CHAPTER 3

General output of establishing an economic-
health-disease information network

In this chapter, the main potential benefits from establishing such an economic-health-disease information network are discussed. Some of issues are presented to show what roles such an information system can play in health policy planning and economic development planning processes.

At this initial stage, it is important for us to define what potential output can be generated both in the short run and the long run, and how to translate these potential benefits into real benefits in the future.

## 3.1 Demographic correlation: economic status, health status and disease incidence pattern in defined populations

It is commonly recognized that health and economic status vary according to their characters. Thus, health conditions of a population group depend on its demographic profile. In this respect, population factors that need to be considered for health condition are population size, growth rate, density, age distribution, gender ratio, and geographical distribution, as well as the composition of household. These factors significantly contribute to health outcomes.

Population size and growth relate directly to the absolute number of persons exposed to disease and, therefore, to the demand for health services. The two dominant demographic factors determining population size and growth are fertility rates and mortality rates, which are both clearly reflective of a population's overall health status.

The age distribution of a population is substantially determined by its birth rate, e.g. groups with high fertility tend to have low proportions of older persons. When fertility declines due to family planning, and mortality declines, the mean age of the population begins to rise. In Southeast Asia, for instance, the United Nations projects the mean age of the population will increase from approximately 25 years in 1992 to 37 years by 2050(Frenk, 1992).

Other population changes that are important for the public health sector include the rapid urbanization and migration patterns observed in developing countries. Urbanization is essentially a process of increased population concentration. Urbanization has been also closely linked with industrialization and industrialization frequently has injurious effects on the human environment, not only in terms of pollution and

occupational hazards, but also in terms of increased levels of violence.

Economic status varies in different population groups, such as occupation, age, gender, education level, urban vs. rural and religious groups. These demographic characters influence the people's economic situation, consequently they affect the health status of the populations. These differences may become larger as economic development expands.

Poverty and diseases go hand in hand. It is common that infectious diseases and malnutrition occur predominantly in poor areas and poor families. If correlations of economic status and health/disease pattern can be discovered, the problems in the defined population can be identified so that appropriate action can be taken. For example, if we observe an increase incidence of a particular infectious disease, it is not enough to know that the disease occurs. We need to learn who is being infected and what kinds of behavior or environment are facilitating the infection in order to target interventions. An information system comprising interfaced economic, health and disease data bases which allows direct cross-reference will help us to tackle these problems and assist policymakers to make appropriate determinations.

## 3.2 Intercountry disease spread by population movement in relation to economic change

It is generally accepted that the potential for major public health hazards is amplified as a consequence of the increasing volume of international travel. Today, migration and travel continue to be critical factors in the spread of disease as is seen, for example, in the spread of multi-drug resistant malaria and the spread of HIV/AIDS in Asian countries.

Population movement links communities of origin and destination. Several forms of exchange can take place between these two communities: resources, information, ideas, money, as well as health problems and diseases. For example, if movers are malaria parasite carriers, their mobility may result in the spread from the destination community to the mover's home community or vice versa.

The extension of intercountry commerce and trade in Asian countries has accelerated the population movement within and between countries which leads to high disease spread, increasing the overall burden of disease. The increase of disease spread has a great negative impact on socioeconomic development, both short-term and long-term, this health problem has to be considered when making international economic policy. The information from such a regional information network will provide a more solid basis to develop appropriate strategies, such as

border commerce strategy, for reducing the risk of disease spread.

This regional network will pave the way for international surveillance by providing a communications system that will facilitate the rapid collection and analysis of data using standard case definitions, transmission of information for the prevention of communicable diseases and promotion of effective public health practice. This facet has important implications for trade and commerce themselves, since effective multi-country surveillance and control reduces the risk of economic loss due to illness/death of the traveling business community.

## 3.3 More accurate prediction of disease for health planning

With more and more data accumulated, which include not only disease data but also the determinants of disease, such as socioeconomic and environmental factors, more reliable and accurate prediction of disease can be done. As a particular health problem can be detected earlier before it becomes serious, the appropriate actions can be taken to prevent it becoming widespread. This lagged time is very important for the planning of preventive health programs, because resource allocation based on the current situation would fall short if the problem is naturally increasing, and also would be at least partially wasted if the problem were naturally decreasing.

As we look to the future, we should consider types of data analysis that move beyond information on what adverse health events have already occurred toward predictions of what is going to happen. So any description of the problems should include historical as well as current data. Trend analysis can be utilized to project future levels of the problem, and similar analysis of the major determinants should be undertaken, for example, measles-susceptibility(immunity levels), malaria-population movement. This information system will systematically collect these kinds of data, thus making it possible to develop more accurate and credible predictions of health problems, with resultant potential saving of expenditure.

The health intervention plans should not be formulated simply because a problem exists today, but because it will exist in the future unless we do something about it. So more accurate forecasting of the trends of disease will lead to better use of appropriate resources, and reduced economic loss due to diseases. Without these data, it is difficult to estimate the problem in the future accurately and the decision could be made just on the basis of equal distribution or based only on last year's situation, which could lead to irrational decision making.

## 3.4  Disease, economic and geographical information system(GIS) database combination to facilitate improving local development planning

There are very close relationships among disease, economic and geographic environmental conditions.  On the one hand, disease has an adverse effect on economic development. It affects the  peoples' capacity to work, restricts mobility and reduces productivity, thus it will reduce the economic output of the population. This is most dramatically illustrated, of course, by the effects of epidemics in a community, e.g. influenza in winter months.  On the other hand, economic development will lead to increased income, to improved sanitation, living conditions as well as nutrition status. As a result, there will be fewer diseases of certain kinds.

