THE TAKEMI PROGRAM IN INTERNATIONAL HEALTH
HARVARD SCHOOL OF PUBLIC HEALTH

HEALTH POLICY TOWARDS THE 21ST CENTURY:

Health Problems Beyond The National Boundary

THE FIRST TAKEMI SYMPOSIUM ON INTERNATIONAL HEALTH 1984

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MICHAEL R. REICH, Editor

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HOWARD H. HIATT

INTRODUCTION

This volume presents the proceedings of the First Takemi Symposium on International Health, held in Tokyo in May, 1984. As such, it makes available to a larger audience than could attend the Symposium the perspectives of several authorities from around the world on critical issues of health resources allocation. The book has two additional objectives. First, it marks the creation of the Takemi Program in International Health, a new research and teaching program at the Harvard School of Public Health, which addresses the problems of allocating resources for health. The Symposium in Tokyo was the first in a series of international meetings to be held every two years by the Takemi Program. Second, it celebrates the life of Dr. Taro Takemi, whose untimely death in December, 1983, prevented his attendance at the Symposium. Dr. Takemi worked vigorously to focus attention on the allocation of medical care resources, and his energies were devoted to making possible the Takemi Program at Harvard.

Speakers at the Symposium discussed problems arising from the growing discrepancy between what needs to be done in the health field, on the one hand, and available resources, on the other. Several speakers discussed aspects of the problem as it confronts Japan and the United States and other industrialized countries. Even more attention was directed at aspects of the issue that developing nations must face. Dr. Takemi, in an address he recorded before his death, took the lead in summarizing the range of health problems that now exist in Third World countries, and the many more that the development process will create. He pointed out the urgent need to transcend national boundaries in the search for solutions. Elsewhere he often emphasized the need to cross disciplinary boundaries in such searches. These themes are illustrated in several essays in this volume and are central to the Takemi Program at Harvard.

Issues of health resources allocation form the main focus of the Takemi Program at Harvard. To plan and implement the early stages of the Program, several of Harvard's ablest scholars and several of Dr. Takemi's most distinguished colleagues were consulted. The views of many appear in the papers and the discussions of this volume. In this way, the Takemi Program has taken a first step in bringing together health professionals from Japan and the United States, health professionals from industrialized and non-industrialized countries, and authorities from medicine, the social sciences and other areas. Such collaboration is in the best tradition set by Dr. Takemi. Such collaboration is essential if the complex health problems that afflict society are to be significantly lessened.

Dr. Takemi's absence at the Symposium was deeply felt by all participants. I hope he would have been pleased by our efforts to continue his explorations, which now will persist in the Takemi Program at Harvard. And it is to Dr. Taro Takemi that this volume is dedicated.

MICHAEL R. REICH

EDITOR'S PREFACE

This publication of the Proceedings of the First Takemi Symposium on International Health resulted from the dedicated efforts of many individuals and organizations. The Japan Committee for the Takemi Program provided planning and organizational services for the Symposium, and also arranged financial support for the meeting in Tokyo. Many members of that Committee participated in the Symposium as speakers, presiders, and commentators, as illustrated in the pages of this volume. They also worked diligently to assure that the Symposium occurred smoothly, by coordinating the activities of persons from several organizations. We especially appreciate the efforts of Dr. Seiji Kaya, Chairman of the Japan Committee for the Takemi Program and Chairman of the Board of Directors of the Institute of Sciences for Human Survival. All participants in the Symposium, especially those who travelled from other countries, should be thanked for their thoughtful contributions. Their efforts helped elucidate the problems of allocating resources for health, both within countries and across national boundaries.

The transformation of the Symposium's record into a published Proceedings required a new set of efforts in Boston. Ginger Quinn worked long hours to transcribe the tapes of the Symposium's many sessions and to enter several rounds of revisions in both papers and discussions. The papers and comments made in Japanese were transcribed in the interpreter's English, and were edited and then reviewed by the speaker. Judith McLaughlin reviewed the entire volume, judiciously shortening comments in the discussions and improving the flow of prose throughout. Margaret Courtney designed the cover and managed the process of publication at the Harvard School of Public Health. And Laurie Shepard patiently guided the volume into its final form for publication, revising the essays again and again to meet the demands of authors and editor.

This volume, as the first publication of the Takemi Program in International Health, represents our continuing efforts to fulfill the Program's objectives of crossing both national and disciplinary boundaries to examine the processes of mobilizing, allocating and managing scarce resources to improve health. While the Program initially concentrates on health problems in poor countries, it also seeks to understand health policy in rich countries, as illustrated in the papers and comments presented at the Symposium.

The reader of these Proceedings will find many statements that provoke thought and debate, including issues that are raised without complete answers. The Symposium successfully identified difficult questions of equity and efficiency in allocating resources for health, questions that must be addressed in both rich and poor countries. In so doing, the Symposium helped set the agenda for future research in the Takemi Program and for the next Symposium scheduled for Boston in 1986.

SYMPOSIUM SPEAKERS

DAVID E. BELL received his M.A. in Economics from Harvard University and holds honorary LL.D.s from Pomona College, Harvard University, the University of Vermont, Notre Dame University and the University of North Dakota. At Harvard University, Prof. Bell serves as Clarence Gamble Professor of Population Sciences and International Health, Chairman of the Department of Population Sciences, Director of the Center for Population Studies, and Acting Director of the Takemi Program.

HOWARD H. HIATT is the former Dean of the Harvard School of Public Health. He attended Harvard College and is a graduate of the Harvard Medical School. He is currently Professor of Medicine at the Harvard Medical School and serves as an adviser to several national and international committees concerned with health affairs. Dr. Hiatt is also a member of the Harvard Committee for the Takemi Program.

WILLIAM C. HSIAO received his M.P.A. from Harvard University in Public Administration and his M.A. and Ph.D. in Economics from Harvard. He is currently Associate Professor of Economics in the Department of Health Policy and Management at the Harvard School of Public Health. Prof. Hsiao is a member of the Harvard Committee for the Takemi Program in International Health.

AKIRA KOIZUMI received his M.D. and D.M.Sc. from the University of Tokyo, and his M.S. in Hygiene from the University of Pittsburgh. He is a Director of the Institute of Sciences for Human Survival and a member of the Japan Committee for the Takemi Program. In July, 1984, Dr. Koizumi was appointed Visiting Professor in Population Sciences and in the Takemi Program at the Harvard School of Public Health.

SEIZO OHE is a former President of the Japan Science and Philosophy Association and was a Professor in the Department of Science and Technology of Nihon University. He currently acts as an adviser to the Institute of Sciences for Human Survival and is a member of the Japan Committee for the Takemi Program.

CHONG KEE PARK received his Ph.D. in Economics from George Washington University. He is the former Director of the Third Division of the Korea Development Institute and currently a Professor of Economics at Inha University.

V. RAMALINGASWAMI is a past president of the Indian National Science Academy and the former Director of the All-India Institute of Medical Sciences. He is presently the Chairman of the Global Advisory Committee on Medical Research of the World Health Organization, and Director-General of the Indian Council of Medical Research in New Delhi.

MICHAEL R. REICH is the Executive Director of the Takemi Program in International Health and a Lecturer on International Health in the Department of Health Policy and Management at the Harvard School of Public Health. Dr. Reich received his M.A. in East Asian Studies and his Ph.D. in Political Science, both from Yale University.

FREDERICK C. ROBBINS is currently the President of the Institute of Medicine at the National Academy of Science in Washington, D.C. He received his M.D. degree from Harvard Medical School and received the 1954 Nobel Prize in Physiology and Medicine. Dr. Robbins served as Dean of the School of Medicine at Case Western Reserve University and was recently appointed Professor Emeritus and Dean Emeritus at that University.

MARC J. ROBERTS earned his Ph.D. in Economics from Harvard University. He is Professor of Political Economy and Health Policy in the Department of Health Policy and Management at the Harvard School of Public Health.

YUKIO SUZUKI is a Professor in the Department of Economics at the University of Tokyo and serves as Auditor for the Institute of Sciences for Human Survival.

EIMATSU TAKAKUWA is a Professor Emeritus of Hokkaido University. He is the vice-president of the National Pollution Research Institute, a member of the Japan Science Council, and a Member of the House of Councillors, the lower house of the Japanese Diet.

TARO TAKEMI was a graduate of the Keio University School of Medicine, and died in December, 1983. He was President of the Japan Medical Association from 1957–1982 and was President of the World Medical Association from 1975–76. Dr. Takemi held Visiting Professorships at Keio University, Kitasato University, Tokai University, the University of Occupational and Environmental Health, and Harvard University. He was Chairman of the Japan Committee for the Takemi Program.

KENZABURO TSUCHIYA holds a doctoral degree from Keio University and an M.P.H. from the University of California. He is the current President of the University of Occupational and Environmental Health in Japan and is a Director of the Institute of Sciences for Human Survival. Dr. Tsuchiya is a member of the Japan Committee for the Takemi Program.

ANDRE WYNEN received his M.D. from the Universite Libre de Bruxelles. He has served on the Board of the Belgian Medical Association since 1964 and is currently the Secretary General of the World Medical Association.

MASAAKI YASUKAWA is an economics graduate from Keio University and is currently a Professor in the Department of Economics at the same institution. He is the Director of the Japan Institute of Demography, a member of the Population Problems Deliberation Committee of the Ministry of Health and Welfare, and a Director of the Institute of Sciences for Human Survival. Prof. Yasukawa is also a member of the Japan Committee for the Takemi Program.

YEON HA-CHEONG from the Republic of Korea, received his Ph.D. in Economics from the City University of New York. Since 1977 he has served as Director of Research Planning and Coordination at the Korea Development Institute. He is currently a Takemi Fellow in International Health at the Harvard School of Public Health doing research on the impact of the expansion of Korea's health insurance coverage on income distribution.

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The Takemi Program at Harvard and a Global Perspective on Human Civilization

Before the emergence of man, a natural order seemed to rule over the earth, an order that included natural enemy relationships between living species. The species homo sapiens then embarked on a tragic fate by destroying this harmony of nature. The Christian myth of "Paradise Lost" in the Old Testament symbolizes this destiny of mankind. As is well known, Adam and Eve were cast out of their paradise because against God's command, they ate the fruit of the Tree of Wisdom. In exchange for the idyllic life of "Paradise Lost," our human ancestors acquired the gifts of self-conscious intelligence and free will. Intelligent and free-thinking man created civilization and, as a result, was forced to earn his living through hard labor. From his animal ancestors, however, man inherited the blind will to live, called selfish desire or "avidya" in Buddhist terms. That aggressive desire of animals still lives deep in man's mind.

Human civilization, thus laden with such a long evolutionary history of natural and human worlds, is full of contradictions. These contradictions are now leading us towards an eventual self-annihilation of the human species. Many symptoms of this phenomenon can be observed:

First is the partly uncontrollable growth of world population, accompanied by shortages of food and energy which cannot be adequately increased by various means of production. Birth control is necessary in one form or another, but to enforce it by law obviously neglects the natural feelings of people and infringes upon human rights. Such a policy, I am afraid, might damage a nation in the long run.

Second is environmental pollution and the destruction of our natural surroundings. These conditions are caused by the continued advance of human civilization, not adequately checked by technical means. For example, the postwar reconstruction of Japan started with a dream of a nation something like Switzerland, but after long years of hard work, that dream failed to be realized. Today, Japan is an affluent but dirty factory for the world, surrounded by polluted air, water and soil. Though the situation has become somewhat better in recent years, Japan is now said to be one of the worst exporters of the industrial destruction of nature, for example, in Southeast Asian forests.

Third, the prosperity created by the achievements of modern industrialization can trigger the excessive growth of human

desires. As these human desires grow, so too grow the antagonisms among individuals and groups, in family and society, and between classes and nations. Nowadays, international conflicts seem aggravated by severe tensions between religious traditions or between political ideologies. These traditions and ideologies, which were originally meant to bring about brotherly love or social justice, are in actuality motivated by earthly desires. These contemporary international conflicts have caused a historically unprecedented flow of refugees in the world, and their numbers are still growing. It cannot be denied that behind all these human sufferings today there exists a hidden anxiety about the possibility of nuclear war in the near future. For the time being, it may be a hopeful consolation for mankind to know that Japan is sticking to its non-nuclear policy.

Fourth, there is no doubt that some catastrophic deterioration of human health has occurred from the irreversible worldwide advance of modern civilization. The imbalance between food and exercise might be the most fundamental defect in the maintenance of life. This imbalance has caused a flood of information and stimuli and has enormously complicated human relations, generating frustration, stress, insomnia and alchoholism, narcotic addictions and sexual anomalies.

All these things affect the family structure. Schools and other social institutions torment youngsters and adults alike, men and women at large. In addition, scientific and technological progress often takes its toll on the human mind. Old people who are well protected by good social security systems do not appear very happy; their deathbed faces look very sad. Participation in sports and hobbies could aid in the cultivation of a healthy and happy old age. Sports, in particular, can help develop a healthy mind; through sports one can experience some of the most genuine joys of life. In this sense, the Olympic games, entirely independent of all international politics, could offer an effective step towards world peace. All these current problems are interrelated and equally important, but in accordance with the central theme of this Symposium, they can be restated as two urgent points.

First and foremost, we must eradicate from the entire human world all diseases caused by ignorance and malnutrition. This concerns mostly the so-called developing countries, but large-scale global cooperation is necessary to accomplish this goal. We must organize an international effort to attain an equitable and effective distribution of all available medical resources in the world. Such an organizational effort presupposes strong international awareness and authority. Therefore, it was very wise for Dr. Takemi to have asked Harvard University in the United States to become the international research and educational center for the realization of this lofty idea of a global welfare community.

Second, we have to face the health problems -- physical as well as mental -- of old people in the so-called advanced welfare states. In this respect, Japan, whose population is now rapidly aging, would have much to learn from the United States and from countries of western Europe which already have large aged populations. Through this learning process Japan may be able to implement better policies appropriate to Japanese traditions. Dr. Takemi, who was very worried about this problem, continually reminded the Japanese people that they must approach the reality of an aging society with courage and wisdom. We have to make every possible effort to realize his vision of a beautiful and happy old age, in Japan and all over the world.

In conclusion, let us look at the Takemi Program at Harvard as a whole, within the world historical perspective of human civilization. If we suppose the root of human civilization to be at the center of the huge Eurasian land mass, Japan is at the eastern end of its eastern branch and America at the western end of its western branch. More than two thousand years ago when the classical ancient civilizations of mankind were independently brought to maturity, dangerous iron weapons began to circulate. At that time, the spiritual leaders of both the east and the west were teaching the ideals of a rational spirit and the morals of brotherly love. As the western branch on the American continent pushed aside the aborigine neolithic civilization of the American Indians, the eastern branch on the Japanese islands pushed against the aborigine neolithic civilization of Asia. By the middle of the 20th century, modern Japan had successfully adopted western science and technology into its Oriental tradition, and since then, Japan has become one of the great world powers. Also by the middle of this century, the United States had already established itself as the greatest world power through the integration of all the western traditions into a new, modern civilization.

Just a generation ago these two ends of civilization, across the largest ocean of the earth, engaged in a dreadful armed confrontation which even today haunts our memory as a bad dream. This bad dream will be turned around by the Takemi Program at Harvard. The eastern end and the western end of civilization are now going to be bound together in peaceful and useful cooperation. This cooperative effort will contribute to shaping the 21st century, and to realizing the cultural and educational cooperation of all nations of the world in advancing the global welfare community of mankind. I hope this Symposium will be a first step in the achievement of this goal.

HOWARD H. HIATT

The Conceptual Contributions of Dr. Taro Takemi To the Takemi Program in International Health

Everywhere the disparity grows between what modern medicine can achieve, on the one hand, and what society can afford, on the other. Further, as the health benefits that derive from a variety of changes in the human environment are more widely appreciated, some expenditures in this area may also be regarded as in the health domain, and, therefore, as competing for health resources.

In all nations of the world these and other facts make urgent the development of better methods for setting priorities for the use of health resources. The evaluation of all competing programs will require attention to issues of trade-offs. Priorities will, of course, differ from one nation to another, and from time to time within the same nation. As difficult as is resource allocation in the industrialized nations, where expenditures for health now often exceed several hundred dollars per capita per year ($1500 in the U.S. last year), that process is far more difficult in Third World countries, where expenditures may be less than $15 per capita per year.

For the process of priority setting to be equitable and rational, more and better data will be required concerning programmatic costs and benefits. For that process to be widely accepted, mechanisms must be found not only to develop, and to increase public understanding of, workable guidelines, but also to involve broader sectors of the public in decision making.

These are some of the challenges that confront health policy makers in all nations. But the process of finding methods for rational and equitable health resource allocation is in a very early stage of development. It represents the underlying theme for much of the research of the Takemi Program in International Health. It will stimulate investigation in a variety of areas where Dr. Taro Takemi made important contributions.

In the remarks that follow, I would like to mention ten basic points that will likely be among those studied by health professionals in the Takemi Program and to illustrate these ten points with citations from the writings of Dr. Takemi. This presentation will thereby suggest some of the many contributions of Dr. Takemi to the foundations of the Takemi Program in International Health at Harvard.

THE ALLOCATION OF EXISTING RESOURCES REQUIRES MORE EFFECTIVE PLANNING

Dr. Takemi:

"Facilities (must) be developed for community use. . . . The matter of collection and presentation of medical information (is vital). I believe that the introduction of computerization to a community must be done essentially by a medical association hospital. Within a medical care facility, too, computerization has basically altered the form of hospital management."

MEDICAL INTERVENTION -- WITH FEW EXCEPTIONS -- WILL NOT SAVE MONEY

Medical expenses are rising and will continue to rise, as new technology is developed, and as populations grow older. While efforts must be made to ensure that all medical interventions are cost-effective, with few exceptions those interventions will require additional resources.

Dr. Takemi:

"Ever-increasing medical expenses have become a problem in many countries of the world. This phenomenon is explained as a consequence of the increased value of health resulting from the progress and spread of medical science and the rise in the standard of living. . . . The development of antibiotics due to the progress of medical science has made it possible to control many infectious diseases, and has changed medical therapy completely. It is a gross mistake to think that the resultant increase in medical expenses is a waste."

THE IMPORTANCE OF PREVENTIVE MEDICINE

In part because of the growing appreciation of the limitations of therapeutic medicine and concerns for its cost, more attention is now being directed at preventive medicine.

Dr. Takemi:

Among the "important problems of community medical care are those of health promotion, disease prevention, early detection of disease, and early therapy.

"The requirements for living long are aging (in a healthy way) and building an enjoyable and peaceful society. Without health, there could be no peaceful and enjoyable society. To build such a society would require preventive measures against people suffering from geriatric diseases and other ailments. The health insurance systems of the past which were useful only when one became ill did not incorporate the idea of preventive benefits. When we enter the stage of survival security, we shall have to provide preventive benefits.

"A baby born today is expected to live to be 80 years old. When the individual becomes 25 years old, he joins the old age health insurance plan by paying the premium. When he is 40 years old, he can receive the benefits of medical checks against health disruptions resulting from aging, as mentioned before. When this system is put into operation, it will perhaps be possible to reduce the mortality resulting from cerebral hemorrhage to less than one-third of what it is now."

As part of the approach to preventive medicine, environmental factors responsible for disease must be identified and controlled.

On this subject, Dr. Takemi wrote:

"How to prevent problems arising from pollution by a heavy metal, for instance, should be studied through the integrated technical development center in collaboration with the physicians in the particular area. Such a joint endeavor would give rise to a new function in community medical care."

Elsewhere he said,

"Protection of the health of individuals also means protection of not only their happiness but also social health and social happiness.

"To medical research must be added the social factors before medical care becomes possible. And these social factors include elements of environmental science, ecology and various social sciences. The basis of medical care provided by the physician must be said to have extremely broadened, compared with that of the past."

THE IMPORTANCE OF BEHAVIORAL CHANGE TO HEALTH PROMOTION

Many preventive (and therapeutic) measures require health education and then a change in human behavior.

On this subject, Dr. Takemi:

". . .we can produce in the future old people who age [in a] healthy [way], which should be possible through health promotion drives . . .

". . .twenty-two years ago . . . I wanted to achieve the following objectives by carrying out a health education program.

"One was to establish a bridgehead for health education in a community primarily for the school children by bringing together teachers, nurse-teachers and school physicians as well as the Parent-Teacher Association to solve the problem about school health care.

"The establishment of community health survey committees, I believe, was the basis for the success of health education in Japan."

METHODS OF PAYMENT AS INCENTIVES TO CONTROL COSTS AND TO PROMOTE HEALTH

In some countries attention is now being given to the possibility of helping to control medical costs by giving the individual a greater role in paying for medical services. Further, some governments are seeking ways to give industrial companies more responsibility for the control of environmental factors that may be a menace to health.

Dr. Takemi:

"What we need is a system under which the employee's wage is increased so that he pays his own health insurance premium, while his employer pays for the preservation of the environment. This way, the health of the workers is very well protected locally and occupationally."

ETHICAL ISSUES WILL CONSTANTLY BE BEFORE US

No matter how efficient the planning and utilization of health resources, there will never be enough in any nation to fulfill all needs.

Dr. Takemi saw this reality years ago and wrote about the difficult ethical choices that must be faced by the individual and by the entire society.

His words follow:

"According to a new medical ethics I have in mind, the protection of the life of an individual is the responsibility of society as a whole and it is in such a society that the physician offers his technology and spiritual service. Therefore, I believe that the physician must become conscious of the fact that the 'technician to protect human life' deserves the strong support of society.

"Medical ethics of the future, therefore, must be based on a global, panhuman viewpoint. It must be one in which there is a meaningful relationship between each individual human being and the physician at all times. I believe that we must clearly recognize the fact that the concept of medical ethics today is expanding to a global scale."

INVOLVING MORE PROFESSIONALS AND A BROADER PUBLIC IN DECISION-MAKING ON HEALTH ISSUES

Dr. Takemi wrote about the creation of community health insurance commissions, the opening up of the Japanese Medical Association to make medical knowledge more widely available, and the need to recognize that both the technology and finances of medical care have aspects that require public interest and public knowledge.

"Since 1957, we have established (community health insurance study) commissions in cities, towns and villages, which were to have on their memberships representatives of people, autonomous entities, medical organizations and men of knowledge. On the common recognition of the importance of community health, these commissions were to compete with one another for the development of the communities they worked for. . . . In a large number of these communities where the commissions were established, medical care problems have been solved locally. The participation of inhabitants in dealing with community health problems represented a new form of citizen participation, different from the usual form of consumer sovereignty.

"In Japan's traditional medicine, the profession was passed on by heredity or from teacher to disciple. In any event, the generational transfer of medical knowledge was usually cloaked in secrecy. The JMA, however, established a policy of making medical knowledge open on the basis of the principle that in a democratic society both the technology and finances of medical care must be made public, and without this principle medical science could not hope to achieve a major development."

PRIVACY ISSUES

Computerization of information, better data systems, and more extensive analyses of those data rightly concern many people as threats to individual privacy.

Dr. Takemi:

"[Although aspects] of medical care must be made public . . . privacy of the patients, of course, must be respected, and . . . 100 per cent observed."

IMPORTANCE OF RESEARCH

With respect to both the biological basis of disease and the effects on health of social factors, we are at an extremely early stage in our understanding. Our capabilities are, therefore, very limited. For these reasons and others Dr. Takemi stressed the importance of research. In fact, he himself set an example, starting with important research early in his career. He was also aware that research in health meant not only biological research, but also "what kind of environment, economic system and form of employment that we must create in order to give the aged better conditions for their survival."

Further, Dr. Takemi recognized that health research must often be inter-disciplinary. When he became president of the JMA in 1957, he invited distinguished scholars from many disciplines in addition to medicine -- law, economics, and

philosophy -- to help examine the basic problems of the organization and of the medical system in Japan.

Dr. Takemi wrote:

"The new policies and measures the JMA produced were products of the process of discussions held by us with these specialists in the various fields on how to apply the bases to the practical problems. They were, therefore, not haphazard ideas, but were spawned by thinking based on a new standpoint of integrated sciences. Even if I were a genius, I could not -- and should not -- think up these ideas. I wish to emphasize in this connection the importance of thinking basically and that the products of such a way of thinking have permanence."

THE WORLD'S GREATEST THREAT TO HEALTH: NUCLEAR WAR

The world faces an unprecedented threat as a result of the growing numbers and accuracy of nuclear weapons. This has also led to a diversion of resources towards the accumulation of these terrible devices and away from urgent health and other social needs.

Dr. Takemi:

"Now, mankind is at a historic crossroads between the choices of either establishing a new bridgehead for scientific progress by abolishing the pattern of war of the past, on the one hand, or of allowing the earth to be devastated by atomic power, on the other.

"Every effort must be made to abolish large-scale, global war. In that process, I believe, the unreasonable solution by unreasonable war, achieved by politics of the past, will cease to exist.

"When we think about human welfare, we find that human existence would be in jeopardy unless we provide better conditions. . . ."

At Harvard, scholars from many disciplines have been examining these issues, some in great detail. The Takemi Program will permit us to give them increased attention. A continuing relation between the Institute of Sciences for Human Survival and the Takemi Program at Harvard will help to ensure that Dr. Takemi's philosophy and that of his students are kept before the Takemi Fellows. Finally, we believe that the advances in health to which the Takemi Fellows will contribute in their own nations in greater measure as a result of their work at Harvard, will also help to bring Dr. Takemi's concepts and a better life to people around the world.

TARO TAKEMI

Medical Care and World Peace

The problem of world peace is now in the limelight because of its critical nature. Without proper foundations, however, discussions of peace are meaningless. Groundless debates about peace carry substantial risks, particularly today because of the Japanese democracy's extreme vulnerability towards public opinion. We still recall the militarism Japan experienced some 35 years ago when public opinion was controlled by the mercantilists and the government of Japan. We still remember our sufferings during World War II. Therefore, when we discuss the question of peace, we must first clearly define what we mean by peace and what is behind the debates about peace, and then consider the strong social impact of the Japanese media. If we fervently desire peace, and I think I rank as the foremost promoter of peace, then we must consider the grounds of discussions of peace, beginning with human beings.

Every human being has an instinctual desire for self-defense, without which mankind would not have survived. Particularly in the field of immunology, the question of self-defense is very critical. In recent years there have been improvements in this field, and self-defense is now clearly defined through technological improvements in immunology. This progress is especially meaningful.

In immunology, you must distinguish between self-defense for individual units and self-defense for a mass or group of individual units. You must clearly define the differences between these two perspectives, both functionally and in a defacto pragmatic sense. What I would like to stress here is that all living beings, including animals and plants, no matter how small, have the instinct for self-defense. Without self-defense, no living organism can survive. In that sense, modern biology has high expectations for further improvements in self-defense, not only for mankind, but for all living things.

Using bacteria, you can conduct a simple experiment on self-defense. Holding a culture of bacteria on the palm of your hand, you place another culture of bacteria on a piece of glass. One hour later, you will find that 99% of the bacteria on the piece of glass survived, whereas only 1% of the bacteria on the palm survived. The remaining 99% died. Currently, people are paying a lot of attention to the 1% of bacteria that survived on the palm. However, no one pays attention to the relationship between the bacteria which failed to survive and the bacteria which survived.

In connection with this experiment I would like to stress the functional relationship between the self-defense or survival of a mass and the survival of individual units constituting that mass. This functional type of analysis is of critical importance for the survival of mankind as a mass. I believe this forms the foundation for world peace. As the experiment with the culture of bacteria on the palm illustrates, the survival rate changes depending on dates and depending on sites and locations. The survival rate's vulnerability to the environment is an important problem that requires further attention. Dr. Rokaso Kobayashi and his colleagues did a large-scale experiment whose results I read with great interest. As I noted above with the bacteria experiment, greater attention needs to be directed to the dead portion of the bacteria -- the 99% portion; but, instead, everybody is studying the 1% that survived. This appears to me to be the source of many problems that we have these days.

Specialization is, of course, of prime importance in modern medicine. However, that is not the entire picture; the other side of the coin is integration. These two problems of integration and specialization should be solved hand-in-hand.

The problem of international health is also of prime importance to mankind. This concept of international health constitutes part of the foundation for world peace. Within the realm of international health we have to deal with the issues of essential drugs, food and nutrition, and also the problem of the self-defense capability of human beings. International health, therefore, is a multi-faceted problem.

The question of population is also included in international health. Since the days of Malthus the population problem has been dealt with primarily by economists. But, under the framework of capitalism, economists' arguments on population are based on the pursuit of profits, and this is not right. As I see the situation, you have to consider the subject of population from the standpoint of survival for mankind, requiring a comprehensive review of the population problem. We must also consider the question of optimum or proper distribution of population on the surface of the globe.

In the 18th century, remarkable improvements occurred in international law and national borders were set. These boundary lines have survived a number of changes since the days of the Industrial Revolution. Environmental pollution, however, ignores those national boundaries. If an army goes beyond the borders of a nation, that action may cause a war, but pollution goes anywhere, disregarding national boundaries. National boundaries, therefore, have to be reconsidered under a new framework.

Rather than analyzing war as an international conflict, as a result of confrontations across the borders, we have to

reanalyze and reconsider the substance and nature of international conflicts themselves. We must determine the role of international conflicts in the improvement of mankind; or else we must admit that international conflicts do little for the improvement of mankind. Because national boundaries can no longer be relied on, I would like to stress the importance of establishing a proper order for the survival of mankind, irrespective of national boundaries. We cannot deny the fact that, after World War II, violent confrontations continued all over the world. In other words, the existence of well-defined national boundaries did not help to establish a real world peace. Yet we must appreciate the fact that there has been no major war for 35 years since the termination of World War II. This is a very rare phenomenon in the history of mankind, and we must work to expand and reinforce this situation. Our present mass media, however, cannot deal with this type of question.

The biggest issue that we must consider is the evolution of our thinking from the question of individuals to the question of masses. From this standpoint a free economy is very individual-oriented. It is a consolidation of the pursuit of interests on the part of individuals, and it clearly can be pointed out that the mass or the group has been neglected. As we are doing in the area of immunology, our thinking must evolve from the individual to the mass. This change in our thinking process would create a new base on which to analyze world peace.

This shift in thinking must also involve the question of the distribution of population on the earth. It is our prediction that when the population goes beyond 7 billion, we will have a food shortage problem. Already the population has passed the 4.5 billion mark. We also need to establish peaceful coexistence, mentally as well as practically. We must consider the kind of life environments that mankind requires. This is one of our most important problems. We must review thoroughly how our life environments can contribute to the progress of mankind.

