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TECHNICAL DISCUSSIONS

DEVELOPMENT OF COMMUNICABLE DISEASE SURVEILLANCE IN THE REGION

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EXECUTIVE SUMMARY

Disease surveillance, particularly of communicable diseases, is perhaps one of the earliest strategies adopted in the 20th century for the purpose of control of the spread of disease; however the strategy never attained the level of development and support necessary to maximize its efficiency and effectiveness. A national disease surveillance system is a tool of information for decision-making and action. Communicable disease surveillance gained momentum with the development of surveillance for diseases targeted by eradication and elimination programmes. The Regional Committee for the Eastern Mediterranean has emphasized the need to strengthen disease surveillance, passing several resolutions on the topic in the past five years. Both WHO and countries have taken important steps to strengthen national surveillance systems.

Existing communicable disease surveillance systems have major limitations. There are evident inconsistencies in case definitions, over-reporting of some and under-reporting of most communicable disease occurrences, and incomplete information in the reporting from the periphery and remote areas. Management inadequacies, lack of coordination of programmatic surveillance and use of different criteria and formats within the health sector have resulted in major variations. At present health care providers outside the scope of ministries of health, such as academic institutions, the private sector, the military and nongovernmental organizations do not feel the need or the obligation to report to the national disease surveillance system. Surveillance data are not used consistently for the purposes for which they are intended, such as priority setting and resource allocation, while the lack of feedback from the central level to the reporting sources undermines the commitment to comprehensive information. Equally important is transparency, and consistency in reporting to the WHO regional and global systems.

Every country needs to develop an integrated and efficient national communicable disease surveillance system, building on the available systems and learning from the successes of vertical programmes. This requires long-term commitment from national authorities and establishment of national regulations for reporting of priority health events. Development starts with assessment of the current national surveillance systems to identify gaps and weaknesses, and setting of priorities according to agreed criteria that will include high impact diseases with epidemic potential and diseases subject to regional and global eradication and elimination targets. It also requires consensus on syndromic and clinical case definitions of the simplest form to facilitate objective reporting by the frontline health workers.

Surveillance systems require personnel to be trained in a variety of functions including analysis, interpretation and use of information. This also strengthens motivation and a sense of ownership and belonging to the activity. Laboratory support entails material resources, equipment and training to provide diagnostic evidence and quality assurance of the surveillance system. Development in communications technology facilitates the use of fast and inexpensive methods to transmit information to and feedback from the central level. Responses to observed changes in communicable diseases trends can then be made at each

level according to national policies and directives. To ensure a dynamic surveillance system, it is crucial to develop performance indicators that will uncover inadequacies in the system for immediate remedial action. Periodic review of the system will highlight its efficiencies and deficiencies and any need to change the priority accorded to diseases.

A functional communicable diseases surveillance system has great potential benefits at the national level. It provides data to monitor and assess trends of diseases over time, which is important for prevention and control. It provides a tool for priority setting and national planning since it provides evidence of the disease burden. It allows forecasting of imminent outbreaks and changes in disease epidemiology, and provides data for grassroots approaches in health care and applied research.

It is recommended that Member States and WHO take further steps to develop functional and comprehensive communicable disease surveillance systems, building on existing achievements and learning from the surveillance strategies of vertical programmes. Countries are urged to invest in short-term and medium-term field epidemiology training, and to strengthen national public health laboratory functions. It is important to involve all health care providers, including the private sector, in national surveillance. It is recommended that performance indicators are developed and that use of communications technology to ensure efficient data flow and feedback is maximized.

1. INTRODUCTION

An epidemiological surveillance system is an essential part of the health information system. It monitors priority health events that are known to be taking place in the population. This system is geared towards disease prevention and control for the population's well being.

Communicable diseases continue to be the most common cause of morbidity and mortality in the Eastern Mediterranean Region. The emergence of new infectious diseases and resurgence of major killer diseases, previously thought to be on the decline, such as malaria and pulmonary tuberculosis, calls for ever more vigilant surveillance. Despite their importance in terms of the overall disease burden, prevention and control of most communicable diseases is feasible through simple and cost-effective strategies. The development, implementation and monitoring of these strategies require epidemiological surveillance. An effective epidemiological surveillance system of communicable diseases needs strong commitment, partnership and cooperation between WHO and countries at national and international levels.

