

D498 PANEL DISCUSSION—OUTLOOK FOR MEDICAL PROGRESS

brace all types of cancer cells that have been adequately studied and provides a framework for further research on the necessary and sufficient cause of malignant tumors.

In concluding this discussion let me ask one more question: if it is accepted that there are a number of environmental and intrinsic factors which can contribute to the occurrence of cancer, why has so much of this discussion been concerned with viruses? This has been deliberate because, if viruses are associated with the development of cancer in man, several practical advances might be developed which could be expected to affect both the morbidity and the mortality that result from the disease. As extensions of what has been learned from studies on cancer in animals, it might be feasible to develop reliable procedures for early and specific laboratory diagnosis; for the effective management of early tumors before they can be recognized on physical examination; for specific prevention of virus-induced cancerous alteration at the cell level before it occurs. The feasibility of such developments has been demonstrated in principle through model experiments with cancer-inducing viruses in animals. Whether they have any applicability to man will depend on answers to two questions: Are viruses causally related to human cancers? If they are, what is the frequency of the relationship?

Until answers to these questions become available the mainstay of cancer control is likely to continue to be treatment—by surgery, radiation, chemotherapy or any other useful means available. I am told that the disease can now be cured on a five-year basis, in about one patient in three, perhaps one patient in two in the best hospitals and under the most favorable circumstances. What this statistic may be in a decade is presently unknown.

PROGRESS IN CARDIOVASCULAR DISEASE

NORVIN C. KIEFER, M.D.:

As you well know, heart disease and diseases of the blood vessels rank, respectively, first and third as causes of death in this country. The importance of consideration of these conditions is too obvious for me to comment further upon it.

I consider it to be particularly fitting that we are to hear these subjects discussed by a physician who not only has great competence in this area, but also is the Scientific Director of the Life Insurance Medical Research Fund.

Dr. Jeffers received his medical degree from the University of Pennsylvania in 1932, the same year that Dr. Horsfall was graduated from

McGill University. I received mine in 1930 and this, I assure you, is my only claim to seniority in this panel.

Since 1935, Dr. Jeffers has been a member of the Edward B. Robinette Foundation for the study of cardiovascular disease at the Hospital of the University of Pennsylvania, where he also was Chief of the Hypertension Section and Associate Professor of Medicine. He also served as Chief Cardiologist at the St. Joseph's Hospital in Philadelphia. Dr. Jeffers also has served the United States Government, as Chief of the Medical Service at McGuire General Hospital during his military service, and later as Consultant in Cardio-Vascular Diseases to the Veterans' Hospital at Wilmington, Delaware. He is a member of a number of medical organizations, including the American Heart Association and the American Society for Clinical Investigation, and he has served as a Governor of the American College of Physicians.

His research and publications are chiefly in the field of heart disease and high blood pressure.

He was appointed Scientific Director of the Life Insurance Medical Research Fund on April 15 of this year, and the offices of the Fund were moved from New York City to Rosemont, Pennsylvania. I know that you share my interest in the work of the Life Insurance Medical Research Fund and will welcome its new Scientific Director, Dr. William A. Jeffers.

WILLIAM A. JEFFERS, M.D.:

As the newly appointed Scientific Director of the Life Insurance Medical Research Fund, I should like to acknowledge some of those in your Society who have given their services most generously as officers of the Fund.

Members of the Society of Actuaries holding office currently or recently include Mr. M. Albert Linton, Mr. William M. Anderson, Mr. George W. Bourke, Mr. Leigh Cruess, Mr. E. M. McConney, Mr. Walter O. Menge, Mr. Ray D. Murphy, Mr. Charles A. Taylor, and Mr. Andrew C. Webster. We look forward to continuing cooperative endeavor with members of your Society.

The common goals of medicine and insurance are, as I think you will agree, to alleviate suffering and want, through enlightened foresight, and to promote good health and longevity. There appear to be good reasons for a special rapport between actuaries and medical scientists: Both have a need to deal with measurable quantities; to test hypotheses through experiments involving mathematical analyses; and to re-examine and revise useful procedures, after securing sound evidence as a basis for action. Another mutual interest will be mentioned presently.

I shall attempt to review the changing pattern of disease that has occurred during my professional lifetime in the last three decades. This will be discussed with emphasis upon diseases of the heart. While agreeing in principle with the points of view taken by Dr. Kiefer, I shall try also to reconcile an apparent contradiction. You are probably aware that my experience has been that of a physician engaged in teaching, research, and the practice of internal medicine. This review of the relatively recent past will, I hope, serve to give some basis for anticipating future trends.

