

Reprinted from the "Medical Digest"
Vol. 4, No. 12, March 1937.

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United States.**

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Progress in the prevention of tuberculosis in the United States.

BY

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I am not qualified to discuss the specific problems which India present in the fight against the spread of tuberculosis, but I am familiar with the measures which have been adopted in the United States from the inception of the movement to eradicate the disease to the present time.

My interest in tuberculosis dates back ten years before the establishment of the National Tuberculosis Association; and I have been a part of the crusade and watched the effect of each move with interest.

To say that no mistakes were made, that the movement was always directed wisely, that the most efficient program was always put forward, would be claiming more than can be established in the light of present knowledge; but that the best collective judgment was used, based on the knowledge and belief at the time, can not be gainsaid. Neither can the magnificent accomplishment of thirty-two years of organized effort be belittled. The mastery in so short a time of a disease which previously had always been considered hopeless and which, at that time, was the cause of every seventh death; a disease of which the medical profession in general had little knowledge, and in which it had comparatively little interest; and one of which the layman was totally ignorant, is a little short of marvelous.

If we examine the accomplishment more carefully, as it appears in naked figures, it shows that the death rate from tuberculosis has been reduced by more

than two-thirds since 1904, and that this saving in human lives is such that it has increased the mean average age of the people of the United States by two years.

Many factors have entered into this accomplishment. The disease has been attacked in its vulnerable spots as fast as they could be discovered. The sources of bacilli responsible for infection have been sought out and their menace lessened; while at the same time the general strength of the individual man has been increased by improving his economic and social status. Broadly speaking, the campaign has been one which has displaced ignorance, doubt and pessimism by knowledge, courage and optimism.

Between 1904 and 1928 the facilities for the treatment of tuberculosis multiplied many fold; the sanatoria from 115 to 618; sanatoria beds from 9,107 to 73,697; preventoria from 0 to 83; preventoria beds from 0 to 5,001; dispensaries from 19 to 3625; nurses doing tuberculosis work from 10 to 7,115; specialists from a few throughout the United States to many in every city, and some even in smaller communities; and antituberculosis societies in every state and every city. Is it any wonder that rapid progress has been made. Such an organized effort to carry on campaign of education in the principles of health had never before been possible, and such an opportunity may never present again. The result shows the power of knowledge when directed against a condition which thrives on ignorance.

If the statistics that I have before me are correct, India has even a greater problem than we had when we were at our worst, as far as prevalence of the disease is concerned; and a much greater one because of the social and economic condition of the people. On the other hand, she has the experience of every Western nation by which to profit. She can pursue her campaign with a confidence where ours was at first a largely hope. She can start with knowledge that other dreams such as she has, have already come true.

Importance of the Conception of the Difference Between Infection and Disease

Probably no other factor except the discovery of the tubercle bacillus, with its dispelling influence on the long held theory of the hereditary cause of the tuberculosis, did so much to direct the modern crusade in the right direction as the discovery of the cutaneous tuberculin reaction by von Pirquet.

This separated tuberculous infection from tuberculous disease. This showed definitely that infection may take place in early years, although the disease is more prevalent in the maturing and adult years. Later study has linked early infection closely with the disease in adult, and has taught us to watch for the beginning of the adult form of the disease at any period after the early infection has taken place. A knowledge of this relationship strengthened our belief in the importance of the immunity mechanism as a factor in resisting reinfection and in healing the disease when established.

There are three outstanding facts with reference to tuberculosis upon which our successful program is based:

1. The disease is communicable, and we know the communicating agent;
2. The disease is preventable, and we know much about the manner in which it may be prevented;
3. The disease is curable and we know how we are curing it.

The part of the general practitioner in our future program

The important thing now is to seek out the weak points in our method of attack and strengthen them. The knowledge of the leaders is probably sufficient today, to reduce tuberculosis to a disease of secondary importance. It is the province of the medical profession to find out why it is not done. The answer will be found not in the lack of knowledge but in the lack of the proper dissemination and application of knowledge.