The World Health Assembly and the Eastern Mediterranean Regional Committee have, for a long time, recognized the importance of communicable disease surveillance as a core strategy for control and prevention of infectious diseases (Annex 1 and 2). At its Forty-third Session, the Regional Committee for the Eastern Mediterranean, reviewing the regional strategic plan in response to emerging and re-emerging diseases, urged Member States to continue to develop their national disease surveillance systems and strengthen the capability of their national human resources to respond to these diseases, and requested WHO to pursue the preparation of guidelines for the prevention, surveillance and control of emerging and re-emerging diseases (EM/RC43/R.14). At its Forty-fifth Session, discussing emerging and resurging diseases in the Eastern Mediterranean Region with special reference to malaria, the Regional Committee urged Member States to continue strengthening their epidemiological surveillance of infectious diseases and promote cooperation between neighbouring countries in surveillance of imported infectious diseases (EM/RC45/R.3). At its Forty-sixth Session, the Regional Committee, having discussed forecasting in communicable diseases, again urged Member States to continue to improve their disease surveillance systems, in accordance with the regional strategy for development and strengthening of epidemiological surveillance (EM/RC46/R.9).

Both WHO and the countries have made great strides with regard to implementing the Regional Committee resolutions and developing their surveillance systems.

- A manual of the recommended standards for surveillance of communicable diseases, developed by WHO headquarters, was updated and distributed to all countries as a guide to sound surveillance activities. It has been very useful in surveillance of priority diseases and in approaching the integrated surveillance of communicable diseases.

- The Regional Office developed a training manual on surveillance of communicable diseases, which was distributed to all countries and has been adapted by them for local use in conducting national training on communicable disease surveillance.

- Two intercountry meetings were held to discuss the development of communicable disease surveillance and a series of intercountry workshops were conducted for training of master trainers.

- Technical and material support was provided to countries for reviewing, developing and updating their national plans of communicable disease surveillance and national training activities and fellowships were supported. Review missions have worked with national authorities in several countries to assess and improve their surveillance systems. To date, most countries have reviewed and updated their national plan for communicable disease surveillance. Development of disease early warning systems gained momentum as well and systems are currently implemented in Pakistan and south Sudan.

- Efforts were made to strengthen capacity in laboratories and the main collaborating centres. In addition, national training workshops on laboratory procedures were held in several countries. Efforts were made to facilitate linkage in the laboratory network at regional and global levels. A network of 18 national laboratories was established for surveillance of drug- resistant pathogens. The causative agents of many outbreaks were determined and genomic typing carried out through the rapid transfer of the samples within and outside the Region.

- Support for laboratory-based sentinel surveillance of specific communicable diseases, such as viral haemorrhagic fevers (VHF), at the regional level was provided by regional collaborating centres such as the United States Naval and Medical Research Unit (NAMRU-3) in Cairo, and by international centres such as the Centers for Disease Prevention and Control (CDC), Atlanta, and the National Institute for Virology in South Africa.

2. DEFINITION AND PURPOSE OF SURVEILLANCE

Disease surveillance is defined by CDC as "the ongoing and systematic collection, analysis and interpretation of health data in the process of describing and monitoring a health event. The information is used for planning, implementing and evaluating public health interventions and programmes. Surveillance data are used to both determine the needs for public health action and to assess the effectiveness of programmes".

This definition simply means information for action. Surveillance systems are networks of people and activities that maintain this process, operating at different levels, and providing information for disease prevention and control and effective early response to emerging public health problems. There are various methods for collection of surveillance data. The commonest method is through the routine sending of health information comprising the daily events from the frontline health care units to the central level. Another method is through the use of sentinel surveillance sites to collect purpose-specific data on priority issues. Other methods include cross-sectional surveys, designed and implemented on sample populations, to fill in gaps in information pertaining to certain domains in health. Each of these methods has its strengths and

weaknesses and it might be necessary in special circumstances to use more than one to obtain comprehensive surveillance information.

The purpose of surveillance systems is generally to provide descriptive information regarding basic epidemiological parameters, such as person, place and time. The primary objective is to monitor the occurrence of disease over time within specific populations and localities, permitting the computation of incidence, prevalence and trends. Surveillance data is used to identify high-risk groups and describe health problems including manifestations, severity and nature of etiologic agents.

A functional disease surveillance system provides information for action; it is a crucial instrument for public health decision-making. Effective communicable disease control relies on efficient intervention which, in turn, relies on effective disease surveillance. Surveillance data provide information for priority-setting, policy decisions, planning, implementation and evaluation. It is a tool for prediction and early detection of epidemics. A surveillance system is also used for monitoring, evaluation and improvement of disease prevention and control programmes. Surveillance is, therefore, not an end in itself but a tool for optimizing the use of resources to protect public health through health care delivery, using the most cost-effective health strategies.