A few examples may serve to illustrate the changing pattern of illness, which by now is familiar to all of us. I can recall the autumn and winter days of 1931 and 1932, when, as medical students, we could visit the morgue in the Philadelphia General Hospital to observe post-mortem examinations being performed throughout the day on persons who had succumbed to pneumonia. Many were muscular young men in the physical prime of their lives. This sad and widespread spectacle is no longer to be seen. You are well aware that pneumonia has long since surrendered its position as a leading cause of mortality, and now but rarely occurs in the severe form seen during our days in medical school.

Concerning this phenomenon, a leader in the field of support for medical education and research, Dr. Alan Gregg, has made this observation:

The fantastic economies of successful research swiftly go beyond any method of accurate accounting. As an example, I would estimate that the work on the sulpha drugs up to and including the proof of their efficiency in the treatment of lobar pneumonia did not cost more than \$150,000. But in as short a time as three years after their value in pneumonia was shown, the saving in life insurance policies that would have been paid by one life insurance company for deaths from lobar pneumonia alone only on the West Coast of the United States, over only one year, was calculated at \$3,000,000. In such ways research gives a continuing and permanent lift to Great Medicine.¹

Infections leading to the rheumatic type of heart disease also have been curbed, following the discovery of antibiotics, cortisone, and related drugs. I can recall a boy of nine who was admitted to the Hospital of the University of Pennsylvania, moribund, and with a fever of 105 degrees. Thanks to these drugs he is now living, is a gifted musician, and a senior in college. This happy outcome seems now to be the rule rather than the exception, and is reflected in recent mortality trends.

Rarely were the medical wards, in 1930, without several husky laborers confined to bed and doomed to die because of syphilis of the heart. First

¹ Alan Gregg, M.D., *Challenges to Contemporary Medicine*. New York, Columbia University Press, 1956, p. 71.

arsenicals, then penicillin, were responsible for the change that has occurred. It is now rare to find a patient on our medical wards with syphilitic heart disease. Dr. Kiefer has properly warned, however, that constant vigilance will be required to eradicate syphilis completely. It is an old and tenacious disease.

Other infections, such as tuberculosis and typhoid fever, no longer take an appreciable toll in this part of the United States, but will recur if medical and sanitary measures should be relaxed, as Dr. Kiefer has emphasized.

In 1930 we could seldom diagnose the exact defects producing the heart murmurs of congenital heart disease, nor were surgeons able to operate upon the heart itself. Now it is possible not only to diagnose these abnormalities with precision, but to correct the majority of them through operations upon and within the heart. This success rests upon research performed in many laboratories and hospitals during the past century.

In 1950 some of us in the University of Pennsylvania embarked upon testing the effect of a new operation designed to ameliorate severe degrees of high blood pressure. Patients chosen were those with *diastolic* blood pressures of 120 to 150, who were living under the constant threat of blindness, failure of the heart and kidneys, strokes, and coronary occlusions. Without adequate treatment, few would likely have survived for two years.

Among 184 patients so treated, 110 were alive in 1960, at the end of ten years. Of the survivors, two-thirds had near-normal blood pressures and were working full time. You could no doubt estimate the monetary gain effected by the increased longevity and freedom from disability among this group of patients whose ages averaged 45. Our fortunate experience was not unique; other similar studies could well be cited. It should be added that subsequently even more effective medical and surgical procedures have been discovered, with the result that our original operation is now seldom required. I anticipate that some further improvement in mortality from hypertension, for those 40 to 60 years of age, may become evident during the next ten years.

Why, with the many advances in medical treatment which occurred between 1930 and 1960, has there been only a gradual improvement in longevity, and a relative increase in deaths due to heart disease? Possible answers are that fewer deaths from infections allow more individuals to die from the heart disease of old age; there also appears to be a relative increase among those dying from degenerative heart disease at an earlier age than previously. Among "degenerative" I include hypertension, arteriosclerosis, and coronary disease.

When should the expected mortality for an important disability be altered, once effective treatment has been discovered? Herein is the dilemma that faces both actuaries and medical scientists. We dare not be impatient where human lives are concerned, and because of the several variables inherent in such problems.

The medical procedure is as follows: Before a discovery in basic science is studied for its possible benefit in the treatment of sick patients, we must employ further laboratory tests for periods of about five years. Another five years will usually be required to prepare it for general use. Finally you, and we, will wish to avoid drawing firm conclusions concerning its effectiveness short of another ten years of treatment experience.

A consideration of the minimum time involved above, *twenty years*, helps to resolve an apparent contradiction: Surely there has been remarkable medical progress within the past thirty years, but the net change has not been entirely in the right direction with respect to heart disease, and much remains to be learned. Furthermore, those discoveries of 20 to 30 years ago are only now being manifested from your point of view and ours, with respect to increased longevity, and improved mortality among young or middle-aged persons.