We cannot accomplish our end in the near future unless we have a whole-hearted cooperation on the medical profession as a whole. It does not share the optimism of the specialists. General medical men do not have confidence in their ability to meet the tuberculosis problems. This must be corrected, for confidence precedes interest and is basic to an intelligent cooperation. There is nothing in the life history of the disease that any present-day graduate of a first class medical college can not understand. There are ample methods of examination at his command to assure him of being able to diagnose the disease in most of the patients who come to him seeking the cause of their illness; for patients rarely seek aid until the disease is well established. He can also direct the treatment if he prepares himself for the task; but if he feels unable to carry it out himself, he can refer the patient to some specialist; thus affording the tuberculous patient the same chance for regaining health that he affords those suffering from other forms of illness. He furthermore can instruct the patient and the family how to prevent the spread of infection among those who associate with the patient. He can give the tuberculin test and find out whether other members of the family are infected and then determine by the X-ray whether or not there is parenchymal disease. Thus family physician has an important service to render to his families which should bear much fruit in a few years by further reducing the incidence of infection, and the deaths from the disease.

This program can all be brought within the province of medical men generally and it must be if we are to make most progress. The first essential is for medical men to have an interest in tuberculosis. They must accept it as their duty and privilege to render the same service to patients suffering from tuberculosis as they do to those with heart disease and kidney disease, or those with metabolic disturbances or digestive ailments. In short they must make tuberculosis as important a part of their practice as any other disease. They

must then equip themselves with the knowledge necessary, and have confidence in their ability to render service.

How may the general practitioner Diagnose Tuberculosis

In diagnosis there are a few simple procedures which any graduate in medicine can carry out which will make him fairly accurate in his work. To be successful, however, he must bear in mind tuberculosis, with its many masquerading syndromes, and must be systematic in his approach. He must know when to suspect tuberculosis. This is determined by the patient's history, and is fairly definite if only sufficient pains are taken to elicit the patient's complaints.

Tuberculosis masquerades in many forms, some of which point to the lung; others away from it. The following are common clinical pictures that should be recognized as possibly being caused by tuberculosis: "nervous breakdown" due to a mild toxemia; "recurrent colds" each of which is usually caused by a reinoculation or an increased activity in some previous focus, or to early cavity formation; a "hemorrhage" in which a half teaspoonful or more of blood is raised; a "pleurisy," which may be dry with acute pain or may be accompanied by fluid; "protracted bronchitis," usually accompanied by cough with expectoration and sometimes slight elevation of temperature and loss of appetite and weight; recurrent "influenza" in which repeated attacks are complained of; symptoms on the part of the "cardiovascular system," of which shortness of breath, rapid heart action and palpitation are among the common complaints.

Such syndromes should make physicians think of tuberculosis. They should then proceed to analyze more carefully the symptoms. I would suggest that they consider the symptoms as belonging to three etiologic groups—those caused by toxins, those of reflex origin, and those caused locally by the tuberculous inflammation, as shown in the following table:

Etiologic Grouping of Symptoms of Pulmonary Tuberculosis

Group I Symptoms due to Toxemia	Group II Symptom due to Reflex Cause	Group III Symptoms due to the Tuberculous Process <i>Per. se</i>
Malaise	Hoarseness	* Frequent and protracted colds (tuberculous bronchitis)
Lack of endurance	Tickling in larynx	Spitting of blood
Loss of strength	Cough	Pleurisy (tuberculosis of
Nerve instability	Digestive disturbances	

* Strictly speaking "colds" should not be listed among the symptoms; for the "cold," as so often described, is a syndrome of acute spread of infection, a large reinoculation with tuberculo-protein; or caseation and cavitation.

Loss of appetite	which may result in	pleura)
Digestive disturbances (hypomotility and hy- posecretion)	loss of weight	Sputum with or without bacilli
Metabolic disturbances resulting in loss of weight	Circulatory disturbances	
Increased pulse rate	Chest and shoulder pains	
Night sweats	Flushing of face	
Elevation of temperature	Spasm of muscles of shoulder girdle and crus and central ten- don of diaphragm	
Anemia	Diminished motion of af- fected side. Lagging.	
Leucocytic changes	If chronic, degeneration of apical soft tissues	

It readily will be seen that the most important of these groups is the local. A hemorrhage of one-half to one teaspoonful of bright blood is nearly always of tuberculous origin; pleurisy whether dry or accompanied by effusion, except when accompanied by pneumonia, or trauma is usually due to tuberculosis; and sputum which persists may or may not be due to tuberculosis but should always be subjected to microscopic examination for the presence of bacilli.

