Environmental Health Perspectives
Vol. 44, pp. 129-133, 1982

Commentary

What Can Be Learned from Studying Asian Health Problems?

by Philip S. Chen, Jr.*

The National Institutes of Health, owing to its broad mandate to pursue and support acquisition of knowledge in biomedicine, is very much concerned with any investigations leading to better understanding of the causes and control of human diseases. One approach is to study health and illness in special subsets of the United States population and of populations in foreign countries.

In this paper, I shall touch briefly on a number of health problems and disease-oriented research topics looked at from the special perspective of Asian and Asian-American populations, hopefully to sensitize perceptions about the contributions that such studies can make to our total understanding of how best to achieve health and conquer disease.

The new goal of the World Health Organization (WHO) is "Health for all by the year 2000." "The aim is to enable all people of the world to attain an acceptable level of health and to lead a socially and economically productive life." (*1*).

Population

Asia, with just over 20% of the world's land area, has over 55% of the world's population. The two most populous countries, China and India, alone account for over 40% of the world's population, and Indonesia is the fifth most populous nation, Japan is seventh, followed by Bangladesh and Pakistan.

An important factor in determining the health of a nation's population is the level of economic development, which in turn is related to the rate of population growth. Growth in population puts enormous pressures on many aspects of a nation's economy. The larger the number of infants and young children who need to be fed and cared for, the greater the number of those who will live in poverty, be uneducated, and underfed.

The annual rates of population growth range from 0.4% in northern Europe to 1.0% in North America and the U.S.S.R. to 1.2% in Japan and 1.6% in China, to 2.6% in South Asia, and to 3.3% in Middle America. The world average is 1.9%.

Control of population growth rates will correlate with improvements in health, and a number of Asian countries are continuing to struggle with this significant aspect affecting their national futures.

Malnutrition

Recent estimates by the Food and Agriculture Organization (FAO) of the United Nations suggest that about 450 million people do not receive enough food. The distribution of malnutrition is very uneven around the world, even within a region such as Asia (*1*). In high-income countries with low rates of population growth, the general problem is obesity due to overeating (i.e., malnutrition of affluence). These countries include Japan and Oceania, as well as those in North America and Europe. In middle-income developing countries, some of which are in Asia, there are high rates of population growth, poor income and land distribution, resulting in food deprivation for many. The higher income portion of the population may also suffer from malnutrition of affluence. The poorest countries, including those in Asia and the middle of Africa, are those in which hunger and malnutrition are most severe. An estimated one-third to one-half of their inhabitants are victims of malnutrition.

China and other Asian countries with planned economies are in a special category. Although per capita GNP is in the lower range, most observers report that overt malnutrition is not common. Thus it is possible for a nation to improve the nutritional status of its populace by devoting long-range attention to this issue. Health research *per se* is not particularly competent to contribute to the solutions of these kinds of malnutrition problems.

*National Institutes of Health, Bethesda, Maryland 20205.

Delivery of Health Care

In Asia, as is true even of a modern industrialized nation such as the United States, there are considerable variations in the quality of health care available to the general population. One general indicator that has been used is the ratio of physicians to the number of inhabitants. In the United States this ratio is about 168 per 100,000 population, which is roughly double the physician:population ratio worldwide of 80.8 per 100,000. In Asia, the number per 100,000 population ranges from a surprising high of 208 in Mongolia, to 26 and 27 in Pakistan and India. The comparable figures for Japan and China are 118.3 and 38.4, respectively, based on the latest World Health Organization figures for 1980. At the low end are Thailand with 12.1 and Indonesia with only 7 (*2*).