From the foregoing it is evident that we are but rarely in a position to pass final judgment concerning improvements in treatment short of 20 years subsequent to their basic inception. Often more time may be required. Sometimes, however, medical and actuarial experience may allow some abbreviation of one or another phase of testing, as in the case of pneumonia. The experience obtained in 20 years will also avoid errors in prediction due to late failure of treatment programs, not evident in the first ten years of testing. This interpretation seems to explain the paradox of many life-saving discoveries within the past thirty years, coupled with but a modest increase in longevity.

It might be added, parenthetically, that the dilemma we face together, in the valuation of impairments for which a changing outlook is evolving, is but a part of the cost of progress. An example, related to the same trend, might be that of the highly trained pilot who is forced down and must try to survive in the jungles of Africa or South America. Our problems are less immediate and severe than are his! Both illustrate the conflict between the old and the new.

In the foregoing it has been emphasized that advances in the care of those with heart disease and other disorders are constantly being reported, but that a test period of about twenty years usually will be required to demonstrate their effects upon mortality and morbidity. There is a related opportunity, of mutual interest to you and to the medical profession: If

we can, together, find ways of increasing the use, by the public, of improvements in treatment, as through health insurance plans, and educational programs such as have been sponsored by various insurance companies, it can be anticipated that improved morbidity and mortality will earlier become evident.

At this juncture I should like to relate the work of the Fund to the subject under discussion. We can take pride in the contribution to human welfare of our official organization, the Life Insurance Medical Research Fund. The activities of the Fund have been of credit to the life insurance industry, as expressed recently by Mr. Milton Amsel, Institute of Life Insurance: "From the point of view of life insurance public relations I think our most valuable non-commercial, non-controversial, and most positive asset is the Life Insurance Medical Research Fund."

You may not fully realize the high regard that the Fund enjoys among the medical profession in this country and abroad. It is recognized for operating according to enlightened principles, reflecting the wisdom and integrity of its Board of Directors, Officers, Medical Directors' Representatives, and Advisory Council. The large part played by members of the Society of Actuaries, beginning with Mr. M. Albert Linton, our first Chairman, is again acknowledged with gratitude. I find it difficult to enumerate those varied talents of my predecessor, Dr. Francis R. Dieuaide, which enabled him to guide the Fund towards its present stature.

Thus, as in the case of all successful enterprises, a number of men, women, and ideas have contributed to the Fund and its program. Each year Dr. Dieuaide has reviewed some of the discoveries resulting from Fund-aided research, relating them to over-all advances. We are an *allocating* Fund, aiding research performed by others in well-established medical institutions throughout the world. The Fund's aid to research has been applied at various of the levels previously discussed, but with particular regard for basic problems to be pursued by acknowledged experts in the fields of biochemistry, physiology, and related scientific disciplines.

In this respect we have helped to avoid a concern expressed recently by Dr. James A. Van Allen, the discoverer of the world-girdling radiation belts, who indicated that "The nation's national ambitions in space exploration have greatly outrun its basic science competence."² The Fund may take satisfaction from the results of its varied investments in basic research. Some of these will lead to practical applications in the future, comparable in importance with the discovery of penicillin.

Within the Fund's portfolio of investments in research are also included projects in clinical investigation, in which studies are conducted

² New York *Times*, October 11, 1961, City Edition, page 2.

concerning the reactions of humans to various careful experiments. These are also performed by experts selected from among many applicants.

Since its inception in 1945, the Fund has allocated almost \$14 million in support of medical research. Of this, \$12 million has aided research projects; the remainder has been invested in the training of 271 Life Insurance Medical Research Fellows for periods of one to three years each. This has allowed them intensive participation in medical research.

Summary

A review of the striking medical advances of the past 30 years indicates that, through continued research, further improvements will occur. The impacts of new discoveries upon mortality and disability are not immediate, but may require more than twenty years with respect to mortality trends. The probable reasons for this delay are mentioned; means for accelerating the process are suggested.

Some contributions of the Life Insurance Medical Research Fund to advances in medical science are reviewed.

I should like to express my appreciation for the privilege of participating in this panel discussion.

The author gratefully acknowledges assistance in preparing this report from the following individuals and their associates: Dr. Paul I. Robinson, Chief Medical Director, Metropolitan Life Insurance Company; Mr. Andrew C. Webster, Vice President for Selection, The Mutual Life Insurance Company of New York; Dr. Paul H. Langner, Jr., Chief Medical Director, and Mr. B. Franklin Blair, Vice President and Actuary, Provident Mutual Life Insurance Company of Philadelphia.