3. PAST AND PRESENT EXPERIENCE

The concept of surveillance has been shaped by an evolution in the way health information has been gathered and used to guide public health practice. Surveillance activities have developed in a way that reflects the particular history of infectious diseases threats and the response to their occurrence, reflecting the importance given by individual countries to public health in general, and the efforts to prevent and control communicable diseases in particular. The occurrence of epidemics and outbreaks of infectious diseases triggered the initiation and strengthening of surveillance of specific diseases in particular, and communicable diseases in general. This also led to refinements in the methods of reporting in response to specific information needs.

Surveillance of communicable diseases has continued to gain momentum in all countries. Its value and importance to public health programme planning, monitoring and evaluation has become increasingly evident. Global disease eradication and elimination programmes, such as those for eradication of poliomyelitis and elimination of measles have contributed to further improvements in reporting, particularly as certification of the achievement of eradication relies essentially on well functioning systems of surveillance. However, while establishing surveillance activities within vertical programmes has allowed the surveillance and control functions to remain closely linked, the overall surveillance function in a country is often dis-jointed and uncoordinated, with field workers participating in numerous complex systems which use different methodologies, terminology, reporting frequencies and forms.

The countries of the Eastern Mediterranean Region, similar to countries in other regions, have demonstrated repeatedly their ability to meet global challenges to monitor diseases targeted

for elimination and eradication, through intricate surveillance systems. During the global smallpox eradication campaign, even the countries with the most difficult terrain and almost non-existent peripheral health care systems managed to report the occurrence of smallpox within 24 hours. For the past 5 years, countries of the Region have reported monthly, and for the last 2 years weekly, on the occurrence of acute flaccid paralysis and confirmed cases of poliomyelitis. In order to provide feedback and maintain interest, the Regional Office developed *Polio fax*, which is despatched weekly to all ministries of health, national officers responsible for poliomyelitis eradication activities and the members of the regional and global certification commissions, as well as many other interested and involved partners.

Similar success is being witnessed in the vigilant reporting of implementation of the strategy of directly observed treatment, short-course (DOTS) for control of tuberculosis, of HIV/AIDS and of dracunculiasis, sometimes despite difficult situations on the ground. These successes indicate the potential that can be tapped and built upon to gain that extra mile for surveillance of other priority health problems.

4. LIMITATIONS OF CURRENT SURVEILLANCE SYSTEMS

Despite all these efforts, existing communicable disease surveillance systems have crippling limitations that need to be critically reviewed in several countries. There are evident inconsistencies in case definitions, under-reporting of most and over-reporting of a few communicable disease occurrences, and incomplete information in the reporting, especially from the periphery and remote areas. In addition, management inadequacies, lack of coordination of programmatic surveillance and use of different criteria and formats within the health sector have resulted in major variations. Other important limitations include lack of understanding of the processes and purposes of surveillance, particularly when generated information is not used for action, and lack of feedback to the reporting sources.

a) Inconsistent case definition

Ambiguity and inconsistency in case definitions result in incomplete and inaccurate reporting. For example, inconsistency in the case definition used for diagnosing cholera at the different levels of the surveillance system results in misclassification of cholera cases as childhood diarrhoea. The opposite also holds true, resulting in over-reporting of the actual events. These problems are more apparent in outbreaks as they may result in delayed or unnecessary response. Inconsistency in case definitions at the different levels of surveillance within a country, and between countries, distorts the data and limits comparability of the incidence of the diseases. Lack of consensus on case definitions, especially between physicians and paramedical frontline workers has been difficult to resolve. This issue is further complicated by the lack or inadequacy of laboratory support and standardized confirmatory tests.

b) Reporting inadequacies

Ideally all cases should be identified and reported. If they are not, the figures will underestimate the actual level of the disease. More cases being reported than actually occur will

lead to an overestimate of the threat. Surveillance data is often incomplete or unrepresentative or, even more seriously, is not reported at all, especially from remote areas and the private sector. Inadequate reporting by private practitioners may be due to concern to ensure patient confidentiality, fear of loss of clients, or hiding the real number of clients for taxation reasons.

c) Inadequate coordination between various sources

National surveillance data on infectious diseases is usually collected by programmes under different authorities, including the ministry of health, the ministry of education (school health) and the ministry of defence (military hospitals and services). In addition, academic or research institutes may conduct but not report specific surveillance activities, while the private sector usually does not report to the national health authorities anyway. Nongovernmental organizations may also run their own surveillance systems in their area of interest. Within the health sector, multiple surveillance systems may operate in parallel, with complete independence. As such, it is difficult for national health authorities to capture the national patterns of disease distribution and trends.

