

THE CONTROL OF TUBERCULOSIS IN THE AMERICAS*

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With every year our social and cultural horizon includes an expanding sphere of awareness and activity. In the field of health we have come a long way. Not many years ago, health was a matter of individual concern; but as the world became smaller, men more mobile, cities larger, and nations more closely connected, health slowly but surely became the concern of the whole community of mankind. Not only the shrinking and hastening world, but war and its devastations emphasize the universal scope of health problems. Now, in this place and time, we face the consequences of destruction. Moral failure, economic collapse, and political confusion contribute to our frustrations when we attempt to deal with the public health of our day. In the long run, we must perceive that little can be done until cooperation supercedes individualism, and unity—world unity—becomes our final spirit of approach.

In the terrible years just passed, the deaths of young men, the devastation of homes, the destruction of those things held to be good and desirable, have been sacrifices to decency and the fine dreams of freedom. Yet disease is the final victor. Epidemics arrive, the starving die, the hearty fall. Malnutrition, exposure, and lack of sanitation provide the physical soil; as terror, despair, and sickness of heart compose the spiritual nutriment for the flourishing of disease.

Among the diseases that are now epidemic in war stricken areas, tuberculosis, which in days of peace had very nearly come under effective control, has become again a fearful problem. Yet happily we know that tuberculosis can be, even under unfavorable circumstances, controlled and eventually eliminated. Experiences of the United States and the Scandinavian countries point the way and leave no doubt that the concentrated effort of many men and agencies in case finding, medical care and isolation, in chemotherapy and, perhaps, vaccination, can defeat a disease that takes a greater toll of lives than does the most disastrous war.

It is a commonplace to observe that disease is not hampered by geographic and ethnologic barriers. Given the speed and ease of travel, the frequent movement and congress of peoples throughout the world, it is unlikely that tuberculosis can be controlled in one country if it is epidemic in another. It is the self-interest of relatively healthy and well-fed nations to prevent the supremacy of tuberculosis in any area. But such action has a more important motive than mere self-interest, for deeply engrained in the culture of the western world is the common sympathy that man has for man, without which democracy is meaningless and ethical principles absurd.

The United States has been more fortunate than many other nations. War did not touch its soil; bombs did not reach its cities. Indeed, through the war years, the mortality rate of tuberculosis continued to decline. We cannot, however, assume that such happy circumstances is the consequence wholly of our fortunate situation. As recently as 1890 the tuberculosis death rate was 245 per 100,000 population. This is comparable to the present estimated death rate of Venezuela, which is 233 per 100,000 and that of Brazil which is 250. From the year 1882, when Koch announced his discovery of the tubercle bacillus, to the year 1892 when Flick organized the Pennsylvania Society for the Prevention of Tuberculosis, there was in the United States a struggle, which must be encountered everywhere at the beginning of a control program, to establish the concept of contagiousness

of tuberculosis, as against the old and still widely accepted idea of the hereditary transmission of "consumption."

As control programs gained in force in the United States and when, by 1904, the National Tuberculosis Association was organized and the whole movement given unity of action and purpose, the death rate from tuberculosis began to decline.

To be sure, many other factors, most of the inscrutable, contributed to this decline in the tuberculosis death rate. However, it must be said that the largest measure of credit should go to organized control programs.

In 1904 there were only six tuberculosis control programs in the United States and only 100 tuberculosis sanatoria and hospitals. In this year the tuberculosis death rate was 200 per 100,000 population. Only 10,000 beds were available. There were no dependable means for the early diagnosis of the disease. When tuberculosis was discovered it was far advanced and death soon followed. Little was done to isolate the tuberculous, and people by the thousands were brought in close contact with virulent organisms. Every year tuberculosis claimed the lives of thousands of children. Young men and women, who had arrived at that period of life when one is most productive, faced certain death when a diagnosis of tuberculosis was made. Because little was done to slaughter tuberculous cattle, bovine tuberculosis attacked our citizens, and extra-pulmonary tuberculosis was widespread.

Between the years 1905 and 1935, the public health and clinical aspects of tuberculosis control underwent gradual but confident development. Methods of diagnosis, treatment, surgery, and health education were refined in technique, extended in application, and improved in quality. Epidemiological studies and surveys were instituted and completed; research projects were undertaken and significant advances were made.

It was in the decade between 1935 and 1946 that all control methods came to their highest peak of development. Mass radiography, with the development of the photofluorograph and the automatic phototimer; experiments in chemotherapy and antibiotics; greatly expanded research in epidemiology; health education; the development of an official national control program; and the expansion of control methods in industry, general hospitals, and the armed forces, marshalled the power of science and shaped the knowledge and understanding of men in the fight against tuberculosis. In spite of the rigors of wartime, the death rate from tuberculosis in the United States in 1945 was down to 39.7 per 100,000 population.