However, economic development can also bring some risks of health problems. For example, increase in industrialization may cause an increase of air pollution and of occupational diseases.  Changes in water irrigation methods in agriculture may cause an increase of malaria transmission. Consumer behavior changes(e.g. smoking, excessive drinking) may cause other diseases.

Demographic and geographical conditions also play important roles in determining disease transmission and affect economic development, e.g. water sources, climates, mountains, forests, transportation and population distribution.

Through combining disease, economic and GIS databases, analysis can be done which will benefit and improve local development planning, such as ensuring that people move away from high risk areas; setting a hospital in the place where it is convenient for people to access; putting a factory, which may cause air or water pollution, far from resident areas; commerce and trade center siting and agricultural methods selection.  This type of forward planning requires good data and appropriate forecasting.

## 3.5 Quick response to regional outbreak of disease and disaster

A regional on-line health information network will bring great benefits for controlling regional outbreaks of disease. There are many successful experiences of health information systems which have been used to deal with emergencies due to disease outbreaks and to avoid or reduce the potential economic loss.

As an example, in China, when six provinces around the Yangtzi River were heavily flooded in 1991, the central government expressed serious concern about disease-prevention activities in the flooded provinces. In response, experts were assigned to the flooded areas,  and prevention guidelines were

developed and distributed to the affected provinces. Simultaneously, the daily disease report was sent to Beijing electronically, the analyses were conducted through comparing the infectious disease morbidity with accumulated data from previous years to identify potential outbreaks and focus on high risk groups. For example, rates of hepatitis during the flood were compared with rates for the comparable time periods from the preceding 2 years. Data collected from the following months indicated that infectious diseases had been controlled effectively during the flood. Without the pre-existing databases and the capacity to predict using models, there would have been expensive disaster in disease outbreaks.

Similar functions could operate in a regional health information system to prevent and control outbreaks of disease one or more countries in the region. Here is how the system might work in the case of an outbreak of cholera in the border area in China. News of such an outbreak could be almost instantaneously transmitted to China's Ministry of Health, the MOH in other networked countries(e.g. Myanmar, Laos, Thailand), WHO in Geneva, leading experts in cholera working outside China and people experienced in dealing with cholera outbreaks in Thailand. Information on immediately improving water quality and technical reports concerning the control of cholera could be sent immediately to China. Quick reaction will be taken in that area. At the same time, the neighboring countries(e.g. Myanmar) would take joint quick action to prevent cholera transmission across the border. Through this regional effort, a cholera outbreak can be controlled more effectively. The rapid intercountry spread of cholera in the absence of such a network was seen clearly in the Amazon region of several countries in South America two years ago.

## 3.6 Monitoring equity in health care

Equity in health care has to be considered in any country, in order to achieve health for all. Almost all countries have more or less inequity in health, which is amplified due to inequity in health resources distribution. Governments need to make policies and take actions to improve equity in health care.

Accurate surveillance is essential for equity in health care. A great deal of morbidity and mortality results from inequitable allocation of health care resources. This cannot be corrected unless there exist accurate and timely surveillance data showing where the needs are, how resources are distributed and what changes in distribution can most readily be made.

Equity in health conventionally has focused on different geographic regions. However, there is a need to identify inequity among people of various socioeconomic backgrounds to identify underserved populations rather than just regions. So such an information system, combining economic databases with existing

health/disease databases, will be much more effective to address the problem of inequity in health care. To achieve this ideal requires that data be available at the local level, in view of the variability that can occur within a province or other large geographic areas.

There is a challenge to the international community - as well as the individual countries - to reduce these unacceptable inequities. It is clearly no longer justifiable to continue in the way we have been moving in the health field. Tomorrow must not be just more of yesterday. A new framework for public health action is needed that takes into account current, changing realities - economic, social, and political - at global, regional, and national levels and reflects demographic and epidemiologic profiles.

## 3.7 Discussion

Establishing a regional economic-health-disease information system will generate great benefits for the countries concerned. It is essential to rational health and economic planning, resource allocation and program management. One cannot manage in dark.

In order to assure the effectiveness of disease prevention and control, it is important to extend the surveillance from national to regional level. Because some communicable diseases(e.g. malaria, AIDs) cannot be eliminated or controlled effectively by only emphasizing individual countries, it needs coordinated actions to solve such problems.

It is also important to broaden the conventional definition of the most common types of health services. Because health conditions have multiple determinants, we must take into account all services that strongly influence health, including those that are not under the direct control of health care agencies.

We have learned that high-quality surveillance increases our credibility with the public and with health care providers. It can be a tool for public relations. Accurate and credible surveillance data are the major tools we have for identifying and forecasting many health problems. Other components of the government and the public sector generally are more likely to follow our recommendations if such recommendations are based on convincing data. Our colleagues in the budget office are more likely to provide resources to be applied to problems when they see clear, convincing, quantitative measurements of the problems we are trying to solve.

Countries must have the vision to embark on long-term development programs that will result in three conditions:

a) If health care systems of the future are to be of optimal benefit to the people who need them, there must be continuing improvement of the efficiency and efficacy of our interventions;

b) There must be increased compatibility with the political and socioeconomic realities of our time;

c) Most importantly, there must be an inherent respect for basic human rights, such as the right to be informed and integrity of the individual.

Such an information network is an essential element in satisfying all three of these conditions, and it must and will play a significant role in the assessment and development of global health. Surveillance will make a vital contribution to fulfilling our vision of health for all and to the socioeconomic development of the world community.

The general benefits of establishing the regional economic-health-disease information network have been discussed in this Chapter. The following Chapters will give an example of utilizing data from such a network which would be beneficial to health policy planning. As malaria is one of the most serious health problems in this region and hence is a high priority for establishing a network, so we take malaria as a pilot study.