Unit, WHO

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Chairman:	Dr M. H. Hafezi, Professor of Public Health, Medical Faculty, Iran National University, Teheran, Iran
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Secretary:	Dr S. W. Bennett, Research in Epidemiology and Communications Science Unit, WHO

Group 6

Chairman:	Dr C. C. Nicholson, Chief Medical Officer, Guyana
Rapporteur:	Dr I. Z. E. Imam, Director, Virus Research Centre, Production Laboratories, Ministry of Health, United Arab Republic
Secretary:	Dr C. Göckel, Parasitic Diseases Unit, WHO

Group 7

Chairman:	Dr H. Ramamonjy-Ratrimo, Directeur technique des Services sanitaires et médicaux, Madagascar
Rapporteur:	Professeur R. Senault, Faculté de Médicine de l'Université de Nancy, France
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Group 8

Chairman:	Dr I. K. Kadama, Permanent Secretary, Chief Medical Officer, Ministry of Health, Uganda
Rapporteur:	Dr J. Spaander, Director General of the National Institute of Public Health, Utrecht, Netherlands
Secretary:	Dr D. A. Henderson, Smallpox Eradication Unit, WHO