Although economic struggles are often discussed today, I believe that there are difficulties in understanding these struggles of the mass production age while national borders remain as they are. Consequently, we must think beyond the concept of national borders, whether we consider them as frontiers for armed soldiers or whether we review them as a new starting line for human culture. I think there are many ways of approaching this issue, but I want to stress here that problems will not be solved by a simple self-satisfying pacifism that says peace could be achieved by giving up arms. As I touched on earlier, the door to the question of international health will be opened if industrialized nations such as Japan and the United States lead the way.

In order to narrow the gap between industrialized and developing countries the proper selection of targets and methods

becomes essential. I must emphasize here that when faced with this problem we must see things a couple of steps ahead, and when looking ahead it becomes apparent to me that nuclear energy is indispensable for human survival. American nuclear physicists studied nuclear energy, wishing prosperity for the next generation of American capitalism. To my regret nuclear energy was used for war through a presidential decision. At the same time, we must remember that religion and politics lacked enough power to prevent that decision. We can easily expect that if nuclear energy is used as a weapon to confuse our society, our future will be darkened and mankind will become extinct.

In considering nuclear weapons, what can we do to ensure progress for mankind? If we produce a neutron bomb, for instance, what kind of defense measures should be taken for this? If we could defeat many defense measures against nuclear explosions, the menace of the bomb would disappear. So we can rightly argue that we should stop nuclear bombs. But at the same time, studies and research that make the effects known will serve the survival of our culture.

Recently, I have been trying to reach deep into the roots of pacifism. What I have found is the question of the stability of instability. This may sound rather difficult, but stability in instability is essential for a dynamic way of thinking: what may appear unstable becomes stable when it goes through many stages and converges. The same process occurs in the combination and separation of genes.

In contrast to the stability of instability, it is also true that unstable factors exist in stability; therefore, it is important to understand stability and instability from a comprehensive point of view. When we talk of stable development some of us consider it an easy process, but this is misleading; it is a very difficult problem. From an academic point of view, many problems that came up after the development of quantum mechanics should have been understood in terms of stability and instability. There are many unstable factors in recent scientific and technological developments and advancements that contribute to instability. These scientific and technological developments are said to be contributing to the progress of mankind; they may appear so, but they will not assure a real progress of mankind for many centuries to come.

We must also realize that instability is created when new things come up without any order. Many recent scientific and technological developments are brought about accidentally rather than planned. The problem of instability is never just an accident. A new logical development process could be obtained by rethinking a correct line of logic. The logic of survival presented by Professor Ohe at this year's general meeting of the Japan Medical Congress refers to the question I once raised at the World Medical Association. I hope that Professor Ohe will

develop his logic of survival towards the theory of the order of survival that I presented.

In the meantime, new things are coming out, one after another, in the area of electronic engineering, in communication equipment, in computers; new things are appearing rapidly and old things are discarded. But this is not real progress. In order to develop an order for survival we have to make plans from the beginning, according to the logic and the order for survival. If we keep talking of progress and development without realizing this, we will fail to see the next major crisis being formed. Here once again I would like to return to the question of stability and instability. This approach could also be applied to life itself: stability will not last forever. There are many factors involved and changes that respond to external changes, although it is difficult to enumerate them all.

In conclusion, I would like to raise the problem of international health from a medical point of view. The Takemi Program, newly established at Harvard University, is tackling this problem. We need to establish a defense mechanism to solve the problem more positively. We may come up with a halfway defense, but I believe that defense should be complete. In this respect, there is a great error in one-way thinking about the direction of scientific and technological development. We live in an age of nuclear terror, yet not a single defense measure is materialized. Behind this thinking, we need a new, comprehensive, philosophical background in thinking.

We also need to develop a logic in which small instabilities are accumulated into a large instability, which then is turned into stability. There we can find a new rule for the emergence of a new science. My conclusion is that unless we learn to solve large problems, such as individual life, education, politics and other new ideas of mankind, it will be impossible to gather up small problems and solve them. Today, due to my health problem, I cannot talk to you and hear your opinions directly and personally and I am very sorry for that. But for realistic thinking, it is essential to make thorough judgements prior to physical inventions and discoveries. This is the duty of scholars; a duty that should not be forgotten by students of medicine.

FREDERICK C. ROBBINS

The Challenge of the Gap Between Opportunity and Available Resources In Health: An Increasing Dilemma

The program that is being initiated during these few days is notable for several reasons. First, it exemplifies the desire and capability of two countries of very different cultural traditions, and who not long ago were at war, to cooperate in an enterprise whose basic purpose is the peaceful one of improving the quality of life for people everywhere. Second, it memorializes Dr. Takemi who played the pivotal role in establishing this program and who was such a towering figure in Japanese, and indeed, international medicine. It is sad that he did not live to participate in this happy occasion when his program is inaugurated. Third, the subject of the program, the appropriate allocation of resources in health, is one that is of critical importance to all nations and is rarely faced in a direct manner.

Societies throughout the world are striving to provide a reasonable standard of health for their citizens, and this goal is explicitly articulated by the World Health Assembly as "Health for All by the Year 2000." A major problem faced by all countries is to define "health" and what will be required in order to achieve it, no matter how it is defined. The situation of a developing country that lacks adequate basic services such as potable water, adequate nutrition for much of its population and an infrastructure capable of providing basic public health measures is totally different from that of many of the industrialized countries where these services are provided routinely. The developing countries' concerns revolve around the provision of medical and preventive care. However, no matter how much the problems may differ in scale, the same key question must be dealt with: How can the resources that are available be distributed so as to achieve the maximum improvement in the health of the populace?

Although this question has always been with us to some extent, only in modern times have societies and governments faced the problem so acutely. This is because there is now so much more that can be done. Science has provided a steady stream of new preventive, diagnostic, curative, and alleviative techniques that have revolutionized public health and medical care; and the promise for the future is even more dazzling. The result has been, for some of the world, a dramatic reduction in acute infectious diseases of childhood. Many chronic illnesses such as diabetes, coronary and other vascular diseases, chronic renal failure, and some cancers are now amenable to treatment or amelioration. Associated with these advances in prevention and medicine has been a steady prolongation of the average life span

with an attendant increase in chronic health problems such as cancer, arthritis, and dementia.

What has just been described is an extraordinary success story. The quality of life of many of the inhabitants of the globe has been immeasurably improved, and there is every reason to believe that the rate of change will continue to accelerate. However, the application of these advances consumes resources, and the cost of health care has risen at an alarming rate. Indeed, many societies cannot afford to provide modern health care to more than a tiny fraction of the populace, and even the wealthiest countries are realizing that it is probably not possible to provide everything to everyone. Thus, on the one hand science is providing more and better technologies at an accelerating rate, but on the other hand there is a steadily increasing gap between what is possible and what can be afforded.

What can be done to deal with this paradoxical situation? There are several approaches to maximize the value of the available resources.

A particular society might choose to exert no control upon medical expenditures and allow the market place to serve as the means of rationing resources. This is not a method that most countries can sustain because it means that those unable to pay will be denied services. Because medical services are generally regarded as a good from the point of view of the individual and of the society as a whole, those governments that have any resources at all assure some services for those who are unable to provide for themselves. This creates a mix in which both the private and public sectors are payers for care and the government becomes directly concerned about the need for some means for allocation of resources with the primary motive of reducing costs. This is the situation that exists in the United States at the moment where there is no rationing of an explicit nature, but cost control is attempted both through regulation and more recently by encouraging competition among providers. Other countries have a system where greater central control and rationing is achieved through limitation of available resources, thereby forcing the providers, largely the physicians, to make allocation decisions at their level. This is the British model.

Finally, there are the countries that have central planning and control and allocate resources at the highest level. This is characteristic of the socialist societies.

However, whatever the system or whatever the level of resources, there are certain common needs for and approaches to the problem.

The rational allocation of resources, whether by the federal government, by local health authorities, or by individual physicians, requires information on which to base decisions. Few countries, even the most affluent, have data

systems adequate to today's task -- a situation badly in need of correction. Most countries collect routine vital statistics of varying accuracy. Although these need to be improved both quantitatively and qualitatively, there is also a great need for planning to obtain more information concerning disease incidence and the state of health of the population. The extraordinary developments in computers, the consequent growth in communication and information sciences and the creation of simple rapid survey methods should make the acquisition of the necessary data and the maintenance of surveillance more feasible, even for the less affluent countries.

With the tremendous proliferation of new technologies, many of which are expensive and may pose substantial risks, it becomes imperative to evaluate better the technologies employed in health care, not just from the point of view of safety and efficacy but for cost effectiveness as well. This often requires field trials that are expensive and difficult to conduct and beyond the capacity of many countries to perform independently. This is an area particularly appropriate for international cooperation.

The physician plays a key role in deciding about the use of resources, and in most cultures physicians are not trained to pay attention to cost or the concept of cost effectiveness. The latter concern is one that most physicians find difficult to deal with. Medical education, in both content and setting, must change to foster a new cost-consciousness in physicians. While we emphasize that decisions should be based upon objective data and rational planning, we must not forget that health care has a societal and personal value that transcends the specific outcome of a particular act. The caring function has a value in its own right that is not easily quantified but cannot be ignored. I doubt that any society wishes for medical decisions to be made solely on the basis of cost. The economists can place a value on human life, but most of us regard life as a priceless possession. Thus, the physician can be placed in a difficult position in trying to deal with this tension between the preservation of life and the charge to do no harm and the economic realities. This can only be dealt with through the application of best judgment arrived at in the light of the mores of the particular society and the cultural or religious beliefs of the patient and family. However, there is no ethical dilemma presented in admonishing physicians not to prescribe what is ineffective or no more effective than something less costly. To heed this admonition requires information about effectiveness which can only be obtained by technology assessment.

Many of our technologies are what Dr. Lewis Thomas has referred to as "half-way technologies." They only partially solve the problem and often are expensive. The classic example of a half-way technology is the respirator for the care of

polio, which was made obsolete by a complete technology -- the polio vaccine -- a vast saving in money and suffering. Renal dialysis and transplantation both represent half-way technologies that are very widely used at a very great cost. Just think how much could be saved, both in monetary terms and in human suffering, if chronic renal disease could be prevented. If we are to provide the best possible health care at reasonable cost, we must strive to develop more complete technologies, which requires a vigorous research program.

We also must better educate and motivate the public to be more active in promoting their own health through proper diet, reduction of smoking and alcohol consumption, appropriate exercise, and the use of available preventive measures such as vaccines. This is not an easy task but its importance is brought home most forcefully when we realize that in the United States, at least, it is estimated that behavioral factors play a role in about 50 percent of all deaths and that cigarette smoking accounts for approximately 30 percent of all cancers.

Although there is much that we can do to improve our ability to allocate resources in a rational manner, we must realize that in the final analysis those decisions which affect quite directly people's lives are made on the basis of social, economic, and political considerations that differ from one country to another. However, the basic problems are universal and I have great confidence that together we can help to narrow the gap between what is possible and what is actually achieved for the improvement of the quality of life of our own people and those throughout the world. May the dream that was Dr. Takemi's be realized to its fullest extent.

MASAAKI YASUKAWA

Trends in World Population and the Future of the Japanese Population

Before his death, Dr. Takemi selected the topic of world population as an issue of top priority for the Takemi Program in International Health. In this paper, I would like to report on this topic, in accordance with Dr. Takemi's intentions. My approach is based on the science for human survival which Dr. Takemi espoused, and which attempts to transcend the boundaries of existing studies, to draw an ideal picture of human survival using an interdisciplinary point of view. Dr. Takemi focused his attention on population size and demographic trends, and, more specifically, on the aging structure of the population. I shall discuss the future of world population trends, in particular the population of Asia, and more directly, the population of Japan. Since population size and demographic structure by age are rapidly changing, population trends are difficult to predict.

As experts in the population problem we must approach the study of population change in a structural way, through the study of fertility and mortality rates. But we should also look at how change in the population structure affects society. Like Dr. Takemi, we should approach the study of population change from both biological and social points of view.

In this paper, I first discuss current trends in world population and then review several important issues for the future of the Japanese population.

TRENDS IN WORLD POPULATION

My discussion of world population trends uses United Nation population statistics as a prime source.

The most serious challenge facing mankind in the 21st century is the explosive growth of population. When World War II ended and many former colonies won independence, those new nations were destined to face grave population problems. These problems arose primarily because the mean zero growth of population, where high fertility offsets high mortality, was broken after the end of World War II when mortality rates rapidly declined. As men endeavored to reduce mortality in developed and developing countries, their efforts ironically produced a population explosion which endangers the human race rather than improves human welfare.

According to U.N. statistics, the world population in 1980 was estimated at 4.4 billion; 1.1 billion lived in developed

countries and 3.3 in developing countries. According to those statistics, world population by the year 2000 is expected to reach 1.3 billion in the developed countries and 4.8 billion in the developing countries, totalling 6.1 billion. In Asia, the population in 1980 was 2.6 billion or 59% of the world population, but it is expected to reach 3.6 billion, a growth of one billion, within 20 years. Yet, recent U.N. predictions of world population invariably have announced a figure lower than the preceding forecast. For example, if we look at predictions for world population in the year 2000, the 1968 forecast was 6.5 billion but the 1975 figure was 6.3 billion. The latest forecast of 1982 was 6.1 billion, reflecting a slight decline in the population growth rate.

The growth rate of the world population was 1.7% in 1980 and is expected to decrease to 1.5% in the year 2000. The growth rate in developed countries has already declined to less than 1%, or 0.68% in 1980. It is expected to fall as low as 0.48% by 2000. The growth rate in developing countries is expected to decrease from 2.04% in 1980 to 1.77% in 2000, a rate below 2%. Such a decline appears to mitigate the risk of a population explosion, but we cannot be too optimistic. We should note that the predicted population of 6.1 billion for 2000 is 1.4 times larger than the 4.4 billion population in 1980.

This decline of the world population growth rate to 1.7% is largely due to a decline in the growth rates of developed countries (1.1 billion people) and in the population of China (1 billion). Other developing countries hardly have reduced their population growth rates. In the very poor countries of Africa, South Asia and West Asia, population growth rates are still reported to be rising.

Although it is generally accepted today that population growth is restrained by fewer births, we should not overlook the fact that it could also result from increases in mortality. A shortage in food supply or lowered living standards in any developing country could cause population growth in that country to decline as the result of these catastrophic events. To avoid such unfortunate outcomes, we should make efforts to reduce mortality and also acquire the means to control fertility.

China is now taking a positive step in that direction. Burdened with a population of 1 billion, China is currently promoting a campaign of "only one child per couple," trying to change the age structure of the population which is currently pyramidal with a greater population in the younger generation. China has been striving for four targets in their modernization drive: industry, agriculture, defense, and science & technology. Through such modernizations the country expects to improve the standard of living from a current U.S. $400 in national income per capita to $1000 by the end of this century. In order to achieve such goals, the Chinese government wants to keep population size within the 1.2 billion range at the end of the

century. Due to expected discrepancies between urban and rural areas, the government set the target at the very strict level of only one child. The number of births that the government actually wishes to realize is 1.5 children per couple on the national average. If current parents have only one child, by the time this child reaches parenthood, the Chinese government believes that the society will be affluent enough to feed two children per couple.

In developed countries, on the other hand, where people have a strong sense of overcrowding, the trend toward low fertility is commonly observed. When the Third World Population Conference in Bucharest was held in 1974, the main theme of population policy was stationary population. A change has since occurred in all developed countries. The aging of the population has advanced because of the increase in life span and the decline in fertility. That is clearly shown by the fact that life expectancy at birth is more than 70 years in developed countries and that the total fertility rate remains as low as 1.6 to 1.9. The total fertility rate is extremely low in West Germany at 1.44, followed by 1.62 in Sweden, 1.70 in Norway, 1.84 in the U.S., 1.87 in the U.K. and 1.95 in France.

We can classify world-wide population growth into two types. The first type is found in developing countries where population growth assumes a pattern of quantity over quality. The second type is found in developed countries where population growth has a major impact on the developing countries because a higher standard of living demands the consumption of a large amount of resources.

FUTURE DEMOGRAPHIC TRENDS OF JAPAN

What kind of a future can we expect in the Japanese population? Any prediction of the Japanese demographic structure must be based on certain assumptions. This prediction is based on the population survey we conducted in 1980, the results of which coincided with the Japanese national census conducted in 1980 and national population trends.

Figure 1* shows the world population explosion, and how the Japanese population will increase. I compare the world population explosion to heating milk; when we heat the milk, first it will simmer and then, all of a sudden, it will boil. This phenomenon is very similar to the phenomenon of the world population explosion.

Population growth started many tens of thousands years ago. The world population was 1 billion in 1930, 3 billion in 1960, and reached 4 billion in 1975. According to the latest U.N.

*All figures and tables appear at the end of each paper.

statistics, it is currently 4.8 billion. With this rate of increase the population could reach 12 billion. Originally it was said that the population will stop at 10.2 billion, but as I mentioned earlier, a population decline sometimes takes place because of increased mortality and decreased fertility. Personally, I believe that a 10.2 billion population is inconceivable; 7 billion seems to be a more probable estimation at this time.

In order to achieve a more limited population growth rate, we must try to control the population rather than relying on catastrophic events to curb it. In that way, we can have a more desirable population growth rate.

The age structure in Japan as of 1980, based on the population census conducted in that year, is shown in Figure 2. One noteworthy point here is that the widest span appears at about the age of 40. In children about the age of ten you have another wide distribution.

The population changes from 1900 to the present, including fertility and mortality rates, are shown in Figure 3. The black line shows the change in the mortality rate. In 1918 and 1920, we had influenza epidemics in Japan -- what we call Spanish influenza -- and toward the end of World War II, about 1945, we again experienced a very high mortality rate. In the immediate postwar period, with the improvements in public hygiene begun by General Headquarters, the mortality rate decreased dramatically. Japan now enjoys one of the lowest mortality rates in the world.

Japan's birth rates peaked in 1920 and thereafter experienced a gradual decline. At the end of World War II Japan had its first "Baby Boom," after which daily commodities became scarce, and the birth rate continued to decline. Then came the birth rate gap in 1966 called "Hinoue Uma," according to Japanese superstition, a very unlucky year to give birth to a girl. Japan has been under the influence of Chinese culture for well over 1000 years. It is natural, therefore, that the Japanese people have adopted the Chinese calendar in their day-to-day life. This calendar is based on various combinations of the five elements (wood, fire, earth, metal, and water) with the twelve animals (mouse, cow, tiger, rabbit, dragon, snake, horse, sheep, monkey, hen, dog, and boar). To provide a large number of combinations, each element has also been subdivided into two parts, the upper and lower.

Once every 60 years, the combination of the "upper part of the fire" (Hinoue) and the "horse" (Uma) occurs (1906, 1966, 2026). For generations there has been a widely prevalent superstition in Japan that if you give birth to a girl in a "Hinoue Uma" year, she will be very strong and likely to eat her husband. Experts in Southeast Asia are particularly interested in this drop in fertility rates and in the potential for using superstition in population planning.

Following the year of the "Hinoue Uma" came the second "Baby Boom" when children born in the first "Baby Boom" became parents. After this, the decline in birth rates began again. As a result of these shifts in mortality and fertility, a rapid change in demography is occurring in Japan. Today we have more aged people than younger people. This change means that younger people have to support a larger number of the aged population. This demographic change is definitely becoming an important problem for Japan.

Table 1 shows the forecast for Japan's population, calculated according to the cohort component method. In the year 2000, babies born in 1975 will be 25 years of age. The average life span, or life expectation at birth, in the year 2000 is going to be 75 for men and 80 for women. According to recent statistics, the corresponding figures are 74 for men and 79.77 for women. The number of births between 1975 and 2000 must also be considered. By taking the number of births of women since 1950, you can forecast the children born in the next quarter of the century and also the survival of babies born in the quarter of a century from 1950 to 1975.

Figure 4 shows a projection of Japanese population growth, based on a fertility rate of 1.75. The replacement level rate of fertility will be less than 2.09. According to this figure, the population will peak between 2005 and 2010 and then will begin to decrease. However, if we do not stop this decrease at a certain appropriate point of time, the curve will rise again, creating a dangerous problem for Japanese society. A critical question is: when do we plan to achieve an optimum level of stabilization in the population of Japan? As Dr. Takemi pointed out, stabilization is created with stable factors.

In other words, if the total fertility rate recovers to 2.09 or thereabouts, due to inertia the population will continue to decrease until the year 2075. As of 1980 the total population of Japan is something like 120 million and the stabilization level will be approximately the same as the level of 1980 or 110 million. I think this is the optimum level. The lowest line shows the trend assuming that the fertility rate is 1.70. The peak is lower and again the population will begin decreasing and then the population level will be 113 million. After I announced these figures, the Ministry of Welfare and Health announced their forecast. They estimated a peak of 130 million and a stabilization level of 118 million, so my estimation was quite close to their estimation. These statistics will provide a reasonable base for forecasting the future of Japan as a nation.

Next let me analyze the age structure of Japan's future population. Even if the size of Japan's future population is approximately the same as the present population, the demographic structure will be very different. Figure 5 shows the age structure of Japan in 1980 and projections for 2000,

2005, 2010, 2020, and 2075. In 1980 the widest belt is between 30 and 40 years, reflecting 8 million babies born in 3 years after World War II. The belt around ten years is the second "Baby Boom" when the first "Baby Boom" had grown into parents. These two wider belts will continue to move up the age structure in subsequent years. If we assume that the birth rate recovers slightly in order to compensate for the decrease in the total population, we can forecast this type of demographic tree shown for 2010. A decrease in the number of children will allow more space for living. When more babies can be accommodated, a slight recovery in birth rates can be predicted.

In the year 2020, the two wide belts have moved up higher in the age structure. Here replacement level fertility is reached, so regardless of the age group, the size is about the same. In the year 2075, instead of having a pyramid we will have a sort of cylindrical distribution where the lower part of the age structure resembles a type of cylinder. The population in 2075 is estimated at 118 million.

If you compare the age structure in 2075 with that in 1980, the total areas of the two trees are the same, but the shapes are very different. In 1980 people 65 years of age and over made up a mere 9% of the total population, however in the year 2075, the corresponding figure will move up to 18.5%, almost 20% of the total population of Japan. As I noted above, it is dangerous if the population keeps growing, but it is also dangerous if the population keeps decreasing. A nation's population has to achieve certain optimum levels at appropriate points in time. Japan should attempt to achieve an optimum size of 116 million.

In 2075, Japan will have twice as many people aged 65 and over than in 1980, so the whole life style will be different in the year 2075. As Dr. Hiatt has pointed out, the percentage of people 65 and over world-wide was 11.5% in 1980. In the 21st century this figure will increase to more than 20%. This world-wide trend is applicable to Japan also, although this age group may decline to around 15% during the 21st century. We have to bear the aging population in mind when formulating health policies and strategies in the future. The changing demographics of world population in advanced countries can create a serious problem.

During the 21st century, around the year 2000, Japan will have an extremely low fertility rate compared to most European countries. Japan may have more senior citizens at this time, even more than the United States. The late Dr. Takemi linked the population problem to the area of international health because he knew that we may have a dificult time supporting our aged population in the future.

TABLE 1

Future Population by Age Groups

~2005, T.F.R. = 1.75
2010~, T.F.R. = 2.09

Number 1000
Ratio %

Year	Total	0-14 Population		15-64 Population		65 over Population	
		number	%	number	%	number	%
1975	111,893[1]	27,220	24.33	75,809	67.75	8,866	7.92
80	116,892	27,506	23.53	78,869	67.47	10,517	9.00
85	120,390	26,011	21.61	82,389	68.44	11,990	9.96
90	123,085	23,146	18.80	85,991	69.86	13,948	11.33
95	125,445	21,906	17.46	86,849	69.23	16,690	13.30
2000	127,534	22,175	17.39	85,854	67.32	19,505	15.29
05	128,696	22,589	17.55	84,359	65.55	21,748	16.90
10	128,997[2]	22,689	17.59	82,392	63.87	23,916	18.54
15	128,622	22,479	17.48	79,510	61.82	26,633	20.71
20	127,495	22,310	17.50	78,007	61.18	27,178	21.32
25	126,082	22,344	17.72	77,434	61.42	26,304	20.87
30	124,491	22,363	17.96	76,620	61.55	25,508	20.49
35	122,902	22,550	18.35	75,062	61.07	25,290	20.58
40	121,457	22,531	18.55	72,820	59.25	26,106	21.24
45	120,169	22,394	18.64	71,918	59.85	25,857	21.52
50	118,999	22,310	18.75	71,985	60.49	24,704	20.76
55	117,960	22,338	18.94	72,295	61.29	23,327	19.78
60	117,094	22,433	19.16	72,339	61.78	22,322	19.06
65	116,508	22,491	19.30	72,075	61.86	21,942	18.83
70	116,212	22,447	19.32	72,060	62.01	21,705	18.68
75	116,110	22,371	19.27	72,121	62.11	21,618	18.62
80	116,099	22,346	19.25	72,106	62.11	21,647	18.65
85	116,078	22,386	19.29	72,188	62.19	21,504	18.53
90	116,080	22,440	19.33	72,147	62.15	21,493	18.52

1) Excluding 46,000 persons without identified age
2) Population size at the peak

T.F.R. = Total Fertility Rate

FIGURE 1

World Population Explosion

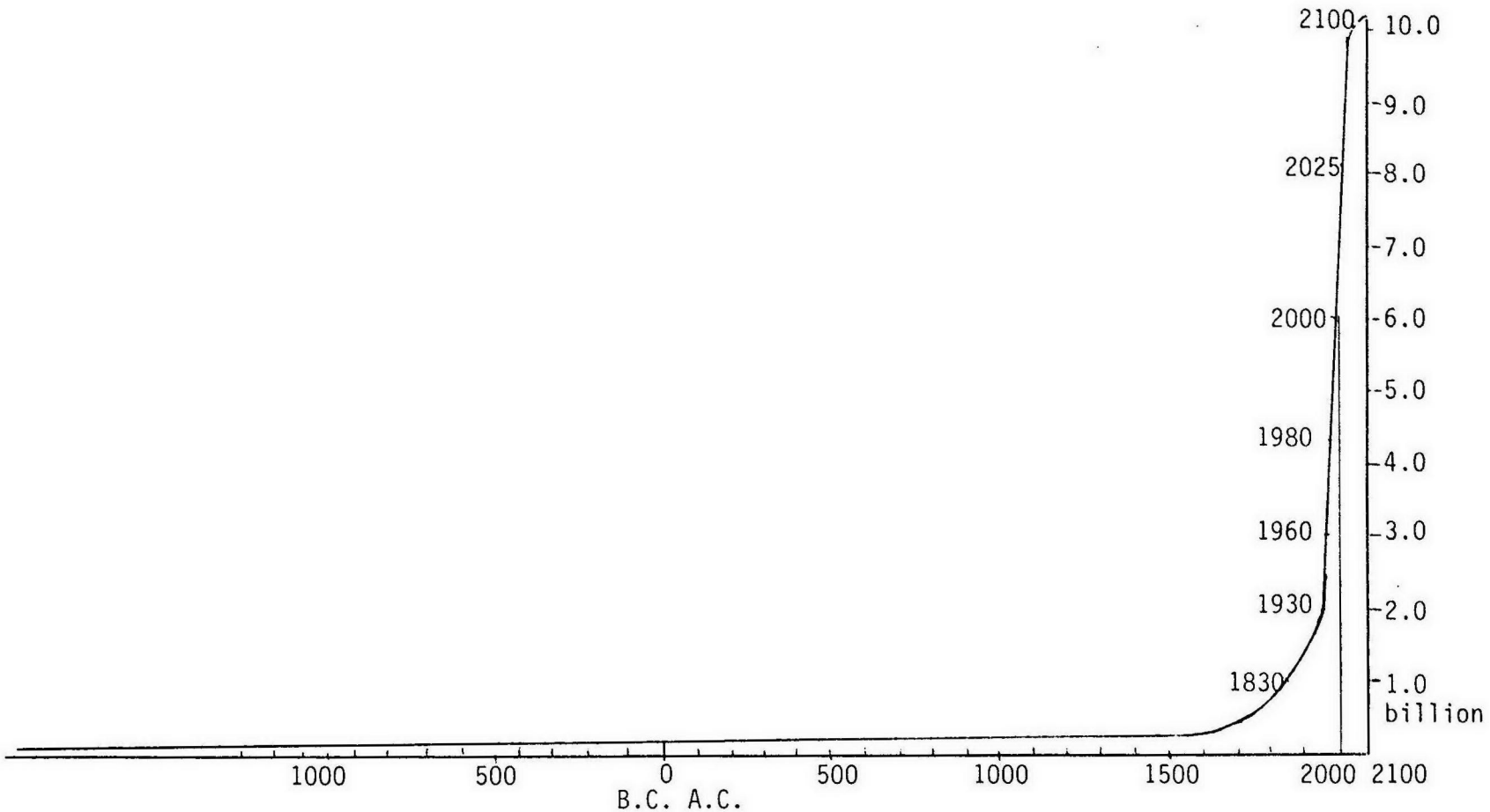


FIGURE 2

Age Structure in Japan
(based on 1980 census)

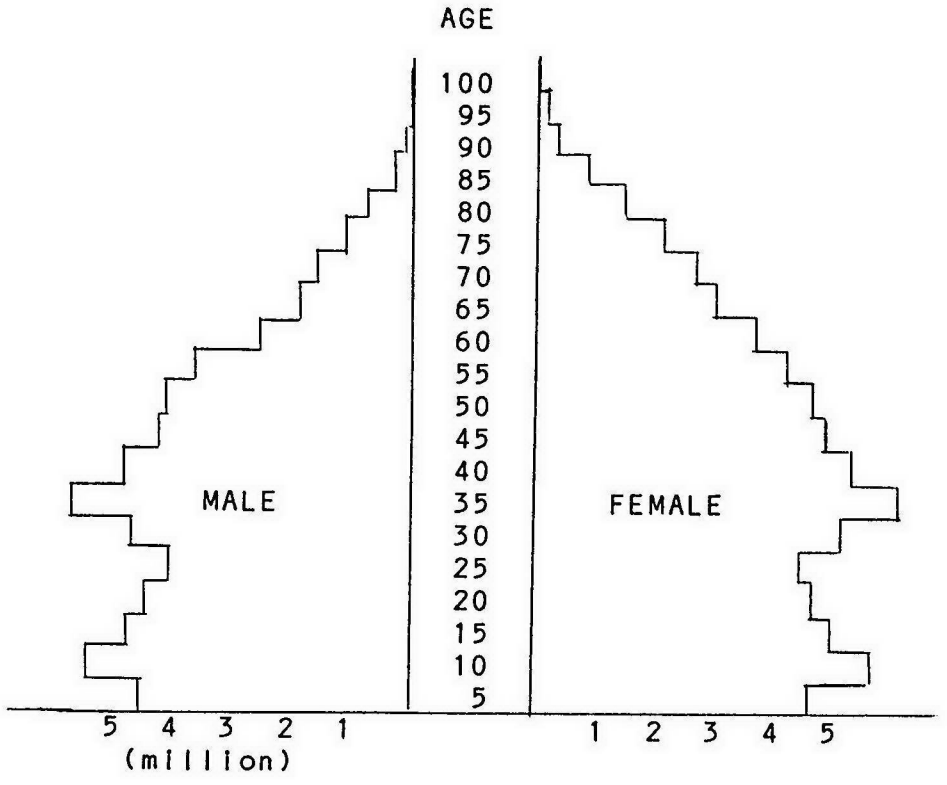


FIGURE 3

Japanese Population Changes

(from 1900 to present)