d) Inadequate utilization of surveillance data

The ongoing analysis of the collected data at all levels of the surveillance system is crucial for timely response. Unfortunately, in many cases data are just collected without any analysis taking place. The surveillance system becomes driven by the need to collect and move data, while scant attention is given to using the data at each level of the health service for decision-making. In some situations, surveillance data are collected on a number of health events which do not represent priorities for the country. In other situations, surveillance for particular health events has been developed by academic or research institutes that have very specific information needs. In other words, the surveillance function is far removed from any corresponding action such as disease control efforts, outbreak response, health resource allocation or national health policy.

e) Feedback inadequacy

There should be feedback loops between the different reporting levels to emphasize the importance of reporting, motivate timely reporting and encourage continuity. However, feedback to the data collectors is rarely provided. In addition, the central level all too often criticizes the periphery for insufficient reporting, while itself not being geared up to quick analysis and response to information coming from the periphery. This always has a negative impact on the frontline health workers.

5. DEVELOPMENT OF A COMPREHENSIVE SURVEILLANCE SYSTEM

5.1 Rationale

The current limitations and weaknesses of communicable disease surveillance in the Region justify the emphasis placed on the need for further and urgent development of national

systems. Such development will require renewed political commitment at the highest level, allocation of resources, capacity-building, streamlining of data sources and building of alliances with partners.

National authorities must make a long-term commitment in order to sustain surveillance of communicable diseases. Political decisions are needed to establish the necessary regulations for reporting of priority health events at national level. Surveillance systems, particularly of communicable diseases, will fragment very quickly, and perhaps disintegrate, without strong political support and legislation.

Disease surveillance requires investment of resources to support capacity-building, particularly in field epidemiology training, to strengthen laboratory support and to strengthen communication. Short-term, inconsistent or partial investment will result in weak and unsustainable systems and inefficiency. The surveillance system should take into account the achievements already made to support specific control, elimination or eradication programmes, and transform these time-limited efforts into a long-term undertaking, capitalizing on special efforts, such as the global poliomyelitis eradication programme.

Partnership with development agencies (whether international, governmental or non-governmental) is essential to improve national disease surveillance systems. This is particularly true in the context of health sector reform initiatives and other development projects. The sources of data on priority diseases must include all health care facilities and providers in the country. Even if ministries of health are the main providers of health care, there are usually several sectors of the community that are catered for by other systems, for example, the military services, academic institutions and sometimes ministries of education. The private sector is gaining momentum as a large stake-holder in health care delivery. In certain situations nongovernmental organizations are the sole caretakers of disadvantaged communities. All of these must be convinced of the need to submit data to the national health authorities on the occurrence of specific priority diseases that are subject to national surveillance, on a regular basis, and they must be obliged to do so by law. Failure to report prevents the national health authority from being informed about large sectors of the population and results in serious incompleteness of the surveillance data.

5.2 Development of a national plan with a multisectoral approach

5.2.1 General

The regional plan on emerging and re-emerging diseases (WHO-EM/CDS/049/E/G) outlines the components of a national plan for communicable disease surveillance. The following sections emphasize the importance of certain critical issues. All forms of epidemiological surveillance require a balance to be established between the information needed and the limits on the feasibility of data collection and management, resulting in some compromises in data quantity and quality depending on how sophisticated the system is.

The development of national surveillance begins with a systematic assessment of the various surveillance systems currently in operation within a country and review of current

surveillance activities against what is needed. This assessment aims to identify gaps and develop or update a national plan so that the national surveillance and response system is improved overall.

5.2.2 Assessment and priority setting

The national health authorities, together with the various health care providers, should establish a list of priority diseases for surveillance, taking into consideration the disease epidemiology, the capacity of the reporting level, the national resources available to support surveillance and the regional and global priorities. Certain diseases will be designated as "notifiable", meaning that, by law, their occurrence must be reported. Regulations are set with regard to determining the time of reporting, type of analysis and type of action to be taken at each level of the health system. The list of priority diseases in each country must include diseases that have a high impact (morbidity, disability, mortality); diseases that have a significant epidemic potential (e.g. cholera, meningitis, measles); and diseases that are the specific targets of national, regional or international control programmes (e.g. poliomyelitis, leprosy, yellow fever, plague). Because of the changing pattern of infectious diseases and the emergence of new threats, countries need to assess regularly the target diseases of their overall surveillance and disease priorities.

