THE FRAMINGHAM HEALTH AND TUBERCULOSIS DEMONSTRATION

COMMUNITY PREVENTION, CONTROL, AND TREATMENT OF DISEASES, AS CARRIED OUT AT FRAMINGHAM, MASSACHUSETTS, U.S.A.

A Paper read at the First International Congress of the People's League of Health at Wembley, on May 23rd, 1924.

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Reprinted from THE LANCET, *June 14th*, 1924, *p.* 1243.

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THE problem of human vitality is an absolutely fundamental problem in the economic rehabilitation of society, and is constantly attracting more attention on part of the public. At the same time, one of the greatest obstacles in the way of improving public health is the failure of the public to appreciate the value of knowledge, already in the possession of experts.

Consequently, one of the first essentials of community prevention, control, and treatment of disease is that of education. The official health agency, receiving its money by budget, is usually restricted in its expenditure, and either unable or unwilling to expend money in experiments or demonstration. It is therefore the duty of non-official or volunteer health organisations to demonstrate the value of our present knowledge regarding disease prevention, control, and treatment. Practically all units of community schemes for disease prevention, control, and treatment now utilised in America, such as sanatoria, open-air schools, preventoria, the public health nurse, &c., were shown to be of value by non-official organisations, before public officials were willing to accept them and expend funds for their maintenance.

The Community Health and Tuberculosis Demonstration at Framingham, Massachusetts, is an example of what can be accomplished by demonstration by a non-official organisation. It was established January 1st, 1917, by the National Tuberculosis Association, with the financial assistance of the Metropolitan Life Insurance Company, to show that by the expenditure of a sufficient amount of funds it was possible to diminish both morbidity and mortality from tuberculosis in a community with an average equipment for health work.

The Metropolitan Life Insurance Company is one of the largest insurance companies in the world, having 25,000,000 policy-holders, and is interested in tuberculosis because 16 per cent. of the deaths in the industrial department are due to this disease. In 1915 the Company paid over $4,000,000 to 14,325 policy-holders dying from tuberculosis, and naturally felt that anything which could be done to reduce tuberculosis mortality would be eventually manifested upon the Company's financial reports.

Tuberculosis is responsible for approximately one in every ten deaths in America, and one in every three industrial deaths is due to this disease. It is, therefore, in part at least, an industrial disease. Each year in the United States approximately 150,000 people die, and from 1,000,000 to 2,000,000 people are incapacitated from tuberculosis. Similar conditions obtain throughout the world, some better, many worse.

The prevention of tuberculosis is, fundamentally, a general health problem, which is all the more reason why it should command serious consideration from the community welfare standpoint. The National Tuberculosis Association alone, and through its associated state and local organisations, is expending upwards of $5,000,000 annually in its efforts to prevent, control, and eliminate tuberculosis, and it is quite natural to ask, " Of what value are present-day methods of disease prevention and control, and is this enormous expenditure of effort and money worth while ? " The story of Framingham answers the question. I shall try, in the short time allotted me, to indicate what has been accomplished in Framingham.

The Scope of the Work Attempted.

Framingham was selected for the demonstration because it represented a typical American community of about 17,000 people, with an average death-rate, average population, and average conditions socially and industrially. Moreover, the local officials, voluntary health and civic organisations, expressed a desire for the demonstration, and assured coöperation. The object of the demonstration was essentially to discover all cases of tuberculosis in the community, to determine the economic and social factors in disease causation with special reference to tuberculosis, to apply the best known methods of treatment, to develop a comprehensive programme of prevention, and organise the community for disease prevention and health creation.

One of the first things undertaken at Framingham was to secure the coöperation of local physicians and townspeople ; the former was accomplished by organising a medical club, before which important lectures and clinics were given concerning various phases of the tuberculosis problem and related medical problems. This also developed certain standards for tuberculosis diagnosis, and elevated the methods of diagnosis and treatment of this disease. Besides, it secured the support and coöperation of local physicians almost to a man. The coöperation of the people of Framingham was secured by acquainting them with the motives, methods, and practical objects of the demonstration by means of special literature, daily press articles, numerous meetings, and the appointment of local representatives on the National Committee and the organisation of many local committees, representing various community interests, such as a local executive committee, a local advisory committee, an exclusion committee (whose duty it was to detect an invasion of the community by migratory consumptives), an industrial health committee, an infant welfare committee, neighbourhood committees, &c.