Until the year 1944, tuberculosis control was the job of private voluntary agencies, and the extraordinary achievements of tuberculosis control in my country is, in large measure, the result of vigorous efforts of the National Tuberculosis Association. However, it became apparent as early as World War I that official agencies were needed to guide, complement, and to cooperate in control activities. In 1919 the National Tuberculosis Association adopted a resolution urging the establishment of a division of tuberculosis control in the U. S. Public Health Service. It was not possible to create such a division at that time; but with the advent of World War II the National Tuberculosis Association appointed a War Emergency Committee to consider what should be done to bring about more unity in the campaign against tuberculosis. The U. S. Public Health Service at this time became actively engaged in this field, and soon after Pearl Harbor the Public Health Service established a small Tuberculosis Control Section in one of its Divisions. Throughout 1943 and early 1944 the agitation continued, and as a result of concerted effort, a comprehensive bill was introduced to Congress. That legislative body acted affirmatively, and on July 1, 1944 the Tuberculosis Control Division of the U. S. Public Health Service was established.

Since the inception of the Tuberculosis Control Division, the U. S. Public Health Service has gone forward, and has made many advances toward a realization of the objective of all agencies in this field—the eradication of tuberculosis in the United States. From the beginning we have had four major objectives in the fight against tuberculosis: (1) case finding; (2) medical care and isolation; (3) after care and rehabilitation; and (4) protection of the tuberculous patient and his family against economic distress. These objectives have been guiding principles which have produced useful findings and have created policies and procedures for the future.

In case finding, the miniature film X-ray machine has been the major tool. It permits the examination of large population groups. Before this instrument was brought to its present state of refined development, only individuals and families could be easily reached by standard X-ray equipment. Now the X-ray goes to the people, examines them in large groups, and discovers tuberculosis, mostly, in its minimal stage. The importance of this finding is made clear by the fact that in former years only 10 per cent of admissions to tuberculosis hospitals were minimal cases. Today, with modern case-finding techniques, 70 percent of all new cases found are minimal. Tuberculosis is at least being found when it can be relatively easily arrested.

When it began operation, the Division put special emphasis on case-finding. The purpose of case-finding is to discover hidden cases of tuberculosis. Such effort, in the past, was directed toward the family members of known infectious cases. Since the introduction of mass radiography, case-finding has had a much greater range. It has been aimed at large population groups. The two sizeable portions of the population which can be quickly reached by mass radiography are persons admitted to general hospitals and persons employed in the industries of the nation. This second group, at the beginning of nation-wide activities, was one of the chief interests of the Tuberculosis Control Division.

It is estimated that by the end of 1946 more than 25 million persons in the United States, 16 years of age and older, will have had chest X-ray examinations through the resources of the armed forces, health departments, industry and voluntary tuberculosis associations.

Industrial workers as a group will continue to loom large in future mass radiography plans; however, a program is already under way, through the cooperative efforts of the American Hospital Association, the National Tuberculosis Association, and the Public Health Service, to have all general hospitals participate in case-finding projects. Such an undertaking will provide for the routine X-ray examination of all patients and employees coming to general hospitals, and their out-patient departments.

Probably the most important single phase in tuberculosis control is medical care and isolation of persons with active or infectious disease. Public Health principles dictate a primary interest in prevention of the spread of the disease. The desired results of case-finding cannot be realized if treatment is delayed by inadequate sanatorium care. In America we are faced with the problem of providing at least 50,000 additional sanatorium beds. At present, long periods of hospitalization are necessary for the care and treatment of advanced tuberculous patients. However, as mass radiography reaches larger numbers of the population, shorter periods of care will frequently be the rule, since many of the patients will have early disease. If sufficient clinical facilities are established throughout the country, such persons, including those on ambulatory collapse therapy, may be regularly transferred to the chest clinic for treatment and supervision. Others need only enter convalescent homes for the period of transition.

Rehabilitation and after-care are also important objectives in the frontal attack on tuberculosis. It is well known that tuberculosis is a relapsing and debilitating disease. In his readjustment to self-supporting life, the patient whose disease has become arrested must have competent medical, social, and financial guidance. This is a complex problem which requires the help of many private and public agencies interested in tuberculosis control.

Reports from the American Medical Association show that the cost of sanatorium care of the tuberculous in the United States is close to \$100,000 each year; but this does not even closely approximate the social and economic losses sustained by tuberculous persons and their families in the same period.

When a patient leaves the sanatorium it is often necessary, because of his invalidism, to protect this person for several years after discharge. Sooner or later, it will be necessary, to follow the example of such countries as Denmark, and provide invalidism insurance for those unfortunate people during the period of their disability. With the knowledge gained from the social and economic studies of tuberculous families, data will be provided to make possible certain changes in our social security laws that will bring economic relief to our tuberculous families.