5.2.3 Setting standard case definitions

The case definition is a fundamental step in the development of the surveillance system, balancing competing needs of sensitivity, specificity and feasibility. The case definitions for the selected diseases must be clear, appropriate and consistent throughout the surveillance system and the terminology should be agreed upon by all partners in the surveillance activities. The role of the laboratory in confirming cases should be well defined and standardized. The syndromic approach can be applied in areas where rapid laboratory diagnosis cannot be obtained (such as at the periphery of many health systems). Although lacking in specificity, the syndromic approach offers a simple and stable case definition which is fairly reliable, immediate reporting, a wider surveillance coverage and, in some cases, the avoidance of disease-associated stigma. The syndromic approach, for example, is used successfully by the poliomyelitis eradication programme, which collects data on acute flaccid paralysis (AFP) caused by several infectious or non-infectious diseases and takes action accordingly.

5.2.4 Investing in training and supervision

Experience has shown that the human resources at all levels are the most valuable part of the surveillance system. It is crucial that the personnel involved in surveillance activities are trained for their surveillance tasks, with ongoing in-service training at all levels followed by close supervision in the field. In an integrated multi-disease approach, field epidemiology training will provide general surveillance and response skills that can be applied almost anywhere in the system and for any disease surveillance and response needs. Short-term and medium-term training courses in field epidemiology should be available in all countries.

Human resources capacity-building in laboratory work must receive due attention. Training in laboratory techniques should also take an integrated multi-disease approach where the same or a similar technique (e.g. microscopy, serological assay) is used to diagnose various diseases. The integrated approach to training should also encourage basic laboratory training for epidemiologists and some epidemiology training for laboratory technicians, in order to ensure that both groups understand each other's needs and approach to surveillance.

5.2.5 Collection and analysis of surveillance data

A common problem with many surveillance systems is that they attempt to collect comprehensive information on all diseases, leaving little time and capacity to analyse the data and undertake timely response to abort outbreaks or reduce the burden of disease. Nevertheless, a minimum set of data should be collected, analysed and acted upon at each level of the health services, peripheral, intermediate and central.

The first level of contact of individuals from the community with the health care provider could be the peripheral health unit, the primary health care centre, the hospital outpatient department or the private clinic. The first objective of these facilities is management of the problem; epidemiological surveillance is secondary and only one of many other tasks requested from them. Staff at such facilities usually have little or no epidemiological training and may see the recording and reporting of information as an added burden. Innovative methods must be developed to raise their interest in this particular aspect of their mandate, such as periodic in-service training, involvement in elementary analysis of the data, and feedback to reflect the value of their contribution in the surveillance system. Peripheral level health workers should be able to make simple tables and charts of certain components of their data on easily recognizable priority diseases and syndromes to monitor local trends.

The second (intermediate) level of communicable disease surveillance is responsible for analysis of the information and recognition of unusual occurrence of outbreaks and changes in disease trends. Laboratory confirmation, investigation, verification and timely intervention to control outbreaks is the responsibility of this level, which should also provide training, supervision and feedback to the first level. Frequent review of the peripheral surveillance system through performance parameters will provide oversight and quality assurance.

At the central (national or federal) level, aggregated information is collected from the district or provincial sources. The national picture of the patterns and trends of communicable diseases is formed. The central level provides high level epidemiological skills and more sophisticated laboratory support and allocates resources needed that are beyond the means of the peripheral units, particularly in outbreaks of national importance and targeted high-risk areas. The central level liaises with other countries, international agencies and WHO in response to epidemics of global significance and diseases subject to the International Health Regulations.

Whatever structure the surveillance system may have, it should ensure the smooth and regular flow of information on priority diseases and syndromes from the peripheral to the central level and analysis, feedback and timely response in reciprocation. It is essential that feedback is built into the surveillance system through a regular epidemiological bulletin or dissemination of

simple tables and graphs showing trends of diseases, progress towards targets and reports on investigation and control of outbreaks so that the partners and providers of the information can see the impact of their surveillance efforts.

5.2.6 Improving communication and collaboration

Communication and information exchange between the different partners at different levels of the surveillance system is essential to ensure a high degree of coordination and cooperation. The level of coordination can affect the performance and sustainability of the system, especially among the health care providers, public or private, who constitute the surveillance frontline. More attention should be given to information obtained from sources other than the public health sector, including nongovernmental organizations and the media, particularly when dealing with rumours of communicable diseases with epidemic potential. The capacity of public health authorities to respond rapidly to outbreak-related information from any source is essential for the efficiency and credibility of the entire surveillance effort. The recently developed WHO Outbreak Verification List (OVL) has rapidly gained momentum and is now serving all countries with total transparency about epidemic occurrence. It has triggered outbreak investigations that have either confirmed occurrence or otherwise relieved public concern.

