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CHANGING PATTERNS OF DISEASES AND THEIR IMPACT
ON WHO COLLABORATIVE PROGRAMMES

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INTRODUCTION

The change in the pattern of diseases and the general shift from acute infectious and deficiency diseases characteristic of underdevelopment, to chronic noncommunicable diseases characteristic of modernization and advanced levels of development, are usually referred to as the "Epidemiologic transition". The most evident indicators of this transition are the changes in the pattern of mortality, particularly in relation to the cause of death as well as changes in morbidity. These changes require a change in support of national authorities to the emerging problems and in the WHO collaborative programmes in response to national efforts.

In addition to discussing this epidemiologic transition and the factors contributing to it, this paper will also cover the changes in the patterns of the organized response to health conditions by both national authorities and WHO.

PART 1. THE EPIDEMIOLOGIC TRANSITION

In the past it was thought that the epidemiologic transition i.e. the shift from infectious and deficiency diseases to chronic noncommunicable diseases was an uni-directional process taking place during a time interval beginning when infectious diseases were predominant and ending when noncommunicable diseases dominated the causes of death. It has, however, become apparent that this transition is more complex and dynamic where the health and disease patterns of a society evolve in diverse ways as a result of demographic, socioeconomic, technological, cultural, environmental and biological changes. It is rather a continuous transformation process with some diseases disappearing and others appearing or re-emerging. This also indicates that such a process is not uni-directional. In fact, a reversal of the trend sometimes occurs. There are some outstanding examples such as the emergence of new infectious diseases such as AIDS and the relapses of infections that were previously controlled, such as tuberculosis and dengue fever.

It is also important to note that several stages of transition may overlap in the same country, e.g., the decline in infectious diseases may be slow or stagnant among some sectors of the population while non-communicable diseases may be increasing rapidly in another sector of the same population. This is still happening in many societies of our region where the low socioeconomic sectors have a high incidence of infectious diseases among children while the upper socioeconomic sector shows a completely different pattern of illness.

MECHANISMS INVOLVED IN THE EPIDEMIOLOGIC TRANSITION

There are several factors involved in the epidemiologic transition, the most important of which are:

1. Demographic changes

Demographic change is a composite of changes in both mortality and fertility. The first demographic change that usually occurs is the reduction in mortality particularly in infants and young children, before a change begins to occur in fertility. Therefore, a large number of young people will survive. They will reach adulthood and will have the disease patterns of adults, with noncommunicable diseases at the top of list. In future they will also be exposed to diseases that more frequently affect elderly people, such as cancer and cardiovascular diseases. Thus, even with the constant age-specific incidence rates of noncommunicable diseases, the absolute number of cases and deaths from these diseases increases substantially with the above-mentioned demographic change.

Table 1 and Figure 1 show the pattern of the crude death rate over the past twenty years. It is clear that the crude death rate has decreased from 17.4/1000 in the early 1970s to 10.2/1000 in the early 1990s.

The infant mortality rate - that is, mortality during the first year of life - has decreased to half its value in the last 20 years, from 136/1000 live births in the early 1970s to only 68.6/1000 live births in 1993. As shown in Table 2 and Figure 2, the pattern of decrease was sharper in the early part of this period and the decrease is now at a much lower rate.

Table 3 and Figure 3 show that the crude birth rate (as an indicator of fertility) did not start to show a significant decrease until recently; an observation which proves that the decrease in fertility follows the change in mortality, particularly in infants and young children.

As life expectancy increases, the number of elderly will increase. This will lead to changes in disease patterns and problems characteristic of the elderly and eventually the total number of deaths will increase as a result of the new age structure.

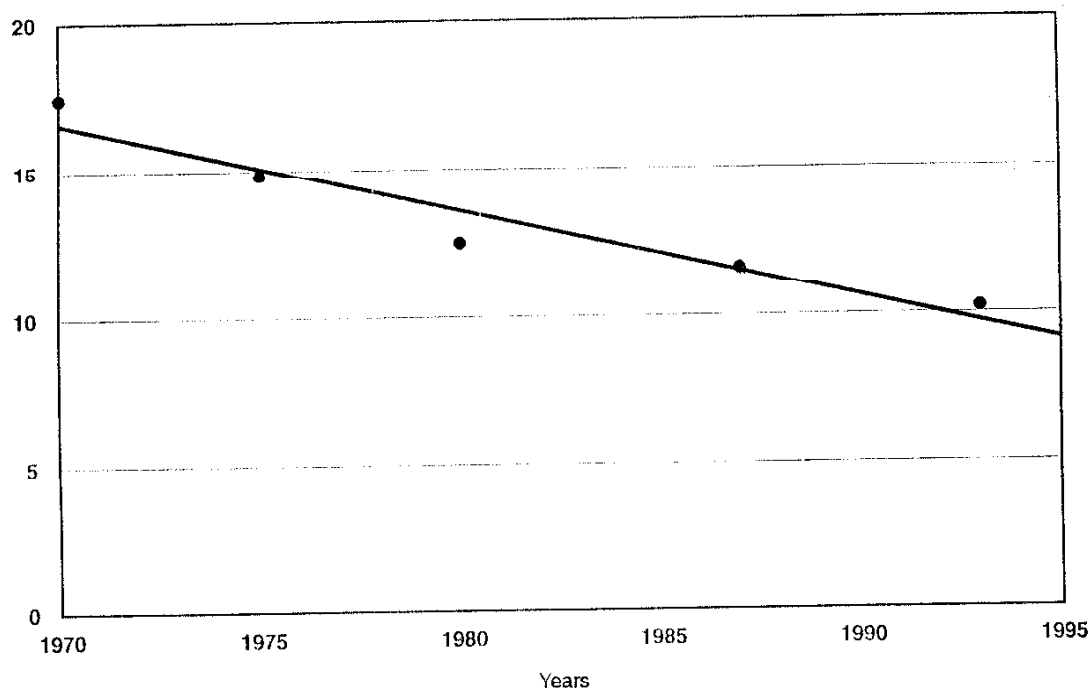
2. Changes in risk factors

The risk factors involved in the epidemiologic transition include biological factors (microorganisms), environmental factors, social, cultural and behavioural factors and the practices of modern medicine.