The protection of the tuberculous family against distress is a special problem in itself. Tuberculosis is a community disease which is important not only in terms of public health but also in terms of national economy. Once the disease becomes far advanced, the affected person is usually disabled for life, or dies a premature and costly death. The family, broken by a long period of illness or by the death of the breadwinner, is almost invariably thrown on public resources for support. Accordingly, a sound medical program must be complemented by a generous plan of public assistance, particularly for the needy families of the tuberculous. If this is not done, the full benefits of other control activities, especially sanatorium care, cannot be realized. It must be remembered that tuberculosis and poverty are frequently associated. A national plan to provide adequate insurance for the family against loss of wages during the period of prolonged sickness is the only realistic answer to this problem.

In the field of antibiotics repeated and persistent efforts have been made to find a drug that would be effective in the cure of tuberculosis. Men of science in almost every nation of the world have worked through lifetimes to find a lethal agent to defeat a germ that has consistently resisted every attempt against its predatory existence. Over the years, the hopes of the ill have been lifted by such attempts at treatment as tuberculin inyecciones, gold therapy, the application of sulfa drugs, and various vaccines. In every instance the high hopes were dashed by failure. Although investigations continued, few drug cures for tuberculosis were offered until very recently when Waksman isolated a promising compound—streptomycin—from certain species of the soil actinomycetes. Streptomycin has forged ahead, and, in laboratory and animal trials, has become the current drug of promise. At the moment streptomycin is being tried on human beings, and, although no extensive controlled experiments have been performed, preliminary result not only give hope of suppressive action, even in meningitis and miliary tuberculosis, but also point the way to further investigation and search for similar antibiotics that may be even safer and more economical.

BCG vaccination on a large scale has not been the practice in the United States as it has been in South America and in Europe. Only in recent years has there been any organized effort to consider the use of BCG in my country. The successful use of this vaccine in South America and in Denmark and controlled studies among American Indians by the Office of Indian Affairs, Department of Interior,

and by the U. S. Public Health Service, directed the attention of researchers in the field of tuberculosis to BCG vaccine and its possible application in population groups where infection is high and hospital facilities poor. As a consequence of these studies, it was determined that the U. S. Public Health Service would be responsible for long-range control studies of BCG vaccination. It was determined to establish a central laboratory to produce the vaccine, and that a large city be utilized for control studies. Within the next few years the U. S. Public Health Service will be in a position to make recommendations for the use of the vaccine. We feel that further research is necessary in the United States to determine the effectiveness of vaccination and also to develop a vaccine composed of dead bacilli.

We feel that one of the most interesting and significant researches that has been undertaken in the field of tuberculosis for many years is the work in non-tuberculous pulmonary calcification, particularly the researches into the occurrence of histoplasmosis. Our studies demonstrated that mild, probably subclinical infection with *Histoplasma capsulatum* is widely prevalent in certain States and relatively infrequent in others. In general, those States in which the frequency of relation to histoplasmin is high are those in which pulmonary calcification is also high. A very high proportion of the pulmonary calcifications observed in roentgenograms of tuberculin-negative persons may be due not to tuberculosis, but possibly to histoplasmosis. It should be mentioned briefly, although it is a matter of great importance, that health education for the general public, the tuberculous and their families, and professional groups, can encompass the entire field of tuberculosis control. The U. S. Public Health Service and the National Tuberculosis Association cooperate in the production of health education materials and work constantly day in and day out to inform the public of protective health measures and of the nature of tuberculosis as a family and community disease.

We feel strongly that tuberculosis can be controlled in any nation if control procedures such as those I have described are effectively applied. As the States of the United States work together to defeat this dreaded disease, the nations of the Western Hemisphere, sharing their experiences, facilities, and knowledge, can in concert bring tuberculosis low. We should think in terms of unity against our enemy—disease—as seriously as we think in union against threats to peace.

There is no doubt in our minds that tuberculosis can be eradicated as a plague of the people of the world. The health, the hope, the aspirations of men, now blighted by an insidious and debilitating disease, can be restored to hundreds of thousands of sick persons, so as to make them useful members of our nations. Only then can the forces of mind and spirit, defeated by preventable deaths, and weakened by lingering disease, be fully utilized in the development and maintenance of a healthy and productive world.

Accidentes en Estados Unidos.—El Consejo Nacional de Seguridad informa que durante 1946 murieron a consecuencia de accidentes en los Estados Unidos 100,000 personas y 10,400,000 sufrieron lesiones, con una pérdida económica total aproximada de \$5,600,000. Estas cifras son 4% más elevadas que las de 1945; sin embargo, las muertes de niños de 5 a 14 años de edad disminuyeron en 8%. El índice de accidentes para 1946 fué de 71.4 por 100,000 habitantes, con la siguiente distribución en cuanto a causas: caídas, 27,800; quemaduras, 10,200; ahogados, 7,300; armas de fuego, 3,100; catástrofes, 1,300. El número mayor de muertes (34,000) ocurrieron en el hogar.—*Jour. Am. Med. Assn.*, 564, fbno. 1947.