5.2.7 Performance indicators

It is essential to develop indicators to assess performance of the surveillance system. This activity should be tailored to measure performance and compliance at each level of the surveillance system. Examples of indicators to measure performance of the surveillance system include: regularity of reporting of surveillance data, including zero reporting; completeness and timeliness of collection of epidemiological data; readiness for intervention and response; feedback to the data source; national laboratory performance and quality assurance of confirmatory diagnoses; response; and reporting to WHO.

6. INTEGRATED SURVEILLANCE OF COMMUNICABLE DISEASE

The theme of an integrated approach to communicable disease surveillance is the streamlining of all surveillance activities in a country within a common system which carries out many functions using similar structures, processes and personnel. The surveillance activities that are well developed in one area may act as driving forces for strengthening other surveillance activities. The coordination of communicable diseases surveillance activities in one system minimizes their cost, improves the overall efficiency of the national surveillance system, reduces the burden on the data sources and narrows the focus onto priorities of public health concern.

a) National level

All functional surveillance systems require similar core activities (case detection, reporting, investigation, confirmation, analysis, interpretation and action) and support functions

(surveillance standards, epidemiology training, supervision, geographical mapping, communications, laboratory support and financial resources). It is thus possible to develop an approach that takes into consideration all core activities and support functions, in order to strengthen the national surveillance system through coordination, prioritization and streamlining of all surveillance activities.

Dialogue and consensus must be reached between the concerned parties on the list of priority diseases to be included in the integrated surveillance system, recognizing the special needs of some programmes for supplementary information and alternative methods of surveillance. A national coordinating body should be designated, with the authority to shift priorities and resources according to new challenges and needs and develop and monitor norms and standards of the surveillance system.

b) Regional and global levels

Coordination between national surveillance systems is required for regional prioritization, standardization and the strengthening of integrated multi-disease epidemiological and laboratory capacity-building. Specific regional capacity may be needed, such as regional reference laboratories, regional epidemic response teams and regional stocks of supplies (e.g. vaccine and drug storage). Electronic reporting of surveillance data is increasingly common, using electronic databases. Data can be analysed more easily and rapidly and when geographical information is available, it can be linked to geographical information systems (GIS) technology. The joint WHO–UNICEF Health Map project, initially developed and successfully used by the programme for eradication of dracunculiasis, has evolved into a multi-disease tool for data collection, mapping and geographical analysis. The dissemination of surveillance data and their presentation to a wider audience, as well as internal feedback, are now available through inexpensive electronic media. A recently developed activity that is gaining momentum in the Regional Office is the monthly reporting of the weekly occurrence of meningitis and cholera/epidemic diarrhoea by the Member States. The aggregated data is disseminated by the Regional Office to all countries, WHO headquarters and other concerned partners. So far, six countries have been responding regularly.

At the global level there is need to coordinate communicable disease surveillance and response activities due to the increasing risk of global transmission. Surveillance standards for communicable diseases are recommended by WHO to support the analysis of surveillance data through common terminology, case definitions and surveillance methods. The integrated multidisease approach to assessment of the national surveillance system may be based on the WHO protocol developed and field-tested in several countries. More specific multi-disease assessment guidelines have also been developed by WHO for vaccine-preventable diseases and are under development for antimicrobial resistance surveillance.

7. UTILIZATION OF SURVEILLANCE DATA

The primary objective of communicable disease surveillance is to monitor the incidence or the prevalence of specific health problems, to document their impact in defined populations and

to characterize affected individuals and those at high risk. It is inherent by definition that surveillance, in health or other wise, is designed for the purpose of action, without which it becomes a futile exercise and waste of time and resources.

a) Monitoring and trend assessment

Communicable disease surveillance data provides information about the trends over time by geographical localities and population characteristics, two important factors for control and prevention activities. Analysis and interpretation for these purposes can be undertaken even at intermediate and peripheral levels, for early detection of a changing trend. It provides the evidence base for national control and prevention programmes through monitoring the behaviour of specific risk factors associated with infectious disease occurrence.

b) Planning, priority setting and resource mobilization

Political considerations are often the driving force governing the distribution of the limited resources between the health care priorities, and more importantly allocations to health within the overall government budget. National authorities should make use of surveillance data to set priorities in health care planning and to allocate resources according to the different demands of the health services. Sample surveys and sentinel sites reports are frequently used in situation analyses for planning. However, there is evidence that national disease surveillance data provide stable and consistent information for planning and decision-making which is less subject to the bias and limitations of the other two.

c) Forecasting

Forecasting is the process by which future events can be predicted. It has been used to predict epidemics, to project incidence and mortality of specific diseases, to select the most cost-effective intervention strategy and to design control programmes. Forecasting necessitates the availability of historical data and the accuracy of such data, proper understanding of the causes of changes in patterns of communicable diseases in the past and determination of the factors that might effect changes in this pattern in the future.