The work began quite naturally with a series of investigations with reference to the incidence of tuberculosis infection and presence of the disease, the hygienic hazards, community resources, &c. Among the more important investigative activities may be mentioned :—

1. A general sanitary survey, including a survey of industrial hazards, school and factory conditions, including problems of general sanitation, cleanliness facilities,

illumination, ventilation, heating, dust, fumes, safety devices, milk and food control, morbidity and mortality statistics.

2. Not only was the community's statistical background studied, but the people themselves were studied, by a sickness survey, designed to give a cross section picture of the amount of disease of all kinds in the community and serve as a measure for comparing illness findings at the beginning, with similar findings at the end of the demonstration. This census was similar to the sickness canvasses and health censuses, frequently conducted by life insurance companies, and was carried out by the trained agents of several large insurance companies, loaned for the purpose, assisted by trained nurses. This survey disclosed 1·8 per cent. incapacitating illnesses, 6·2 per cent. for all forms of illness, and only 0·24 per cent. tuberculosis (a point which shall be discussed later); 81·1 per cent. of the individuals recorded ill were receiving medical attention.

3. A number of medical examination campaigns, not only of industrial workers, but 14,000 of the 17,000 people living in Framingham, were given a thorough medical examination; this revealed an active tuberculosis present, in 1 per cent. of the population, with a prevalence of illness and disability of all kinds of 77 per cent.

4. A study of infant and child life in Framingham was made by visiting every home, where a birth had taken place during the previous year, and recorded certain essential prenatal, obstetric, and postnatal facts. A tuberculin survey was made by an expert on 460 children, ranging from 1 to 7 years of age. This was done to throw light, if possible, on the sources of childhood infection, and to select those most needing special care. It was also done to determine the reaction percentages of different nationalities, neighbourhoods, &c., as well as to determine the reliability of the tuberculin test in young age-groups as an index of tuberculous disease. This study revealed 33 per cent. positive reactions, which differed significantly in different race stocks. Of special interest are the findings in Irish and Italian race stocks. While the Italian stock gave the highest percentage of positive reaction, very few cases of active tuberculosis were found among them either in adults or children. On the other hand, while the percentage of positive reactions among the Irish stock was low in Framingham, as elsewhere, the Irish stock contributes more than its share to the morbidity and mortality rates. Re-examination of these children at subsequent dates disclosed no cases of demonstrable tuberculosis.

5. A careful investigation was made of the influenza sequelæ, which revealed many interesting things, among which was the relative degree of protection, in the tuberculosis group, of which only 4 per cent. became afflicted with influenza, while 12 per cent. of the population at large was estimated to have had the disease. It is also interesting to note, in connexion with the incidence of influenza in race stocks, that while the tuberculosis incidence among the Irish was eight times that of the Italians, the Italians had an influenza incidence four times greater than the Irish.

6. A census was made of all individuals in Framingham, covering such environmental factors as hygiene, housing, economic status, &c.

7. A survey was made of tuberculosis infection among cattle supplying milk to Framingham.

"Community Diagnosis" and "Community Treatment."

As a result of the foregoing activities, a "community diagnosis" was made. This was followed by a "community treatment," the basic principle of which was to continuously encourage the community to meet its own health requirements and place the non-experimental phases of the demonstration on a permanent basis. The "community treatment" comprised a number of activities, the most valuable of which was an expert consultation service, offering consultations to local physicians, factory medical and nursing staffs on cases of suspected tuberculosis, or respiratory infections. This resulted in earlier diagnosis of tuberculosis, tripled reporting of tuberculosis, and tremendously increased the number of tuberculosis cases disclosed. It also encouraged the search for early tuberculosis and examination of contacts. This latter procedure resulted in the establishment of summer camps for pre-tuberculosis children as well as the establishment of domestic economy and good hygiene educations for families having tuberculosis or under-par children.