**Table 1. Trend of the crude death rate for countries in
the Eastern Mediterranean Region
(1970-1993)**

Period	Crude death rate/1000 population
1970	17.4
1975	14.8
1980	12.5
1985-1989	11.6
Latest available 1993	10.2

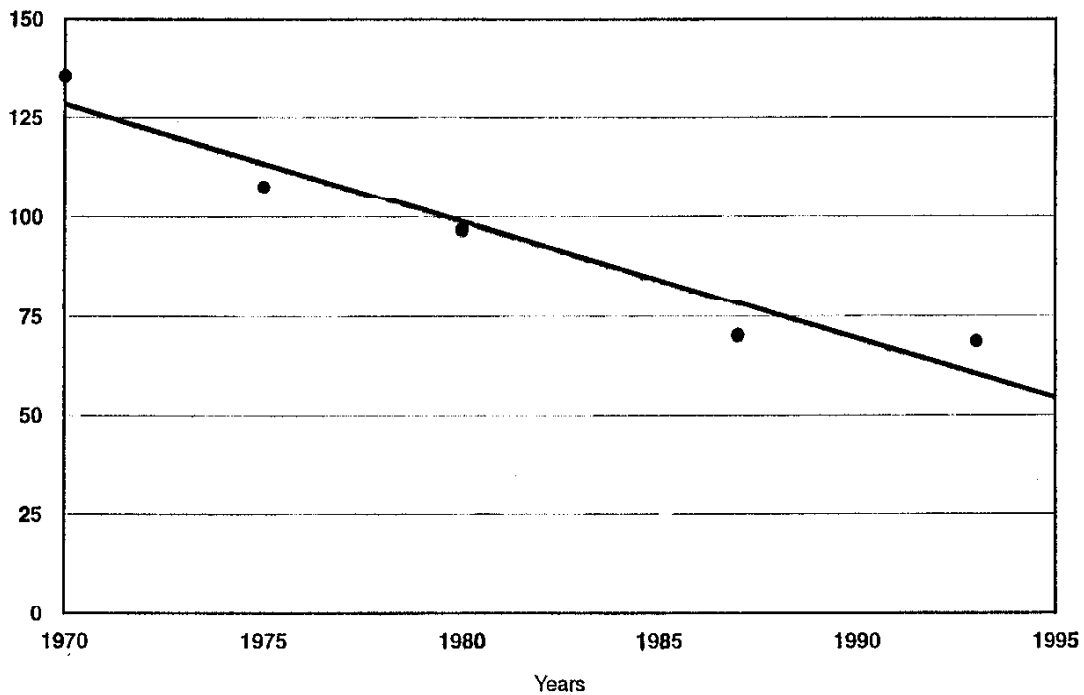
**Figure 1. Trend of the crude death rate for countries in
the Eastern Mediterranean Region
(1970-1993)**



**Table 2. Trend of infant mortality rate for countries in
the Eastern Mediterranean Region
(1970-1993)**

Period	I.M.R. (Infant deaths/1000 live births)
1970	136.0
1975	108.0
1980	97.1
1985-90	70.4
Latest av. 1993	68.6

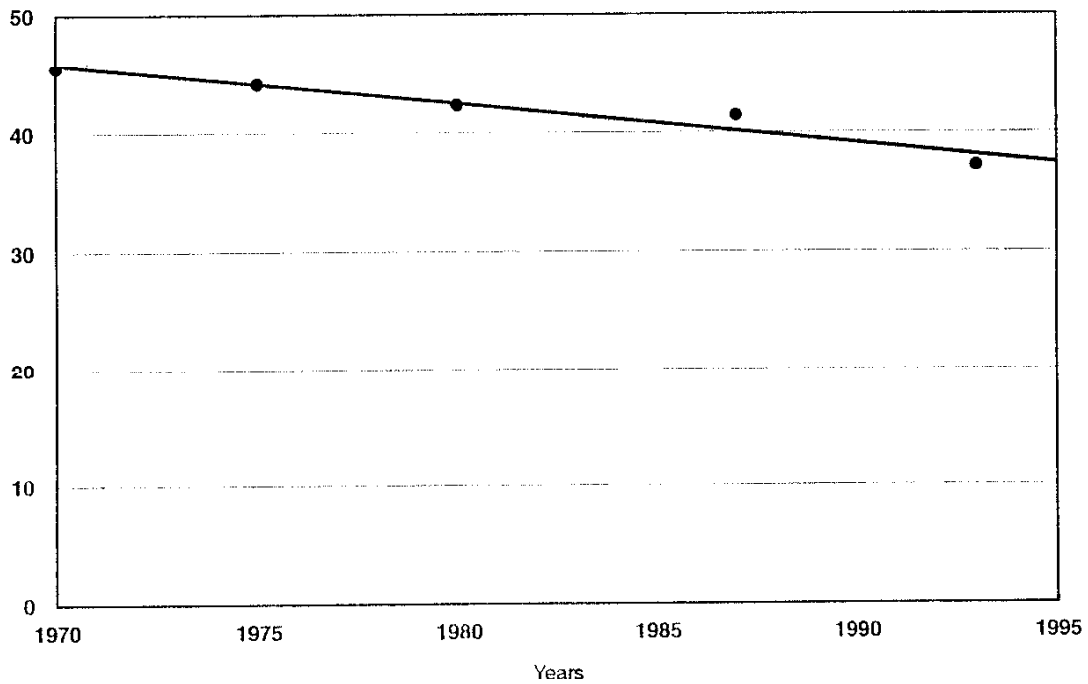
**Figure 2. Trend of infant mortality rate for countries in
the Eastern Mediterranean Region
(1970-1993)**



**Table 3. Trend of crude birth rate for countries in
the Eastern Mediterranean Region
(1970-1993)**

Period	Crude birth rate
1970-	45.4
1975-	44.1
1980-	42.3
1985-1990	41.4
Latest available (1993)	37.3

**Figure 3. Trend of crude birth rate for countries in
the Eastern Mediterranean Region
(1970-1993)**



2.1 Biological factors

It is well known that microorganisms constantly undergo changes that enable them to cope with an increasingly hostile environment. In fact, the development of mechanisms that permit survival of the most adaptable microorganisms is more rapid than the development of defense mechanisms that allow their hosts to combat microbial invaders. This adaptive process involves finding and exploiting weaknesses in the defenses of the host and can happen by means of several mechanisms:

2.1.1 Alteration in antigenic identity

The antigenic change of influenza viruses is well known. It permits the emergence of virulent strains of influenza viruses, for which the population has no immunity, and hence the rapid spread affecting all ages. With the appearance of a new strain, preceding strains tend to disappear or become sequestered for long periods of time and rarely reappear. The appearance of a new strain of the influenza virus results in billions of cases of influenza and millions of deaths. These deaths are usually not recorded as due to influenza but are registered under the terminal cause of death which is in most cases cardiac or chronic chest diseases. This results in a misleading impression that the incidence of these conditions is increasing.

Cholera presents a similar picture to that of influenza. When the *Eltor vibrio* became pathogenic, it swept the world in the early 1970s and practically took the place of the classical strain. Last year, a new strain, the 0139 appeared and is replacing the *Eltor vibrio*. In areas where this strain did spread it did not save any age group, even in its usual endemic areas. This means that there is no immunity against it and indicates that it is a new variant. The picture observed in endemic areas as a result of infection by 0139 in Bangladesh and India with thousands of cases among adults and older age groups is very much different from that observed with the classical or *Eltor* strains.