Irritation in the larynx, cough and lagging of the side of reflex origin are of special importance. So is flushing of the face when it is present.

The toxic group has no specific significance. It is the same for any toxemia. Diphtheria, whooping-cough, measles, typhoid fever, syphilis, tuberculosis and other infections cause similar disturbance in the nervous and endocrine systems, only differing in degree. When taken in conjunction with reflex and local symptoms, however, symptoms of this group have a very definite value, and are particularly useful in indicating activity.

Analysis of the symptoms from which the patient complains, according to this grouping, will usually suggest the presence or absence of tuberculosis. Usually a combination of symptoms of the three groups will be found when the disease is in the active stage.

Two other informative procedures are at the command of the general practitioner which should be carried out whenever the clinical history is suggestive: (1) any sputum present should be carefully examined, and (2) an X-ray should be taken.

These three measures: a carefully taken clinical history; an examination of any sputum that may be present, and an X-ray, will give sufficient data upon which a diagnosis can be made in most instances of active tuberculosis.

These measures can be carried out by any man who has had the advantage of training in an up-to-date medical school.

I have omitted physical examination from the procedures that must be carried out by general men, not because it is unimportant; but because of the fact that so often the failure to find evidence of disease causes the physician to doubt, when the other procedures are definite. Every physician who suspects the presence of tuberculosis in a chest should examine it as carefully as he is able to do, but he must not be influenced too much by negative findings if he is unaccustomed to examine chests.

A diagnosis being made, what shall the practitioner do next? If he is conversant with the principles of therapy, he should apply the proper measures himself or call on some one else to do so. Delay at this time is often detrimental to the patient, and in certain cases may prove as costly to the patient as delay in acute appendicitis.

One thing that must be understood is that the look and feelings of the patient suffering from tuberculosis do not give an adequate idea of the condition within his lung, because tuberculosis is a chronic disease which passes through many stages of activity and quiescence, allowing the patient to regain his strength and weight between attacks; and quite often, yes, usually, has done so before the patient seeks medical aid. Even lung cavities may be present without the patient's knowledge.

When a diagnosis of active tuberculosis has been made, treatment should be applied immediately. The more acute the illness the more imperative this is. Two accomplishments become immediately imperative—one to prevent further spread of the disease or further destruction of tissue, the other to heal the lesion present.

One must always bear in mind that nature is the great healer. Her methods are the ones to understand and to imitate. Cure of disease is a physiologic process, and the higher the plane of physiologic activity maintained by the patient the greater his chances of cure. This is the basis of the hygienic, dietetic, open-air, rest, regime which has been so large a factor in putting the treatment of tuberculosis on a successful basis.

General men should know the manner in which these measures operate so that they may understand the necessity of carrying out the procedures even if they do seem to be simple and nonaggressive.

Rest is the basis of all therapy for two reasons: first, it reduces the tendency of the disease to spread from the foci already formed, or to cause further destruction of tissue; and second, it relieves the body of the unnecessary demands made by exercise. There is no other measure so clearly indicated in the presence of activity as rest. But rest must be supplemented by such measures as an adequate diet; a general hygienic environment such as may be supplied by simple, cleanly premises, and proper personal hygiene: open air, and an

optimistic, cooperative psychology. The quicker these measures are enforced, the better for the patient.

There is nothing magic in these measures. They will not change the harmful conditions which are present quickly. They will, however, relieve the cells of unnecessary burden by decreasing the absorption of focal contents, and they will put them in the best condition for physiologic response by which the disease is to be overcome. So these measures should be immediately applied when active tuberculosis is discovered, and they can be started by the general man even though he does not intend to assume the responsibility of treatment beyond that of referring the case to some specialist.

Various measures which assist the patient mechanically are now being used which can often be applied to the benefit of the patient, such as pneumothorax, operation on the phrenic nerve, and thoracoplasty. But these must be left to those with special training.

The point that I am attempting to make is that for the general physician to render the excellent service to the tuberculous patient of which he is capable by training, he must know the principles underlying treatment so that they will be applied at the right time and in such a manner as to produce the most favourable result.

In the presence of no other illness of a chronic nature is it so important that the proper treatment be applied as in tuberculosis; for tuberculosis is the most curable of all chronic diseases when treated adequately at the proper time. Here is a service that the general man can render with the knowledge that he will be putting his patient in the way of regaining health.