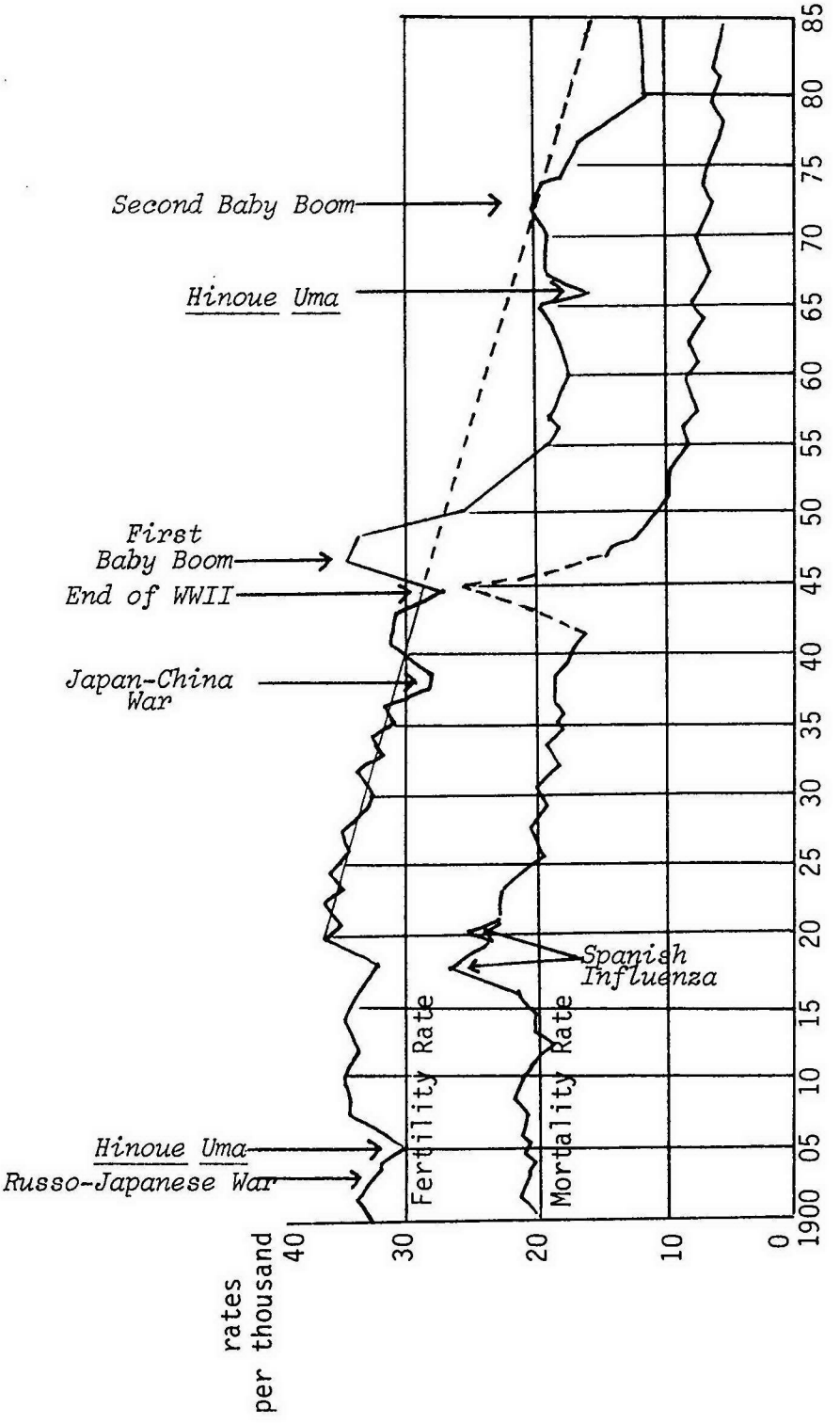
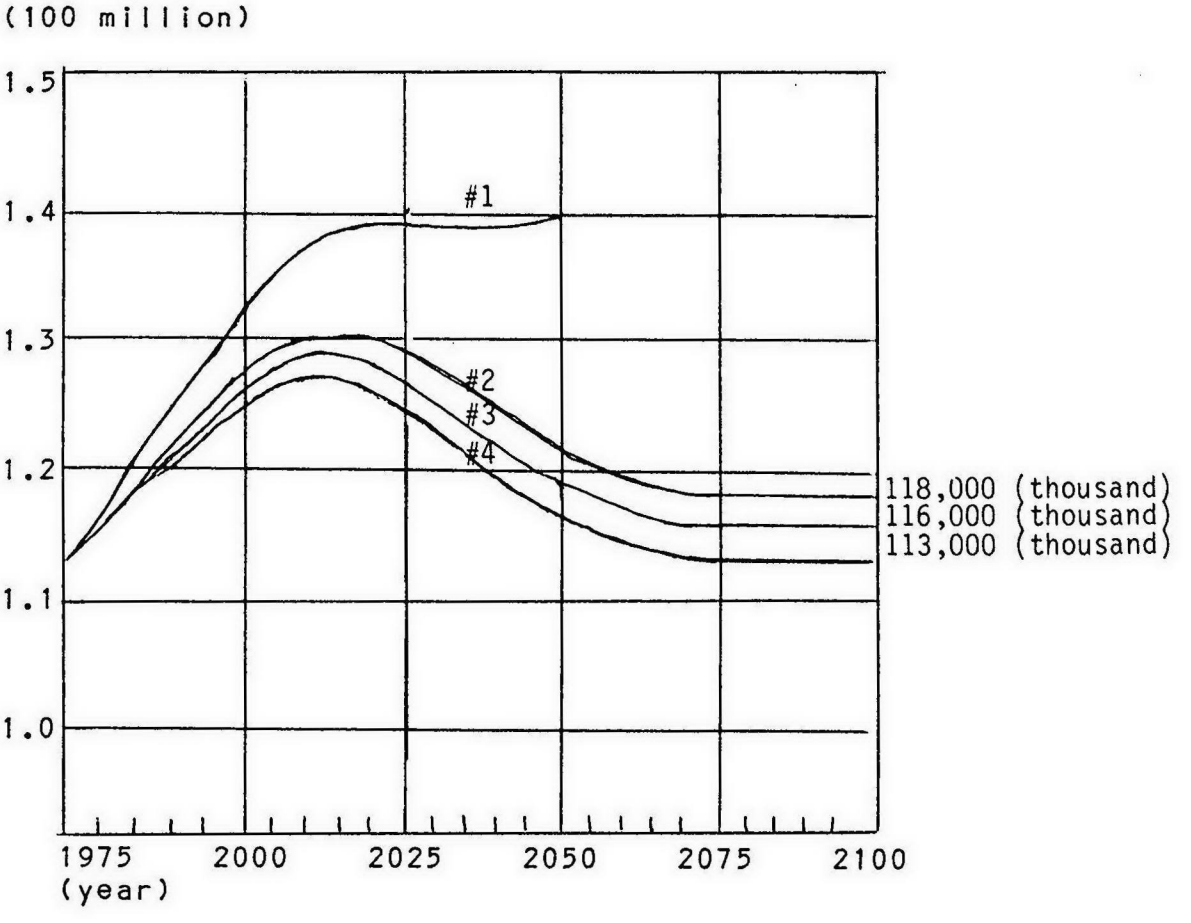


FIGURE 4

Future Population
Trend Towards the Stationary Population



#1 Institute of Population Problems, 1976
Total Fertility Rate (TFR) = 2.10

#2 Ministry of Health and Welfare

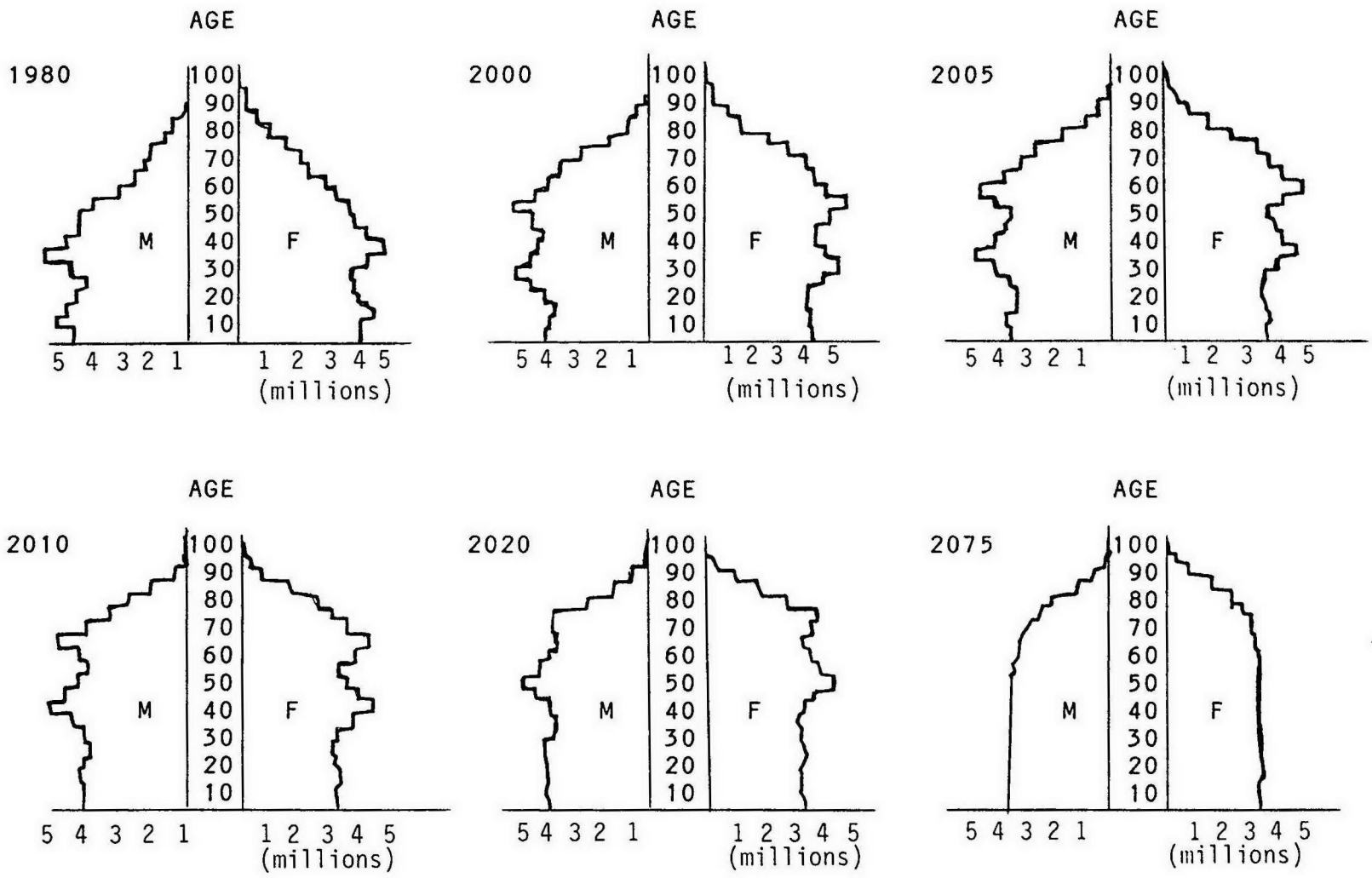
#3 Institute of Population, 1981
TFR = 1.75 → 2.09

#4 Yasukawa
TFR = 1.70 → 2.09

FIGURE 5

Trend of the Age Structure

~2005, T.F.R. = 1.75
2010~, T.F.R. = 2.09



M: Male
F: Female

D. BELL: As Professor Yasukawa reminded us, it is highly appropriate to begin this Symposium as Dr. Takemi would have suggested -- with a discussion of population trends.

Professor Yasukawa addresses two different and contrasting population situations in the world today: that of developing countries whose populations are still growing rapidly, and that of industrialized countries, specifically Japan, whose populations are growing very slowly. Although there are many interesting points in Professor Yasukawa's paper, I will confine my discussion to two questions, one concerning each part of the paper.

First, in the developing countries, what is the effect on health of the continuing rapid rise in population? One superficial answer is that it is plainly necessary for the health authorities in developing countries to try to provide more resources to keep up with steadily rising populations. But, given scarce resources, this is very difficult to do, especially since population growth is not uniform over the developing world. In general, in fact, the most rapid rates of population growth are in the lowest income countries. Moreover, within countries, the same rule holds: the highest population growth rates are experienced by the lowest income groups, usually those in rural areas.

What makes this situation doubly difficult is that the countries and groups with the lowest incomes also have the most serious health problems. To illustrate, the infant mortality rate (the number of children who do not live to be one year old of every thousand babies born alive) for countries in South Asia or Africa is more than ten times the rate in industrialized countries like Japan. Even in China, which has done better in health than many other less developed countries, the infant mortality rate is five times that of the industrialized countries. This means that those countries and groups that have the worst health problems face the most rapidly growing populations and have the smallest resources to apply toward health. I believe, therefore, that Professor Yasukawa's paper points to the first major conclusion of this Symposium, namely, that the most difficult health problems in the world, as we move towards the 21st century, are in the lowest income countries where the rate of population growth is the largest and the economic resources are the least. All of us concerned with health problems beyond our national boundaries must, therefore, give high priority to assisting developing countries to strive simultaneously to reduce their population growth, to improve the health of their people and to achieve broad increases in social and economic welfare.

My second question relates to population trends in Japan. As Professor Yasukawa notes, the proportion of the population of Japan that is age 65 and over is steadily increasing, rising from 8% in 1975 to an anticipated 20% by the year 2015. Dr. Yasukawa argues convincingly that this change will bring major problems for Japan's health care system, social insurance system and other elements of Japanese life.

I wonder if the situation may turn out to be even more difficult than Professor Yasukawa suggests. As he explains, there are two reasons for the aging of Japan's population: better health is leading to longer life expectancy, and lower fertility means that fewer babies are being born. I would like to focus on the second point. At present, the fertility rate in Japan and in most other industrialized countries is below the replacement level of two children per couple. Japan's total fertility rate dropped to 1.9 in 1975 and 1.7 in 1980.

I question Professor Yasukawa's estimates of the aging of Japan's population because he assumes that the fertility rate will not drop further and that when the Japanese population begins to decline in size, the fertility rate will rise again and eventually become self stabilizing. As he pointed out, the industrialized states are leading the world into an entirely new period in history, a period of very low birth rates and very low death rates.

No one knows with any certainty why fertility rates have fallen as far as they have. The reasons certainly include such factors as changes in family structure, the rise in women's education, the increasing employment of women outside the home, and the rise in the investment cost of giving children a good education. But because we cannot estimate how these and other factors express themselves in particular fertility rates, we do not know how far fertility rates will fall or whether they will level off and rise again. Professor Yasukawa concludes that Japan will face serious difficulties in dealing with an aging population. If fertility rates continue to slide downward, the difficulties will be even worse than Professor Yasukawa predicts. Although our present knowledge does not allow us to forecast accurately, we should observe and analyze carefully what happens over the next years, particularly in those European countries where the fertility rates have fallen even further than those in Japan.

M. YASUKAWA: Professor Bell, you enhanced my presentation with your additional comments. In respect to Professor Bell's skepticism about reaching a self-stabilizing level of population growth in Japan, I admit that the situation might be more severe than I anticipated. My prognosis may not have predicted the population trends objectively.

It is important to note, however, the need to maintain our dreams and expectations in our vision of the future. Without

hope people cannot keep on living. We must resolve to stabilize the population of Japan. My biggest concern is with the increase in the aged population. The question we must ask ourselves is whether young people can support the increasing aged population. Confronted with the choice between supporting their children or their elder grandfather and grandmother, they might opt to sacrifice the survival of the elder population. Even though I sincerely hope that such a situation will never occur, nonetheless the problem must be confronted.

I would like to respond to Dr. Bell's comments on the anticipated recovery in the fertility rate. Immediately after World War II, we had the first "baby boom." In the years 1972-73, the children of these babies created the "second baby boom." For this second baby boom to have caused a sudden recovery in the fertility rate, the babies of the first "baby boom" would have had to bear more children. They did not; a much smaller number of babies were born than were anticipated. This trend seems to signify a definite change in Japanese behavior. Since the first oil shock in 1973, our economy has stagnated. At the same time, the status of women in the society has improved. This improved status has triggered a chain of events, including a trend toward higher education for women, an increase in the number of women seeking jobs, late marriage, an improvement in contraception methodology, and a general improvement in housing and lifestyle. Concurrently, as well, the cost of education has risen. Therefore, as I noted in my presentation, with the increase in population comes increasing expenses to support these people. That is why I anticipate a very mild recovery in the fertility rate.

F. ROBBINS: Missing in the comments made by the two speakers is the fact of the transfer of populations from those countries that are increasing in their population to those that are stable or falling, and the consequent social and health and other issues this transfer raises. We see this in the United States and in many other parts of the world. Because Japan is separated by ocean from much of the world, this transfer of population is not so evident at the moment. But it is a global problem, and could become even a bigger one. I would be interested in comments on that.

D. BELL: International human migration is a subject of increasing interest and concern around the world. It is important to recognize first, however, that the number of persons who migrate internationally is a tiny 7raction of the annual increase in the world population. At the present time, the population of the world is increasing each year by perhaps 80 or 85 million. The number of persons who migrate from one country to another is not more than two million per year, or perhaps three million in unusual years. Consequently, as a factor in relieving the pressure of the rapidly growing populations in poor countries, international migration is not a significant safety valve. Nevertheless, even though the numbers

are small, those who migrate into a society are conspicuous because we are accustomed to thinking in ethnic and national terms, in terms of "us" and "them," in terms of seeing the migrants as outsiders.

For the United States this is an extremely sensitive political, social and economic question. The United States has the largest regular immigration of persons. Although no one knows the exact extent of migration, because we have a number of illegal migrants per year, we are accustomed to receiving approximately half a million to one million people each year as new legal residents of the U.S., many times more than any other country. Migrants certainly do bring a variety of strange ailments with them, but there is not a recent example, at least not that I am aware, of an epidemic starting from any of these ailments. The question of A.I.D.S., an important viral illness causing a lot of concern in the U.S. and elsewhere, may be an exception, although the epidemiological evidence is still very obscure.

Migration is also a social and political factor of great moment in Japan. Japanese public opinion has favored thus far a policy of accepting very few international migrants.

The question of the "brain drain" also deserves mention. Persons who are educated in less developed countries are moving to more developed countries, leading the less developed countries to conclude that they have invested in the education of individuals who are not benefiting the economy of their country of origin, but instead, contributing to the economy of the country to which they are moving. This question is much less sensitive today than it used to be 10 or 20 years ago for two reasons. One is that so many people who left developing countries for advanced education in Japan, in the U.S. and Europe, have later returned home. The second is that the educated, trained and experienced leadership today in the developing countries in many fields is vastly superior to what it was 10 or 20 years ago. Nevertheless, the "brain drain" does still exist in some developing countries and is still an important, though small element, in international migration.

M. YASUKAWA: The main theme at the International Conference on Population, to be held in August this year in Mexico City, is the issue of population migration. I would just like to emphasize that at the same time as fertility is declining in the advanced nations, there is recent indication of fertility decline in some developing nations as well, so the aging population will also be a leading issue for these nations in future years.

MARC J. ROBERTS

The Logical and Philosophical Problems of Allocating Scarce Health Care Resources

INTRODUCTION AND OVERVIEW

Increased attention worldwide is being focused on the problems of how to allocate the limited resources available for health care. Economic hard times have brought budget difficulties to many governments. Individual citizens have had less to spend as well, and corporations have become concerned about their ability to afford rapidly rising health insurance costs. Yet, new medical technologies and rising public expectations seem to be pushing all nations strongly in the direction of ever increased expenditures on health care.

How are we to cope with, or even understand, the resulting dilemma in which even the richest nations find it impossible to afford everything in the way of medical care? Competing theories and claims abound. Some say we should worry about economic productivity, others counter that we must not, that there are "rights" to care, that deserve respect regardless of consequences. Some urge us to give patients what they "want," others tell us to supply what they "need," and still others claim to be unable to tell the difference between the two suggestions.

This paper is intended to provide a preliminary reconnaissance of the terrain in question. It first reviews four alternative theories which might be used to guide the allocation of health care resources. Then, it considers a series of conceptual problems common to all of these schools of thought. It concludes by considering two practical examples -- organ transplants and controlling cigarette smoking, and asks how each theory would deal with each problem.

The purpose and method reflect a commitment to enhancing what the contemporary American philosopher John Rawls has called "reflective equilibrium;" that is an understanding of both our ideas and our practice that results in an increased consistency between the two. Exactly because it is so difficult to capture the complexity of reality in the simplifications we call "theories," we cannot presume that if our general arguments and our practice are inconsistent, that it is the latter that necessarily must give way. On the contrary, our actions might reflect subtle distinctions or complex notions our formal ideas have not yet embodied. Or our practice might be based on tradition or sentiment which on reflection we will choose to abandon.

Either way, in this essay I work back and forth from theory to practice, to show what different theories apparently imply and what various practices appear to assume. My aim is first to provoke readers to turn in on themselves, to examine and rationalize their own beliefs, then, with their own positions strengthened and clarified I hope they will turn outward to critically reexamine the patterns of practice we all see in the world around us, and provoke more extensive, as well as more enlightened public deliberation over these great and deep issues.

ALTERNATIVE DOCTRINES

In this section I examine four alternative doctrines by which health resources might be allocated. In each case I note what basic views of man and society might lead me to advocate such a doctrine, as well as some of its implications. In all instances, these are really intermediary theories -- proposed rules to guide allocation. They are neither specific allocational injunctions nor fundamental philosophical concepts. Such "mid-range" notions, however, do provide a handy basis for organizing our discussion, even though each is typically subject to a variety of specific interpretations.

Satisfy "needs": This doctrine is surely one of the most widely articulated principles as to how we should allocate health care resources. It is often based on the view that individuals have a "right" to health which is taken operationally to imply a right to whatever care is required to produce such health.

How could one justify the notion that society "ought" to provide whatever care is "needed?" The usual philosophic argument is based on some claim about man's essential nature, and what respecting that nature entails or implies. The argument can be religious or secular, the rights justified by divine revelation or discovered by pure reason of the sort Kant claimed was the foundation for morality. In either case, the critical question is how (and whether) the notion of "need" can be given a clear and morally relevant justification, and how such a potentially unlimited claim can be reconciled with other worthwhile social objectives.

Satisfy "wants": Those who advocate using "wants" instead of "needs" as a basis for health care resource allocation usually take economic models as their point of departure. They view health care as just one "good" among many and say that like all other goods, it is up to the individual consumer to decide how much health care he or she prefers. Health is not an end in itself, just a means to happiness. Hence, there is no way to say whether or not a person "needs" certain health care more or less than they "need" a more comfortable house or better food.

Since consumers' "wants" might well be unlimited, such advocates have to constrain each person's claims either by their

current income and wealth, or by what their claims would be if the distribution of resources were "fair." Thus, market arrangements, or markets supplemented by either general income distribution or more limited subsidies, are often recommended by such advocates.

The philosophic basis of such an analysis tends to be utilitarianism. Society is presumed to exist to make its members happy. Each of society's members can and should judge for themselves what will do that. Thus, people should get what they will pay for (because that reveals what they "really" want when confronted with limited resources). Public policy should be limited to correcting market imperfections (e.g., ensuring free entry and seeing that consumers have good data) and perhaps correcting ethically unacceptable income inequalities.

Do what is "fair": This doctrine begins not so much with the problem of how much resources to provide for health care, but rather focuses on the distribution of those resources. It asserts that people in the "same" medical circumstances should have access to the "same" care, regardless of their social and economic status. The strong form of this doctrine, a pure egalitarianism, says that all should have the same care. The less restrictive form says all should have access to some minimum level of care.

While this approach finds it easy to argue that "equals" should be treated "equally," it is less helpful on the question of how to treat "unequals." Even if all heart attack patients were to receive the same care, how should we determine how much to spend on them versus on chronic manic depressives or on cosmetic surgery? What does "fairness" require or allow us to do in such cases? On the other hand, the doctrine, unlike "need," does contain a way to respond to varied national economic circumstances. It is plausible to argue that what constitutes "fair" care in Kenya or Sri Lanka is not the same as in the U.S.A. or France.

The roots of this position tend to be in the philosophic tradition of social contract doctrine. The argument is that no social authority is legitimate except that established by consent. The question then becomes, what authority over the distribution of medical care resources either has been granted to the state, or would be granted if the question were properly posed? That is, what content would be given to the notion of "fairness," if everyone were asked to consent to a society run by mutually agreeable principles?

Advance social goals: This fourth ethical doctrine views medical care as a means to an end, as a contributor to some overall social objective. Care is to be allocated in ways that contribute to that objective. The oldest form of this argument is the "human capital" model that views each individual's worth in terms of the economic output they can be expected to produce

in their remaining lifetime. Medical care is then allocated to make the value of that output as large as possible.

Sometimes market wages are taken to be a good proxy for the social value of a person's labor. The argument is that all the relevant markets work well enough so that each person's compensation depends on the value of the output they produce. In other versions of the doctrine, markets are taken to be imperfect and therefore some adjustment has to be added to apparent cash income to correct for these distortions (e.g., to account for the otherwise low wages and hence apparent lesser value of women versus men).

One recent version of this doctrine takes the production of health as an independent goal and argues for efficient allocation within the health sector (maximizing "quality adjusted life years" or some such similar index). As with "fairness," the issue of how much to spend on health (compared to other things) and hence how valuable health is (again compared to other things) is left unresolved.

Philosophically this doctrine has obvious roots in medieval (and Greek) ideas of community, whether it was the Spartan polis or Lord Shafftsbury's analysis of the "great chain of being" where every social group had its role. Indeed, not dissimilar ideas are found today in many discussions of the problems of economic growth in the Third World, where the doctrine takes the form of technocratic optimization and maximizing national output.

PROBLEMS OF MOVING FROM DOCTRINE TO PRACTICE

Putting any of the doctrines just reviewed into practice requires us to make more specific some central concepts and relationships. This is not easily done in all cases. Simply because we use certain words does not mean that the categories they denote have clear and unambiguous counterparts in natural phenomena. Simply because we talk in ways that presume that certain relationships exist does not mean that those relationships in fact exist in the world. In fact, some of the most basic ideas embodied in the preceding doctrines are very difficult to use, once we think about actual situations.

The multi-dimensional continuity of "health": All ideas that invoke a right to "health" implicitly presume that the term "health" is either already reasonably well defined or else would be relatively easy to define in an uncontroversial way if only we took the time to do so. Otherwise, the doctrine would not have much practical value since it would be hopelessly unclear and/or controversial as to exactly what claim was being made.

Thus, the "rights to health" doctrine tends to presume what I call the "multi-box model" of individual health status.

Health states are viewed as divisible into a limited number of well-defined and mutually exclusive conditions, one of which is "health." This approach, in western thinking, has its roots in the Law of the Excluded Middle of Aristotelian Logic (Everything is either A or not A) and finds its modern embodiment in the I.C.D.A. system of diagnostic categories. It also fits in well with the professional experience of physicians who constantly confront the decision to "act" or "not act." They therefore must constantly transform continuous variables like blood pressure into discontinuous ones: "high blood pressure" implying intervene versus "non-high blood pressure" implying don't intervene.

This approach does only minimal violence to reality (although it ignores severity variations) when we are dealing with infectious diseases, each of which has a distinct and well defined etiologic agent. In that context "health" is literally and simply the absence of disease. But when we consider chronic, degenerative, developmental and metabolic conditions, the oversimplification of this way of thinking becomes a serious problem. At what point does a sufferer from rheumatoid arthritis, arteriosclerosis, schizophrenia, diabetes, or mental retardation become "healthy?" What exactly is meant by claiming there is a right to "health" in such situations?

The fact is that an individual's health status must be seen as a multi-dimensional continuum. The relevant dimensions include among others physical functioning, social functioning, mental state (clarity, pain, etc.) and physiologic condition. Physicians increasingly realize that some treatment choices reflect trade-offs among these dimensions -- for example, the short term mortality risk of coronary surgery versus the pain relief it might produce. The whole question of what society should do for people facing such choices, what rights and what responsibilities they have, is simply not answered by saying they have a "right to health." The critical term is too ambiguous for us to even know what it is that is being claimed.

To put it another way, such a formulation surpresses, ignores and assumes away many of the most important ethical issues. How can we establish priorities among different kinds of health gains to individuals in different kinds of health situations? Who should make such decisions and what norms should guide them? Asserting "rights to health" merely begs these questions.

The relationship of various inputs to health status: In areas other than health, economists have developed the notion of the "production function," the relationship between inputs and outputs in any line of activity. In discussing how to allocate health care resources, assumptions are often made about this relationship. The two assumptions in question are that there is a discontinuity or threshold in the relationship of inputs to outputs, and that there is little substitutability among inputs

in producing any given level of output. Both assumptions, I will show, are essential to any claim about the "need" for certain health care inputs and in many cases, in fact, neither is really correct.

Suppose we deal with our previous point, the multi-dimensionality of health status, by constructing an index (ignore the problem of how to do that for the moment). Then we can consider the graphs in Figure I, which are payoff functions. They show alternative possible relationships between the inputs devoted to health care and the health status of the patient.

To say that a patient "needs" certain care carries with it the connotation that the payoff function is as in Figure I(a). In that case, unless we get to point T (for threshold) the patient gets little or no benefit, while resources beyond T produce little or no gain, since the patient is "cured" and becomes "healthy." Suppose in contrast the payoff function is as in (b) or (c). What level of inputs does the patient "need?" In (b) there is a resource level that produces a maximum health status (beyond M we get "negative returns"). But is that the same as "need?" After all, in going from R to M we have doubled the resource input for a perhaps 10% gain in health status. And in (c) there isn't even such a level; added resources continue to produce added benefit, albeit at a very slow rate.