2.1.2 Emergence of drug-resistant strains

With the advent of effective therapy for many infectious diseases, many scientists assumed that these diseases would disappear. However, after several years of widespread use of antimicrobials, it became apparent that some strains of microorganisms could survive in the hostile environment of the drug. This has been observed more in diseases which require rather long periods of therapy with antimicrobials such as tuberculosis for example. The limited resources available for treatment of patients suffering from these chronic diseases, especially in developing countries, result in interruption of therapy or use of inappropriate treatment regimens. The final result is the appearance of resistant strains. This change to drug resistance is believed to be associated with chromosomal mutations in the organism. The mutation reaches a position of dominance in the presence of the antimicrobial against which it has been developed. This behaviour is being observed in many microbes such as the tubercle bacilli and the meningococci.

The development of resistance is not restricted to microbes but also affects parasites. The development of resistance of the malaria parasite to chloroquine has been and is still one of the main causes of setbacks in malaria control programmes.

2.1.3 Dual infection

A recent observation is that with the appearance of HIV infection, which is affecting the same population already infected with TB, there is a significant increase in clinical tuberculosis. This new combination "HIV/TB" has produced two phenomena: first, the risk of developing active tuberculosis as a result of HIV infection increases from 10% in a lifetime to 10% in the first year of infection; secondly, there is an increase in drug resistant TB affecting HIV infected persons and spreading to others. At present WHO estimates that there are at least 5 million persons who are dually infected by both HIV and tuberculosis. This requires a special management and treatment regimen; for example, the use of ethambutol is preferred to streptomycin to avoid transmitting HIV. Ethambutol is also preferred to thioacetazone to avoid the development of Stephan Johnson Syndrome (SJS).

2.2 Environmental factors

There is conclusive evidence that changes in the patterns of diseases, in particular a decrease in the occurrence of certain communicable diseases (such as cholera) are the result of the development of environmental sanitation particularly a clean water supply, sanitary disposal of waste and proper housing. On the other hand, environmental factors may increase the incidence of infectious diseases if they offer opportunities for transmission of aetiological agents from the reservoirs of infection to susceptible hosts, e.g. by promoting breeding of vectors of diseases or because of overcrowding.

The main environmental factors in changing the patterns of diseases include:

2.2.1 Exposure to environmental pollutants

The discharge of waste products from industry and the many other sources of hazardous waste into the air people breathe, the water people drink and the food people eat is behind the increase in some diseases such as various types of cancer and chronic chest conditions, including asthma and chronic bronchitis.

One of the main growing environmental pollutants is ionizing radiation from medical and occupational contacts and from commercial and warfare usage of atomic energy. Unforgettable examples include the atomic bomb explosions at Hiroshima and Nagasaki during the Second World War and the explosion of the atomic reactor at Chernobyl. These have been responsible for thousands of deaths and very large numbers of cases of cancer. The dangers resulting from these and similar incidents will continue for several generations.

It is not only industry and wars which are responsible for pollution. More important are the conditions of life which contribute significantly to changes in the environment and hence to changes in the patterns of diseases. Excessive use of insecticides both in agriculture and in public health for vector control is another source of significant environmental pollution. Excessive use of cars some of which are not well maintained, is well known as a source of air pollution and its effect on developing lung cancer is well documented.

2.2.2 Overcrowding

The migration from villages to towns due to industrialization and the development of high density urban areas facilitates the spread of infections, especially of diseases spread by droplets and those related to atmospheric pollution.

With urbanization, group care for children increases, such as in nurseries and day care centres. This is well known to be associated with the risk of spread of infections due to *H. influenzae* type 6 and *N. meningitidis*. Attendance at day care centres poses a real risk of illness to young children, and also has an impact on parents and other family members. Children attending day care centres are well known to be the transmitters of acute infections of the gastrointestinal and respiratory tracts to their families. Some of these diseases have the potential for significant clinical illness such as hepatitis A; other organisms have the potential for producing congenital problems when they affect pregnant mothers, such as the German measles virus, the cytomegalovirus and parvovirus B19.

2.3 Social, cultural and behavioural factors

Social, cultural and behavioural factors are closely related and interlinked with each other. The shift from an agricultural to an industrial society and its accompanying process of modernization has produced changes which have been reflected in the following:

2.3.1 Changes in community relationships

Modernization has adversely affected close community ties, which used to provide opportunities to share sorrow and happiness and to alleviate stress. An evident example of the maladjustment due to urbanization is the traumatic encounter of rural youth with urban values. This frequently has a serious impact on mental health.

Another example of the change in community relations is the care of the elderly. In rural communities where extended family and tribal life used to predominate, care of the elderly was essentially a family responsibility. This is no longer the case, particularly in urban areas. The elderly are now cared for away from their families at homes for the elderly. They no longer see their young growing and are deprived of the social environment required for a happy life.

2.3.2 Changes in lifestyle

Conditions of life and the way people live and work (sometimes called lifestyles) have been a cause of many diseases, particularly non-communicable diseases.

The notion of lifestyle has gained wide currency in the health field. It is commonly used in a restricted manner to mean specific individual behaviours that are interpreted as risk factors. This usage does not take proper account of the sociocultural context of behaviour. As a matter of fact, lifestyle refers to the manner in which the social group translates its situation into a pattern of behaviour which produces what we call behavioural risks.

Major behavioural changes in lifestyle, social behaviour and social value systems have been introduced by mass media (TV, radio, newspapers, journals, magazines and books) which is one of the main manifestations of modernization. Media influence is so powerful that it could be rightfully said that the public is completely controlled by the media. One of the negative influences of media on health comes from advertisements on commodities which are not necessarily needed by the communities but the latter are made to believe that what is advertised is needed. A particularly destructive example is tobacco advertising which was very extensive a few decades ago and helped establish this hazardous habit. Its roots became well fixed in the communities who thought that smoking would make them appear modern and advanced.

2.3.3 Decreased concern about moral values

Urbanization and industrialization have unfortunately been accompanied in some communities by a decreasing concern with moral and religious values and the appearance of lifestyles which have led to these changes in the pattern of some diseases. An example of such lifestyles which have prevailed in this century is the so-called sexual revolution. It has simply meant more sexual promiscuity and homosexuality. This is well demonstrated by the rapid spread of sexually transmitted diseases (gonorrhoea, syphilis, herpes simplex, hepatitis B and more importantly HIV infection). A factor which has facilitated sexual promiscuity is the widespread use of contraceptives which have alleviated the traditional fears of conception and led to promiscuous heterosexual relations.

Drinking and smoking are also evidence of decreased concern for religious values. Their effects on health are well known, as they are major risk factors for noncommunicable diseases.

2.3.4 Human mobility

History tells us that the opening of trade routes between continents was accompanied by the spread of infectious diseases. The black death in Europe in the 14th century and the cholera pandemic in the 19th and 20th centuries are well documented. The spread of syphilis in the 18th and 19th centuries has been related to wars and the movements of armies. More

recently, the movement of a large number of troops by air from South East Asia to the Pacific Islands during World War II contributed to the introduction of dengue fever in the South Pacific Region.

During the last two decades the introduction of the human immunodeficiency virus that causes AIDS to many parts of the world has been directly related to human mobility.