The availability of accurate and complete disease surveillance data is a prerequisite for a meaningful forecast. The inter-relation between the availability of the surveillance data and the process of forecasting can be visualized as a four-fold table describing the situation of presence or absence of surveillance and forecasting (Figure 1). Countries with functional disease surveillance systems have information for action and decision-making. They have vision when such data is used to predict and plan for the future. These countries have a mission to undertake if they have not maximized the benefit from surveillance data for forecasting. However, attempts at forecasting and planning for the future without surveillance data is like dreaming and the absence of both is total confusion.

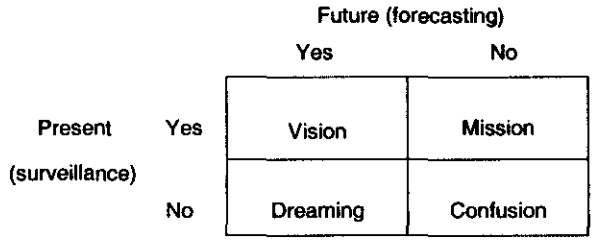

Figure 1. Forecasting and surveillance information paradigm

d) Research

National disease surveillance data is a rich source of information for research, particularly in areas where sample survey and sentinel sites data are not sufficient. Routine surveillance data provide better representation, especially at community and first level of contact with frontline workers, and are particularly useful for exploring grass-roots approaches in health care, evaluating the impact of national intervention strategies and testing innovative community approaches to disease control and prevention.

Surveillance data of this type might be used in research to measure rare occurrences which require large data sets, such as morbidity and mortality of less common diseases, to assess burden of diseases and to determine cost-effectiveness of control interventions on a national scale.

8. CONCLUSIONS

Disease surveillance is a core strategy in the drive to control and prevent the occurrence of ill health and reduce the burden of disease. Communicable disease surveillance is a tool for evidence-based priority setting and national planning. It provides data for the assessment of disease trends over time and forecasting of epidemics for early preparedness and response. In the past few years, countries have taken several steps to strengthen surveillance but further steps are now needed to develop functional and comprehensive national communicable disease surveillance systems.

The continuing high burden of communicable diseases, the emergence and resurgence of pathogens and epidemic-prone infections, the increasing trend of antimicrobial drug resistance and the cost-effectiveness and feasibility of control strategies strengthen the rationale for improved surveillance. The current inadequacies in feedback and relatively limited transparency within and between countries must be remedied. Innovative ways to encourage the reporting from the private sector and other government institutions and authorities must be sought. Countries are urged to invest in human capacity-building through epidemiology training and laboratory strengthening. The use of performance indicators will facilitate identification of weaknesses and complacency.

9. RECOMMENDATIONS

It is recommended that Member States:

- View the development of disease surveillance as a core component of health systems development and an essential tool in designing and monitoring health sector reform activities;
- Build on the positive achievements of existing surveillance systems and particularly learn from and adapt the successful surveillance strategies of the vertical eradication/elimination programmes;
- Review and update the existing public health legislation to strengthen compliance of all health care providers;
- Invest in and make resources available for implementation of medium-term and short-term field epidemiology training and strengthen public health laboratory capacity;
- Ensure involvement of all health care providers, including other government institutions, the private sector and nongovernmental organizations in the development of a national communicable disease surveillance system that truly represents the national priorities;
- Seek innovative ways to encourage the private sector to report priority communicable diseases to the national surveillance systems;
- Ensure greater transparency in reporting communicable disease surveillance data to WHO and between countries;
- Develop training modules on epidemiological surveillance and include such training in curricula for health professionals;
- Encourage multilevel analysis and interpretation of surveillance data to ensure timely local response and support to peripheral reporting sites;
- Maximize the use of technology and communications facilities to ensure efficient flow of data and feedback mechanisms;
- Develop performance indicators that will facilitate monitoring of the surveillance system and undertake remedial action on noncompliance;
- Gradually broaden the approach for surveillance of communicable diseases to include issues related to noncommunicable diseases surveillance.