These figures may be misleading, in the sense that not all health care is delivered by physicians. For example, we have all heard of the great contributions of the "barefoot doctors" in the People's Republic of China. These paraprofessionals, as well as the more highly educated physicians, are trained in the use of traditional Chinese medicine as well as in Western medical knowledge. Much publicity had been given to the use of acupuncture following former President Nixon's trip to China, and his personal physician, Dr. Walter R. Tkach, encouraged the NIH to support research on acupuncture. At that time, I was working for the National Institute of General Medical Sciences, and Dr. DeWitt Stetten, the then Director of NIGMS, was asked by the NIH Director, Dr. Robert Q. Marston, to initiate an acupuncture research program. The NIGMS convened international workshops, and a review committee was established within the Division of Research Grants to evaluate grant applications in acupuncture. An initial flurry of research began, coincident with the opening of many acupuncture clinics scattered around this country. In the last half dozen years or so, however, interest in acupuncture has diminished and stabilized. It is generally accepted that acupuncture can exert an analgesic effect, mediated perhaps through some mechanism involving the endorphins. The claims for therapeutic effects of acupuncture in the cure of a wide variety of diseases are generally not supported by reliable research evidence.

An example of the contribution of traditional Chinese medicine to Western medical knowledge is the discovery of ephedrine through scientific studies of an old Chinese herbal concoction. Several decades ago, the Chinese-American pharmacologist, Dr. K. K. Chen, performed, in this country, the work which led to the acceptance of ephedrine as a standard pharmaceutical agent.

I might add at this point a brief comment about the reported remarkable improvement in health care in the People's Republic of China, and the manner in which it was attained. Certain lessons can be learned from this which have applicability to other Asian countries as well as to the United States.

Soon after founding of the People's Republic of China, Chairman Mao issued four cardinal principles as guidelines for medical and health work in China. One was to stress prevention, another was to unite the practitioners of Chinese traditional medicine and of Western medicine. Today it is accepted that China has advanced considerably: in its health delivery system, using barefoot doctors, health aides, and midwives; in its medical education system; in its production of pharmaceuticals, medical instruments and apparatus; in its sanitation efforts, resulting in eradication or control of smallpox, cholera, plague, and venereal diseases; in its family planning programs; and in its integration of traditional medicine with modern Western practices.

Cancer

In a monumental study recently completed in the People's Republic of China, data on cancer mortality over the three-year interval 1973-1975 were collected among a population of 840 million Chinese using a cadre of approximately 600,000 health workers. Results were issued in a Chinese publication entitled *Atlas of Cancer Mortality for the People's Republic of China* (*3*). The data are most dramatically displayed in colored maps showing mortality rates for various cancers by county. About 700,000 deaths per year were due to cancer.

Some dramatic differences between the Chinese and the U.S. data can be highlighted. In the United States, the leading cause of cancer mortality is lung cancer in men and breast cancer in women. In contrast, the leading cause of cancer mortality in both men and women in China is stomach cancer, followed by cancers of esophagus and liver. In the United States lung and breast cancer are followed by colon and rectal cancer.

Overall cancer mortality in China is higher in urban areas, in males, and in certain ethnic minorities. Among children under 15 years of age, cancer is the cause of only 0.8 percent of deaths. The overall statistics placed China lower in cancer mortality than most industrialized nations but higher than many other nations in Africa, Asia, and Latin America.

Certain variations within the country are very interesting from a research standpoint. For example, esophogeal cancer varies markedly with geographical areas and there are six areas in China with unusually high rates. For example, in Linxian, Hanan province, esophogeal cancer rates may be the highest in the world, with one death in six in this county attributed to esophageal cancer.

The county maps of China show that there are high rates of nasopharyngeal carcinoma in southern China. Several factors are associated with this cancer. For example, antibodies against Epstein-Barr virus tend to be elevated in patients with this disease and can be used as an assay in screening programs. Genetic factors may also play a role, because there are higher rates among Cantonese who migrated to that region several generations ago. Also there are high incidences of liver cancer on the southeastern coastal provinces and in an area of northeastern China, which may be linked with liver disease caused by viral hepatitis B, with ingestion as a contaminant in the diet of aflatoxin, known as a potent liver carcinogen, and with possible exposure to hepatotoxic pesticides.