In this region many communicable diseases are introduced through human mobility for work, trade and tourism and the millions of workers from South East Asia and the Pacific region coming to work in the Gulf States. The early introduction of HIV infection to Morocco and Tunisia was related to the return of nationals of these countries from work in southern Europe where they were exposed to infection. Many of the sexually transmitted diseases in the Gulf region are related to mobility between them and India, Thailand and the Philippines.

2.3.5 Expansion of education and participation of women in the labour force

The process of urbanization and industrialization has been accompanied by two important cultural transformations: the expansion of education and the increased participation of women in the labour force. These, in turn, have caused profound modifications in the dynamics of families and communities which have resulted in the use of contraceptives, reducing many of the problems related to reproduction by extending birth intervals and has contributed to greater maternal and neonatal survival by reducing exposure to high risk pregnancies.

2.4 Practices of modern medicine

Several changes have occurred in the quantity, distribution, organization, and quality of health services that have contributed to the epidemiologic transition. The discoveries and technological developments of the twentieth century, e.g. the discovery of antibiotics and antimicrobial agents, insecticides, vaccines and diagnostic and therapeutic technologies have resulted in remarkable progress in the prevention and control of many diseases and in the effective management of many others. One of the most dramatic victories has been the eradication of smallpox. Another evident success has been the reduction of morbidity and mortality from diseases for which there are available protective vaccines such as poliomyelitis, diphtheria, tetanus and measles. It must, however, be remembered that relaxation of vaccination efforts can very quickly result in the resurgence of these diseases as has been the case with poliomyelitis in Pakistan and is now the case with diphtheria in Russia and the Ukraine.

Although therapeutic interventions have been the key element in saving millions of lives each year and in reducing some of the serious complications that often follow infection, they actually do not modify the probability of becoming ill (except in so far as early treatment reduces the risk of spread of infection to others). In chronic diseases, this type

of intervention actually produces the paradoxical effect of increasing the absolute morbidity level.

On the other hand, the cure-oriented intervention techniques of modern medicine which permit the liberal use of antimicrobials and chemotherapeutic agents and an increasing number of manipulative procedures have been responsible for some side effects of diseases. In addition to side effects such as allergy, depression of bone marrow, deafness, etc., excessive use of antibiotics may cause what is described as superimposed infections. The excessive use of antimicrobials inhibits indigenous organisms which are competitors to external invaders and permits colonization and proliferation of organisms which are non pathogenic under normal conditions.

Infections associated with manipulative techniques are another example, particularly under conditions where aseptic techniques are not strictly followed. The most evident of these is neonatal tetanus which occurs by contamination of the umbilical stump. The spread of viral hepatitis B and C and HIV infections through the use of contaminated needles and through unscreened blood transfusions are another example in which intervention becomes a source of infectious disease. As well, the use of equipment such as urethral catheters and endotracheal tubes permits organisms to gain access to otherwise healthy sterile organs.

From the above review of epidemiologic transition, it is clear that there is no unique path in the transition that leads to low mortality, less incidence of communicable and deficiency diseases and an increase in incidence of chronic and noncommunicable diseases. On the contrary; there are many paths, a multiplicity of stages and no society reproduces identically the same experience as any other.

The course of transition is very vulnerable and many obstacles are not easily overcome by the partial interventions prevailing in many parts of the world. The results are lack of continuity, slow downs and even regressions in transition. This is due to the fact that socioeconomic transformation in developing countries has not affected all classes and has increased the vulnerability of some groups. An example is the reversal and slow down of the decline in mortality during the 1970s and 1980s. In many countries this was the result of austerity programmes which led to the erosion of the health infrastructure and the elimination of intervention programmes. All these are responses to international forces beyond the control of those countries most affected by them.

We have vivid examples of reversal within our region. In Iraq, Ministry of Health statistics show a significant reversal in the epidemiologic transition over the past three years. The total number of deaths has increased almost 4 times from 1990 to 1993 (Figure 4). This reversal is more evident in the under-5 mortalities which increased more than 5 times during the period from 1990 to 1993 (Figure 5). If data were available, we should have seen the same pattern or worse in Afghanistan and Somalia. The same is expected in countries affected by man-made disasters, especially wars.

Figure 4. Total deaths from all causes in Iraq during the years 1989-1993

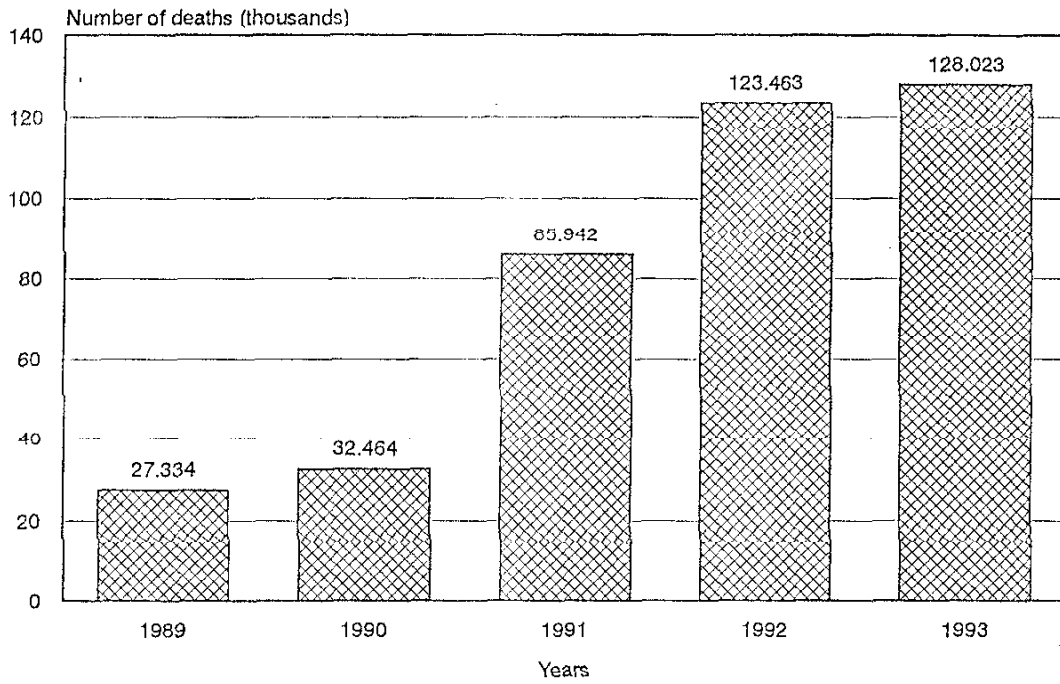
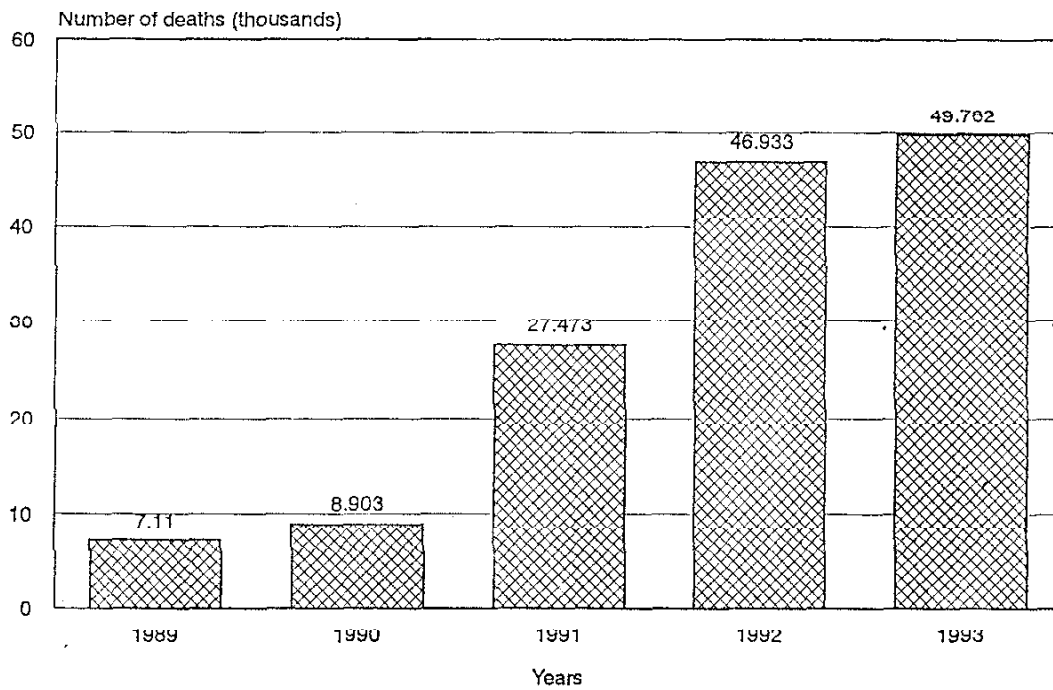