It is recommended that WHO:

- Play an advocacy role to increase awareness about disease surveillance systems, and develop user-friendly material in this field;

- Report periodically to Ministers of Health on communicable diseases, providing regional epidemiological figures and trends;

- Facilitate exchange of information between countries of the Region;

- Identify and strengthen collaborative work with regional reference laboratories and disseminate information on these to all Member States;

- Take appropriate steps to introduce the integrated communicable disease surveillance approach and its application in the Region.

Annex 1

RESOLUTIONS OF THE WORLD HEALTH ASSEMBLY CONCERNING COMMUNICABLE DISEASE SURVEILLANCE

Resolution WHA22.47(1969):

Requested the Director-General to assist Member States in utilizing their existing services to perform epidemiological surveillance as effectively as possible.

Resolution WHA41.28(1988):

Declared the commitment of WHO to the global eradication of poliomyelitis by the year 2000 and urged all Member States to intensify surveillance to ensure prompt identification and investigation of cases of poliomyelitis and control of outbreaks and accurate and timely reporting of cases at national and international levels.

Resolution WHA48.13(1995):

- Urged Member States to strengthen national and local programmes of active surveillance for infectious diseases, ensuring that efforts are directed to early detection of outbreaks and prompt identification of new, emerging and re-emerging diseases.

- Requested the Director General to draw up plans for improved national and international surveillance of infectious diseases and their causative agents, including accurate laboratory diagnosis and prompt dissemination of case definition, surveillance information, and to coordinate their implementation among interested Member States, agencies and other groups.

Annex 2

RESOLUTIONS OF THE REGIONAL COMMITTEE FOR THE EASTERN MEDITERRANEAN CONCERNING COMMUNICABLE DISEASE SURVEILLANCE

Resolution EM/RC43/R.14(1996): Regional Strategic Plan in Response to Emerging and Re-emerging Diseases

Urged Member States to:

- Continue to develop their national disease surveillance systems to ensure early detection of emerging and re-emerging diseases;
- Develop national plans for surveillance and response to these diseases;
- Develop and strengthen the capability of national human resources to respond to these diseases;
- Exchange information on these diseases between themselves and with WHO;
- Support research on these diseases including research that focuses on the economic burden that arises from them;

Requested the Regional Director to:

- Assist countries in the preparation and implementation of national plans;
- Strengthen the role of regional WHO collaborating centres in this field and prepare a list of these centres to distribute to Member States;
- Pursue the preparation of guidelines for the prevention, surveillance and control of these diseases.

Resolution EM/RC45/R.3(1998): Emerging and Resurging Diseases in the Eastern Mediterranean Region with Special Reference to Malaria

Urged Member States to:

- Continue strengthening their epidemiological surveillance of infectious diseases and their capabilities to respond to emergence of these diseases in line with the regional plan on emerging and re-emerging diseases;

- Promote cooperation with neighbouring countries in surveillance and prevention and control of imported infectious diseases;

- Promote applied research related to emerging infectious diseases including malaria.

Resolution EM/RC46/R.9(1999): Forecasting in Communicable Diseases

Urged Member States to:

- Continue to improve their disease surveillance systems in accordance with the regional strategy for development and strengthening of epidemiological surveillance;

- Introduce the concept of forecasting for priority communicable diseases and strengthen their capabilities in this regard.

Requested the Regional Director to take the necessary measures to support Member States in their efforts to introduce forecasting in their communicable diseases control activities.

BIBLIOGRAPHY

1. *Recommended surveillance standards.* Geneva, World Health Organization, 1999.

2. An integrated approach to disease surveillance. *Weekly epidemiological record,* 2000, 75:1–7.

3. *Regional plan on emerging and re-emerging diseases.* Alexandria, World Health Organization Regional Office for the Eastern Mediterranean, 1997 (unpublished document WHO-EM/CDS/049/E/G).

4. *Surveillance of communicable diseases: a training manual.* World Health Organization Regional Office for the Eastern Mediterranean, 1998 (unpublished document WHO-EM/CDS/052/E/G).

5. Forecasting in communicable diseases. Paper presented to the Forty-sixth Session of the Regional Committee for the Eastern Mediterranean, 1999 (EM/RC46/14).

6. Buehler J. Surveillance. In: Rothman K, Greenland S. *Modern epidemiology* (2nd edition), Philadelphia, Lippincott-Raven, 1998.

7. Last JM. *A dictionary of epidemiology.* Oxford, Oxford University Press, 1995.