The community was thoroughly organised, not only for the control of tuberculosis, but for general health and disease prevention. This included general community sanitation, the promotion of infant welfare work, school health work, industrial health work, tuberculosis nursing, and a programme of education, which included lectures to mothers and to industrial groups and health cinema programmes. These activities popularised health knowledge in the community and improved municipal methods of disease prevention, especially tuberculosis. The tuberculosis clinic was reorganised. Tuberculosis cases were placed under supervision as rapidly as they were discovered. Those requiring institutional care were sent to suitable sanatoria or hospitals, others were cared for in the dispensary or at home. The local Board of Health, the School Committee, the Park Commission, the Framingham Hospital, the Civic League, and Red Cross were either developed or expanded and aided directly or indirectly along financial and other lines.

The Changes which have Taken Place.

The foregoing is thus a brief sketch of the demonstration's purpose, its organisation, and activities. The changes which have taken place in Framingham may be summarised as follows: The demonstration is now in its last year, but has been so successful and convincing that the community has taken over all prenatal infant and pre-school work, all the school health work, and general health administration of the community, including tuberculosis nursing, tuberculosis and venereal disease clinic work, and to a large extent the health production and disease preventive activities in the industrial age-group; and what is more significant,

next year every activity undertaken in the demonstration and every suggestion made will be taken over as a community activity.

When the demonstration began, Framingham had only just appointed a full-time health officer, who had under his supervision the following activities: Laboratory examinations, quarantine, care of tuberculosis cases, certain police duties, and a tuberculosis clinic. Within four years the Board of Health increased its budget 130 per cent. and established four infant clinics, one tuberculosis health station and clinic, with consultant on call at all times, one infantile paralysis clinic, one venereal clinic, a tuberculosis nurse visiting 100 patients, two infant and pre-school nurses visiting 450 babies, and three part-time infant welfare physicians.

Before the demonstration began there were 3039 children in Framingham schools with one part-time physician and one full-time nurse. Physical examinations were made only at request of the nurse. After five years of demonstration, at which time there was only a slight increase in the school population, the health organisation comprised one full-time physician, one nurse, one dental hygienist (who cleans mouths, holds tooth-brush drill, gives talks to classes, &c.), one dental clinic, and one director of physical education.

The Effect on Industrial Workers.

Naturally, the demonstration has evoked an intense interest in industry, as the highest death-rates are found in the industrial age-group. As a result of the demonstration, the devices for preventing accidents, and procedures for improving the health of the workers have steadily increased. There are approximately 5000 industrial workers in Framingham, nearly half of whom are employed in one industry. When the health demonstration began the health work of this industry consisted of one nurse, one rest room, one-room clinic, a physician on call, and a sick benefit association. After five years of demonstration activity, the health equipment of this same industry consisted of one full-time physician, a three-room clinic, one full-time dentist, a dental clinic, two nurses, one rest room, complete surgical throat and ophthalmological outfits, and a sick benefit association assuring three weeks in the hospital in any one year if necessary. The plant was also organised on advanced democratic profit-sharing and management-sharing basis, with considerable participation in control by employees of different grades through industrial partnership, industrial associates, and shop committee devices. Compulsory examination of new employees is now carried out by the plant physician, this procedure being at the request of the works committee. It must be pointed out that medical and nursing facilities in industry can only functionate fully when developed and operated in very close coöperation with employer and employee, and should be used for the purpose of fitting the men to a job rather than as a means for rigidly weeding the unfit from industry. A civic league was organised in 1917, and a year later opened its new building with a swimming pool and gymnasium open to

the public. General health and educational work has been carried on regularly, and health clubs and community garden clubs are in operation. The two hospitals in Framingham have training schools, and the student nurses assist in several important demonstration activities. One of these hospitals has a district nursing service.

The Park Commission has opened five playgrounds under the supervision of a physical director. General conditions in Framingham have undergone many constructive changes. The sewage system has been modernised, the milk-supply has been very much improved, the milk consumption has been doubled, and almost complete pasteurisation is in effect. Public spitting has been greatly reduced as a result of education and enforcement of city ordinances.