Figure 5. Deaths of <5 years old from all causes in Iraq during the years 1989-1993



**Table 4. Mortality estimates for the under 5 years children
for the Eastern Mediterranean Region
(1970-1993)**

Period	Under-5 mortality/1000
1970-	190
1975-	160
1980-	140
1985-	125
1990+	110

INDICATORS OF THE EPIDEMIOLOGIC TRANSITION

It is difficult to select one or more indicators which demonstrate the changing pattern of diseases. There are however, demographic, mortality and morbidity indicators which can individually and collectively give an indication of the changing pattern of diseases.

Demographers have tended to concentrate on mortality patterns as the best indicator since they are fairly easy to measure and are unambiguous. There is also a finality about death. However, it is well known that overall mortality does not tell everything needed about health, and hence the necessity to consider both mortality and morbidity indicators.

1. Mortality indicators

One of the mortality indicators is the crude death rate. Table 1 and Figure 1 show a pattern of decrease in the crude death rate during the last two decades. The rate of decrease is itself decreasing as it has already reached rather low level rates.

A good and sensitive mortality indicator, the infant mortality rate, is in general highly correlated with the overall mortality. It has traditionally been used as the basic indicator of mortality at young ages and indeed as a general indicator of the overall health status and social and economic development. Table 2 and Figure 2 reflect the situation of infant mortality in the region and the evident trend of decrease.

In recent years more attention has been focused on other ages of early childhood. In part, this reflects the recognition that the causes of death which claim many infant lives (predominantly post neonatal) also affect young children. Table 4 reflects the estimates made by the United Nations for countries of this region with respect to the under 5 mortalities. It shows that in 1970 one in every 6 children born died before reaching the fifth birthday and currently only one in every 9 children born die before the fifth birthday. As with all estimates, the absolute figures have to be interpreted with caution but the pattern is clear.

crude death rate or even age specific death rates sometimes conceal important changes particularly in the causes of death. As might be expected, infectious and parasitic diseases are still by far the leading cause of mortality in the region. However, there is evidence that the risk of dying from major chronic diseases such as circulatory diseases is not insignificant in the region. Deaths from circulatory diseases and stroke are second only to those caused by infectious and parasitic diseases. Several of the principal causes of chronic diseases and in particular cigarette smoking are very widespread in the region with no evident downward trend. It is likely that the conquest of infectious diseases will be accompanied by an increase in the deaths from chronic diseases such as lung cancer and coronary heart disease, similar to the picture previously observed in developed countries.

Figure 6 shows the World Bank estimates and projections of the ratio of deaths from cardiovascular diseases to deaths from infectious and parasitic diseases. It shows that in the EMR the ratio of CVD to infectious and parasitic diseases, which was around 0.5 in 1985, is expected to become 0.8 by the year 2000 and will then exceed 1.0. That is, by the year 2015, the number of deaths from CVD will exceed that caused by infectious and parasitic diseases.

Again it is essential to emphasize that estimates must be interpreted with caution. It is difficult to study the pattern of mortality from cardiovascular diseases from available mortality figures for most countries of the region for two reasons; first, the decrease in labelling the cause of death as ill-defined and unknown during the last 3 decades. This shift from ill-defined causes to specific causes may produce an artificial increase in some causes of death including CVD. The second reason is the fact that during the period 1960 to 1990 three revisions of the International Classification of Diseases were used for classifying causes of death. The 3 revisions (7, 8 and 9) did not classify hypertensive heart diseases in the same manner.

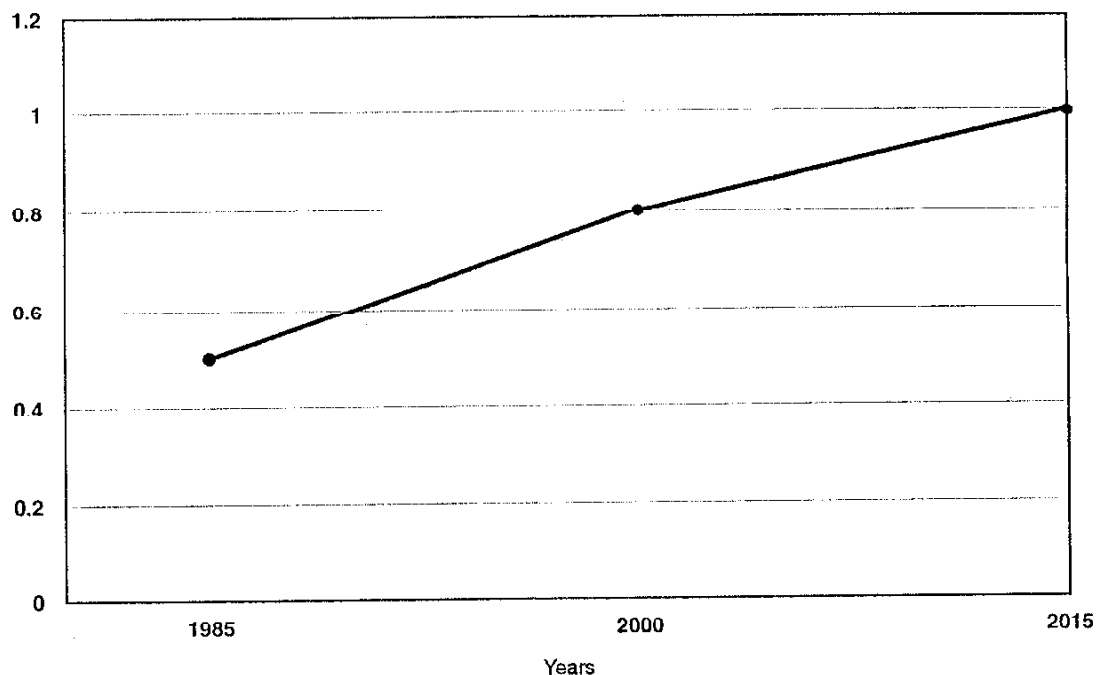
Although cardiovascular diseases are becoming relatively more important than communicable diseases as a cause of death, the death rates from CVD, especially in developed countries, are not increasing. This means that more people will live to old age when cancer is more likely to occur. Mortality from cancer is increasing all over the world. Out of all major causes of death cancer is the only one that is rising significantly. Table 5 shows the proportionate mortality patterns from various causes for developed and developing countries.