The point is, we cannot presume, as talking of "need" typically does, that the world will solve our resource allocation problem for us by apparently picking out the one level of resources that is required to deal with each problem. Yes, there are some cases where "need" has an intelligible meaning. One "needs" vaccine and needles to do vaccinations, or antibiotics to treat infections. But it is surprising what a small percentage of all health care resource allocation decisions occur in cases where the desired output is uncontroversial and the way to achieve it unambiguous. Yet, it is only in such cases that we can use the term "need," and then all it means is "something almost everyone would agree to." More usually we have choices to make. We can spend more and get more or spend less and get less. Even where we confront "step functions" like Figure I (a), we may not want to climb every step -- some may be two broad and shallow, offering too little for too much.

A similar problem arises when we consider choosing the specific input mix to achieve any given level of benefit. Economists draw "isoquandts" to depict such relationships. Suppose there are two inputs used to produce a given output. Put one on each axis of the diagram and in that space draw lines connecting all input combinations that produce the same output. You have a sort of topographical map -- one can only draw a few selected "contours" representing an arbitrary selection of output levels -- analogous to elevations on the map.

Two inputs that can be easily substituted for each other produce isoquandts that are straight lines (Figure II(a)). If we need the two in fixed proportions so that more of one does no good without more of the other then each isoquandt is a right angle as in Figure II(b). If there is some but not unlimited substitutability, we get curves as in Figure II(c), where either input alone is sufficient to produce some output, or Figure II(d) where some of each input is essential.

Policy with regard to health care resource allocation often presumes the world is like Figure II(b) when it is not. Whenever someone talks about how many beds or physicians are "needed" they are falling into this oversimplification. In reality, in many cases we could substitute home care for beds or other personnel (or equipment) for doctors -- at least to some extent.

The implication of all this is both clear and startling. In many, many cases there is simply no way to answer questions like "How many doctors do we need?" To ask such a question presumes a discontinuous payoff function and fixed proportions. That is, for each patient it presumes that there is only one output level possible and only one input combination to achieve that output level. When the world is not in fact like that, there is no way we can decide what we "need."

Instead, we must ask questions like "How many doctors are part of a cost-effective plan to provide the health status outcomes we would like?" The latter formulation (unlike the former) calls attention to (instead of concealing) the choices we can -- and indeed must -- make with regard to both output levels and ways to produce them.

The role of non-health care inputs in health status: A third major problem in using various doctrines to guide the allocation of health care resources arises as a result of the large role of non-health care inputs in determining health status.

We know, for example, of the importance of individual behavior, especially with regard to smoking, diet and exercise, in effecting chronic conditions like heart disease and cancer. We know as well that in developing countries, nutrition levels, housing conditions, water and sanitation facilities, education, and transportation and communication all play a significant role in the need for and use of care. These facts are perhaps more widely appreciated than the two previous points so I need not dwell on them, but only on their implications.

These are two. First, there is no way that a society can guarantee individuals "health." Individuals themselves have too much to do with their health status for us to do that. I suppose hypothetically it would be possible for some nation to undertake a very aggressive and coercive program on diet, smoking,

exercise, etc., so as to remove all elements of personal choice and responsibility with regard to these variables. But I consider that to be so unlikely that it is not a relevant counter-argument to my point. We simply cannot guarantee to alcoholics that they will not die of cirrhosis of the liver nor to smokers that they will survive lung cancer.

Nor is it clear we would want to offer unlimited compensatory care to make up for an individual's unhealthful behavior. To do so both undermines self responsibility and runs the risk of encouraging such behavior (and raises the society's costs of care) by protecting individuals from the consequences of their actions.

The second implication is that in many situations it is hard to logically look at the allocation of resources for health care without also considering those devoted to prevention. In some developing countries that integration is more apparent even than in the West, because the tradeoff between better water supplies and more drugs is so evident to all. But as we go forward in considering what resources to devote to care, we will have to bear this in mind.

Lack of knowledge: The fourth major obstacle to the practical implementation of any of these doctrines is our lack of knowledge about the "production functions" for health care. Non-physicians often find it very surprising to discover that much of clinical practice is not based on well defined and quantified research studies but on some combination of tradition, intuition, judgment and experience. Medicine is really an "art" or at least a "craft" as opposed to a "science." Much of it has not been reduced to well defined and explicit propositions and rules.

This fact helps account for the wide variations in patterns of clinical practice among different communities that Wennberg among others has repeatedly documented. Physicians with different training and experience treat similar cases very differently. It helps explain how and why some care providers in the U.S. are able to lower surgical rates substantially (compared to their surrounding community) without apparent health consequences, and why lengths of stay for a given condition vary so much from hospital to hospital, and even more from region to region.

Part of the reason for this lack of knowledge is that reliable clinical data are very difficult to collect. The placebo effect, the great variety in individual responsiveness, and the natural recuperative powers of the human body all make a physician's own uncontrolled experience systematically unreliable. Any one person's small sample of cases tends to inappropriately reinforce the view that his practice is correct. This phenomenon accounts for the now numerous instances of procedures gaining widespread acceptance which later proved to be worthless.

This situation poses real difficulties for any resource allocation doctrine which relies for its justification on the consequences it produces. How are we to know what inputs are part of a cost-effective plan if we know so little about the relationship of inputs to outputs? How are we to redivert resources from low productivity to high productivity uses if we cannot tell these apart?

CIGARETTE SMOKING

The arena in which I propose to test these various theories is the realm of public policy toward cigarette smoking. Exactly because this is an unconventional (if widely discussed) area for the allocation of health care resources, and so clearly embodies the third problem just discussed, it provides a provocative test case.

Smoking is almost assuredly the most serious "behavioral" source of ill-health in the U.S. today. With cancer 20 to 25% of all U.S. mortality and 25% of cancer due to lung cancer, which is mainly cigarette induced, one immediately has 5-6% of all U.S. deaths due to this one cause alone. Add in a significant role for smoking in other cancers, in strokes and cardiovascular disease, in chronic lung disease and emphysema, and in deaths from house fires, and one clearly has 20% or more of all mortality in the U.S. today in which smoking plays a major causal role.

Public policy toward cigarette smoking in the U.S. is a quite varied mixture of actions. First, advertising is banned on radio and television. Second, cigarette packages themselves and all print advertising must contain a specified health warning. Third, there are federal excise taxes (of 16 cents per pack of 20) and state excise taxes that vary greatly, which together discourage consumption. Fourth, there are a wide and growing variety of state and local laws that restrict smoking in certain locations. Finally, many local jurisdictions and school boards, as well as some federal efforts, are directly devoted to anti-smoking advertisements, educational efforts and research.

In addition, there is a large scale federal government role in the growing of tobacco. A system of allotments limits total production and a system of crop loans in effect guarantees minimum prices to producers, although not to buyers. The net effect of these schemes is most probably to decrease consumption slightly by decreasing supply and raising tobacco prices. Although when the costs of processing, distribution, marketing and taxes are considered, the effect is likely to be small because tobacco costs are only a fraction of retail cigarette prices.

The result of all this has been some downward trend in per-capita cigarette consumption since 1963, as well as a substantial shift in demand among cigarette types. Filter brands are now over 90% of the market versus only 50% in 1960, and low tar brands are about 30%, up from 3% in 1970. Also, the amount of tobacco per cigarette has declined by nearly 40% since 1953 despite the move toward longer sizes. However, consumption among some groups (e.g., women) is still rising and the health effects of even the current rates of consumption are very substantial.

How might our various theories lead us to intervene in this arena? What additional preventive health measures would they justify?

Needs: However difficult it is to define "need" in the context of medical care, the example we are considering shows the even more severe limits of the doctrine when applied to the preventive area. How much anti-smoking government action does anyone "need" to be subject to? The question obviously does not have a very coherent or persuasive answer. Conversely, how much tobacco does someone "need?" Addicted smokers have strong positive views on that while anti-smokers say they don't "really" need their unfortunate habit. This only goes to reveal again that making operational notions of "need" depends on pre-existing agreements about what objectives are to be achieved and how they are to be achieved. It is exactly in those latter decisions -- where the rhetoric of "need" is uninformative -- that the real choices must be made.

Wants: While the doctrine that the economy exists to satisfy current wants provides somewhat more of a basis for public action on smoking than "needs," the basis for that action is still quite circumscribed. For now we must justify any intervention with one of two arguments.

First, one could argue that people are currently manipulated and/or poorly informed and so are making mistaken choices. This situation could provide a justification for expanded informational and educational efforts. This can be supported, for example, by the claim that while tobacco companies have an incentive to provide pro-smoking information and messages, no one has the incentive or the resources to provide messages on the other side. Hence, absent government action, the public would be misinformed.

However, a true "wants" oriented analysis will remain intensely concerned about the possibility of paternalism and about inappropriate manipulation of the individual by the society. After all, the whole foundation of this argument is the need to respect individual choice. Just how bold can a required health warning on a package be before it becomes an infringement on, instead of an aid to, freedom of choice? At what point does the expansion of "No Smoking" zones

inappropriately interfere with smokers' rights? For believers in this doctrine, these are serious issues.

A second "wants" oriented basis for public action is the correction of market imperfections. If one accepts the whole framework of contemporary neo-classical economic analysis, one can conclude that a competitively structured free-market economy will be efficient, and in that sense, satisfy wants. For this to happen, prices have to reflect costs, production has to be efficient, etc. Hence, features of the cigarette market which fail to meet these structural requirements can be appropriately altered by government action. The persistent advocacy by some economists of an end to the tobacco allotment and price support program (which might actually increase smoking!) is typically based on this perspective.

It is not clear what additional policy actions in the U.S. today a "wants" perspective would justify. Some of these advocates would probably even prefer to go back to the period from 1967 to 1970 when under the "Fairness Doctrine" television stations carried both cigarette advertising and anti-smoking commercials as opposed to the current ban on broadcast advertising.

One new line of attack that this doctrine might support would involve trying to insure that the costs of smoking (including health costs) were more fully and accurately borne by smokers. This could be done in several ways. One would be to impose premium differentials on health and life insurance policies. These would however raise some obvious implementation difficulties with regard to reporting and monitoring, difficulties which become more serious the larger the differentials become. In addition, since so much health care (and support of dependents) is publicly financed, there would seem to be a case for raising the tobacco excise tax high enough to provide support for Medicare and Medicaid, Welfare and Social Security costs from smoking-induced illness.

Ironically, the Federal Excise Tax remained at 8 cents a pack from 1951 to 1982, despite a tripling of consumer prices over that interval. In 1982 it was raised to 16 cents a pack, but it is scheduled to go back down in 1985, unless Congress intervenes. I am currently trying to gather the data required to estimate what such a "full cost" tax rate would be.

"Fairness": If we try to base the allocation of health care resources on "fairness" we would most likely find ourselves justifying that view on the basis of some sort of social contract doctrine that asserts a set of reciprocal rights and obligations among members of the community. There are many possible (and quite different) versions of such an argument. At least some of them, however, lead both to and from the notion that society is more than an atomized collection of individuals. Rather our society has both the possibility and the

responsibility to define itself in terms of a commitment to shared substantive values and ideals.

On this basis one could conceivably justify more aggressive anti-smoking efforts (as well as more activity against alcoholism, in favor of jogging, etc.) than a pure "wants" approach would legitimate. After all, a community could perfectly plausibly be defined in part by some joint commitment to physical health and vigor, just as it also might be defined by a commitment to values as diverse as social justice, education, the preservation of nature and the advancement of artistic beauty.

Such a line of argument always runs the risk of authoritarianism. And in a society of deep value diversity, raising the issue of basic social commitments can be deeply divisive. The European religious wars of three centuries ago, the fundamentalist revolution in Iran, and less dramatically the politics of abortion in the U.S. today reveal what can happen when a society engages in the "Great Politics" of moral virtue. Still there may be a middle group between a politics that is purely the division of the spoils and a politics that justifies killing to preserve virtue. In such a middle ground, one could make the argument that designating certain public areas as no smoking expresses social disapproval of a pattern of action that is legitimately and appropriately discouraged. Such an analysis, similarly, would justify (and perhaps is required if we are to justify) current educational programs in U.S. schools which almost assuredly go beyond merely presenting "the facts" on smoking and substance abuse to advocacy of some kind or another.

Social good: Finally, we come to the doctrine that provides the most diverse basis for public action on smoking (or on any preventive health measure for that matter). We can justify a great deal once we feel able to assert that it serves an important social objective, that can override individual interests (as opposed to merely a joint commitment to a certain kind of self definition as in the previous doctrine). The problem with this doctrine is: who gets to decide what that objective is, and how are they to proceed in thinking about that question?

History offers us many alternative answers to this question. For some it has been given by supernatural revelation, for others it has been implicit in a collective racial unconscious or provided by a common cultural experience. Others have found it in a natural law of life, or in communal destiny. Not infrequently some especially gifted religious or secular leader has claimed to have the answer as a result of their superior powers and insight. I must confess, however, to a deep and instinctive skepticism and sense of danger when confronted with such claims, albeit they are a major driving force in health care resource allocation in many situations.

Any society which operated on such principles would find it easy, however, to justify almost any measures that met the test of fostering the collective good. Outright bans, penalties, compulsory re-socialization (including communal monitoring and communal criticism of backsliders), all of this would be potentially legitimate. And indeed, if this seems unlikely with regard to smoking, one only has to consider areas like family planning to see this is not an entirely hypothetical set of responses when a society believes the stakes are high enough.

ORGAN TRANSPLANTS

Organ transplants have been done in the United States since 1963, when both kidney and liver transplants were first performed. The world's first heart transplant was done by Barnard, in South Africa in 1967, and the first one in the U.S. by Dr. Norman Shumway at Stanford in 1968. We now appear to be approaching a rate of 5,000 kidney transplants a year, while there are perhaps 125 heart transplants a year nationwide. The liver transplant rate is similar with one group (Starzl's at Pittsburg) responsible for perhaps 80% of these.

There are many points at which public policy influences the utilization of transplant therapy. In some states (including Massachusetts) a hospital proposing to perform such services requires permission from the state government (under the so-called "Certificate of Need" law). In addition, there is the question of when and how the state and federal governments, as part of the Medicare (for the elderly) and Medicaid (for the poor) programs, will pay for such procedures.

Since 1972 almost all persons in the U.S. with end-stage renal disease have been covered under the Medicare program as a result of PL 92-603. From then on, the federal government has paid for most of the costs of either kidney dialysis or kidney transplantation. This program now costs about $2 billion per year. So far the federal Medicare program has generally not paid for heart or liver transplants on the grounds that these are "experimental," a condition for denying payment under the law. Payment under the Medicaid program, in contrast, is a matter of state-by-state determination, and several states (including Massachusetts) have bent, if not broken, their own regulations to declare persons "Medicaid eligible" (and the procedure "non-experimental") in order to cover these costs in certain highly publicized cases. Coverage under private insurance plans (including Blue Cross) is also highly varied from plan to plan and state to state, but again tremendous pressures have been brought to bear on such plans to cover care when particular cases have become the subject of intense media coverage.

The "cost" of a transplant is an extremely ambiguous number. For heart and liver transplants, estimates range from

$10,000 to $250,000, depending on how the analysis is done. Several decisions are crucial in determining where on this range any estimate falls. First, is the cost computed for the procedure itself or including the care of the patient, both before and after? Since post-operative complications are common (perhaps even more for liver than for heart transplants) and since the intensive care that results is very expensive, costs are much higher if we view the unit of analysis as the case (which seems correct) and not as the procedure itself. Second, do we compute the costs on the basis of each patient cared for or each patient who survives? Since survival rates to 5 years are at best 60%, this obviously makes a difference.

Most importantly, we must decide which costs to count. Many published discussions cite figures that are not costs at all, but the bill such a case would generate. Since hospital rates are typically set on the basis of fully allocated average costs (where the costs of all overhead activities are allocated to or spread over the various service delivery components), bills tend to give us a relatively high cost number.

On the other hand, suppose one were to argue that there was enough slack in the hospital system to produce these procedures with no additions to facilities or central administrative staff, and only a little impact on nurses, laboratory staffing needs, etc. Then one could get quite low numbers reflecting only the costs of directly consumed drugs and supplies, the cost of procuring the organ and perhaps a little nursing overtime. This would involve an estimate of what economists call "shortrun incremental (or variable) cost."

At the opposite extreme, if one were to presume that the addition of this procedure to the delivery system would lead to new construction (beds, operating rooms, intensive care units) then the "cost" might be even greater than current bills. The new capacity that would eventually be added would surely be more costly than the average of current capacity, and one would want to estimate the "long run incremental costs."

Finally, note that the costs of instituting transplants at any one institution might not be limited to that institution. If that institution is operating at or near capacity, even if it does not expand, there could be spill-over effects. Patients might get diverted to neighboring institutions that eventually might expand (adding either staff or facilities or both), thereby incurring costs that are really attributable to the transplantation activity.

Thus, we see the complexities involved in estimating the costs of transplants, from a health systems perspective. Doing so involves, in effect, forecasting alternative futures for the delivery system, especially since we will also have to care for the patients who would have been transplanted even if that procedure is not performed. And obviously, those alternative

futures are not fixed and given, but will be shaped in part by how public policy evolves in each case.

Now what can our various ethical theories tell us about how to deal with such problems?

Social worth provides the most straight forward basis. We would provide a limited number of transplants (however many the society "could afford" or "found useful," given its priorities and resources). We would allocate these to those whose survival most advanced our social objectives. If we wanted economic growth we would look for valuable technical skills perhaps. If we wanted regional domination, we would save talented military leaders. We could also decide to save artists, or politicians, or scientists, or some mix of all of these, depending on our specific objectives.

Exactly which providers perform the service, and what that did to budgets, the availability of other services, etc., would all be worked out in some planning or budgetary process. The degree of centralization of that process would reflect the prevailing pattern of social organization.

Wants: At the opposite extreme would be the essentially decentralized approach of a "wants" doctrine. We would give transplants to those who "wanted" them sufficiently, that is, to those who would be willing to pay what it cost. We might or might not cover it through some state sponsored medical insurance scheme. A hard line "wants" approach redistributes only cash, not specific benefits. In such a mode one would have a negative income tax or other money transfer system and leave people free to purchase "transplant insurance" or not, as their own calculations of costs and benefits told them to do.

On the supply side, a "wants" doctrine might well lead us to advocate less regulation and more use of the free market. We would probably not regulate providers and instead allow any willing buyer to buy the treatment from any willing seller. This "pro-competitive" approach has in fact found many defenders in the U.S. in recent years as a general approach to health care system problems.

Needs: Transplantation provides a striking case where all the difficulties in interpreting "need" do in fact surface. At first glance, this would appear to be a perfect case for a "needs" analysis. After all don't we have here a case where there is a "threshold" payoff function in which the patient gets little or no benefit (i.e., will die) without some specific level of resource input? Further thought, however, reveals the inaccuracy of this view. First we need to use some measure of "expected benefits" on the vertical axis of our diagrams. That is, for each resource input level, ask what the benefits would be of various possible outcomes, and take the sum of those alternative benefit levels, each of them multiplied by the

likelihood of their occurrence. For many patients, transplantation will provide only slightly greater (or even less) expected benefits at significantly increased cost (i.e., the "step" will be very broad and shallow). Furthermore, distinguishing those for whom there are net expected benefits from those for whom there are not is often very difficult, given our limited knowledge.

How small does net benefit have to be before we say there is no "need?" Indeed, suppose someone says they would prefer the risk of short range death given the slim chance of a reasonably long life that even a "counter-indicated" transplant would provide. That is, the case involves negative expected benefits on some weighting scheme that seems plausible to many, but positive net gains if we give great weight to long run survival probabilities. Does this patient "need" a transplant?

Similarly, how do we deal with the problems of perverse incentives? Do we do liver transplants for those whose disease is self induced, by heavy drinking or heart transplants for obese heavy smokers? If they have quit alcohol or tobacco is that enough? Or do we want evidence that despite the stress of transplantation they will stay off tobacco or alcohol; thereby making the procedure a better bet? Does any one group (current, clearly reformed, or those who might redevelop alcoholism) "need" a transplant any less? Does that concept help us very much here?

Fairness: Finally, "fairness" appears to be the normative rule that underlies (in some form) much of current practice. How else are we to account for a policy that funds all (or almost all) end-stage renal disease treatment from public funds? But of what does "fairness" consist in the transplant context? It apparently does not mean that we fund all possible procedures for everyone. That would lead to insupportably large claims on the nation's resources.

One possible answer lies in the concept of a "decent minimum" level of care as articulated in the recent report of the U.S. President's Commission on Bioethics. That report advances the notion that each individual citizen, as a result of their citizenship should be viewed as having the "right" to some specified level of care. That level is set in light of social and historical circumstances. Hence, it will vary from community to community and over time as economic growth, medical technology, social ideas and so on all vary.

How is the content of this "decent minimum" to be determined, as a matter of logic as opposed to simply through political practice? What arguments would we make to each other about what to include or not? I suggest that one consideration does have to do with the relationship between the cost of, and the effectiveness of the technique (assuming it were widely employed) versus a similar calculation for other alternative uses of funds that are close to the margin of decision. That

is, if we make procedure "x" universally available on a non-discriminating basis, what would we gain, and what would it cost, compared to other possible expansions in our definition of the "decent minimum?" This application of such an analysis is not on a case by case basis, but is part of the decision to include a procedure in a package of entitlements that would then be available without case-by-case review.

The tricky part of such a decision, however, lies in delineating who will be considered an appropriate candidate for any given procedure. The more inclusive the selection criteria, the larger the pool of candidates, the higher the total costs and the lower the average benefits. But in drawing the criteria to what extent are we justified, and would we be able, to exclude patients who might benefit but are not given the service because the expected payoff is too small? If the ESRD program is any precedent, it will be very difficult to explicitly impose such limitations. Instead, if there is to be such triage, it is more likely to take place because there is a limited capacity to perform the service. Thus, rather than creating all the transplant capacity we "need," we may be best advised to create what we can afford, allocate that fairly, and then see if there is reason to provide more. In the short run, the limited supply of organs may provide an external limit that will constrain expenditures. But the prospect of an artificial heart should not make us confident that accidents of history will forever spare us from difficult social policy decisions.

In this context, "fairness" would imply selection based only on an individual's medical condition and not on economic or social circumstances. Yet even that ideal is neither universally accepted nor self-evident. Many transplant programs make the availability of "emotional support" or of an appropriate "recovery environment" criteria for choosing among candidates. Yet I find that it is not easy to decide whether the nature of an individual's living arrangements should affect their ability to obtain a transplant -- even if those arrangements are likely to effect recovery probabilities.

Even if there is a publicly provided minimum, do we allow the rich to buy access or utilization beyond the "minimum?" My own view is that the answer depends on what services we are discussing. I would say "no" in the case of life saving procedures if by exerting a demand the rich deprive other potential beneficiaries. I have no objection to wealthy individuals buying whatever cosmetic surgery they want. But, if there is a limited supply of organs, as in fact there is, one man's exercise of his free market rights implies someone else's inability to get a transplant.

Ironically in practice as a society we seem to look not only at costs per patient but also at costs to the system in determining what to fund at public expense. This provides an advantage to those suffering from relatively rare conditions

since they can ask for a level of subsidy that would be insupportable if their numbers were also very great.

I believe that some of these difficulties can only be resolved (or even understood) by recourse to a deeper level of philosophical analysis than I have time for here. Suffice it to say that giving content to a notion like "decent minimum" involves some of the pivotal issues of contemporary thinking on moral philosophy. I find the revival of "social contract" doctrine, as espoused by Rawls, Waltzer and Sandel helpful, but I must leave a full analysis for another time and place.

SUMMARY

Several of the points that emerge from this discussion are both obvious and yet widely ignored in public debates on health care resource allocation.

- There are different philosophies about how to allocate care resources and not every one agrees. Thus only the narrow minded write about evaluation issues as if the answer were "obvious."

- These differences in philosophy can lead to quite significant differences in public policy. Thus, exploring one's views about the various ethical doctrines is an intensely practical matter -- not a pointless academic exercise.

- We have been unwilling to sufficiently face these moral issues. Instead, we have suppressed many of them into slogans like doing what is "medically necessary." Such obfuscation preserves control over these decisions by bureaucrats and professionals (mainly doctors) but does not facilitate informed public debate or effective democratic decision making.

- Any one theory seems incapable of capturing all our ethical feelings. We might use one doctrine for transplants and another for orthodontia and another to inform our choices about care for severely mentally retarded adults. The world is a more complex and subtle place than our ideas typically take account of.

- It is naive to expect that cost-benefit analysis or cost-effectiveness analysis, however helpful, either can or should provide a full ethical framework for analyzing resource allocation questions.

- Many time-worn, even time-honored notions like "need" should be reexamined in light of our improved understanding of the world, and revised accordingly. Rather than ask "What does this case need?" we must often ask "What resources would provide the level of care that is socially appropriate in the most efficient way?"

The latter formulation calls attention to the choices we can, indeed must, make about both inputs and outputs.

FIGURE I

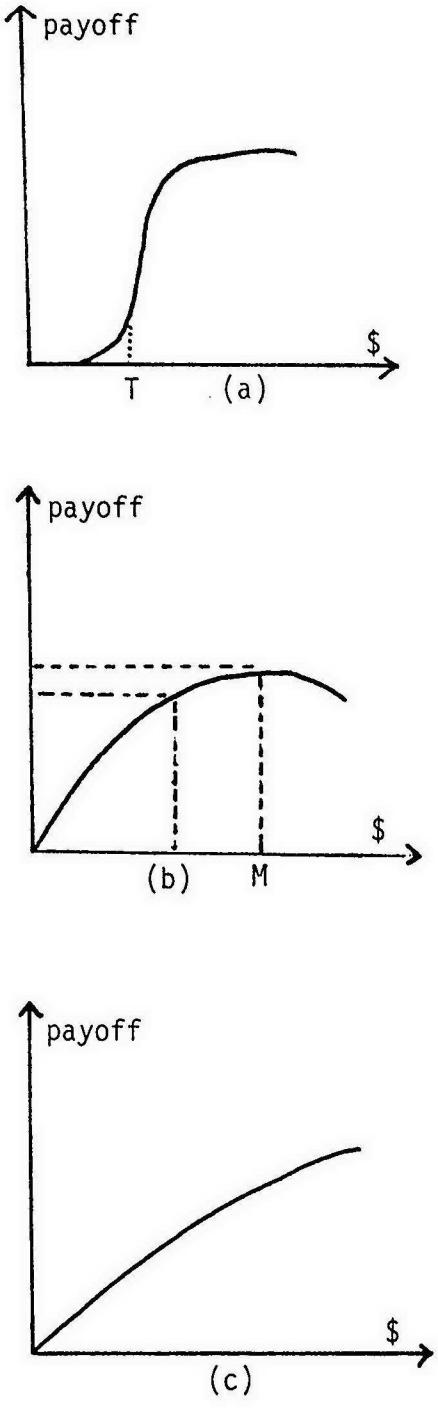
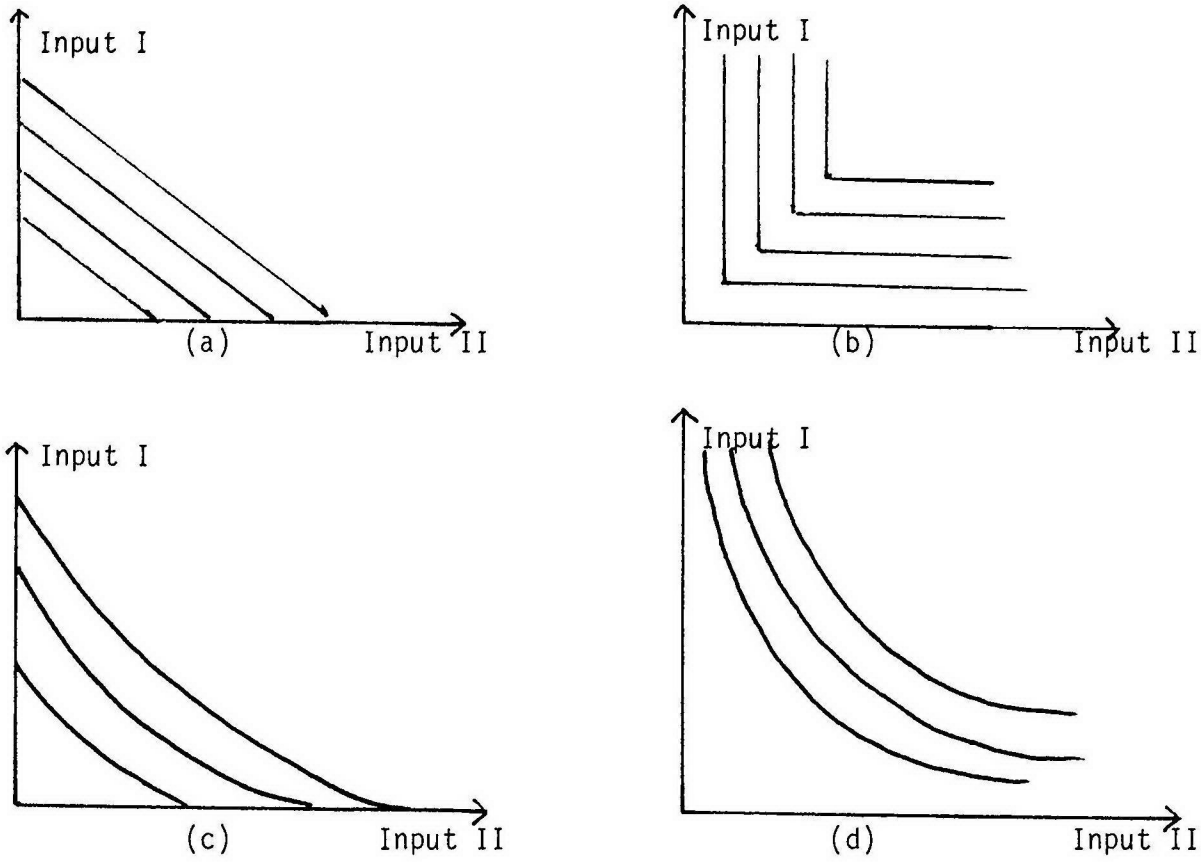


FIGURE II


Input I
(a)
Input II
Input I
(b)
Input II
Input I
(c)
Input II
Input I
(d)
Input II

Y. SUZUKI: Thank you for the introduction. I was very impressed with the two examples Professor Roberts cited, smoking and organ transplants. I neither smoke nor drink and thus have a good chance of enjoying a long life. Since I will likely die a natural death, I will not need costly health care resources. I have little desire to obtain consumer goods. I never even wanted a refrigerator or a car and only have them because of my wife's wishes.