Cancers of the lung and bladder are found to be more common in major urban areas, such as Shanghai, Tiensin and Beijing. Contributing factors might be an increased level of cigarette smoking or of industrial pollutants and the use of coal-burning stoves in unventilated homes. Dr. Robert Miller of the National Cancer Institute reported on a valuable data resource in Shanghai—a tumor registry containing information on incidence and mortality going back to the 1960s (4). By comparing cancer incidence in Shanghai with that for Chinese-Americans and other ethnic groups in the United States, epidemiologists may be able to gain useful knowledge concerning possible etiologic factors. The Shanghai data show that cancer of the prostate and Ewing's sarcoma of bone are rare, whereas stomach cancer is the most frequent neoplasia.

The National Cancer Institute has sponsored a number of exchange visits of scientists between our country and China. Several NCI epidemiologists have spent time traveling in or working in China. Reports on the special clustering of cancer in domestic animals, such as pigs, chickens, and ducks, have provided very useful clues in research on the etiology of human cancer.

Dr. Robert Miller has also worked in Japan and related the interesting discovery of a very high incidence of primary respiratory tract cancers in Japanese who worked in a mustard gas factory during World War II. The latest statistics indicated that 73 of 500 workers had fallen victim to such cancers.

Genetic Diseases

A recent visitor to Beijing reported to the WHO on quantitative differences between the Chinese population and the general U.S. population with respect to several genetic diseases. For example, cystic fibrosis and several leukodystrophies were seen relatively infrequently among the Chinese. However, other genetic diseases are observed relatively frequently, such as Down's syndrome and other chromosomal defects, Huntington's chorea, phenylketonuria, homocystinuria, Duchenne's muscular dystrophy, and even Tay-Sachs disease in a certain province (Hanan). The Tay-Sachs gene may have been introduced into the latter geographic area during the 13th century, when it was said that Jewish traders had lived in Kai-feng City, marrying Chinese spouses.

The unavailability of special diets such as low-phenylalanine for patients with phenylketonuria is a problem. U.S. medical scientists, through visits to China, are helping to provide advice with respect to better diagnostic methods and treatment modalities for genetic diseases. As the general level of technology improves in the study of genetic diseases, there will undoubtedly be significant findings that will become evident owing to the very large and yet mostly homogeneous population in a country as large as China. The same can be said of other Asian countries.

Infectious Diseases

Most Asian populations do not differ from those in Western countries in their basic reactions to disease agents. However, a number of infectious diseases remain very serious problems in particular Asian populations, in contrast to the U.S. where they are rarely or never seen.

Parasitic Diseases

Malaria continues to be of global impact, especially in South Asia. In 1976 there were over 8 million cases. One of the serious problems today is falciparum malaria, resistant to chemotherapy. Considerable research efforts are aimed at immunologic approaches, i.e., the development of a vaccine. There is evidence that vaccines might be able to be produced from practically all stages of the parasite in man (sporozoites, schizonts, gametocytes, merozoites). One intriguing approach is to attempt to interrupt transmission, in effect by "vaccinating" the mosquito.

Transmitted by snails as a vector, Schistosomiasis has increased in incidence as a result of large-

scale water impoundments and artificial man-made lakes. Some 200 million people are infected. Research is aimed at improved chemotherapeutic agents. The most recent drug is called Praziquantel, said to be especially useful in treating *S. hematobium*.

Acute Diarrheal Diseases

Diarrheal diseases are major killers of children, causing in excess of 5 million deaths annually. Rotavirus and enterotoxic *E. coli* as well as cholera are the major culprits.

Tuberculosis

Tuberculosis, once a public health problem in Western nations, accounts for 4th place among causes of death in Southeast Asia. There are 3.5 million new cases annually with 0.5 million deaths.

Leprosy

Four million individuals are infected with leprosy in Southeast Asia, mostly in India.

Infectious Disease Research

Research on these "tropical" and other diseases has been assisted by planned efforts in which NIH has played a significant role. The United States–Japan Cooperative Science Program is now in its 16th year. This program is coordinated for the U.S. side by the National Institute of Allergy and Infectious Diseases (*5*).