Table 5. Proportionate mortality patterns from various* causes for developed and developing countries (1960/1980)

Cause of death	1960 (percentage)		1980 (percentage)	
	Developed	Developing	Developed	Developing
Infections	12	43	8	40
Tumours	15	4	19	6
Cardiovascular diseases	49	11	53	19
Others	24	42	20	35

* Extracted from IARC scientific Publication no. 100

Figure 6. Changing cause-of-death structure in the Middle East/North Africa



2. Morbidity indicators

It is important to realize that when fatal acute diseases dominate the health profile, mortality data would often give an adequate description of the prevailing health problems. With reduced incidence and fatality of many acute diseases and the emergence of chronic, often incurable but not immediately fatal conditions, causes of death would only reflect a small fraction of the complex health profile of the population.

Changes in the levels of sickness are extremely important to complete the picture of epidemiologic transition. They are, however, very difficult to measure and a substantial proportion of ill people recover without help or involvement from the health services and are not recorded.

It is also important to differentiate between infection and disease. Infection implies that the causative agent has entered the body of the host and is multiplying but not necessarily with the appearance of signs and symptoms. In contrast, the term disease refers to the occurrence of clinical manifestations. The latter causes the greatest concern to health authorities. For example, hepatitis B infection may only result in an

infected person becoming a carrier capable of transmitting infection to susceptibles without evident clinical manifestations at least for some years and hence posing an important threat to public health. This also applies to HIV infection.

Medical and epidemiologic uncertainties prevent an exact count of the number of diseases, infectious and noninfectious, that afflict human beings. There is no question that they are greater in number and variety than ever before.

In sections 2.1, 2.2, 2.3 and 2.4 above, several examples were given of the changing pattern of communicable and noncommunicable diseases and related factors. This review shows that there is a real pattern of decrease in the occurrence of diseases for which national immunization programmes are being implemented, specifically measles, diphtheria, poliomyelitis and tetanus, even though surveillance of these diseases has improved considerably. The reverse is observed with respect to malaria which is showing an increase except in a few countries of the Region. Tuberculosis showed a general decreasing trend but is resurging and increasing in areas where HIV infection is spreading. The pattern of HIV infection shows evident continued increase.

Data on the incidence of chronic noncommunicable diseases (i.e. the number of new cases per population unit per annum) would be ideal in depicting changing patterns of morbidity from these diseases. Unfortunately such data are not available on a comprehensive form that can be used to show patterns over time. Disease registers such as for cancer and for diabetes, and data from surveys are all recent and rarely carried out with standard methodology. Reliance is therefore based on mortality data.

Predictions of incidence based on several factors including demographic structure and prevalence of predisposing factors have been tried in some diseases. For cancer it is predicted that the number of new cases of all types of cancer in the world will increase from the present estimated level of 10 million cases per year to 15 million cases in 20 years (by the year 2015). This increase is expected to be highest in the developing countries.

The limitations with respect to morbidity data for cancer also apply for cardiovascular disease morbidity. Indirect indication of patterns may be obtained from data concerning their risk factors. Hypertension as a risk factor of CVD has been recognized since the 1950s. Several studies have examined the blood pressure levels of different population groups and the magnitude of related hypertension. At the same time, during the last 20 years the methodology used for measuring blood pressure in surveys has become more standardized and results are also reported in a more uniform manner (according to age and sex), a definition of hypertension using the laid down by WHO in 1978. It is clear from these studies that the prevalence of hypertension in the age group 40 to 60 is not low and could increase by more than 30%. However, in some populations it is reported to be very low. Even with low figures, it is clear that the number of persons

with hypertension is comparatively high. As well, morbidity is increasing due to progressive demographic changes and the increasing prevalence of major risk factors for these diseases.

It is sometimes difficult to differentiate between communicable and noncommunicable diseases. Researchers are discovering that some common illnesses with a mysterious aetiology considered to be noncommunicable diseases may actually be at least partially the result of microbial infection. Examples are the relation between helicobacter pylori and peptic ulcer and the relation between human papilloma virus and cervical cancer. As well, rodent-borne hanta viruses may play a role in hypertensive renal disease and no doubt hepatitis B and C viruses are the main causes of primary hepatocellular carcinoma.

3. Other indicators

Both mortality and morbidity data are outcome indicators and it is essential to supplement them with other indicators that reflect the social and behavioural changes occurring in the community. One of these indicators is the fertility pattern.

With respect to fertility, Table 3 shows that the crude birth rate did not show a significant decrease until recently, which proves that the decrease in fertility occurs after the change in mortality particularly in infants and young children.

The total fertility rate has decreased from 6.7 in 1970 to 5.2 in 1990.

PART 2. RESPONSE OF NATIONAL HEALTH CARE SERVICES TO THE CHANGING PATTERN OF DISEASES

The changing pattern of diseases and the accompanying demographic changes are challenges to the national health care authorities which will have to significantly modify their health care system to fit needs resulting from those changes. At the same time they must address growing health care costs particularly in national health care systems significantly dependent on government resources.

Several aspects must be considered by national health authorities. These include the emergence of noncommunicable diseases which increases pressure on the health care system as they require more specialized and more complex services such as hospitalization for relatively long periods of time. As well, there will be a greater demand for more specialized human resources and more elaborate technologies which are definitely more costly though not necessarily more effective.

Another important aspect of this transition is the increase in life expectancy which means an increase in the elderly population and the provision of health care services for them. In the majority of countries the provision of health care services is least targeted for the elderly.

The provision of effective health care services for the elderly may require a change in the health care system itself to ensure that the quality of life of the elderly is significantly improved since giving "lease" to life with no quality would be miserable and worse than dying at an earlier age.

One important approach is strengthening home care, an effective way of delivery of health care services to the elderly. In this region, families still provide a substantial amount of care particularly to the elderly and to the chronically sick. Policy decisions must be made to strengthen this pattern of health care and to encourage it by extending support to families caring for the elderly or the sick at home. Efforts should be made to make home care the principal care and institutional care to be added if and when required. The shift from home care as a supplement to institutional care to having institutional care as a supplement to home care requires considerable investment in training of home care workers and even family members.