One of the most satisfying and significant results of the demonstration is the interest local physicians have taken in tuberculosis, and their efforts to find new and early cases. This has been largely due to the highly efficient consultation service in charge of Dr. P. C. Bartlett, who with scientific skill and exceptional tact and judgment, has made the service one of the most valuable features of the demonstration, and utilised by nearly all local physicians. The consultation service is not limited to tuberculosis work, but as far as possible it enters the field of general medicine. This service has attracted nation-wide attention, and is now in operation in Massachusetts, Illinois, New York, Oklahoma, Vermont, and Wisconsin.

The Results of the Investigations.

While the demonstration has been on a relatively small scale, it has revealed certain conditions, which one may say are representative of the average American community, and has brought out certain standards of community health work which can be advantageously applied to the country at large. Among the most important results of the investigative activities of the demonstration the following should be mentioned :—

1. In six years of demonstration, the general death-rate has been reduced 16 per cent., the infant mortality-rate has been reduced 50 per cent., the tuberculosis death-rate 53·6 per cent. (the rates being corrected for non-residents and certification errors). While a reduction in these rates may have taken place anyway, or other factors were responsible, attention is invited to the fact that the death-rates in the towns about Framingham which were selected as control towns have experienced only slight reductions in the tuberculosis death-rate.

2. The examination of a representative population indicates that about 1 per cent. is suffering from active tuberculosis and an additional 1 per cent. from the disease in an inactive form. This corresponds to about ten active cases for every annual death in an average community. Therefore, in a city of 100,000 people, there are probably 1000 cases of active tuberculosis. This is a percentage which has been substantiated by my own tuberculosis examinations of 174,000 American soldiers during the World War. Similar surveys in civil and military groups

have given approximately the same percentage. (Of the first million American soldiers examined for military service in the World War, 0·873 per cent. were rejected because of tuberculosis.)

3. These demonstration figures may well serve as a guide as to the percentage of tuberculosis which should be reported in a community. When the demonstration started at Framingham, there were only 27 known cases of tuberculosis under care. The average ratio of reported cases to deaths was 3 to 1. After intensive search several hundred cases of tuberculosis were found, and the ratio of reported cases to deaths was raised to approximately what it should be—namely, ten cases for every death. This means that a city with 100 deaths a year from tuberculosis, should have reported approximately 1000 cases of active tuberculosis annually.

4. The number of cases requiring hospital or sanatorium care has been found to be one or two for every annual death in the community. Consequently, a community should provide at least one, but preferably two, beds for every annual death. One may estimate that about 42 per cent. of the total active cases under observation during the year will require institutional care. This will include, of course, many short stays in sanatoria or hospitals for educational and hygienic purposes.

5. In the beginning of the demonstration, Framingham was equipped with a tuberculosis dispensary with a part-time nurse and medical attendant at the clinic. There was also an anti-tuberculosis society doing some educational work. This may be considered an average equipment for a city of 17,000 people. With this organisation as stated, the ratio of reported cases to annual deaths was three to one. It is evident, therefore, that the average community reports little more than half the cases of tuberculosis and probably most communities report only about one-third. Consequently, no effectual campaign can be waged against tuberculosis when only approximately one-third of the cases are under care, while two-thirds remain uncontrolled and potential sources of infection. This means that an efficient case-finding plan is necessary to bring the unknown half or two-thirds under supervision. In Framingham, a sickness survey carried out by insurance agents and nurses disclosed some new cases after the health survey had been made. However, when practically the same area was canvassed and the residents given a thorough medical examination, nine times as much tuberculosis was found. Therefore, it is felt that routine medical examinations are necessary. This can only be accomplished by means of an educational programme, which would have as its basis the evidence that in an average community about 90 per cent. of the population are infected with the tubercle bacillus, and of this 90 per cent. infected, probably 2 per cent. have tuberculosis in an active or arrested state, but 10 per cent. will eventually die of the disease. Accordingly, the education programme must teach how infection takes place, how children and others must be protected from massive infection by controlling open cases, improving general sanitation, and by the pasteurisation of milk-supplies. The educational