Professor Roberts referred to a multi-dimensional continuum, terminology we use frequently in statistics and mathematics. There is no need for resource allocation where there is no desire or want. If you do not need medical health care, health resource allocation is not necessary. If you don't want to watch T.V., you don't have to buy a set. I would be interested in Professor Roberts's comments on these statements.

C. K. PARK: I would like to express my appreciation to the Japan Committee of the Takemi Program for inviting me to be a commentator in this Symposium honoring the late Dr. Takemi. I had the privilege of being acquainted with Dr. Takemi for nearly ten years.

No matter what our country's stage of development, we cannot talk about health policy issues these days without mentioning resource allocation. Health costs are rising dramatically and the national health expenditure as a proportion of the GNP is steadily growing in both developing and industrialized countries. Therefore, it is quite appropriate that the first Takemi Symposium on International Health set aside a session to deal exclusively with the question of resource allocation.

Professor Roberts's ideas about scarce health resources are interesting, instructive and provocative. In focusing on alternative theories which can guide the allocation of health resources, he concentrated on the normative aspects of these theories, an area of discussion that some economists consider outside their purview. As a professor of economics, Professor Roberts is to be commended for wrestling with such basic humanitarian issues as ethical, moral and philosophical problems. I'm sure that most of us here would welcome Professor Roberts's call for more extensive and more enlightened public deliberation of the problems of the limited allocation of health care resources.

I would like to make two brief comments from the perspective of developing countries. I feel that we need to focus more attention on how to allocate scarce health resources efficiently. There is often a conflict between equity as an ethical criterion and efficiency as a social goal. Whatever

amount of health care resources are available, there are frequently serious inefficiencies in their use, particularly in developing countries. Most common are the inefficiencies in the use of health manpower. Highly trained personnel are often used for tasks which can be properly performed by less highly trained personnel. In developing countries, the use of inappropriate technology may be another source of inefficiency in the allocation of scarce resources.

By undermining efficiency the wasteful use of scarce resources may lead to a reduction of equity or fairness as well. This means that the interaction among alternative doctrines, as Professor Roberts suggested, needs to be more carefully examined and evaluated, particularly in the case of developing countries.

The second point I would like to make is related to the concept of needs. The concept of needs is quite different when viewed from the perspective of the developing countries than when perceived by the affluent, industrialized countries. In the developing countries, the concept is often used as a means of focusing more closely on the interaction between poverty, inequality and development -- especially for the concept of basic health needs. The recent forecast of "basic needs" as advocated by the International Labor Organization and others may be one example of such an approach. The fundamental frame of this approach is that development strategy needs to be oriented toward achieving a rapid, relative and absolute improvement in the standard of living of the poor countries in the world. So, when we talk about needs, we may have to differentiate between the needs arising from different social and economic environments.

I would appreciate it if Professor Roberts could elaborate on these two points.

M. ROBERTS: Professor Suzuki suggests that if you are healthy and will likely die a normal death, you will not be in need; and if there is no desire or no want, then what would be the basis of allocating resources? I think there are two answers to this predicament. First, if we really did live in a society in which we were all healthy until we die, there might be relatively little place for health care. In that sense your point is well taken, because if we all lived a long and healthy life, and one day, peacefully and relatively quickly died, it would be as if all automobiles lasted twenty years and then disintegrated -- there would be no need for automobile mechanics. But this is not the usual situation, either with our bodies or with our automobiles. Your comment raises two interesting questions, however. One, to what extent should the person you described bear the costs of caring for less fortunate individuals? Two, is the answer to that question the same or different if my misfortune is, in part, a result of my own actions? For while it may be one thing if I contract some condition through no fault of my own, perhaps it is another if I

contract a condition because I smoke or drink too much. In the first instance, you are paying into my social insurance to cover my bad luck, but in the second, you are being asked to pay into social insurance to cover my bad judgment or lack of self-control. That is why I suggest the possiblity of a tax system on those forms of bad behavior that contribute to ill health, so that I do not ask you to subsidize my self-destructive habits.

I also think there is an important social equity and incentive issue to consider. If we subsidize bad behavior, we encourage people to engage in it and conceal from them the real implications of their actions. If cigarettes were very expensive and each pack carried the statement, "Half of the price of this package is going into a special fund to care for your eventual illness," some smokers might think about the hazards of smoking when they purchased their cigarettes.

To turn to Professor Park's comments, I do agree profoundly with several points he made. First, he noted that the relationship between efficiency and equity may be more complicated than is sometimes thought. Let me elaborate slightly. Sometimes, in the less developed countries, we provide inappropriately trained care-givers in the name of equity. For example, suppose we have a situation where there really is no need for a fully trained doctor in a village and a partially trained paramedic with backup at a regional hospital would suffice. In the name of equity, we state that everyone must have a doctor because we believe it is fair only if everyone has the same care. But if it is expensive to train doctors, we could end up with less, not more, care in the countryside because we have insisted on inappropriately overtrained personnel. This would be an example, I would think, of equity being diminished because we have failed to be efficient. A more efficient use of personnel would also be more equitable in terms of the ultimate outcome.

I think this suggests that there are different conceptions of equity and we need to be very careful about our definitions of equity so that we are not inefficient as we try to be equitable. To make this point positively, management efficiency can support equity. Sometimes when health care providers are asked to be efficient and to talk about costs and benefits, they respond "I am giving care; I am a good person; I am serving moral values; do not bother me with all this management." Professor Park reminds us that attention to management can advance generosity and care, instead of conflicting with them.

In many developing societies, there is a deeper question that has to do with the provision of very advanced care to few. This is a profound problem of equity and efficiency. Should a society that has poor medical care in the countryside invest in the capacity to do heart transplants in the central city? Here again, we get conflicting definitions of equity. The urban elite in the central city will tell us that fairness mandates

that they have the same access to advanced technology as their counterparts in other countries. This raises the interesting question: Is the basis for equity comparisons within a country, or is the basis for equity comparisons worldwide? I think we see that people have some different views of equity in some of these discussions.

Finally, Professor Park questions the terminology "basic needs." In my paper, I call on all of us to stop using the word "need." I say that we should start asking what inputs are part of an efficient plan for reaching desirable objectives. I argue for this formulation because it calls attention to the two choices we make, the choices among different combinations of inputs and choices among objectives. Professor Park mentions the International Labor Organization doctrine of basic needs. While I do respect the ILO and agree with many of its ethical objectives, I nonetheless suggest that the term "needs" is used in that context, as in many other contexts, for its emotional, symbolic or rhetorical value. We could use other less emotionally compelling words, but the notion of needs has a strong claim on us. It is a claim on our humanity, and it is in the service of that objective that such terms are used. I share the objective, but I do not believe the language really clarifies our choices.

V. RAMALINGASWAMI: I come from a culture where philosophy pervades every aspect of life. Two or three issues raised in this discussion are profound and seem to me to be the thread running through this conference.

First, there is the much debated question of what constitutes health. Unless one has an idea of the contours of this concept, one cannot even begin to approach this problem in all the dimensions which Professor Roberts has indicated. To shed some light on this question, I think it might be worthwhile to examine our traditional systems of medicine. We search these systems, of course, to find magic, herbal cures, but we should recognize that these systems also have much to offer in terms of their conceptions and philosophies of health and life in general. My own country has "Vedic" medicine or "Ayurveda" as it is called, which was developed, possibly 2000 years before Christ. "Ayurveda" literally means "the science of life," and this medicine talks not about disease but about health as its primary goal. Man is seen in harmony with nature and with life, and mind and body relationships become tremendously important. So the first comment I'd like to make is that these traditional systems of medicine, despite the many things about them that we consider irrelevant or idiotic, do have some nuggets of gold other than herbal cures.

My second point relates to Professor Roberts's penetrating comment about how human experience may not fully coincide with human theory or conceptualization. If I may convert this point into a practical example, many cultures that have subsisted on

very low levels of income for generations have developed what I call the "economics of scarcity." I have always marveled at mothers who come from extremely poor backgrounds but still manage to raise healthy children. In searching for what to do in situations of scarcity, we might find it worthwhile to examine these human experiences. Can traditional insights provide some clues or answers to a rapidly aging population?

The third point I would like to make concerns the complexities of the relationship between living standards and health indicators. If you take this large mass of country data, there is a fairly high correlation between living standards and health indicators, especially if you look at a multi-dimensional phenomenon like life expectancy at birth. I found the earlier part of the curve most interesting: the income levels and indices of health are low to begin with, but relatively small inputs produce substantial increments in health; however this relationship begins to attenuate as the health situation further improves, yielding lesser and lesser health increments to more and more resource inputs.

My next comment concerns the question of tobacco related diseases. I was told by an economist that it would cost more to treat the end stages of the tobacco related diseases of the world than it would to wipe out infectious disease and malnutrition. I don't know on what basis this statement was made but I certainly find it interesting.

My last comment is on the whole question of needs, desires, wants and demands. I used to think that if a society was sufficiently aware of the issues involved and the political system was legitimate and responsive, then the demands of the people would be redressed, no matter what political shape that system took. But there is a danger here, as I think Professor Roberts has hinted. Demands could take the form of large hospitals, or airports or steel mills when there were more primary needs to be addressed.

H. HIATT: In response to Dr. Ramalingaswami's comment, it seems that one function which the Takemi Program in International Health might play is to address such questions as that of tobacco. We are presently seeing in the United States a modest degree of control of tobacco-related diseases through the dissemination of information about the dangers of tobacco. However, we simultaneously find ourselves in the position of increasing exports of tobacco, particularly to Third World countries. If we can somehow disseminate the lessons we have learned, perhaps some good might be achieved.

Professor Roberts began with a comment on the practical aspects of these issues. If there is time, I would be interested in hearing someone from Japan comment on how the issue of organ transplant has been confronted there and having Professor Roberts, who recently chaired a commission in the

United States concerned with the issue of liver transplants, describe the recommendations of this commission.

K. TSUCHIYA: In Japan, the question of organ transplant is highly controversial and there as yet is no social consensus about the issue. The issue of heart transplantation was once very much in the limelight but the arguments were never resolved and there have been no heart transplants in Japan in recent years.

M. ROBERTS: Dr. Ramalingaswami asked me whether, in certain situations, the use of health care resources might not produce very substantial gains even with small resources. The answer is yes. There certainly are situations where even the very modest use of modern technology, for example, vaccinations of certain sorts, can produce very substantial increases of health status. Simply because, in the past, improvements in health status have followed economic development, does not mean that in the current world, when we have effective technologies, we must wait for economic development in order to improve health status. Some of these technologies are relatively inexpensive and the problems in their use tends to be, as Professor Park suggested, administrative, not technical.

Secondly, in response to Dr. Hiatt's point, it is extremely difficult for physicians to decide exactly who are appropriate candidates for transplantation. The definition of the pool of potential recipients depends on what criteria you use. For instance, if age is a criterion, the pool of people to receive transplants is much larger if the age cutoff is 60 or 55 than if it is 45 or 50. Given our ignorance of the relationship between decisions and outcomes, it is very difficult to justify one set of criteria as opposed to another. Hence, we have recommended in Massachusetts that they begin by placing limits not on the number of cases there will be but on the number of hospitals which will do these procedures. We have recommended that we proceed experimentally: we will see how many cases we can do and then judge whether this number seems satisfactory. In that sense, I think the task force recommendation is in keeping with my opening remarks, to proceed from practice to theory as opposed to the other way around.

V. RAMALINGASWAMI

Health Priorities in Situations of Severe Scarcity — The Allocation Problem

"Those who need health care most, get it least
and those who need it least, get it most."

MALCOLM SEGALL (1)

INTRODUCTION

It is an honor to be asked to give a presentation at the First Takemi Symposium on International Health. This presentation derives its inspiration from Dr. Takemi's own philosophy. His belief that close interaction between medical science and economics is crucial for the future of man, and that medical services should be regarded as an investment in man, led to the concepts of biomedicine, "bioethics" and "bio-insurance" as rational bases for the development and allocation of resources.[2]

The WHO view of health as a state of well-being is now generally accepted. Health is widely regarded as a product of the socio-economic environment in which a person lives and indeed as an inherent part of development itself and not just a mere consumer of resources.[3] Gunnar Myrdal once said, "The standard of health depends on the whole social milieu, especially the prevailing attitudes of its institutions." Health is considered a dynamic social process leaping out of science and "drawing its nourishment from the totality of society."[4]

THE HEALTH SCENE IN SITUATIONS OF SEVERE SCARCITY

In the least developed countries, large unresolved health problems and claims from other sectors compete for severely limited resources. The populations of these countries, especially those living in rural areas, have little or no access to modern health care. The result is high rates of disability and death from diseases that are readily preventable. The greatest burden of ill health falls on the very young and the poor. Up to 50% of total mortality may be contributed by mortality in children under 5 years of age. The dominant disease pattern reflects a synergistic interaction between malnutrition and infectious diseases. A cluster of causes and a multiplicity of effects produces a pervading poverty and a deleterious life situation. High infant and child mortality are compensated by excessive fertility. Pregnancies take place too early, too often and too close together, leaving behind washed-out, anaemic and crippled mothers. The population is crowded in

an environment loaded with the causes of disease and death. The child who survives his illnesses, saved by the "magic bullets" of modern medicine, is thrown back again into the dull, drab environment characteristic of the poverty syndrome. He represents a living record of the dramatic impact of the earlier years with progressive inability to cope with the life situation, another human being with an altered body compositions, an asymmetry of body proportions and disharmony of growth. This is the portrait of poverty, the health scene in situations of severe scarcity.[5]

In many ways the present can be described as one of the finest hours of technological advances in medical science. First, in the Pasteur-Koch era, the role of specific infectious agents in producing human disease was discovered, leading to a remarkable impact on human health through purified water supplies, environmental sanitation and vaccination.[6] Then, from 1950 onward, came an era in which we deepened our understanding of cell biology, of microbial agents and viruses with its impact on sophisticated innovations in medical practice. And now, in the present era, molecular biology, immunology, genetics, and the techniques of genetic engineering and cell fusion hold great promise, especially for the Third World in the control of communicable diseases and excessive population growth.[6,7,8] It is a matter of deep human tragedy that these advances in medicine are not matched by parallel improvements in the health conditions of the people in the Third World. The crucial issue of our times is the wide gulf separating medical advance from fulfilment of basic human needs.

PRIORITY SETTING

Against such a somber background, our ship of health has to be navigated (not allowed to drift) towards clearly defined goals and priorities. We must mobilize required resources, implement the programs with a commitment, evaluate and monitor progress along the chosen path and apply corrective measures, in a dynamic continuously evolving fashion. The Nations of the World at Alma Ata resolved in 1978 to adopt the primary health care approach as the key to the attainment of the goal of Health for All. This approach aims to provide health services that are low in cost, available and accessible to all, close to where people live, relevant to their perceived needs and responsive to their expectations, supported actively by the community and integrated into the broader national efforts towards socio-economic development. The approach is based on equity and access, has deep ethical and moral implications and is a powerful instrument of development. It is the answer that the Community of Nations found at Alma Ata to the present inequalities, injustices and distortions in the health care system, manifest in most acute form in situations of severe scarcity.

Primary health care is easy to articulate but is most demanding in its implementation. It involves inter-sectoral and inter-disciplinary activities and people's active participation, all of which represent difficult challenges. While the idea is by now firmly rooted, progress in its implementation is a cause for concern. Clearly it is difficult to implement all the eight "commandments" of the approach at once and to the same extent, not to speak of additional ones identified by individual countries. The resources needed for such an operation would be larger than the current levels of expenditure on health in the least developed countries. Furthermore, massive attitudinal changes have to take place not only within the health system but in all other related systems including the National Planning System itself. The barriers posed by the present health system have to be recognized and resolved. The present cannot be scrapped but needs to be molded and transformed while new structures are built in accordance with the newly established goals and priorities. In the ultimate analysis, the priority setting and resource mobilization decisions which each country must make are essentially politico-technical in nature.[1] One can only indicate in this essay some broad guidelines enabling priority setting; one cannot provide blueprints. Resource constraints will necessitate a phased approach. In so doing, while the short-term view that what can be done here and now has to be dominant, long-term investments, especially within the overall philosophy of primary health care, should not be ignored.

GUIDELINES IN PRIORITY SETTING AND RESOURCE ALLOCATION

Against the background of severe scarcity of resources, the running thread should be maximization of social optimality and economic efficiency in the health care system. To do this effectively, there should be the requisite information base and the capability to engage in national health planning which includes identification of needs and their relative priorities, mobilization of resources, programming services and linking with overall goals of socio-development.[9] In this respect maldistribution of health care with its concentration in urban areas is the most pervasive problem.[3,10,11] This will mean redistribution of health care resources, a task which will require courage so that resources are allocated in relation to need and demand, with demand being mediated by the capacity to pay.[1,12,13] Provision of services and allocation of resources guided by the principle of equity is the most crucial transformation needed in health services. In this respect, central resource planning should be coupled with peripheral program planning. To do this effectively, we need to have knowledge not only of disease-specific epidemiology but also of social epidemiology. In Zimbabwe, for example, the best served 3% of the population were in receipt of health care resources 300 times greater than the least served 3% of the population.[1]

HEALTH RELATED VERSUS TRADITIONAL HEALTH SECTORS

It is now apparent an acceptable level of health cannot be achieved by the health sector alone. Indeed much of the improvement in health status in industrialized countries following the first Industrial Revolution is attributable to overall improvement in living standards falling largely outside the traditional health sector. The tools presently available, and the exciting prospect of better tools in the near future as a result of advances in modern biology, provide mankind today with a new opportunity to make effective health interventions. Even with limited economic growth, these health interventions can lead to rapid improvements in the health status of populations.[14] Several recent studies have demonstrated this at the microlevel.[15,16,17] And yet it should be clearly understood that health cannot be advanced independently of simultaneous and sustained development. Here one comes face to face with the dilemma of how much of the scarce resources should be allocated to the traditional health sector and how much to health-related sectors such as water supplies, sanitation, food production distribution and availability, education -- especially of women, provision of rural energy at low cost, reducing the energy drain on impoverished women, housing, etc. These interventions in health-related sectors have a wide ranging impact, confer large social benefits impinging on health, deal with a multiplicity of causes and effects, and have long-lasting benefits. It would seem wise not to allocate to one at the expense of the other, but to bear in mind that health activities, when integrated into appropriate activities in other sectors, lead to maximization of health benefits. It is thus obvious that the health sector should be looked at as a whole with integrated planning.

PREVENTION OF DISEASE AND PROMOTION OF HEALTH

Preventable diseases are cheaper to prevent than to cure. Vaccines are history's most cost-effective public health tools.[18] Treating tobacco-related diseases will cost more than treating malnutrition and infectious diseases. Therapy for complications of measles is a major drain on health resources in the developing world.[19] Estimates of benefit/cost ratio for measles vaccine may well exceed 20:1 in developing countries such as the Ivory Coast.[20] It is estimated that over 70% of the disabilties in developing countries are due to malnutrition, inter-current infections, poor perinatal care and accidents including violence.[21] To a large extent, these disabilities are preventable. Immunization breaks the dangerous partnership between malnutrition and infection which is at the core of preventable disablement. Half of the child mortality and most of the growth retardation in developing countries is attributable to this dangerous partnership.[22]

Immunization is an "opportunistic marvel" as Dr. Hafdan Mahler puts it. The technnology is effective; it is easily administered; and there is certainty of returns. Immunization provides an excellent tool for introducing progressively in its wake a whole range of low-cost interventions, thus enlarging gradually the areas of primary care. It facilitates the development of institutional mechanisms, management skills and technology support for other programs as well. Preventive services, if located close to the homes of people and available to them at convenient times, and if accompanied by intensive education, can produce handsome dividends.[23]

DISEASE AND SUFFERING

Medicine has to deal not only with disease and disability which are visible but also with suffering, which is invisible but real.[24] Any health care system that does not cater to the perceived needs of the community is doomed to failure. People rarely articulate disease prevention and health promotion as their urgent needs. They want access to water, credit, markets and job opportunities. Acute suffering and injuries are a source of concern to them. Bridges of understanding and confidence with the people have to be built on the basis of fulfillment of such needs.

Criteria have been suggested for setting priorities in this area [25,26]: 1) community concern regarding a given disease; 2) its point prevalence; 3) its seriousness; and 4) its susceptibility to management. To this must be added cost-effectiveness of various alternatives and a pharmaceuticals policy that will provide drugs for common maladies and acute emergencies at reasonable prices.[1,4]

It is rational and economical to deal with the cluster of causes of ill-health in the form of an integrated package of services. Intervention for the treatment and prevention of common infectious diseases of childhood, for the protection of maternal and child health and for fertility regulation form the tripod on which a package of services could be based. This is what, some years ago, I called a Biological Minimum Program.[5] From the practical standpoint, there are advantages in an intergrated package of services, since nutrition, infection control and family planning services are aimed at the same target groups, use the same entry points and prevent duplication of logistic variables.[27] Community-based services are conducive to efficiency and continuity, with the use of simple technologies, village-based health care agents and appropriate mix of intervention to suit local epidemiological situations. In this manner, it is possible to ensure wide coverage and access to the most underprivileged.

EDUCATION AND COMMUNICATION

There is perhaps no greater priority in the entire health field than that of education and communication, the induction of a way of thinking and behaving which is conducive to early disease recognition, disease prevention and health promotion. This education and communication has to be based on reliable epidemiological information about the origins of diseases and their evolution. The information has to be integrated into the knowledge base and common behavior of people. In this process, parents and teachers play a crucial role. The messages have to be practical and meaningful. This is the reason why my country, India, despite scarcity of resources, invests so heavily in space technology. Dr. Seymour Kety said in a symposium, "As a member of society I am concerned even more about the failure of society to utilize the rather common-place and sometimes classical contributions that science has offered. . . . I am much more disturbed about the lack of use of methods of birth control. . . . I am much more concerned about our failure to use the knowledge that we acquired decades ago about sanitation, about infectious diseases and more recently about nutrition. . . I am much more concerned about the failure of our society to recognize the important deprivations that occur in poverty."[28]

THE DOUBLE BURDEN

Developing countries carry a double burden -- the existing burden of ill health consequent upon under-development, the hallmarks of which are poor environmental sanitation, malnutrition and rapid population growth and the evolving burden of new health problems contingent upon the adoption of current patterns of economic growth.[15] The desire of developing countries to industrialize at a fast rate is understandable, but the total ecological consequences and health costs of large developmental projects, both in the long and short term, need to be worked out together with cost/benefit evaluation of environmental protection measures. Where there are overwhelming benefits, a certain amount of risk may be acceptable.

ERADICATION VERSUS CONTROL

In the early 1960s mankind had a dream of eradicating tropical diseases, by using our "magic bullets" to fight against microbes, parasites and their vectors. But alas, we realized that effective tools are not enough, although they are of the utmost importance. It is equally important to generate the managerial and organizational capabilities and the education and motivation of both the providers and users of health care, to make these technologies accessible for the vast rural populations. Recent history with regard to a number of tropical diseases such as malaria has taught us to work, with possible exceptions, towards control of these diseases and bring them

below the level of public health significance first, rather than focus on eradication with its enormous costs, however laudable it may be.

TRANSCENDING PRIORITIES

Finally, two issues that are central to health priorities in situations of severe scarcity transcend the others. The first of these deals with Manpower Development for health care.

MANPOWER DEVELOPMENT

Health Manpower Development is a critical factor influencing the economic efficiency of the health care system. Medical care of the future depends upon medical education of the present.[29] Educational programs in medical sciences have become irrelevant and dysfunctional to local needs. The whole environment of the urban teaching hospital militates against the student-physician acquiring a live interest in community health problems, in comprehensive health care services and in preventive and promotive activities. Much has been written about reorienting and restructuring medical education and several innovations are being introduced. Deep and fundamental changes are needed to align health manpower development to the goals of primary health care, supported and sustained by secondary and tertiary levels of care.

Reorientation of medical education to community needs, restructuring of auxiliary cadres and introduction of a new type of community-based health worker are being attempted extensively. The new physician should be able to lead the health team, and use illness-related curative activities as an opportunity to pursue activities of health promotion and disease prevention. The physician is a key figure in the drama of primary health care.

IMPROVING EFFICIENCY OF EXISTING SYSTEMS

The second issue of great urgency is how to make more efficient use of existing structures and services. Governments in developing countries are making efforts to extend health services to rural areas and urban slums through the use of health teams and health centers for the geographically under-served populations. Health assistants, auxiliaries, village level workers and traditional birth attendants are being employed as a hierarchical force and attempts are being made to provide comprehensive health care. This has gathered momentum, especially since Alma Ata. National strategies, programs and plans of action have evolved which are in various stages of implementation.

And yet we know that the services that are being provided are still being largely bypassed by the rural populations and there is much to be done to bridge the gap between rhetoric and action.[30] The steps suggested (indicative, not exhaustive) to overcome some of the major drawbacks that beset the existing health care system are [31]: make sufficient provision for maintenance of expensively erected physical facilities; match salaries with supplies; provide for transportation and communication between the health care system and the people; utilize the skills of highly trained physicians optimally rather than in routinized health care activities; eliminate ineffective, expensive and unnecessary medical procedures; use cheaper alternatives to hospitalization; reduce excessive laboratory and x-ray investigations and distribute manpower on an equitable basis; develop community and social support systems for the chronically disabled; promote a balanced cadre of health care personnel (specialists, general physicians and outreach personnel); place greater accent on progressive replacement of hospital care by ambulatory care, day care, home care and self-care; reduce expenses on low priority areas; effect economies in the procurement and supply system of drugs; generate self-discipline in the profession in prescription of drugs and encourage low cost alternatives; discourage aggressive sales promotion of drugs; and evolve a national pharmaceuticals policy.

I have made no reference to the traditional systems of medicine. In terms of their contribution to health manpower in geographical and cultural proximity to the people and to the range of affordable therapeutic modalities, they have a significant role to play. Rather than being relegated as inferior and competitive, they should be regarded as evolutionary and complementary and given their due place and responsibility in the overall health system.

In summary, health resources are scarce, health needs are great, and yet the opportunities to bring major improvements in health in such settings are never more promising.

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H.C. YEON: I would like to extend my appreciation to Dr. Ramalingaswami for his extremely interesting and informative presentation. I fully agree with most of his discussion of setting health policy priorities as we move toward the 21st century. I was glad to hear that Dr. Ramalingaswami treats health services not only as consumption goods, and that he considers health services as a product of the social and economic environment.

My remarks are drawn from my country's experiences with health policy formulation and my own research in health economics. The social and economic conditions of a country have important bearing on the type of health care delivery system that it should choose. A given health goal can be achieved in many different ways; the optimum path will vary according to the social and economic factors involved. In the course of formulating long-term health policies, especially in the setting of national health priorities and targets, some countries may concentrate more on the health status of the population while others may concentrate more on the various provisions of health services. Countries will also vary greatly in their interpretation of what is an acceptable level of health and in the approaches they use in attempting to provide health care services for all. It is not easy, therefore, to decide which approach to choose, how to specify well-defined objectives and targets into integrated national policies, strategies and plans of action. Despite these words of caution, I believe that this conference on health policy experience holds some useful lessons for formulating future health policy in developing countries.

Increasing total health expenditures can improve health status (total health benefits). However, as Professor Roberts and Dr. Park noted yesterday, the marginal benefit from these increasing investments is already diminishing in many developed countries. However, in many developing countries, the investment of government resources in the health sector lags far behind investment in other sectors.

In Korea, the provision of health care services has been inadequate for the last several decades. The distribution of health facilities and manpower between urban and rural areas is unbalanced, resulting in low quality and inaccessible medical care in rural areas. To compensate for these problems, the government has developed three major national health policy priorities: 1) emphasizing cost-effective primary health care approaches, oriented toward preventive treatment; 2) extending health insurance systems and streamlining health care delivery systems; and 3) correcting the regional imbalances in the distribution of medical care facilities and manpower.

Drawing on this experience in formulating health policy, I would like to draw our special attention to three important issues to be carefully reviewed in future policy formulation. The first one is the issue of equity. The most subjective or value-based criterion is the equity of health care financing. The basic questions are: Who bears the burden of financing? Who are the beneficiaries of health care? Should everyone contribute an equal share of the total cost of health care, or should everyone's contribution depend on their ability to pay? Because of different accessibility to health care facilities (economically and geographically) and different risk of illness, there is a trade-off between vertical and horizontal equity concepts in decision making.

The second issue I would like to raise is the concept of cost under the condition of resource constraints. All the needs and wants of society cannot be met simultaneously. This is true even in the advanced and richer countries because of their establishment of national priorities and resource constraints. Dr. Ramalingaswami indicated that, "Immunization is an opportunistic marvel." Opportunity costs are incurred by all users of resources; the scarcer the resources, the higher the opportunity costs. In the case of health care, these costs are incurred by both the producers of health services through their use of staff, buildings, materials, equipment and supplies, and by the consumers of health goods and services. Therefore, overall, health service costs should include opportunity costs on both sides.

I am a little confused by Dr. Ramalingaswami's concepts of primary health care. It seems that the paper emphasizes the important role of future primary health care policy particularly in the least developed countries (LDCs). But at the beginning of the presentation, if I'm not mistaken, Dr. Ramalingaswami also stated, "The resources needed for primary health care would be considerably larger than the current levels of expenditures on health, particularly in LDCs." I understand what is meant by a multidisciplinary approach, but I don't understand what is meant by the current level of health expenditure. Does it mean modern technology or does it mean herbalist and traditional medicine? If it means herbalist and traditional medicines, do we think this is sufficient to meet the demand for health services in average LDCs, not in the particular cases of India or Zimbabwe, which Dr. Ramalingaswami indicated in his presentation?

The third issue is the development of cost-containment measures under severe resource constraints. It seems to me that the objective of cost-containment measures must achieve the same benefit at lower cost or increased benefit without adding to cost, because both parameters (cost and benefit) are susceptible to change. It seems to me that benefit analysis has to be conducted jointly with cost analysis. One way to contain cost is to ensure that the degree of financial complexity involved is

appropriate for the task to be performed. In the case of highly skilled staff like physicians, they should not be employed for tasks that could be performed by less skilled personnel. The use of auxiliary manpower for vaccinations is a case in point, as strongly recommended in the presentation, but Dr. Ramalingaswami also said that, "The physician is a key figure in the drama of primary health care." What is meant by a key figure? Does it mean that the doctor should play a supervisory role or be active in the delivery of most of the health services?