Certain laboratories located in Asia have received considerable encouragement and sponsorship by Western nations. The International Center for Diarrheal Diseases Research (ICDDR) in Dacca, Bangladesh, and also the International Center for Medical Research in Ching-Mai, Thailand, are sites where NIH staff have actively participated in many research studies. The National Institute of Allergy and Infectious Diseases is currently conducting field trials of hepatitis B vaccine for both its primary effect in protecting a mother from hepatitis as well as a possible secondary effect to protect offspring from later developing liver cancer. This is obviously a very long-term clinical trial but one with enormous implications, both for infectious disease and in cancer prevention.

Radiation Exposure

One truly unique opportunity available only in Asia is the ability to study the long-term effects of radiation exposure in the atomic bomb survivors of Hiroshima and Nagasaki, Japan. Nowhere else in the world is there such a population. A number of NIH staff, primarily from the NCI, but also from NIEHS and other institutes, have worked at the Radiation Effects Research Foundation (RERF) and its predecessor the Atomic Bomb Casualty Commission (ABCC).

The evidence that whole body irradiation can produce leukemia was firmly established by observations of the occurrence of acute and of chronic leukemia, both of which began to increase several years after the atomic bombs were dropped, peaking some 6 years later, but with continued higher incidence long afterwards. Prior to such direct observations on a large exposed population, the evidence for radiation-induced leukemia was based on individual case reports of early radiation workers or of radiologists, and experimental studies of the effects of x-rays in mice.

Despite the fact that their populations greatly exceed ours, the Asian countries have many of the same problems. Their leading causes of death are the same as ours: heart disease, malignant neoplasms and accidents. They are beset by the same behavioral factors as we are. Smoking is well recognized as a leading environmental health hazard. Just consider a few statistics on the number of cigarettes consumed by persons aged 15 or older in 1973: In the U.S. it was 3850; in Japan, 3240; in the U.K., 3230; in Hong Kong, 2780; in Singapore, 2490; in Pakistan, 760; and in India, 170. Clearly, several Asian countries are approaching the U.S. in a high cigarette consumption, and it can be expected that lung cancer, emphysema, heart disease, etc. will increase as a result. Indeed China, India, Indonesia, and the Republic of Korea are among the world's top 10 tobacco-producing countries.

In closing, the participation by Asian scientists in the total biomedical research effort should be noted. Many researchers and research support staff at the NIH as well as around the country are from an Asian heritage. Currently, the largest number of participants in the NIH Visiting Program (comprising Visiting Fellows, Visiting Associates, and Visting Scientists) comes from Japan. Many other Asian countries are represented as well. Since the commencement of diplomatic relations with the People's Republic of China, an increasing flow of research trainees, primarily Visiting Fellows, have come from the PRC. The "cultural revolution" unfortunately had caused a massive disruption in the research and educational system in China; as a consequence, its biomedical researchers were not able to keep pace with the rapid progress in science. The National Institutes of Health is contributing to the upgrading of biomedical research capability in that nation by providing many training opportunities for PRC

scientists within the intramural NIH laboratories and clinics.

Health research and efforts to improve health care are peaceful activities which can greatly contribute to human well-being. They are noble endeavors of which mankind can be proud. Such studies of and by Asians and Asian-Americans help to meet our own aspirations for health as well as the overall global goal set by the World Health Organization.

REFERENCES

1. Sixth Report on the World Health Situation, 1973-1977, Part I: Global Analysis. World Health Organization, Geneva, 1980. pp. 1, 18.
2. World Health Statistics Annual, 1980. Health Personnel and Hospital Establishments, World Health Organization, Geneva, 1980, pp. 2-8.
3. Atlas of Cancer Mortality in the People's Republic of China. China Map Press, Shanghai, 1979.
   Li, F. P., and Shiang, E. L. Cancer mortality in China. J. Natl. Cancer Inst. 65: 217-221 (1980).
4. Miller, R. W. Cancer epidemiology in China: two years of progress. In: Cancer Research in the People's Republic of China and the United States of America, Paul A. Marks, Ed., Grune & Stratton, New York, 1980, pp. 79-83.
5. The United States–Japan Cooperative Medical Science Program. Third Year Report, 1975-1980, Department of State Publication 9127, East Asian and Pacific Series 217, 1980.