Other important points should be taken into account by national health authorities:

1. There is a need to understand the social and behavioural aspects which have a direct and indirect effect on health. Interventions based on these aspects have a better and more positive impact on health.
2. There will always be substantial differences in the patterns of illness among the different sectors of the population in the same country. The poor low socioeconomic group will still be afflicted by communicable diseases and the affluent will be more affected by diseases of lifestyle. The middle class suffers both the diseases of poverty and those of lifestyle. Hence, the need to maintain the services necessary to respond to all these patterns.
3. Today, no country is remote and none that is disconnected epidemiologically. The influenza pandemic and more recently the AIDS pandemic have shown that infectious diseases in one part of the world represent a potential threat to all other parts because of global interdependence, modern transportation, trade and changing social and cultural patterns. There are cases of infectious diseases with very short incubation periods, acquired in one place and manifested in another place thousands of miles away. National health authorities should also take into account the changing patterns of diseases in other countries, particularly those of neighbouring countries.
4. Countries which have been largely successful in the battle against specific diseases should avoid complacency, shifting all their concern and efforts to other problems, since the diseases apparently conquered may appear again and constitute a major threat to health. Such complacency sometimes extends even beyond a particular disease to embrace other infectious diseases and the danger increases when this move is accompanied by a neglect of national expertise. Examples of the dangers of such over confidence are the polio epidemic in Jordan in 1992 which was the result

of overconfidence in the EPI programme and the relaxation on immunization of a single group of expatriates from whom infection reached the general population and claimed over 30 cases of paralytic polio-myelitis.

5. National health authorities should not only provide care according to the current health needs and plan according to projected health needs, a process that could be described as a passive contribution towards health. They should also actively contribute towards shaping the transition which is a positive contribution towards health for all. In this regard, health authorities should endeavour to:

- affect and influence the basic determinants of health by promoting family planning, environmental health and genetic counselling;
- increase individual resistance by health promotion and preventive actions such as, vaccination, proper feeding habits, promotion of healthy behaviours and avoiding indulgence in dangerous habits such as smoking and drinking.

PART 3. RESPONSE OF WHO TO THE CHANGING PATTERN OF DISEASES

Since its inception in 1947, WHO has been recognized as the leader in global health programmes and initiatives. This has been the case for EMRO all through its almost 50 years of life, and we can identify three stages or paradigms in the life of EMRO.

1. The pre-1970 paradigm started with the early days of WHO. Emphasis was placed on the control of infectious diseases and on addressing the so-called deficiency diseases. Malaria and other parasitic diseases, tuberculosis and other bacterial diseases received priority attention. The adopted approach was what we now call "vertical programmes" which in some cases took the form of mass campaigns. In these programmes, at the time called projects, the WHO contribution was to recruit a suitable expert or a team of experts to provide technical guidance and train national counterparts to carry on and extend the work. Support also included provision of supplies and equipment to ensure success of the project. Examples of these projects were TB control through widespread screening and BCG vaccination and malaria elimination through insecticide spraying.

Wrestling with infectious diseases and the project vertical approach was the WHO's principal modus operandi in combatting communicable diseases. Examples of evident successes were the control of Bejel; a less evident success was malaria control/eradication in some countries. During this period efforts were also directed at certain noncommunicable diseases such as mental and psychological disorders.

2. The second era was that of the 1970s and early 1980s. Much of the hard work of previous years by both national authorities and WHO resulted in remarkable success in reducing the devastating effects of certain communicable diseases. Morbidity and mortality caused by infectious diseases were decreasing and there was evident improvement in life

expectancy in many parts of the region. While it was possible to eradicate smallpox, centuries-old scourges such as malaria, leprosy, cholera and TB were still affecting millions of people in the region.

This period also witnessed massive migration of populations from rural to urban areas and an increase in diseases of urbanization including mental illness, air pollution and changing life patterns as well as an increase in occupational risks.

It became clear that health services in many countries were not keeping pace with the changing population in either quantity or quality. The approach adopted by WHO for collaborative activities could best be described as health-for-some. This situation which prevailed not only in EMR but globally, triggered the health-for-all approach through PHC which was officially endorsed in the Alma-Ata declaration in 1978. In fact, the EMR was already in the health-for-all era before the Alma-Ata declaration. The 8 essential elements of PHC had already been given prominence in the WHO programmes of collaboration with Member States of the EMR.

This meant a considerable shift in the WHO collaborative programmes towards the development of national health care systems. This period also witnessed the initiation of programmes such as the expanded programme on immunization again built on the philosophy of HFA, with specific objectives of vaccinating all children against the common diseases of childhood. Another programme which progressed rapidly is diarrhoeal diseases control which again emphasized treatment of all cases of acute diarrhoea to prevent deaths.

On the other hand, this period witnessed less importance being given to parasitic diseases. Many programmes such as malaria control have seen a significant reduction in resources allocated, whether financial or manpower, although they are still of public health importance. In fact, in countries, such as Pakistan PHC was essentially built on the malaria staff which with the new direction, have significantly reduced their efforts in malaria control.

One of the main highlights of this period was the emphasis placed on health manpower development. This was a justified response to the needs of the many newly independent states wishing to build up their public health infrastructure and respond to the HFA strategy and PHC approach.

A new mood of hope and optimism concerning mental health disorders, both prevention and control, has also emerged. More and more Member States are giving priority to mental health. This is also reflected in the WHO programmes of collaboration. Promoting school mental health was another area of emphasis.

3. The third paradigm started in the early 1980s. During this period, chronic diseases were given more emphasis. Efforts in the field of cancer prevention and control soon increased to include cardiovascular diseases, diabetes and the so called lifestyle diseases.

**Distribution of regular budget allocations
under DPC from 1988 to 1995**

	1988/1989		1994/1995	
	Amount (US\$)	%	Amount (US\$)	%
Noncommunicable diseases	665 000	6.2	1 092 200	9.8
Communicable diseases	10 140 000	93.8	10 058 000	90.2
Total	10 805 000	100.0	11 150 200	100.0

This period witnessed no real increase in the budget of WHO and all the inputs in the new programmes of the 1980s was at the expense of the old programmes such as malaria, schistosomiasis and other parasitic and endemic diseases control programmes, which have unfortunately suffered considerable reduction in financial allocations. However some communicable disease control programmes such as the diarrhoeal diseases control programme (CDD), the programme for control of acute respiratory infections (ARI), tropical diseases research, onchocerciasis control, etc., have managed to secure extrabudgetary funds for their activities and continued to develop during this period.

This era witnessed continued emphasis on national manpower development especially through national training courses as well as greater emphasis on applied research as an essential element in the development of national public health programmes.

The joint WHO programme review missions (JPRMs) which have been functioning for the last 10 years, are unique to EMRO. The changing pattern of diseases at the national level influences in some cases the programme of collaboration reviewed by these missions. However, the same exercise has witnessed the widening of the programmes of collaboration in many countries to include more than 30 programmes. This has resulted in dividing the budget into very small sums which does not have a significant impact on any one programme.