I fully agree with the point that the general population should make more effort to maintain better health. However, if we can go further, another way of containing costs is to form a "resource mix" suited to the situation. Where investment capital, taxable capacity, foreign exchange, and highly skilled local manpower are scarce, they should be used only where they cannot be replaced by less scarce resources. Conversely, the resources that are relatively more abundant should be utilized more extensively.

The other way of containing costs is to ensure that all resources are used to full capacity, avoiding waste by ensuring that whenever possible, resources complement one another and serve many uses. Let me use community health aid as an illustration. In the Korean health care delivery system, there used to be single-purpose workers, like maternal and child health workers or family planning workers. Now, there are multi-purpose health workers who perform both functions.

Whether setting health care policy priorities for the 21st century involves the development of a new integrated, comprehensive, health care delivery system or the improvement of existing systems, we should pay special attention to the issues of equality, efficient resource allocation and the development of cost-containment measures.

V. RAMALINGASWAMI: I'm delighted that Korea is taking the approach of cost effectiveness, prevention and correction of maldistribution.

Dr. Yeon mentioned that he was confused about my position on the implementation of primary health care. The successful implementation of primary health care is contingent on the availability of resources; and more resources are needed than are currently being expended in the least developed countries. I think the actual cost of primary health care, in all its dimensions, has not been determined, but the cost would be considerable if all related sectors were included.

The cost of health care is large. We need to press for more resources. Perhaps instead of waiting for everything to come to us, we could begin by choosing the most profitable technologies, as a vehicle for developing the infrastructure and

management capabilities of health care. I do not want to get into the polemics of discussing selective care versus non-selective care. I think a more practical approach should be adopted.

My second comment is related to the physician as a key figure. As a physician myself, my opinion on this may be biased, but I will let the audience decide this matter. In most societies, a physician is respected. A physician should act as a leader of the health team. Working with auxiliaries and extension agents, the physician should use his highly developed skills for those tasks that he is most prepared to do, and not waste his time on routinized health care tasks.

The last point is crucial. Should we institute comprehensive multi-dimensional health care, or should we improve the existing system? It may not be an either or question. Because each developing country has already invested extensively in its present health care system, these systems cannot be completely eliminated. Our present health care systems are the foundation on which to build, as we work towards the goal of comprehensive care.

DR. MATSUMOTO: Dr. Ramalingaswami discussed two groups, the supply-side group and the recipient of health service. I believe these two should interact in order to achieve the goal of improved health care. In additon, self-determination and self-reliance must also be considered.

V. RAMALINGASWAMI: Dr. Matsumoto has raised the very crucial question of the supply side and the receiving end. The two should interact with a spirit of self-reliance.

DR. OIZO: Towards the end of Dr. Ramalingaswami's speech, he referred to two kinds of resources, manpower and traditional cures. India has a large number of medical schools teaching modern medicine. How should Indian physicians make use of traditional cures in health care? The role of traditional medicine in the light of modern medicine is a very critical problem in Third World countries.

V. RAMALINGASWAMI: Traditional and modern medicine in India are two cultures which are not meeting, in spite of all the efforts we are making. There are many conflicts to be resolved, but I continue to hope that there will be some meeting point.

DR. ATSUMI: Several years ago I went to Austria and asked government representatives how they determined priorities. They said priorities were largely dependent on political pressure, independent from medical implication. In some cases, they said you just throw a card and heads or tails determines the priorities. The question of deciding priorities among different diseases (such as cancer, cardiovascular disease, or apoplexy) is a critical problem that deserves greater attention in all countries.

AKIRA KOIZUMI

Human Survival: Quality vs. Quantity

This essay discusses the issue of quality versus quantity in human survival, an important topic for consideration on the occasion of the First Takemi Symposium on International Health.

AVERAGE LIFE EXPECTANCY AT BIRTH

In 1982, the average life expectancy at birth was reported to be 74.22 years of age for males and 79.66 for females, which ranks first or second among the countries of the world. It is only recently, however, that the Japanese average life expectancy at birth has reached such a high level. In 1971, life expectancy at birth for Japanese males was about 70 and females above 75. In 1951, the average Japanese life expectancy at birth was about 60 years for males, whereas it exceeded 65 years of age for females in 1952. It was 44.92 and 49.63 years in the 1935-1936 Life Table, and 42.06 and 43.20 in the 1921-25 Life Table.

Japan's mortality rate has also only recently declined to a low level equal to other developed countries. In contrast to other developed countries that reached low mortality rates much earlier and made steady progress towards these rates, Japan reduced its mortality rate from a much higher level and at an accelerated speed.

It is thought that many factors influence the expansion of life expectancy. No one can disregard the effect of antibiotics as a major reason for the decrease in the mortality due to infectious diseases, such as tuberculosis, pneumonia, bronchitis, and enteritis. At the same time, the improved accessibility of medical care cannot be ignored as a supporting factor for the decrease. With regard to tuberculosis, Japan had an established preventive system for that disease even before antibiotics became available.

Due to improvements in nutrition, the period of 1947-50 in Japan was a time of liberation from hunger. The improvements in nutrition may also have enhanced the beneficial effects of medical therapy including antibiotics.

Rapid economic growth in Japan began around 1955. In 1961, with the establishment of a program called "health insurance for the whole nation," Japan entered a new era of nationwide health care. Economic growth enabled public financing to cover a major portion of people's medical expenses. Japan came to be one of

the world's nations with high accessibility to medical care services. Medical technology, which made increasing advances along with other services, was also supported economically.

The nutritional status of the Japanese has continued to improve. Although the average intake of calories, protein and fat is still below the level of the Western countries, this lower intake may contribute towards keeping a comparatively low death rate in Japan. It is now widely accepted that Japan's traditional eating habits are better for health, particularly for preventing coronary heart disease, than those in Western countries.

We have analyzed the relationship between the changes in average life expectancy at birth and per capita national medical expenditure in Japan.[1,2] To remove the influence on these figures of long term price fluctuations, a correction was made using the consumer's price index, published by the Bureau of Statistics at the Prime Minister's office. If the average life expectancy of males and females is expressed together as "x" (the horizontal scale) and per capita national medical expenditure for the same year as "y," there is a correlation between "x" and "y," which can be expressed by the following equation:

$$y = 4 \times 10^{-5} \times 1.34416^{x}$$

It is obvious that the longer the average life expectancy, the higher an additional per capita national medical expenditure which corresponds to a unit increase in the average life expectancy at birth. Therefore, the "marginal cost" of medical care relative to a marginal increase in average life expectancy at birth is increasing continuously, as shown in Figure 1.

QUALITY OF SURVIVAL - A NEW GOAL OF HEALTH CARE

Using the average life expectancy at birth as an indicator for the levels of a nation's health is losing its adequacy; an alternative indicator is necessary. What must be discussed are the real outcomes of medical expenditures and how the benefits should be evaluated.

In calculating life tables, the average life expectancy is determined by the number of survivors by age. Quality of survival, therefore, is discussed in relation to the number of survivors by age.[2,3] Figure 2 shows males and females separately, with changes in the number of survivors by age and sex in 1965, 1970, 1975 and 1979 in Japan. The chart shows a steady improvement of survival. In Figure 3, the number of survivors without medical care is shown, based on the data from the Patient Survey conducted by the Ministry of Health and Welfare. In Figure 4, the number of survivors without any discernable disease is shown, based on the data from the National Health Survey conducted also by the Ministry of Health and Welfare. In Figures 3 and 4, improvement is not as remarkable as that seen in Figure 2. In Figure 4 particularly, survival curves of each year are overlapping except for the infancy period.

Table I shows the proportion of sick people and medical care users among survivors in percentage for 1965, 1970, 1975, and 1979 by age-group and sex.

In Figure 5, the solid line at the top represents the number of survivors by age, the second solid line the people who did not visit physicians on a particular day by age, and the dotted line the people without any disease in a particular period by age in 1979. The two solid lines below show the "subjective" feeling of the condition of health divided into: "not in good health" between the dotted line and the third solid line from the top, a majority of "almost healthy" between the third and fourth solid lines, and "in very good health" between the fourth solid line and the horizontal axis. Data of this subjective feeling about one's own health is from a Basic Survey on Health in 1979 conducted by the Ministry of Health and Welfare. Table II also shows the proportion of the above mentioned subjective feeling in percentage.

This study demonstrates that a remarkable growth in the average life expectancy at birth in Japan is due mainly to the survival of sick persons. It can be concluded, therefore, that average life expectancy does not represent levels of "health" and that a new health indicator should be sought to evaluate the quality of survival.

COPING WITH COMMUNITY HEALTH RISK

The term "community medicine" is commonly used in the United States and Britain. The British use of the phrase implies comprehensive health care, with prevention and therapy provided together, basically in communities. This implication is found in the book entitled Lecture Notes in Community Medicine, written jointly by Farmer and Miller.[4] In the United States, on the other hand, community medicine is considered to be a new and important type of health care which is not provided by public health or medical care. Burton and Smith's Public Health and Community Medicine[5] is a good reference for the American usage of community medicine.

Chiiki-iryo or community medical care, which was advocated by Dr. Taro Takemi and the Japan Medical Association (JMA) for years, is a health care system based on medical professionalism. It may be considered a community medicine unique to Japan.[6] Community medical care by the JMA has been developing into a clearer framework of practical activities supported by the concept of primary care.

The term of Kenko-kanri or health service program is also well established and developed in Japan.[6] A remarkable result obtained by the health service program was the mass examination system for tuberculosis prevention, which proved to be effective in the early detection of patients. This system

was also applied in the prevention of adult and occupational diseases and maternal and child health. Furthermore, the system was developed in combination with preventive treatment. Some characteristic aspects of the development of these systems are listed below.

First, the health service programs developed in each community have been supported by laws and administrative measures. Therefore, the activities have also been incorporated into the administrative systems for community health, school health and occupational health.

The second feature is technical progress in health examinations. Significant progress has been observed, especially in screening methods, where suspect cases are systematically transferred for follow-up examinations. In connection with the detection of suspected cases of various diseases, another feature of health care found in recent years is special attention to the so-called "high risk" groups which cover pregnant women with toxemia, premature babies, primary patients of tuberculosis, etc.

The third feature is that health service teams, the major practice bodies for health programs, have been organized and engaged in cooperative work to attain a common goal. These health service teams include medical doctors, public health nurses and clinical nurses, with clerical as well as other technical staffs. Recently, clerical work, such as record keeping and information processing for health programs using computers, has also demonstrated a higher efficiency than before.

Certain contemporary living habits, such as overeating and insufficient physical exercise, are also having practical consequences on health. It is most likely that, in ancient times, when a man was running about here and there in search of food, he did not indulge in overeating or physical exercise. At our present stage of civilization, however, man is raising himself in the same way that he feeds cattle. Overeating and insufficient physical exercise, though found only in limited areas of the globe thus far, are thought to be caused by an oversupply of food and a waste of energy sources. Civilization thus has created risks along with conveniences.

Mortality and morbidity rates are sometimes used as arithmetical expressions of the health risks of a population. They express the probability for unfavorable health factors to arise. In most cases, however, the probability expressed is an experiential probability, which accounts for the present state of affairs. Also, the probability depends upon the group's characteristics, especially sex and age structure. Health risk can be determined for groups with other characteristics as well, such as, a group of pregnant women, or more specifically, a group of pregnant women with toxemia, or a group of those who

previously experienced a miscarriage. A group with a high probability risk factor is called a high risk group or a vulnerable group.

The goal of community health planning should be to reduce the total burden of a community by using a wide range of measures in the area's health programs, including prevention, treatment and rehabilitation. One effective step is health insurance, in which the insurance works to spread the risk. Even in this case, however, it should not be forgotten that the goal is to decrease the total risk of the community. Our future efforts to establish a welfare environment with these factors will help meet the original objectives of community medicine health care.

HEALTH CARE IN THE POST-INDUSTRIAL SOCIETY

Before the first oil crisis, studies of the future were briskly pursued by the so-called developed countries under the name of Futurology. A rosy future was described on the basis of a growing economy and unlimited increases in GNP. Then, however, the world economy entered a low growth period, contrary to the forecasts, and optimistic futurology disappeared.

A different future forecast was introduced by The Third Wave by Alvin Toffler, with an emphasis on the development of the information society. In this perplexing and confusing time, this future forecast is drawing much attention from people who are facing such unprecedented problems as lower economic growth, the aging of the population, and the diversification of value concepts.

I am not convinced by all of the arguments in The Third Wave. I do believe it likely, however, that our life style will change radically due to enormous progress in information sciences and electronic technology, symbolized by newly created words such as "prosumer" and "electronic cottage". This future development should not be interpreted as a problem of ethical selection, but must be accepted and cooly faced as an inevitable outcome of history.

I would like to regard the present 20th Century as the "century of concentration."[7] People, materials and information are increasingly concentrated at limited geographical points at which various "productions" occur. People are concentrated in urban areas. Manufacturing facilities are greatly advanced and mass production is carried out in a concentrated way. The mass media are also developed. The same can be said about education.

In addition, in the field we are directly involved with, medical care is given in a concentrated manner. Large hospitals and medical centers are equipped with highly sophisticated

facilities. Several hundreds or thousands of in- and out-patients can be treated. The numbers of medical care personnel and staff are close in number to the number of patients under treatment. Such large hospitals or medical centers in some ways resemble the concentrated mass production plants in the automobile or electronic equipment industries.

These examples illustrate that concentration in the 20th Century has been an historical fact which has drastically enhanced efficiency from an economic point of view. However, efficiency does not always mean effectiveness. For example, efficiency in the production of materials can result in an oversupply of products on the market, causing economic and social confusion. It is not possible to replace the word effectiveness with the word ethics, while it is dangerous to connect efficiency directly with ethics.

There is apparently a need to determine if medical centers can follow the same path in this century of concentration. Large scale hospitals and medical centers are definitely intended to make full use of the advantages of concentration. All the patients, medical doctors and hospital staff are concentrated at one point. A highly concentrated medical care facility and system includes not only the medical records of patients but also medical research data. Naturally, capital can also be said to be concentrated in such systems.

Concentration certainly has remarkable advantages. At the same time, we cannot deny that certain disadvantages are also involved. The most serious disadvantage is that medical care must be provided in environments which are entirely different in the physical and mental sense from the everyday life of the patients and their families. For medical doctors in large scale hospitals and medical centers, the daily life of patients or the background of the community they belong to may be of no primary importance so far as the medical care is concerned.

Much attention is now being drawn to the approach of community medical care which emphasizes the daily life of patients and the community background. This approach was advocated by Dr. Takemi and the Japanese Medical Association. It is not simply community-oriented but characterized by comprehensive health care, covering prevention, treatment and rehabilitation.

In The Third Wave, Toffler predicted that the present industrial production, characterized by concentrated mass production, will become dispersed due to the rapid progress of information sciences and electronic technology. Ultimately, he said, the place of production will become identical with the place of consumption. I have no idea how much of his prediction will be realized. However, it appears certain that modern industrial civilization, or what Toffler calls "the second wave," contains a serious defect in the loss of humanity or the sense of alienation.

These problems also appear in modern large hospitals. A privacy problem, for example, results from the concentrated and collective handling of medical records in hospitals. I understand, however, that this problem could be solved by technological means. What is more important and more difficult, however, is recreating the mutual trust between the doctors and patients.

SCIENCE FOR HUMAN SURVIVAL AND DR. TARO TAKEMI

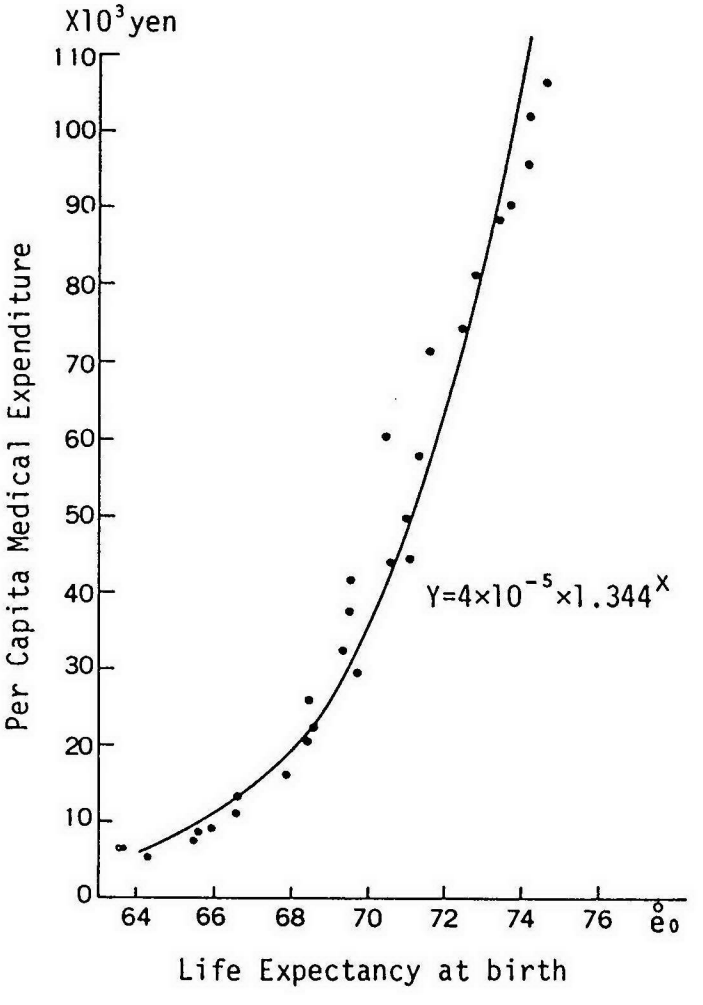
At the 29th congress of the World Medical Association in Tokyo in 1975, Dr. Taro Takemi designated the title theme as "Development and Allocation of Medical Resources." The delegates of the congress acclaimed the project, and launched a follow-up committee to study the subject on a global scale.

As the president of the Japan Medical Association, Dr. Takemi was instrumental in establishing the Study Committee on Medicoeconomics within the Association. At the same time, he sponsored three meetings of the follow-up committee in Tokyo, with JMA's Committee acting as a propelling force. It is well known that Dr. Takemi's leadership in this area much contributed to the establishment of the Takemi Program in International Health at the Harvard School of Public Health.

Dr. Takemi also initiated the Seizon Kagaku Kenkyu Kai or the Study Group on Sciences for Human Survival in April, 1982, and led its research activities. I understand that his interest in this particular aspect of science was first formed in about 1935. At the meeting of Life Sciences in Basel held for the first time in 1972, he was the only representative from Japan. He established an academy on life science within the Japan Medical Association. The academy has since met annually, and the proceedings of all eight meetings have been published.

Dr. Takemi devoted his late years to the Study Group on Sciences for Human Survival and encouraged new developments in this discipline, thus giving a new vision to the development and distribution of health care resources. The Study Group on Sciences for Human Survival developed into the Institute of Sciences for Human Survival, Inc., which attempts to integrate existing disciplines of sciences through the process of constant reappraisal of the objective in the present and in the future as well.

Figure 1. Relationship between life expectancy at birth and Per Capita Medical Expenditure in Japan.



Note: Life Expectancy is a weighted average of male and female

Figure 2. Number of survivors

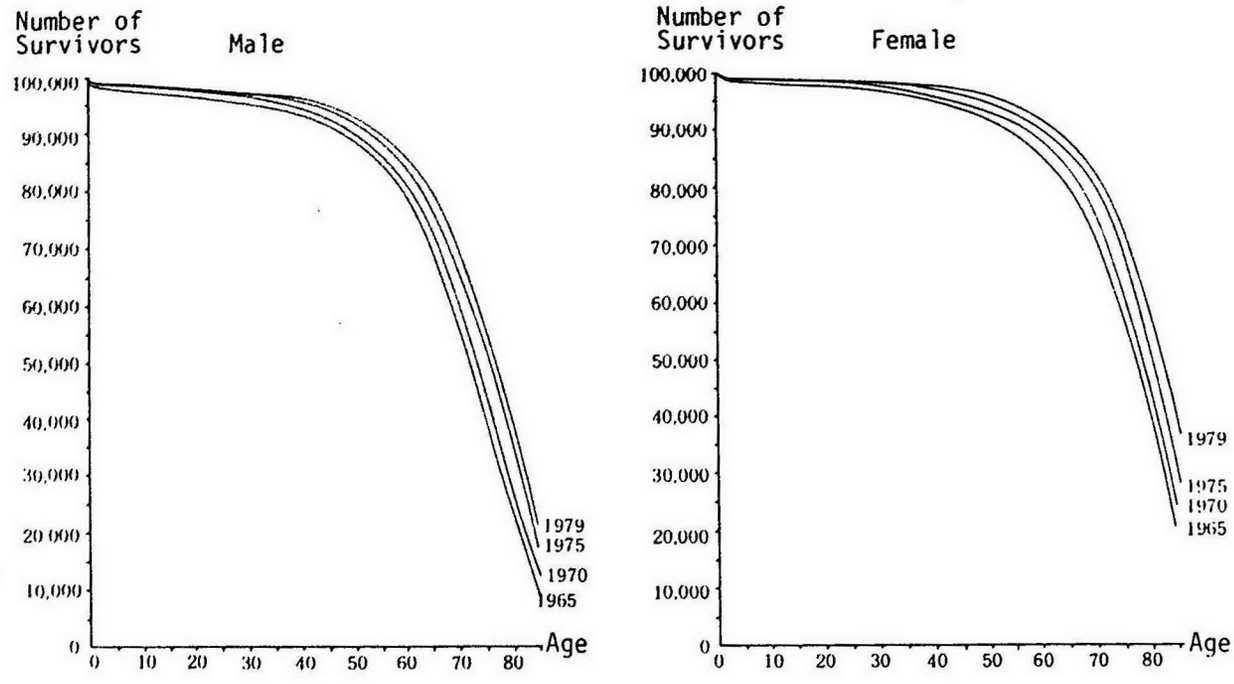


Figure 3. Number of survivors who received no medical treatment

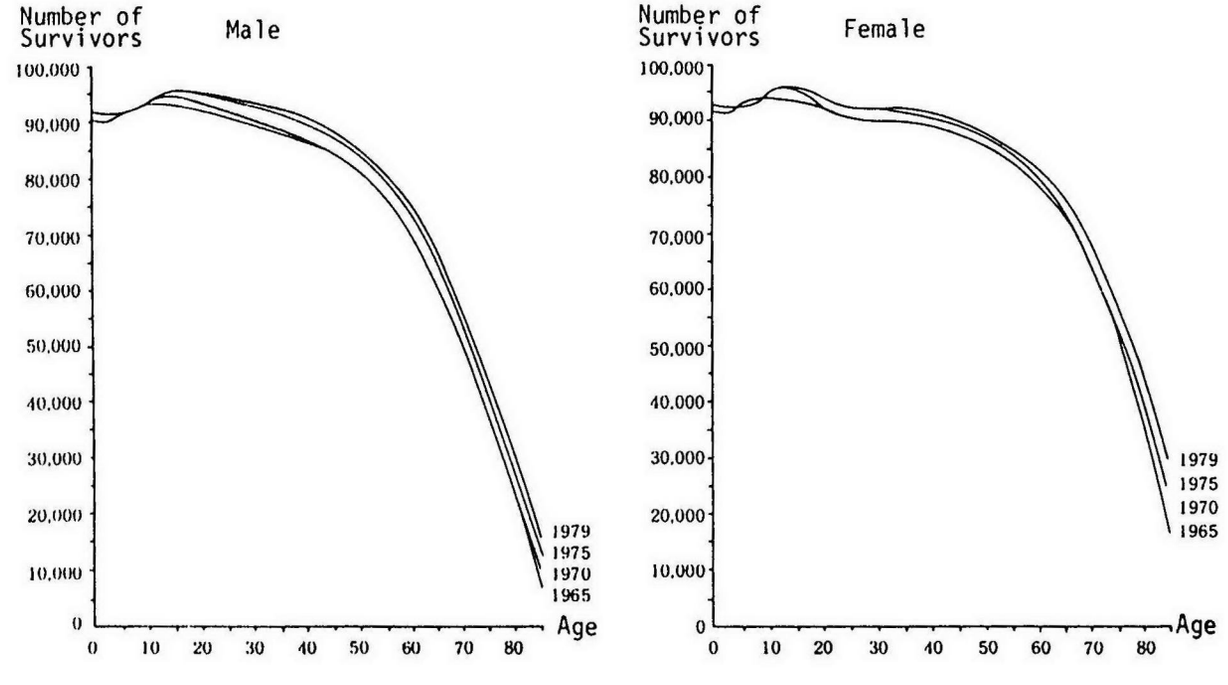


Figure 4. Number of survivors with no disease

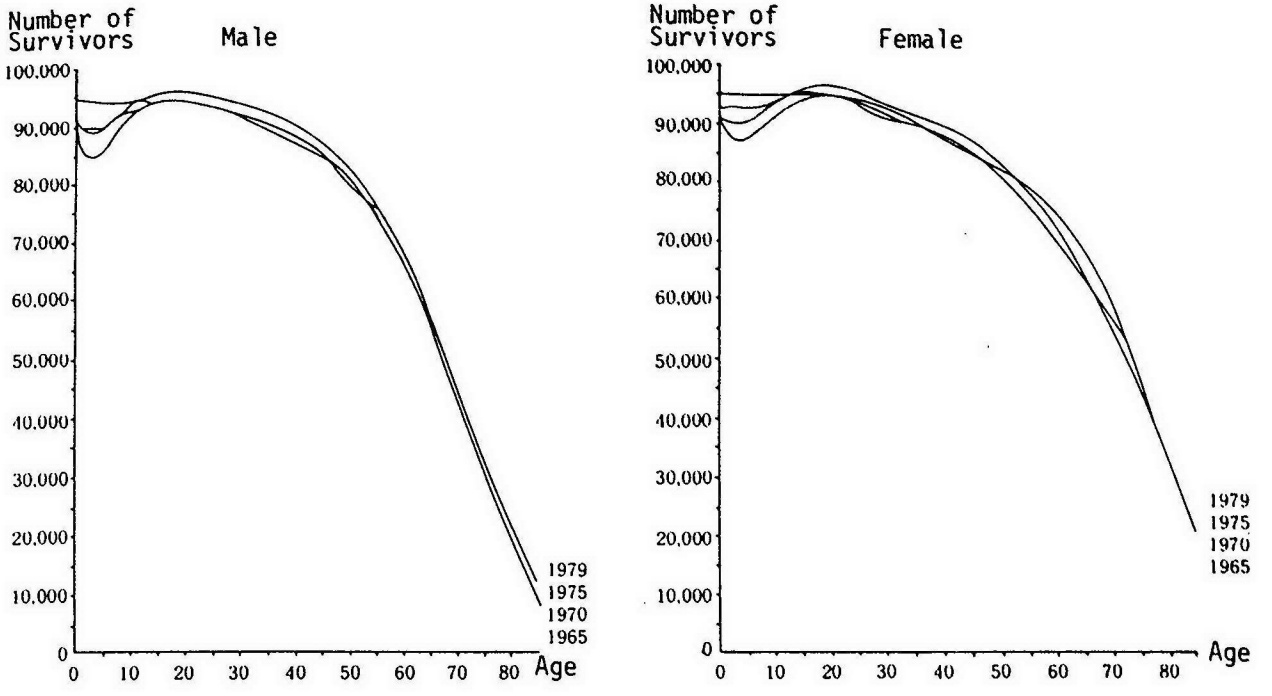


Figure 5: Proportion of Survivors by Subjective Feeling of Health

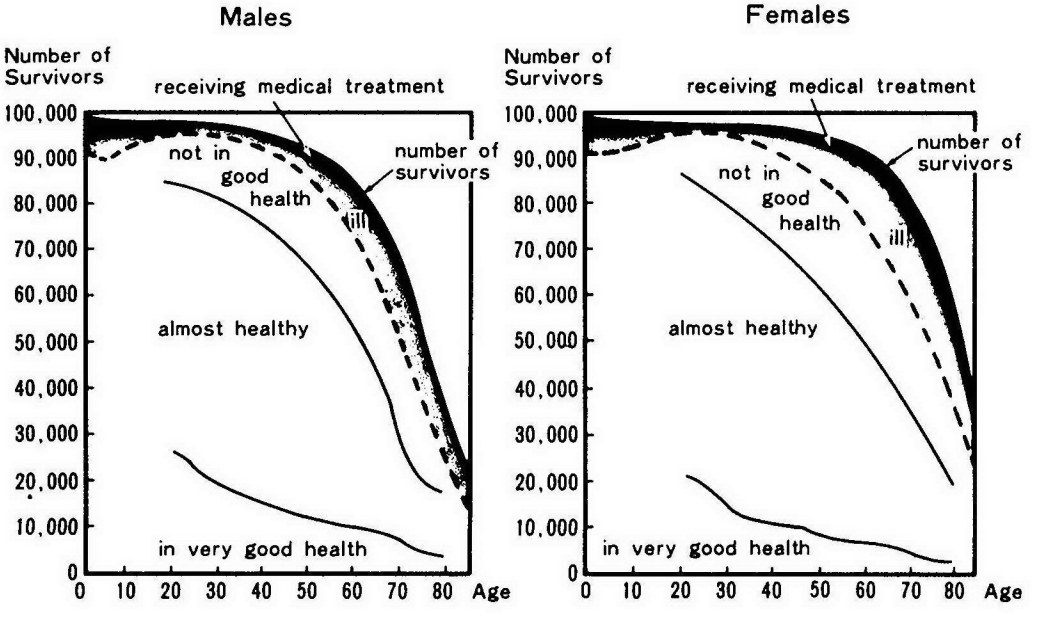


Table I Proportion of Sick People and People who Visited Physicians

Sex	Year	Age Group		
		0-14	15-64	65-85
Sick People				
Male	1965	3.3	7.4	19.1
	1970	6.4	9.0	27.0
	1975	9.2	9.4	31.4
	1979	6.8	8.8	35.6
Female	1965	3.3	7.4	16.8
	1970	5.4	10.4	24.2
	1975	8.4	10.7	32.3
	1979	6.6	10.3	38.0
Medical Care Users				
Male	1965	5.1	6.5	8.6
	1970	6.4	7.0	12.0
	1975	5.5	6.2	16.8
	1979	6.5	6.0	17.2
Female	1965	4.5	6.3	7.0
	1970	5.9	7.5	10.8
	1975	5.7	7.1	18.3
	1979	5.8	6.9	19.1

Table II Proportion of Different Subjective Feeling on Health

Subjective Feeling	Male		Female	
	Age Group		Age Group	
	20-64	65-85	20-64	65-85
In very good health	17.4	10.7	11.8	5.9
Almost healthy	62.6	43.8	62.3	38.2
not in good health	20.0	45.5	26.0	55.9

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W. HSIAO: Dr. Koizumi made an important contribution to health policy by drawing our attention to the possible trade-off between improving the quantity measurements in health outcomes with improving the quality of the surviving life. Too often we have concentrated our efforts to measure the effectiveness of health care only on the quantitative measurements, e.g., life expectancy, mortality rates, infant mortality rates or incidence of disease.