programme must also teach that many cases can recover by proper institutional care, and there must be instilled into the community the idea of annual thorough medical examinations, which may be done at the clinic or by the family physician with the help, if necessary, of the clinic, or consultation service, or by the factory or school physician, in the case of industrialists and children. It has been estimated that one factory or school physician is required for every 3000 individuals. An adequate nursing service must be provided also, of at least one nurse for every two or three thousand people, to do infant welfare, school, factory, and home nursing, and follow up arrested cases of tuberculosis.

6. The Consultation Service is, perhaps, the most important single measure developed in Framingham for the discovery of tuberculosis. In addition to the foregoing, adequate institutional equipment, community organisation, and legislation are necessary.

It will thus be seen that tuberculosis in Framingham is being brought under control, and if these same methods could be applied to the entire United States it would mean a saving of 80,000 lives a year or more than were lost by the United States in the World War. It would prevent untold suffering and poverty, and when one considers the economic value of a human life, it is clear that, measured in the terms of money alone, the programme would mean a saving of millions of dollars annually.

Fundamental to the success of such a demonstration is the sympathetic coöperation and support of the local medical profession as well as the community in general. There must be created a strong sentiment for health work. The demonstration should be thoroughly grounded in the life, public affairs, and institutions of the community. It should show what scientific medicine is and what health movements are, and it should not permit itself to be regarded as a strange something imported for the purpose of destructive criticism and exposure of official and non-official agencies. Much of the credit for the success of the Framingham demonstration is due to the highly efficient service of its executive officer, Dr. D. B. Armstrong. The willingness and desire on the part of Framingham to develop and support an adequate health programme is reflected by the increased expenditure for health from 40 cents, when the demonstration began, to 2 dollars and 35 cents per capita last year.

Aside from local manifestations of benefit from the demonstration, its influence has been national in scope. It has stimulated scores of American communities to adopt new methods for discovering and caring for tuberculosis, as well as for infant welfare work. It has brought about the splendid big Millbank demonstration which is applying the Framingham data to an entire county in the New York State (Cataraugus) to a city of 175,000 (Syracuse) and to a district in New York City, having a population of 216,000, and fairly typical of Greater New York City as to age grouping, race stocks, birth- and death-rates, economic, social, and industrial conditions.

While the Framingham demonstration was primarily on tuberculosis, it has been very broad in its character. It has contributed to better health administration, better recreational facilities, better industrial relations and conditions. It has, in short, not been merely a medical demonstration; it has been a health and social demonstration to promote general healthfulness of the population at large, to prevent disease, reduce mortality, increase productiveness, and promote happiness.

I know of no more fitting sentiment for my closing remarks than to repeat the words of Dr. Lawrason Brown in his presidential address before the 1922 meeting of the National Tuberculosis Association: "We are to-day our brothers' keepers. In health matters we can know, if we strive aright for our high aim, no east, no west, no north, no south. Those who are weak we must support until they can stand alone. Too many of us have only recently learned to walk. I hope the day will never come when in New York or in California, in Washington or in Florida, we shall lose that sense of national helpfulness that has always existed in tuberculosis work and restrict our altruism to the confines of the municipality and states in which we live," and, may I add, nor to the country in which we live.

May I, in conclusion, say that when one surveys the list of names comprising the medical and lay council of the Peoples League of Health, one is impressed with the extraordinary wealth of knowledge at the world's disposal, and it is delightful to contemplate what could be accomplished with this knowledge in way of disease prevention and health creation, and also how much it would contribute to the laying of a permanent physical foundation for future social, economic, and spiritual evolution, if the knowledge already in possession of the League's experts could be utilised in a demonstration of its many splendid activities.

It is hoped these great possibilities will be appreciated, and thus inspire an action similar to the generous financial assistance given by the Metropolitan Life Insurance Company to the National Tuberculosis Association, making the Framingham demonstration possible.

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