The achievements of WHO collaboration with Member states over the past 2 decades have been substantial. The report on the "Second evaluation of the implementation of the global strategy for HFA", records the improvements achieved in health status and underscores the important contribution of WHO's activities at country and intercountry levels. During the late 1980s and early 1990s certain communicable diseases showed a resurgence and some new communicable diseases, particularly AIDS, appeared. This pattern is repeated in many WHO regions. The appearance of these diseases reminds WHO of the necessity of maintaining emphasis on these problems and on emerging diseases. A special programme is being established by WHO to answer this need.

CONCLUSIONS AND RECOMMENDATIONS

The changing pattern of diseases observed over recent years, from acute infectious and deficiency diseases to the chronic noncommunicable diseases, is a continuous process of transformation with some diseases disappearing and others appearing or reappearing.

It is clear that infectious diseases are still an important public health problem and a major cause of death and of illness and will continue to be so for future generations. At the same time, noncommunicable diseases are coming to the forefront as causes of illness and death, especially in countries where it was possible to control many communicable diseases.

This transition is very vulnerable as several biologic, environmental, social, cultural and behavioural factors have been responsible for structuring these patterns in the community. It is subject to non-continuity, slow downs or even reversal of the transition.

Being a continuous process, several stages of transition may overlap in the same country. This represents a challenge to national health authorities which must continuously modify their health care services to address the needs created by this changing pattern of diseases. As well, health authorities have the important duty to try and shape the transition in a positive way by all possible means.

The response of WHO to this transition has been reflected in a significant shift in the programme of collaboration with Member States to fit with the stages of the transition.

In order to effectively address the epidemiologic transition and to develop national, regional and global efforts to address it, the following are the main recommendations:

1. Development of a well designed surveillance system (national and regional), capable of detecting unusual occurrence of diseases, documenting their geographic and demographic spread and estimating the magnitude of the problem. A good system can identify factors responsible for disease emergence, facilitate epidemiologic investigation and assess the impact of intervention measures.

Unfortunately, there is insufficient appreciation of the value of comprehensive surveillance programmes. Even among public health personnel surveillance is often limited to collection and transmission of data. This is a very narrow concept of surveillance. As well, public health professionals are unfamiliar with surveillance methods because the subject is inadequately covered in medical schools and even in schools of public health. Poor surveillance leaves policy-makers and public health officials with no basis for developing and implementing policies for controlling diseases.

It is, therefore, highly recommended that national authorities develop strategies to strengthen disease surveillance mechanisms. One of the basic strategies is to develop a national computerized database. It should involve various sources of data and particularly private medical services, especially in countries where a substantial part of health care services are delivered by private practitioners.

2. Identification and designation of collaborating centres which should be actively involved in surveillance of the specific disease(s) for which they are designated. National authorities, by accepting the designation of a national centre as a regional collaboration centre also accept the responsibility of giving this centre all the support and resources needed to help it undertake this function.

A regional network of collaborating centres would be an effective tool in surveillance. There are considerable capabilities in the region within ministries of health, universities and even private institutions which can effectively carry out surveillance.

3. Development of national manpower experienced in surveillance to carry out national and regional surveillance. Apart from a few countries where well-designed systems of training in field epidemiology are being implemented, there is a dire shortage of manpower. There is a shortage not only of general epidemiologists but also of other specialists such as medical entomologists and malariologists. The situation is similar for noncommunicable diseases, where there may be specialists in clinical management aspects but few epidemiologists.
4. Encouraging, promoting, and supporting research especially in establishing the epidemiologic pattern of diseases of public health importance; cost effectiveness analyses of proposed interventions, studies of behaviours that affect risk and studies on measurement of the effectiveness of public health interventions.
5. Public health education and promotion of healthy lifestyles. Health education efforts to achieve positive behavioural changes are essential for the prevention and control of diseases. A carefully conceived media campaign can have a beneficial effect on changing behaviours related to the occurrence of diseases, such as smoking, over-eating, drinking, and other dangerous behaviours and lifestyles.

Forty-first Session

Agenda item 9(b)

**CHANGING PATTERNS OF DISEASES AND THEIR
IMPACT ON WHO COLLABORATIVE PROGRAMMES**

Summary of Recommendations

In order to effectively address the changing patterns of diseases, the following are recommended:

1. Development of well-designed national and regional surveillance systems capable of detecting unusual occurrence of diseases and documenting the status of various diseases. Such systems should not be restricted to government health services alone, but should include private practitioners as well. Support through a national computerized database is also essential.
2. Identification and designation of collaborating centres with effective networking for individual health problems.
3. Development of national human resources experienced in surveillance.
4. Encouraging, promoting and supporting research, especially in establishing the epidemiological pattern of diseases of public health importance.
5. Public health education and promotion of healthy lifestyles.

Forty-first Session

Agenda item 9(b)

CHANGING PATTERNS OF DISEASES AND
THEIR IMPACT ON WHO COLLABORATIVE PROGRAMMES

Summary for the Report

Dr Wahdan introduced the document on the item.

He said that there was a general shift from acute infections and deficiency diseases to chronic noncommunicable diseases. This transition is a dynamic and complex one, and is not unidirectional, because it is possible that, some times, even a reversal of the trend may occur.

The mechanisms involved in the transition were described in detail. They include (a) demographic changes, usually in the form of reduced mortality, especially in infants and young children, followed, after some years, by reduced fertility; and (b) changes in biological, environmental, social, cultural and behavioural factors and in the practice of modern medicine. The biological factors include alterations in the antigenic identity of microorganisms, such as the influenza virus and the cholera vibrio, emergence of drug-resistant strains as in the case of cholera, tuberculosis and malaria. The environmental factors include exposure to environmental pollution and overcrowding. The social, cultural and behavioural factors include changes in relationships adversely affecting community ties as in the case of care of the elderly, changes in lifestyles and decreased concern about moral values which lead to increased drinking, smoking and sexual promiscuity. The practice of modern medicine has also contributed to this transition--as a result of the discovery of antibiotics, insecticides, vaccines, improved or new technologies, diagnostic reagents, and increased manipulative procedures.

This process of transition is very vulnerable and can be affected by several factors. The indicators for such transition include changes in mortality and morbidity and others reflecting social and behavioural changes.

Dr Wahdan's presentation included a review of the recommended response by national authorities to such demographic changes. He emphasized that, in addition to providing services which meet the health needs, national authorities should try to positively influence the transition by addressing the determining factors.

The response of WHO has also been changing according to the changing patterns. During the first two decades of WHO's existence, support was provided mainly for the control of infectious diseases, through more or less vertical programmes, with some evident successes. During the 1970s and early 1980s, the emphasis shifted to the development of national health care systems able to cope with the needs for meeting the goal of health for all. Then came the period of late 1980s and 1990s, when the emphasis was on chronic noncommunicable diseases as well. However, communicable diseases continue to be of great public health importance throughout the Eastern Mediterranean Region.