Dr. Koizumi showed that the life expectancy in Japan has increased at an impressive rate due to several factors, including preventive measures as well as economic factors, e.g., increasing nutrition as well as the availability of antibiotics. He points out that some of this impressive outcome is due to the insurance financing of the medical services in Japan. Partly because of the technological advancements, health care has been concentrated in urban areas, in large hospitals or clinics. Translated into economic terminology, the word "concentration," which Dr. Koizumi used, can mean "economies of scale." When economies of scale exist, services are provided at a lesser cost by producing a large volume, and, hence, services can be delivered at a smaller per unit cost.

Dr. Koizumi rightly pointed out that, by proceeding in this way, we have created problems in the quality of care. When, for instance, hospitals are concentrated in large cities, although the patients are cared for in technologically centered facilities, they are often alienated from their families, friends and work places.

Dr. Koizumi's first graph showed a curve with an upward slope, indicating a direct relationship in Japan between increasing health expenditures and increasing life expectancy. If Japan spends more money on medical expenditures, the life expectancy of the Japanese people will continue to increase. This is somewhat at odds with what Professor Roberts noted yesterday, that is, that most industrialized nations are operating on the flat part of the curve. I thought that perhaps Dr. Koizumi would comment on whether Japan may have found a different method of using health care resources effectively to improve the quantity of life.

Now let me turn to other less technical issues. Dr. Koizumi raises ethical and analytical questions relating to the quality of health care. How do we evaluate the quality of life? Whose value should we place on that quality of life? Most of the post-industrialized nations have tried three types. First, we tried to regulate the input of the quality of medical services by licensing doctors, by imposing rigorous education requirments before doctors could be certified; by licensing hospitals and nurses. We found, however, that regulating the

quality of input does not necessarily produce a quality outcome. This finding is related to Professor Roberts's comments yesterday that we do not have sufficient understanding of the relationship in health between input and outcome. As a result, the post-industrialized nations, or, at least, the United States and Europe, moved to a second phase: we tried to define the medical process that should be applied to a certain patient with a certain condition. We established "protocals of diagnosis or treatment." For example, if a patient comes in with a cough or fever, the patient should be given an x-ray along with a medical examination. Having found, at least in the United States, that these protocals are not a satisfactory means of assuring quality care, we have now moved to a third type of trying to wrestle with the question of the quality of surviving life resulting from medical intervention.

Dr. Koizumi posed an ethical, moral and technical question: what is it to save a life? What if a person is alive but disabled? In terms of physical and social function, this disabled person is alive. But is the quality of his life better than death? Too often in the United States we have only used the quantity measurement, namely we want a person to stay alive as long as he or she can, but we do not give adequate attention to the quality of that survivng life.

Who evaluates the quality of life? Does society or the individual? As Professor Roberts pointed out yesterday, the surviving condition of a person is really multi-dimensional and not a discrete function. Should we keep people alive as long as they can eat, or should we only keep people alive who can walk and converse and go to a movie?

Who will make these determinations? I know some pecple who would like to live as long as they can, regardless of their condition; while others only want to stay alive as long as they can enjoy a normal life. So another question I would like to pose for Dr. Koizumi is, are there social, ethical, religious or physical sciences that can address this problem of the quality of life?

As the discussions of this Symposium progress, I am impressed that most of the technologies we are suggesting that developing nations adopt are, as Dr. Robbins said yesterday, the completed technologies, e.g., prevention, if you can prevent a disease then a person can live a normal life. However, in the post-industrialized nations, we often use the half-way technology, e.g., keeping someone alive and not restoring that person to full health. Therefore, my question to Dr. Koizumi is whether the concern of quality of life is universal or whether this question rests largely with the post-industrial nations.

A. KOIZUMI: I would like, first, to address myself to Professor Hsiao's question about life expectancy and medical expenditures. If the average life expectancy is regarded as the

output and outcome of medical care to evaluate how effectively the medical expenditures are utilized, the "X" horizontal axis is the life expectancy at birth, and the "Y" vertical axis is to show the number of expenditures per capita, therefore one dot on the curve is to show the correlations. When the life expectancy was short, the per capita medical expenditure was rather modest, but the amount of expenditure required to prolong and extend the life expectancy becomes greater. Therefore, the shorter the life expectancy, the more effective it is to invest in medical expenditure. But we slow down the efficacy of the spending of medical care when we are enjoying a very long life expectancy.

This resembles a curve for academic achievement. When children are achieving grades of say 60 or 70 points in school, they try harder to achieve higher marks. But when someone already has high marks, say 90 points, incremental improvement is only achieved through an enormous effort. Japan is now reaching a similar point for medical expenditures.

With respect to Professor Hsiao's second question about quality and quantity, quantitative evaluations won't suffice. But who is to evaluate the quality of life? Individuals have differing value systems, determined in part by their particular place in society. Therefore, you cannot make one uniform statement about what type of life is high quality. Yet, we cannot individualize only, because we need a consensus on what determines a high quality life in order to formulate policy. A multi-disciplinary approach must be taken in order to study what medical services should regard as high quality life.

Professor Hsiao's third question is whether the quality of life issue is limited only to the post-industrial society. Personally, I believe that the quality of life issue should be universal. The theme of this Symposium is "Health Problems Beyond the National Boundary." Those countries presently enjoying a high standard of living and experiencing improvement in the quality of medical services may have previously experienced failure and have learned invaluable lessons from their errors. Developing countries can learn from these advanced countries. In turn, some of the less advanced countries have solved their own problems in manners peculiar to the demands of their individual nations. Many advanced countries can learn from the developing nations; e.g., many developed nations waste resources in medical services.

M. REICH: I would like to raise two points for additional consideration, first, on questions of quantity and then on questions of quality. My comments will seek to illustrate two key aspects of the Takemi Program at Harvard and two key themes of the Symposium. The first is the question of "beyond national boundaries," and the importance of comparison; the second has to do with health policy and the implications of empirical studies for making future policy decisions. We should also note for our guests who do not read Japanese, the words of Dr. Takemi here,

seizon no riho, or "reasoned approaches to survival," something which I hope that we are all engaged in.

On the issue of quantity, what can developing countries learn from Japan's experiences in reducing mortality rates, and how can those lessons be useful in national health strategy and planning? Dr. Koizumi cited seven reasons for the improved life expectancy and decreased mortality rates in Japan. I would tentatively regroup these seven reasons into three categories. The first we might call "Public Health Measures": TB prevention systems, improved nutrition and the maintenance of Japan's traditional diet. The second we might call "Medical Care Measures," the use of antibiotics, access to medical care and improved technology. The third is "General Social Change": economic growth and, consequently, the ability to provide public financing for medical expenses.

As many of you are aware, there is a long debate about the causes of the demographic transition and the decreases in morbidity and mortality in the 18th, 19th and 20th centuries. Public health specialists generally stress the importance of public health measures such as better water supplies and sewage disposal. Dr. Koizumi's list raises an important methodological question. How can we determine which factors were most important to Japan? We also might ask if this was a complete list. Were there other factors that should have been noted, for instance, the control of parasitic diseases, the role of immunization programs, land reform and its relationship to the redistribution of wealth in the postwar period? These are essential questions to ask, especially as developing countries consider their own strategies for health policies and their own demographic transitions.

Which factors should receive the highest priority in planning health policy, especially when not all that is desirable is affordable? The answers to this question will differ in different countries at different points in the development process. As Dr. Atsumi noted earlier in this program, each country has its own methods for making decisions, and those methods often include political factors.

Research in this area will be a central focus of the Takemi Program at Harvard. Let me just give you two brief examples. Among our first group of fellows is Dr. Lukas Hendrata, who has worked for many years in Indonesia in the delivery of health services in poor rural areas. Dr. Hendrata will be working with Professor Roberts in analyzing health strategy for Indonesia and providing recommendations for that health strategy. In this work he will have to consider the issues of allocating resources, between public health measures and medical care measures and also between those measures and other sectors of the budget.

A second example is the issue of essential drugs. Last April, Harvard held a major international conference on essential drugs, sponsored by the World Health Organization, UNICEF, The International Federation of Pharmaceutical Manufacturers' Associations and the U.S. Agency for International Development. The conference brought together over 150 people from around the world, including many of the diverse parties in this issue: industry, government health officials in developing countries, representatives of international organizations and academics. The presentations at the conference demonstrated the complexity of the issue of essential drugs. They described the administrative problems in distribution, the problems of negotiation between public and private sectors, the issues of determining trade policy, the political priorities given to health, the role of international organizations and the role of multinational corporations.

Like the issue of essential drugs, each of the factors listed by Dr. Koizumi involves many complexities. Administrative issues, economic issues, technical issues, political issues and cultural issues are all suitable topics for research in the Takemi Program.

Let me move now to the question of quality. Consideration of quality takes us from consideration of empirical questions, "what is?", to normative questions, "what ought to be?" Dr. Koizumi noted a number of normative questions about the quality of human survival: How should doctors and patients relate? How should communities influence health care? How should society deal with alienation? The important question here, it seems to me, is what do we mean by the quality of survival?

Dr. Koizumi points out quite correctly that average life expectancy cannot simply be equated with health. I think that illustrates a larger point. Often what can be easily measured is not, if you'll excuse a small pun, what really counts. It returns us to the question of what is health. Part of the problem in defining health is that the definition changes over time. It changes as life expectancy increases, and even in one's own life as one ages. Sometimes we forget that these social concepts are not static; Japanese culture today is not the same as Japanese culture a hundred years ago. Similarly, the concept of health is not the same; we have new technology, new social institutions and new professionals. While it may be correct, as Dr. Koizumi suggested, that we have better measures of quality, perhaps we need first a better understanding of quality and what quality means. The decisions about what quality is must be resolved through social and political processes, including even conferences like this one.

Let me just end on one note. The question of quality and quantity reminds me of discussions of environmental pollution in Japan. In the last 15 years, Japan has improved its control over levels of pollutants and has shifted its objectives from

reducing pollution levels to enhancing environmental amenities. Here again there is some conceptual ambiguity. What do amenities mean? The concept is especially ambiguous in Japan since the English word is not translated but is written in transliteration as "amenities." The resulting ambiguity reminds us of the social processes of definition and the importance of having clear concepts of quality.

A. KOIZUMI: Dr. Reich is correct to talk about quantity as well as quality. One factor that I wish to add in discussing the issue of quantity is the distribution of education. About 100 years ago, Japan began its system of compulsory education. We were very successful in controlling illiteracy and reducing it to nearly zero. This is a very important factor when considering the quantity issue of Japan's life expectancy. But we may have to wait for the future to determine which factor was more important.

Second is the issue of quality. One specific example was given by Professor Suzuki yesterday afternoon when he said that he personally has refrained from smoking, has decided not to have a television or car, has tried to remain frugal in life, and, because he is in complete fitness, does not have to avail himself of medical services. Professor Suzuki's lifestyle is one way of enjoying the quality of life. When we establish a universal definition of the quality of life, however, two things are necessary. One is a subjective quality and the other is an objective quality. The type of knowledge a person has can contribute greatly to improve the quality of his or her life. This subjective factor adds additional complexities. The analytical approach, which has been dominant, tried to compartmentalize and analyze in detail. There is another way, however, and that is to try to integrate things. Instead of analyzing details, sometimes an integrative approach is needed which may even take into consideration the value of intuition.

V. RAMALINGASWAMI: In Kerala, a state in India, some studies are being conducted that bear on the main thesis of Dr. Koizumi. Kerala is relatively poor even by Indian standards and yet has achieved health levels similar to those of many developed countries. In our research, we are presently examining the complex multi-factorial background to this development. Although recent studies show that life expectancy is above 60 years in this area, there is some evidence that morbidity rates are in fact increasing. This needs to be examined more closely.

Dr. Koizumi raises an important question about when quality of inputs and quality of outputs do not seem to coincide. How should you measure the quality of input? If input is to be measured in terms of the quality of education and levels of certification in a developing country, should you compare the quality of medical education in that country to that of Hopkins, Harvard, etc.? Or should you look, instead, at the ability of

the products of that education to resolve the problems of that society?

A final point I would like to make concerns the allocation of resources between public health and medical care. Certainly even in public health activities we need to have more information on which public health measures are the most cost effective. There are many people who believe that providing a pure water supply is of the highest importance. Yet if resources are scarce and inputs into the water supplies are great, I wonder if these inputs will produce the kind of payoffs you expect, especially if they are not accompanied by intensive health education and education in personal hygiene.

MICHIO YAMAMOTO: Quality of health in human life is a very important issue. The question of what is the purpose of living should be more deeply pursued.

In the discussions about average life expectancy and morbidity, I would like to see the question of urbanization explored further.

General Discussion

K. TSUCHIYA: It is my privilege to chair the last overview session of the Symposium. Before starting the discussion, I would like to remind us of the late Dr. Taro Takemi, whose picture is behind me and who has been our guiding spirit during this Symposium.

Although I do not intend to be a preacher of Dr. Takemi's philosophy, let me take this special opportunity to summarize some of his ideas. He was a very great man and I cannot pretend to completely understand his philosophy. However, let me try my best to introduce some "Takemi words" through which we can, hopefully, obtain a glimpse of his genius. As you know, in terms of creating words, Dr. Takemi was a genius. Sometimes the words he created were rather difficult to understand. But while they may have been confusing, his expressions were full of meaning. For example, the term "bio-ethics" existed before it was used by Dr. Takemi, but he gave this concept of bio-ethics a new humanism. To him, bio-ethics covers not only science, organ transplantation and quality of life, but also includes extensive rules applied to human survival. I have translated his "bio-ethics" elsewhere as a combination of integration of Oriental, especially Japanese, humanity and occidental (or scientific) humanity. The former represents culture and a way of life in communion with "nature"; in other words, the generosity and mercy of nature upon which Oriental people have depended for thousands of years. In contrast, Occidental people have tried to find a way to humanity using science as a weapon. Dr. Takemi's "bio-ethics" is further related to "survival order," which will be discussed later.

Dr. Takemi first used the expression "medicoeconomics" at a scientific session on the development and allocation of medical care resources at the 29th World Medical Assembly in 1975. The word medicoeconomics is an integration of medicine and economics, and designates the science of balancing the needs and demands of medical care; in other words, it is a new science for providing information and criteria for policy making in the distribution and allocation of medical care resources, not only in the developed but also in the developing countries. Yesterday, Dr. Robbins touched upon the subject of cost effectiveness. Physicians are not interested in cost questions, nor do any medical institutions presently teach this subject. In the future, however, this type of subject should be included in the curricula of medical schools all over the world. Policy decisions come out of medicoeconomics.

Toward the very end of his life, Dr. Takemi stressed the dignity of old age. In relation to the word "dignity," he also had a philosoply of "aging with health and happiness." I believe "sukoyaka ni oiru" in Japanese can be translated as "aging with health and happiness." But, the word sukoyaka is difficult to translate into English. If an old man is sukoyaka, he is physically and mentally healthy with dignity as a man.

Dr. Takemi also often used the term "survival order." In the background of this term I can see his humanism and scientific approach by which man can survive on earth as long as possible. However, Dr. Takemi hoped that for man not only longevity but quality and order of life as a "Sociobiological Organism" (again his term) should be maintained. If you look at the status quo of culture and civilization in Japan, you cannot deny the existence of disorder in human life. People enjoy freedom, and their demands for freedom increase until disorder results, and this disorder makes them unfree. If you think of the survival of man on a global basis, you have to think of world peace. Dr. Takemi created the expressions "stability amongst instability," and "instability amongst stability." This concept is closely related to the survival of mankind, which is slightly different from "peace," because he wanted to analyze "peace" using a scientific approach.

Since time is so limited, I must proceeed to the general discussion of this Symposium. However, I hope that all the participants will carefully read the papers and books written by Dr. Takemi. You will find him vividly alive within those pages.

Turning now to the sessions, we have received a number of questions directed to the presenters. Let me take these questions in the order of the presentations. After our responses, we will have a panel discussion with floor participation.

Dr. Matsumoto of the Ministry of Health and Welfare raised three questions in regard to Professor Yasukawa's presentation on world population and the population of Japan: 1) on the global size of maximum population, what is the maximum population that can be sustained on the globe, and under this maximum population, what is the maximum population for Japan?; 2) which is more important in terms of the strength of a community or country, quality or quantity of population, level of education, etc.; 3) as for population planning, what are the most critical elements: the level of health, educational level, economic situation, income bracket, GNP, income per capita?

M. YASUKAWA: It is difficult to give a prognosis of world population. Let me try to respond.

The first question dealt with the maximum population on this earth. To answer this, I will have to resort to statistics and data from the United Nations since this is our only reliable source. According to the United Nation's projections, there are as of 1982 4.8 billion people in the world. In my report

yesterday, I said that the population as of 1980 was 4.4 billion. According to the United Nations, the world population was 4.4 billion, with 1.1 billion people living in advanced countries and 3.3 billion in developing countries. The ratio here is very simple, one to three. In the year 2000, the population of the world is estimated to be 6.1 billion, with 1.3 billion people in advanced countries and the remainder, 4.8 billion, in developing countries. This is, of course, assuming that human beings will still be alive in the year 2000.

Although the rate of population growth is slowing, the total population in the year 2100 will be 10.2 billion, according to the United Nations. I believe this size is not practical. 10.2 billion is twice as many people as we have in the world now, and the globe is already overcrowded. Even supposing we only had a 50% increase, this population would grow to either 6 or 7 billion. Look around you and just imagine that there were 50% more people. It is a horrible thought. The fertility rate would go up; living conditions would deteriorate; and, consequently, the mortality rate would increase. As a result, although the number of people would increase, the quality of life would decrease substantially. In my opinion, taking into consideration all the parameters, including food, energy, and living conditions, 7 billion is the maximum population the world can tolerate. So I dare to take exception to the United Nations projections.

As for Japan, as I discussed yesterday, the population will peak at 130 million between the year 2010 and 2030. This estimate agrees with the numbers announced by the Japanese government. Just as we have skillfully controlled the mortality rate, we need to be able to control the fertility rate in order to obtain the optimum economic and social conditions from the standpoint of health. At present, the actual level of fertility in Japan is 1.77, below the fertility replacement level of 2.09. While it may appear that we have gone a little too far in controlling the fertility rate, in fact we have been smart, because Japan is a small island country with practically no basic natural resources. Practically all the children born to Japanese parents are educated in Japan and die here on the island. Japan is a self-contained community. So within these life constraints, how should we survive? If you look at the question this way, Japan's low fertility rate is a welcome phenomenon.

The Japanese have concluded that 130 million is the maximum population for the country. I think these islands could sustain more than 130 million; however, to do so would require a lower standard of living. And once you have attained a certain level of living, it is unimaginable to think of tolerating more population at the sacrifice of lowering your living conditions. In terms of day-to-day behavior, the Japanese have made the choice already. They have chosen the higher standard of living.

The second question asked about the size and quality of the population and how these affect the strength of the nation.

Perhaps by suppressing the quality of population we can increase the quantity of population in a country. But a structural change may bridge the tensions between quality and quantity. In the case of Japan, the aging of the population may overcome the problems between quality and quantity.

The third question is how this will affect the population increase and productivity. Japan is presently facing an aging of its population. On the one hand, we have an increasing aging population; on the other, fertility is suppressed. The high technological advancements will physically make the living standard high, but because the population is overcrowded there is pressure and stress. Compared with other countries, Japan still continues to maintain its economic strength, but within that affluence we still experience stress.

K. TSUCHIYA: In yesterday's discussion, Professor Bell commented that the fertility rate of 1.7 that Professor Yasukawa had cited might decline below that level. The fertility rate is very important. I would like to ask Professor Yasukawa what the basis is for setting this fertility rate, and Professor Bell, why does he predict that this fertility rate will decline?

M. YASUKAWA: With the oil shock, Japan plunged into a low growth economy. Simultaneously, many social changes occurred: the social status of women increased; more women entered careers or higher education; more people married at a later age; contraceptive use increased; and the housing situation worsened. In addition, the population has been aging, which means that, in the future, we will have the the burden of supporting more elderly people.

As Professor Bell mentioned, the fertility rate in Japan is below the 2.9 level, at the 1.7 level. I don't think the fertility rate will go below 1.7 because Japan is an island and has to be self-contained. We cannot import labor from outside as do Western European nations. Professor Bell, do you have any comment?

D. BELL: I have two comments, if I may. First, I did not predict what the fertility rate is going to be in Japan. I suggested that one reason it might decline further is that this has already happened in a number of industrialized countries in Europe, and the same factors that have led to the decline in the Japanese fertility rate to the current level of 1.7 are still active. The society is still changing in the same ways that it has been changing. Therefore, it seems to me legitimate to question whether the fertility rate may decline further. But I am certainly not making a prediction.

Second, I respectfully differ with Professor Yasukawa about the question of whether there is a maximum population for the world. It seems to me the most remarkable circumstance about the last two hundred years of human history is that, even though

the population has risen dramatically, especially in the last 50 years, the means of subsistence of the population has increased even more. Today, in Japan for example, there are many more people than there were two decades, four decades, and a century ago, but everyone in Japan is living at a much higher standard of living. The question, therefore, about the world as a whole, is whether the means of subsistence can be raised sufficiently to keep up with the prospective further major growth in world population.

The record of the past 40 years would have been considered incredible by a group sitting in this hall forty years ago. People like us would have said that, if the population of the world were to double in forty years, there would be no way in which the world could provide enough food, shelter, medical care, education and so on. Yet the population has doubled and living standards over the entire world have gradually improved, despite this enormous growth in population. That doesn't prove the world can do the same thing over the next forty years, but it certainly leads to some doubt as to whether we can assert that there is a precise number that is all the world can handle.

Thus far, the power of science, technology, modern economic organization and modern political organization has been sufficient to keep up with this fantastic increase in total population. There are many countries -- India is a classic case -- in which one doubts that this can continue to happen, but so far it has. Therefore, I put a question mark by that number of 7 billion for different reasons than I put a question mark by that figure of 1.7.

DR. MOON: Could you comment on the fertility decline in Japan and the U.S.A. and what can be expected in the future? Also, how do social values about children affect fertility rates?

D. BELL: We have already talked about the fertility decline in Japan. In the U.S., fertility is not at 1.7, but is approximately 1.8 and declining. So the U.S. must contend with the same questions as Japan. I'm not sure there is any general answer to your second question. You can argue, as I did yesterday, that one of the reasons for the decline in the fertility rate is that people want to give each child a better chance. To do so, they must invest in advanced education, full health care and so on, all of which are extremely expensive. The children that exist in the low-fertility-rate countries are not being treated with disdain; on the contrary, they are extraordinarily well cared for. So the fact that there are fewer children does not mean that people value children less. It would seem to me that the counterargument is at least as strong: that people value children even more.

M. YASUKAWA: I think the value placed on children will increase. We are presently experiencing a demographic

transition, from high fertility and high mortality to low fertility and low mortality. Low fertility and low mortality expand economic growth. When people are aware of economic growth, they try to adjust the number of children they have in order to meet their own standard of living.

K. TSUCHIYA: Dr. Murata of the Takasaki Medical Association would like to ask the following question of Professor Hsiao. How are the advanced nations going to tackle the problems of the social participation of volunteers in primary health care, as advocated by WHO and UNICEF. In Japan, questions of health, welfare and education are not applied to community volunteers because of administrative problems, and physicians and practitioners encounter problems in the community. So how do the advanced nations cope with these problems of the volunteers in the community?

W. HSIAO: Let me first of all restate what I understand to be the issue. In many less developed nations WHO and UNICEF are trying to provide primary health care to all people by mobilizing the social and economic resources within a community through the use of self help and volunteers. Dr. Murata is asking about the attitude of the advanced nations, and, in particular, the U.S., to this approach. I think it's accurate to say that health care delivery problems are rooted in the political, cultural, social and economic structure of each nation. The health care problems for developing nations are different than those of the more advanced nations; i.e., many developing countries are having serious problems with infectious disease, lack of potable water and inadequate immunization of children. In these nations you can promote the delivery of primary health care with minimally trained health workers who are organized on a local level. Also you can organize the financial resources of the local communities.

As far as I know, in the U.S. and Europe these kinds of efforts are applauded as efficient means of mobilizing resources and organizing local communities for extending health care to all the people. I think there is skepticism expressed, however, as to whether these methods can be extended to the industrialized nations where disease and illness are more chronic in nature. We do not know enough about the prevention of chronic diseases like cancer or cardiovascular illness.

DR. MURATA: In Great Britain and the U.S., we are witnessing a society in which the size of the aged population is growing and chronic diseases are becoming prevalent. Since financial shortages will allow only outpatient medical care, not inpatient care, home care should be applied in order to sustain a high level of medical care.

Currently, the Takasaki Medical Association is trying to shift the inpatient medical services to outpatient and to

promote home care. There is no central figure to promote this kind of primary care service, however. Nor is there a decision yet as to who will deliver this primary care. This is not only the problem for Japan, but the United States and other advanced nations will need to adopt this approach as well. No government can afford the additional expense of a large aging population.

T. TSUBO: In the world, there is presently a gap between the medical services provided in the south and in the north. While we try to create some balance and equilibrium in terms of manpower, we also have to consider the issue of quality. It's not only the quantitative distribution that is important, but the qualitative equilibrium as well. The World Medical Association raised this issue at Alma Ata. The problem is that the definition of traditional and classical medicine is not so clear, and we do not have clear-cut criteria by which to measure quality. The Alma Ata declaration and the joint efforts by WHO and UNICEF tried to clear up some of this confusion. We will not be able to improve medical services unless we strive for quality control.

A. WYNEN: Dr. Murata pointed out the fact that, because medical expenses have escalated rapidly, a patient's stay in the hospital must be limited. When elderly patients recover to a certain degree, they are asked to leave the hospital. These elderly patients then have to return to their own communities and there is no central figure to look after them when they return home.

Since Dr. Murata will actually be handling these kinds of cases, he will encounter some patient confusion about whom they can turn to. In these situations, there should be an interface vis-a-vis welfare at the community level so that no individual patient who is asked to return home will be without additional care.

DR. BABA: I live in the Totsuka Ward of Yokahoma, a bedroom suburb with a population that is now 450,000 and is rapidly increasing. The medical center is operated by the local Medical Association. Twenty years ago, a report written by Dr. Ohyama of Kanagawa Medical Association discussed the comprehensive health plan of Illinois State, a plan that helps not only physical health but mental health as well. Dr. Ohyama was one of the chief directors of that plan. I feel the Kanagawa Medical Association would like to follow the model of the state of Illinois; however our problem of "sectionalism" (or bureaucratic boundaries) does not allow us to directly attach our Medical Association to the government of Kanagawa. I would like to hear Professor Bell's thoughts about this issue.

D. BELL: Since I am not informed about this matter, let me refer the question to my colleague Professor Hsiao who has worked with a number of states in the United States and may know about the Illinois experience.

W. HSIAO: I'm afraid I don't know specifically about the Illinois experience, but let me comment on the many experiments in home health care that are being conducted in various local communities in the United States.

Yes, there is a serious problem for the aging population whose physical and mental capacities are impaired but do not require hospitalization. Often these people do not have their sons and daughters living close by. How do we maintain these people in the local communities? How do we mobilize the community social services to provide this support? In the United States there are organized home health services that provide a whole range of physical support and services to elderly people, including delivering meals twice a day to people's homes, cleaning their houses, doing their shopping and assisting them with their bathing. Included in this support are such medical services as giving injections, taking blood pressure, etc. Unfortunately we find it difficult to distinguish between medical service and social support service. As a result, because we cannot clearly identify what population should receive these social services, these services can be very costly and the local communities and the state governments find that they do not have the resources to organize these services for all the people who need them. Perhaps a younger person will say, "I need that service, too." Suppose my wife was not feeling good and said, "I need someone from the home health services to come clean the house for me." How do you differentiate her need from that of an elderly person who does not really have the capacity to do this cleaning?

In the United States, we know how to organize these services at a local level, but have faced serious problems with their cost and financing. Presently, some private insurance companies have developed insurance products to insure the young people so that, when they grow old and need home health services, they will be eligible for them. This is a way of investing for their future.

K. TSUCHIYA: Professor Roberts introduced four approaches in the allocation of resources. Are those the only four approaches possible? Maybe those four approaches vary from country to country in their various stages or levels?

W. HSIAO: I think I can accurately reflect Professor Roberts's view on this question. I don't think Professor Roberts intended these four approaches to be all inclusive. Is one of these four approaches the most appropriate or relevant for all nations? I think the answer is no. You must look at each nation's own social, cultural and economic structure.

When we talk about wants, usually wants are relevant only to societies that have a market exchange system for health services. Wants would not be that important to a socialistic nation. The social worth approach may be more appropriate for a

socialistic nation. The social worth approach may be more appropriate for a socialistic nation. So I think Professor Roberts would say that a nation has to select the most appropriate approach depending on its own economic and social conditions.

D. BELL: Could I add one word? Professor Roberts explicitly said that he did not regard these four approaches as the only approaches, and he recognized that, in different countries and circumstances, other principles in addition to those four might be appropriately applied.

M. REICH: Since I knew Professor Roberts would not be here today, I asked him this question last night at dinner. I particularly asked him whether he thought it might be possible that his four approaches were bound to Western culture and whether there might be some other approaches that might come out of Eastern culture, out of Japan, out of China, out of India. He told me that he would expect there might be other approaches and that he did not intend his approaches either to be exclusive or necessarily universal. I'm sure that he would welcome any proposals from you for additional approaches.

K. TSUCHIYA: The four approaches discussed by Professor Roberts are not independent of each other. They are inseparable, that is, they might come in combination, as needs and wants can come together. I guess we have to further qualify what we mean by this definition.

There is one more issue I would like to touch upon. I think Dr. Hiatt wanted more information about the particular issues regarding organ transplant that Japan is facing. Can anyone supply him this information? Dr. Hiatt, do you want to add something?

H. HIATT: I think all nations that are struggling with this problem -- and, clearly, there are not many -- find themselves in a dilemma. As Professor Roberts pointed out yesterday, our principal experience is with kidney transplants, but we face a growing problem with respect to making choices, as the number of organs that can be transplanted increases. The list now includes not only kidney, but also heart, liver, pancreas and, of course, skin. My question was designed to inquire about the approaches concerning resources for organ transplants that have been taken in Japan. I am curious to know what positions underlie these approaches and whether there are disputes on those issues.

K. TSUCHIYA: Dr. Atsumi, perhaps, since time is limited, you can restrict your information to kidney transplantation?

DR. ATSUMI: As a matter of fact I am a specialist in artificial hearts. With respect to organ transplantation, I think I can provide you with some information.

As of December, 1982, 2,500 patients in Japan received kidney transplants. 2,000 of these transplants were from living donors and 500 were from cadaver donors. In Japan, we have more living donors than cadavers. But it is difficult to secure donors. The number of heart transplants was 40. Thus, 95% of the transplant cases are kidney transplants, with the balance transplants of other organs. The Japanese are intrinsically resistant to giving away their organs, and recipients are also inhibited and resistant about transplantation. Presently, Japan has a number of centers to analyze tissue and organ types, and we are now endeavoring to establish organ banks. I think we have here today the President of the Organ Transplantation Association of Japan, Dr. Kuwabara.

DR. KUWABARA: The figures quoted by Dr. Atsumi were all correct; however, transplant surgery in Japan is probably 10 years behind the European countries. Due to religious and other reasons, the Japanese people are resistant to this trend. There are also statutory constraints. Kidney transplantation and membrane transplantation are the only kinds of transplants permissible by law. Otherwise, you may be accused of damaging cadavers or organs. We hope to improve the situation little by little so that in the near future we may be able to catch up to European countries or the United States.

K. TSUCHIYA: Dr. Nishi from the Institute of Public Health has a question to address to Dr. Ramalingaswami.

DR. NISHI: My question is about the health resources. Water supply and agricultural irrigation are very closely related to health. Therefore, we should consider resource allocation in other disciplines. I think participation in these areas is very important.

V. RAMALINGASWAMI: I entirely agree with Dr. Nishi's views. I think that these indirect sources -- what I referred to as "health-related" activities, as opposed to traditional health activities -- are important. Resources are allocated in different departments of government in these areas. Water is generally not with health; agriculture, of course, is with another ministry; rural development is with some other ministry; and a number of voluntary agencies and social action groups are involved. So, I agree entirely with you that, in the planning stage, one has to have a holistic view, a total approach to health. The difficulty, however, is to find out how much resource is being provided in each of these boxes, even in the existing resource provision of a country. It is difficult to get this information because activities impinging upon health are scattered in so many different sectors. We need to get more refined information on what contribution these different sectors are already making, in order to have a total view of the resources.

K. TSUCHIYA: I would like to add a comment on the relationship between medical expenses and life expectancy. I do not think there is a causal relationship. In the beginning, medical care does not play a big role, except for nutrition and other peripheral areas. This is one thing you have to bear in mind when looking at the graphs presented by Dr. Koizumi. I am not trying to degrade the importance of the physician (after all, I am one), but medical care can only do so much.

In talking about comprehensive approaches, Dr. Ramalingaswami indicated how much could be put in each box in terms of priorities. But who is going to allocate these resources, or who mobilizes these resources that exist in our society? I really would like to come to some conclusion about how we realize this philosophy in a real situation.

V. RAMALINGASWAMI: Mr. Chairman, I think that this is the most crucial question. Where are the resources in the public and private sectors? In what kinds of boxes? How does one mobilize these resources? Who mobilizes them? And after mobilization, how do you determine allocations? Each country will have to decide these very difficult questions. I indicated that these are politico-technical decisions. The technical dimension is that we have technologies and know the possibilities that those technologies offer and their costs and benefits. The political dimension will take into account the social factors, the aspirations of people, the kind of system that is operating, the pluralistic society where a certain amount of the caring function is carried out by public expenditure and a certain amount by private initiatives. In any event, I think the translation of the philosophy into action is a country-level, locally-specific phenomenon. And all that one can do in discussions across national boundaries is to indicate the choices and the alternatives that lie before us, and the kind of principles on which we can proceed. Another way of looking at this would be to take a case study of a particular country. Case studies allow you to look more closely at the various subsystems that are present in a total system. Perhaps at the next Takemi Symposium we could have case studies from different countries to address the questions of how this is done in practice.

DR. ATSUMI: In the morning session, I said that the studies about cancer, heart disease and apoplexy are quite advanced. Patient numbers and medical resources can be estimated with some degree of accuracy. We should show these figures to the entire nation, and, then, if the nation wanted to eradicate cancer, we could emphasize that research. If the nation instead wanted to reduce heart disease, then we could shift the emphasis to the eradication of heart disease.

But this is not the only problem. What is important is how to grasp the philosophy itself. In each nation, the level of medical care is different. Depending on the level, each country

can make its own plan. There are two ways of thinking about the resource allocation model. One is that, in each level, the goal should be to secure the minimum required for human survival. The second philosophy is that each form of medical care, though it may differ depending on the class and the level, should aim at improvement of the quality of the level. These two concepts or philosophies are important in order to continue our discussion.

V. RAMALINGASWAMI: The question of levels is very important. When we are talking about health for all it does not imply that everyone on this globe will attain a fixed level of health. Levels of health differ from country to country; the idea is to enable people equally in any country or region to lead socially and economically productive lives. There are no cutoff points here. I think the approach of Alma Ata is basic and fundamental while the practical ways in which the approach will be translated into action programs will differ in different settings. The primary health care approach and the basic issues it means to attack are actually common in principle across every country. It's a question of resource allocation.

One final comment is that, even when a country has reached higher economic standards, it is faced with a new set of problems like the ones that have been presented to us this morning. There may be instances when, to cope with these problems, we may have to return to certain traditional values in society: community support, social support and home care. Many institutions that take care of chronic disablement which have been somewhat dismembered in the course of our growth and development may need to be reinstituted. A reinstitutionalization of some of these approaches may be necessary.

D. BELL: May I add just one point which I think is raised by the question and Dr. Ramalingaswami's answer. In the spirit of Dr. Taro Takemi, there is a point we have not yet quite focused on in this Symposium, that is, that an ethical standard should apply to all of us who are at a more affluent level, in considering countries and situations that are at less affluent levels. As I understand Dr. Takemi's philosophy of bio-ethics, it is broad enough to include the conception that people should feel some obligation to contribute to the improvement of health, not simply in their own countries, but elsewhere in the world as well. When I served in my own country's foreign assistance program, I argued at length -- and without much success -- for increasing the resources which the United States made available to improve welfare in the Third World. I believe in a general conception of moral and ethical behavior in the modern world that requires us to share responsibility beyond our own boundaries. This is not a comment on the direct question that Dr. Atsumi raised, but it seemed to me something that was important to say in this particular Symposium, in the light of Dr. Takemi's strong feelings on this subject.

T. TSUBO: As Professor Bell just mentioned, the question of bio-ethics should move toward the more comprehensive disciplines in every society including school educational curriculum. Otherwise, we won't be able to realize ideal comprehensive medical care. At the level of resource allocation, if a nation wants to eradicate cancer, it will have to develop the kinds of resources that are necessary to accomplish this. Even if the nation were to appeal to the current decision-making mechanism or the current priorities in political decision making in health and medical care, we have to realize how this bio-ethics could be based on the decision-making process to maintain quality care and human services in terms of safety and security.

The present and the future health risks and demands in a community must be scientifically forecasted so that they will also be reflected in future health policy making. In the 1960s and 1970s we used national health planning, but now we have to think in terms of community health planning. Certain policies for priority of care should be made at the community level based on community, ecological, genetic and life style factors. Others -- policies regarding organ transplantation, for example -- should be dealt with on the national level. In that sense, comprehensive health planning will become more important in the future.

Y. S. SHIN: I wanted to make a little clearer why we are here and what we have discussed. Although I first heard about bio-ethics just yesterday, I am convinced that this is the philosophy for which primary health care is looking. Medical science should not just deal with sickness, but it should also grapple with physical, social and mental well-being. There should be a comprehensive approach. Japan, the United States, and my country (Korea) all have to ask ourselves if we are going in the correct direction or if we should shift directions in the future? We have to work at maximizing the effectiveness and efficiency of health care delivery.

We have to remember that without implementation, planning is worthless. We have not talked much about policy issues, spending time, instead, clarifying philosophies, and defining Dr. Taro Takemi's views more clearly. In the future, we should talk more about policy issues.

K. TSUCHIYA: Could we leave this question now and move to the next issue? Professor Suzuki of Tokyo University has a question and comment to direct to Dr. Koizumi and to all the other professors present.

Y. SUZUKI: Today, as I have listened to the many discussions, I have acutely realized the importance of the question of scarce resources. Although I do not like to admit it, when we grow older, weaker and less healthy, we must depend on outside medical care and physicians. As many other

physicians have mentioned, this question of scarce resources is a relative concept. Dr. Takemi made many health proposals to the nation. In one full-page advertisement in the newspaper, he said that we should promote "youthful health" and the prevention of illness, and try, as much as possible, to reduce our consumption of medical resources.

We should reduce our dependence on medical care. As Dr. Koizumi just mentioned, it is important to maintain good health in order to cut down on the consumption of medical resources.

Secondly, the medical provider will accumulate new research studies and the quality of medical care will be further enhanced. As a result, people will be able to get medical care more efficiently and at a lower cost. Then, relatively speaking, the scarceness will be reduced. In some advanced nations, we might even be able to solve the question of scarce resources. Developing countries like India and other countries in Africa, or Asia may benefit from the resulting surplus of medical resources.

Yesterday, I mentioned that I want to try, as much as possible, to live a natural life and not be bothered with medical care. Of course, I am not sure I can do this, but ideally I would like to live and die like the late Dr. Takemi. I may not be able to live a beautiful and healthy life: an unfortunate event such as a traffic accident, or some unexpected illness like cancer could befall me, but the probability is very small. Each individual should endeavor to live a happy and beautiful life. Of course, it is important to have the support of physicians and other external people, but each individual should make his own individual effort to be healthy.

As to the question of the quality of health, quality differs according to each individual interpretation, that is, how much effort the individual is willing to expend on this subject. In Japan, science builds up its theories subjectively; these subjective elements need to be incorporated into the science of the survival of human life. In that sense, the Oriental thought that we can't solve everything with scientific analysis alone, might be important. It may be useful to grasp the situation more intuitively, perhaps even to apply the spirit of Oriental Buddhism or Zen Buddhism. Although these approaches may be quite different from the spirit of Christianity, they could be very important in seeking to understand the survival of human life.

K. TSUCHIYA: There are two points which I would like to raise in relation to Professor Suzuki's comments. With respect to scarcity of resources -- for the current level of medical expenditure, I would like to use the analogy of the credit card. It has become quite fashionable to make payments using credit cards, but you have to remember that eventually this account payable will be withdrawn from your bank account. In the case

of medical expenditures, money will not be withdrawn from an individual deposit account, but from a public pool of funds; therefore the consumer can easily forget the expenses involved. I feel that there can be an increased awareness about this situation so that people can be quite specific about their expenditures.

A second point is on aspirations. You mentioned that Dr. Takemi passed away in a very composed manner. Medical service is there to assist, even though the individual is making every effort to avoid being a beneficiary of medical services. When traffic accidents or cancer occur, individual aspirations of trying to live (in a positive manner) will surely be reflected in the conservation of scarce medical resources.

V. RAMALINGASWAMI: Just two comments on Professor Suzuki's intervention. Like you, Mr. Chairman, I was also fascinated with the marvelous new terms coined by Dr. Takemi to express new thoughts in the field of medicine. It took me a long time to grapple with the ideas of bio-ethics and bio-insurance, but as I reflected more and more, I realized that there is a profound message behind these concepts. What Professor Suzuki mentioned about society being maximally happy when it is least dependent on high technology intervention is similar to what that health philosopher, Ivan Illich, used to say, that a lot of things can be done best by families and individuals, and we should conserve our advanced resources for the most complicated cases. That is one issue that is evident regarding the economic efficiency of the health system.

The second is a phenomenon which I believe that Dr. Takemi must have had in mind. In many developing countries we see many people who bypass the more peripheral health care structures and concentrate at the metropolitan and teaching hospitals in the cities and the towns. This works against the concept of a graded referral system in health care, whereby you filter out the common illnesses at the lower level and send into the higher levels of medical care and technology only the very selected cases which require careful study and attention. In many developing countries, a good bit of physicians' time is taken up with activities that could be performed by someone with less advanced training.

DR. MOON: I have a question for Dr. Koizumi. The exponential curve between per capita medical expenditure and life expectancy at birth -- if you use the data before the Japanese national health insurance -- how will the curve look? I'm curious to know the inferences of various financing measures on the improvement of life expectancy in terms of quantity and quality.

A. KOIZUMI: Your question is highly stimulating. I would like to explain a technical point: medical expenditure per capita in Japan is supported by many medical insurance plans.

For my graph, per capita medical expenditure includes this amount. If you are asking, if national health insurance is spent in certain amounts, how will it be influenced and reflected in the changing exponential curve of prolonging the life expectancy, I would like to compare the period before 1960 to that after 1960, when a total national insurance scheme was inaugurated in Japan.

M. YASUKAWA: I would like to comment on Dr. Koizumi's graph of the correlation between expenditures and national life expectancy. He noted that perhaps we should have a different way of rendering the horizontal axis, for even though we continue to put increasing incremental inputs in expenditures, we cannot expect a satisfactory growth of life expectancy after a certain point. Therefore, what is the margin beyond which we cannot expect any incremental growth in life expectancy?

We must remember that human life is like a drama played only once. Therefore, one of the big themes for the Science of Human Survival to study is how to live and how to die.

A. KOIZUMI: The first paper that I reported elsewhere contained a graph with the horizontal axis in a vertical manner. The reason I did not show that particular graph is that I wanted to show the amount of medical expenditures as life expectancy increases. As Professor Tsuchiya said, no cause and effect relationship is shown. Our graph tries to show the relationship between the two variables of medical expenditures and life expectancy.

K. TSUCHIYA: Lastly, Professor Hashimoto of Tsukuba University raised this question. In order to study the risks related to environmental pollution, (for example, the environmental pollution that Japan experienced like Minamata Disease) what should be the scale and criteria that we utilize? And what kind of medical services should be used to treat these pollution problems?

M. REICH: This is an important question, and I'm pleased that Professor Hashimoto has asked it. One point is the difference between the perspective of a medical doctor and the perspective of a public health specialist. Medical doctors, especially clinicians, are trained to look at the individual, or even at a specific organ or something smaller than an organ. Public health specialists, on the other hand, are trained to look at populations -- to think about diseases and populations, to think about causes, consequences, policies, implications, social aspects and economic aspects. Specifically, let me take the case of Japan's Minimata Disease and suggest ways in which individual physicians who had a public health perspective made a difference in the way in which the problem was treated and in the way in which individuals were treated. Individual physicians in institutions and communities can make a difference. For environmental problems, it is necessary to have

physicians who have this population perspective, within industries, within academic circles, within government and in clinical practice. These four spheres are critical for environmental as well as occupational problems.

In industry, in the case of Minamata, there was a doctor by the name of Hosokawa who was experimenting on cats with waste from his factory. Finding symptoms in the cats which indicated poisons in the waste, he took actions, under difficult circumstances, to make people aware of this problem.

In academic circles, there is a neurophysiologist at Kumamoto Medical School named Harada who also went beyond academic boundaries and beyond individual patients to look at the population and other problems that the patients were experiencing in mercury poisoning.

In government circles, Dr. Hashimoto tried to change policy and tried to deal with other ministries who might not have the same perspective of looking at health problems within populations.

And in the town of Minamata itself, there was a clinician who tried to deal with the health problem not simply on an individual patient level, but on a community level. This perspective of looking at populations is not easy; it runs into numerous problems, many of which have been discussed in this Symposium. I think the important point is to see things within society in a systems perspective, something that Dr. Takemi would have heartily supported.

K. TSUCHIYA: The "ten commandments" that Dr. Hiatt presented yesterday included the problem of bio-ethics. I would like to add to the "ten commmandments" the question of survival, making "11 commandments" instead of ten. In light of the framework of this Symposium, I think it beneficial for us to add this 11th commandment to the ten commandments already suggested.

I'm very thankful that we've had an enthusiastic and heated debate. I'm sure the late Dr. Takemi would be pleased.

ANDRE WYNEN

For 20 years, I had the privilege and great honor to work closely with Dr. Taro Takemi. In Tokyo in 1975, when Dr. Takemi was elected President of the World Medical Association, a collectivity of more than one million physicians, I was chairman of the Council and it was my privilege to receive his oath. I also had the pleasure of participating in the three meetings of the WMA's Follow-up Committee on Development and Allocation of Medical Care Resources, meetings sponsored and chaired by Dr. Takemi. After so many years of close cooperation, you may easily understand my emotion at this conclusion of the First Takemi Symposium on International Health. For me, his spirit is more than ever among us and I shall conclude this Symposium in the way he indicated by calling physicians to defend their patients.

Eleven years ago, the situation inside and outside of the World Medical Association (WMA) was very different from today. At that time, thanks to the continued and unconditional support of the WMA colleagues from Japan, and especially Dr. Taro Takemi, we managed to keep WMA alive. We put the WMA to work in new fields, and it adopted positions that today honor the world medical profession. That profession never despaired, continuing to work within the WMA to strengthen that organization and to promote the consideration of ethical moral issues related to medicine.

Dr. Takemi's dynamism and leadership, first as Chairman of the Socio-Medical Affairs Committee and then, in 1975, as President of WMA, permitted the development of studies and programs in the new science of medical economics. Unfortunately, this science was initially better received by economists, sociologists and politicians than by physicians. Yet physicians have always been the persons most concerned about the basis of medical science development and, consequently, about its increasing cost. They are also the only persons entitled to prescribe modern diagnosis and treatment techniques.

Dr. Takemi had long meditated on the increasing impact of economics on the evolution of medicine and particularly on the best use of medicine for the benefit of patients. He had forseen the inevitable and increasingly cruel competition between the interests of the healthy and the ill.

Before I share my own thoughts on the topics that have been discussed here, I shall briefly summarize the presentations by the speakers at this Symposium.

It was a moving experience to hear the voice of my old friend Taro Takemi, on the tape-recording of his Symposium speech. Drawing upon his own experiences as a practitioner, Dr. Takemi became the first in the medical profession to initiate programs in medical economics, and to consider the concepts of bioethics and "bio-insurance." Dr. Takemi's speech and Dr. Hiatt's presentation elucidated the philosophy of that great man.

In his excellent keynote address, Dr. Ohe introduced Dr. Takemi's philosophy and outlined the most important threats to our future: the expansion of the world population; 2) environmental pollution; 3) ideological oppositions; and 4) the irreversible worldwide advance of modern civilization.

Dr. Robbins compared the health situation in developing and industrialized countries, noting that all countries face the same question: "How can the available resources be distributed so as to achieve the maximum impact upon the state of health of the population." Commenting that it is impossible to provide everything to everyone, Dr. Robbins explained that the fast development of medical science has widened the gap between what is possible and what can be afforded. He proposed changing medical education to foster a new cost-consciousness in physicians.

Professor Yasukawa presented dire figures on the growth of the world population. Although he anticipates a decline in the demographic explosion, he also predicts an increase in the elderly population. Three workers will be required to support one elderly person, Professor Yasukawa said. This is already the case in Europe.

Professor Roberts described his four approaches in analyzing the logical and philosophical problems of allocating limited health care resources: social worth, wants, needs and fairness. He also indicated the problems and ambiguities in defining the concept of health.

Just as defining health is a difficult exercise, Dr. Ramalingaswami commented that determining health priorities in situtations of severe resource scarcity and deciding the "right" allocation of resources to meet these priorities are serious undertakings. According to Dr. Ramalingaswami, the real origin of the catastrophic health situation in the developing world is the almost total lack of resources, not only to fight against infection but to combat malnutrition and the extreme poverty of the population. An acceptable level of health cannot be achieved by the health sector only, Dr. Ramalingaswami concluded. One point should be added to his commentary. Without a solution to the problem of malnutrition, the success of medicine against infection only leads to more misfortune and more inhumanity.

Finally, Dr. Koizumi clearly showed that the classical indicator for the evaluation of health levels in a country or a

region, the average life expectancy at birth, should be abandoned because it represents the length or the quantity of life, not the quality. When a survival curve is examined chronologically, a considerable portion of the increase in the number of survivors appears to be represented by diseased persons undergoing clinical treatment. This is an extremely important question we must consider, if we are to find the right guidelines in medical ethics and bioethics within the science for human survival.

At the same time and in the name of the WMA, I bring my full support to the comments made by Mr. Tsubo on the WHO policy and the Alma Ata Declaration on primary health care.

EVOLUTION OF MEDICINE AND NATURAL SELECTION

Darwin surely did not foresee that the extraordinary progress of medical science would progressively oppose natural selection. In 1939, the issue was raised for the first time in a tragically rational way when Hitler signed the order to exterminate the mentally ill in Germany. At the same time, members of the teaching profession (such as Konrad Lorenz in Vienna) extolled, in the name of National Socialism, the use of euthanasia to protect the race's hereditary patrimony.

The viewpoints defended today in France, 45 years later and this time in the name of the socialist dialectic advocated by Jacques Attali, seem to be based on the same philosophy. The comfort of the healthy society is considered at odds with the survival of the chronically ill, the handicapped, and the elderly. With the evolution of medicine, the burden represented by these sectors of the population increases. We can see this position manifest in the self-defense reactions of most healthy people who, in every democracy, influence political decisions, particularly those related to medical economics.

Can the physician remain passive when the incompatibility of the defense of society and that of his patient is more and more obvious each day? The public prosecutor, who defends the interests of the community and calls for punishment of the defendant, cannot claim to be defending the latter's interests. Similarly, society can surround itself with medical counselors to defend its socio-medical interests, but society can no longer authorize these physicians to practice their art for their patient's sake. Conversely, the physician who has chosen to treat patients must, under all circumstances, remain on their side. The physician should never accept the interests of the healthy community. This incompatibility represents an ethical conflict.

INDIRECT RESPONSIBILITY IN SICKNESS INSURANCE

Every health insurance program must respect this principle of incompatibility, and must discuss this issue and have a dialogue with the medical profession. For the physician's natural role is to protect the interests of the human being who is sick or threatened by disease. A socio-medical dialogue which results in a definition of the duties and responsibilities of medical practitioners would undoubtedly lead to conclusions totally different from those the politicians and the decision makers in socio-medical affairs are trying to force gradually on physicians.

At the same time, the medical profession must reconsider its concepts and attitudes, and rid itself of the guilt complex it has been induced to adopt. The consideration of "cost-effectiveness and cost-benefit" can only exist between physician and patient. Often even the patient's family should be left out of this calculation, particularly if the patient is old and has brought a heavy financial and social burden. The indirect intervention of a third party -- health insurance or society -- has perverted the system by creating a confusion of interests. This intervention has also, progressively and imperceptibly, distracted the physician from his main natural duty, the defense of the patient.

Certainly the community or the health insurance program has a duty to protect those citizens and insured persons who are in good health. In this respect, nobody questions their right to ask physicians to help them as experts and advisers. But the physicians, in such circumstances, should not treat patients since they cannot defend simultaneously both the patient's and the State's or the insurance program's interests. On the contrary, the practitioners must defend the patients, especially when they are pressured to sacrifice their interests, for example, to benefit the healthy through cost containment programs. In medical economics, the dialogue between physicians and society must be clearly defined to avoid any confusion of interests and, above all, any incompatibility of functions.

DISTRIBUTION OF THE GNP -- POLITICAL CHOICES

Each discipline has its own vocabulary which works magic on those listening to it. Therefore, after having focused attention on the health care budget term "all-in" lump sum, it seems that the atmosphere has been eased -- and nobody can explain this psychological phenomenon -- by replacing the term with the word "envelope." First used in France, this new word is now very popular all over Europe and in other continents as well. Evidently, the concept of a closed pre-established budget is now being widely used by health care strategists. The best examples of this are Preferred Provider Organizations, Health Maintenance Organizations, and Diagnosis Related Groups in the

United States. Gradually, this system seems to force physicians to make decisions strictly within the budget and, consequently, to ration medical care. Physicians are compelled to decide who may live and who must die. Unfortunately they are confronted with an unacceptable dilemma.

To be free of guilt in this situation, physicians must convince themselves that the envelope allotted to them is only one part of a much larger envelope called GNP. But GNP is also divided into several, generally unequal parts. Their size has been determined by the socio-political pressures exerted on the authorities responsible for this distribution. In some countries, for example, the trade unions have exerted pressure to increase the social envelopes for financing holidays and various allowances and special budgets for artificially maintaining declining industries such as the steel industry or obsolete coal mines. In other poor countries, political leaders have favored the purchase of jumbo jets over the development of a better medical infrastructure and have supported traditional medicine -- at no cost to the State, of course. The Alma Ata Declaration has been used many times to justify this policy.

In such a system, the importance of the medical envelope will depend on how much pressure the medical profession exerts on the political leaders who dispense the GNP, compared to how much pressure is exerted by the medical and other sectors. The responsibility of the medical profession to defend patients is, in part, carried out by such political action.

SECURITY -- COMPETITION BETWEEN SECTORS

The competition for the disbursement of the GNP is inevitable. The public must be made aware of this competition between the various groups of social beneficiaries. In the race for available resources, the sick represent a minority. Ill-defended, they may soon find themselves in a situation where cost containment means care rationing which, in turn, means euthanasia.

This statement is no exaggeration; it is the inevitable consequence of a policy which is progressively depriving physicians of the necessary means to safeguard the quality and safety of their medical services.

CAN MEDICINE BE A PUBLIC SERVICE?

The cost of illness has increased substantially, largely due to the progress of medical science and the subsequent need for sophisticated medical equipment. Salaries are often insufficient to cover these expenses. Moreover, the inability to work due to illness and the resulting loss of income further worsen the situation.

By converging commercial interests with patients' interests, medical insurance represents a solution to this economic problem. The great danger of insurance schemes organized and administered by the State or the community, however, lies in the right they have granted themselves (which is not the case with private insurance) to change unilaterally the provisions of the contract that binds them to their subscribers. This problem occurs especially when priority is given to other interests other than the funding of medical care for patients.

This practice has become so common that we wonder if it is still morally acceptable to allow public and semipublic services to be developed and controlled by the majority of the healthy. The selfishness of the healthy has grossly increased in these times of crisis, and their interests are increasingly in conflict with those of the ill.

In addition, an analysis of the behavior of patient's families shows that they are becoming less and less willing to make the sacrifices imposed by the illness of a relative.

The medical profession cannot remain indifferent to these fundamental problem of bioethics and bioinsurance. Isn't this behavior pattern a reflex of species that auto-destruct themselves when they have grown over their demographic limit?

COLLECTIVE AND PERSONAL FUNDING

The above considerations do not exclude the necessity for the patient to assume part of the cost of personal health protection. Of course, we would not think of returning to that time when only the rich could afford adequate medical care. We are talking of personal financial participation, proportional to the patient's income. For the patient must be made responsible for his illness.

A study on the role and efficiency of cost-sharing systems in health administration, published last year in the New England Journal of Medicine, emphasizes the importance of personal financing. The individual or family budget must allocate funds for participation in medical care, just as it allots funds for other important items such as protection against cold, hunger, lack of culture and information, etc. All free medical care schemes -- public or private -- have led to abuses of consumption. In particular, resources assigned to real patients have been diverted to the healthy.

The physician has the urgent duty to defend human beings against disease, and to fight for a fairer distribution of the GNP. By continuing to stress the importance of medical care, the medical profession will remind politicians, sociologists and economists that medical care cost containment involves stumbling

blocks much more serious than they initially appear. Refusing to take these obstacles into consideration will result in a deep change of human values and an exclusive reliance on the law of the strongest. This was one of the most important concerns of Taro Takemi.

EIMATSU TAKAKUWA

The Takemi Program at the Harvard School of Public Health is just beginning. Its first international symposium, "Health Policy Towards the 21st Century," is drawing to an end. I am honored to have been given this opportunity to close the Symposium. I am the freshman at the Takemi School. All the speakers, including the keynote and special lecturers, are first-rate, superior scholars, and the audience participants are also experts. The discussions these past two days have been lively.

Dr. Wynen has summarized all of the speeches, pointed out very important issues, and added his own comments. There is, therefore, nothing for me to add. But since I have this responsibility, I would like to make a few remarks about my impressions of the Symposium.

After World War II, one of the most rapid developments that took place was the information system. This information media has a function to let the whole world know instaneously of events happening around the globe. This means that everybody can witness unfortunate events such as war, terrorism, and starvation. But, at the same time, this reveals the limit to our human wisdom because we cannot prevent these unfortunate events. Dr. Takemi stated in his recorded tape that "All people should benefit from medical care equally, and the world should be peaceful. This is the aspiration of mankind." He also referred to the human commonalities that extend past national boundaries, such as the desire for survival and the mechanism of self defense. The concern for human survival is the foundation for world peace, and the health issue is deeply related to this. I have to admit that his is a very excellent opinion.

The development and allocation of medical resources was discussed and had previously been taken by Dr. Takemi as the main theme in the General Conference of the 29th World Medical Congress. This medical issue is extremely important. As Dr. Tsuchiya noted in his introduction, I was formerly the Deputy-Director of the National Institute for Environmental Studies, and I moved to Japan's parliament, the Diet, as recommended by Dr. Takemi, in order to reflect sciences in politics. All of you know that presently Japan's Health Insurance Revision Bill has been submitted to the Diet and is the most important item on the current agenda, together with the revision of the educational system. It is my regret, however, that medical care is focusing on economic aspects rather than preventive medicine, and as a member of the Diet, I feel very sorry about this.

Medical resources are not just goods but also include people, knowledge, and know-how. As we consider the 21st century, the population problem is one of the most important issues on the agenda. The population problem should be recognized as a question of quantity and quality. This morning Dr. Ramalingaswami delivered a presentation focusing on the quantity of medical care in developing nations. The population problem needs environmental, scientific, and biological approaches. Furthermore, we must address the issue of the growing aging population in advanced nations. Unless we study these areas more deeply, we will not be able to realize comprehensive medical care.

In order to tackle these problems, we have to collect information and allocate medical resources more effectively, being aware of the differences between advanced and developing nations, and the different needs in each nation with regard to economic problems, allocation of medical resources, preventive, health-promotive activities, health education, and research and development. Our discussions at this Symposium varied widely. These subjects are all areas for international cooperation.

The Takemi Program in International Health at the Harvard School of Public Health aims at utilizing research results from many disciplines in training international health experts from each nation to work toward bettering the welfare of mankind. I believe this is the foundation of Dr. Takemi's theories.