

CHICAGO'S TUBERCULOSIS PROBLEM.

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IN 1908 the Chicago Department of Health made tuberculosis a reportable disease. In that year the number of deaths from tuberculosis was 3,915, while only 2,577 cases had been reported to the Department of Health. The number of cases reported increased from year to year in relation to the number of deaths, but it was felt, even with this showing, that the full number of cases was not being reported.

In addition to the maintenance of dispensaries as a method of reaching the tuberculosis patient, and with the idea of getting in touch with children in incipient and easily curable stages, in the spring of 1916 the Municipal Tuberculosis Sanitarium assigned to work in the public schools a force of one hundred doctors and nurses, who worked in conjunction with similar forces from the Department of Health in making physical examinations of pupils. During the school year, September, 1916, to July, 1917, 114,405 examinations were made, and 50,343 pupils were found to have physical defects. Of this number, 4,594 were referred to the Sanitarium dispensaries for further examination, for which examination 2,498 children appeared at dispensary. A diagnosis of tuberculosis was made in 1,407 of these cases, and this number was recommended for open air school treatment.

Having before me, then, such data as were obtainable from the Health Department records of tuberculosis cases reported by the private physician, the deaths recorded, the work carried by the dispensaries, and the results of the examination of school children, I was convinced that a plan different from those already followed must be adopted if we were to have any reliable statistics as to the prevalence of the disease or to make any appreciable dent in its ravages.

Consequently, on August 2, 1916, I introduced a resolution before the board of directors of the Municipal Tuberculosis Sanitarium for the purpose, first, of locating and referring to the dispensary those infected with tuberculosis in the area surveyed; second, to establish their social and financial status; third, to determine the sanitary conditions under which they live; fourth, to collect information in regard to the housing conditions in the area.

The eight square miles of Chicago's most congested districts were selected for this survey. This territory comprised, in the north section, that densely populated Italian district known as "Little Hell," as well as a number of lodging houses, stores, cheap hotels and manufacturing establishments; it embraced the heart of Chicago—the "Loop"—and the south

section took in the best business quarter of the city, which also is occupied by Chinese restaurants and stores, railroad freight depots, warehouses, and many large factories.

Dr. Clarence L. Wheaton and Dr. John Ritter of the Sanitarium staff, well known diagnosticians and clinicians in the field of tuberculosis, superintended the work, Doctor Wheaton in the north section and Doctor Ritter in the south. Under these men, eight physicians experienced in tuberculosis dispensary work were appointed. The actual field work was performed by fifty-five physicians under the personal direction of their supervisors.

All registered cases of tuberculosis in the district were given to the physicians for follow-up, and examination. These cases were known and designated as "old" cases, and comprised 4 per cent of the total tuberculosis cases found in the survey.

Having thus acquainted himself with a number of people in his district, the physician was instructed to begin his house-to-house canvass. He asked permission to examine each member of the family found at home at the time of the call, and, if there were any not at home he returned in the evening to examine them. Educational literature, printed in six languages, was distributed in all homes and places where examinations were made.

The method of procedure in making examinations was as follows: all male patients were stripped for chest examination. In the case of females, the clothing was partially removed and the stethoscope was always placed next the skin. If the findings then war-

ranted further examination of the chest, the clothing was removed and some light article of clothing substituted that permitted of easy exposure of limited areas during the process of the examination. It was not thought necessary or advisable to strip women to the waist.

In making diagnosis, efforts were made to secure sputum specimens, but open tuberculosis was recorded when the findings on physical examination indicated moderately advanced disease, and, in the third stage cases, cavity formation, regardless of whether specimen was obtained or not. In the incipient stage of the disease, the diagnosis of open tuberculosis was not recorded except upon demonstration of the germ. Where sputum could be obtained by the survey physician, patients were requested to take specimen to the nearest dispensary, whence it was sent to the laboratory for examination.

The symptom complex for glandular tuberculosis included, first and foremost, history of tuberculosis in parents or exposure to the disease; enlargement of supraclavicular glands, tracheo-bronchial adenopathy; enlarged tracheal glands; Eustace Smith's sign of bronchial adenopathy; tubular breathing at sides of sternum; harsh breathing posteriorly; bronchial breathing at interscapular space at one side. In a few disputed cases, X-ray and the tuberculin test were employed. Many cases of enlarged cervical glands were eliminated as non-tuberculous where there were findings of pediculi, enlarged tonsils, decayed teeth or other disqualifying symptoms.

Data with reference to duration of disease, possible source of infection, length of residence, nationality and housing conditions were secured; in fact, every effort was made to secure a comprehensive report on each case examined.

The field physician made a written daily report to the supervisor of all work accomplished. In order that there might be uniformity of methods of handling the work, daily and later weekly conferences were called of all field physicians and supervisors.

Each case report was required to bear the signature of the field physician who made the examination and to be countersigned by the field supervisor, before receiving the approval of the general supervisor. Every possible effort was made to secure accurate work and records.

Little difficulty was experienced in obtaining permission to make examinations.

Our physicians were interested and faithful, and did the best work possible. Perhaps 100 per cent efficiency was not attained in this survey—it may be open to some criticism—but it is no less infallible than the work of the medical profession generally.

After careful analysis, I have concluded that approximately 75 per cent of the cases of tuberculosis among those examined have been tabulated. The large number of new and unreported cases found fully justify the expenditure—\$42,076.

The population of the eight square miles of the survey district was estimated from the 1916 school census at 371,259. The total number of persons

examined was 165,700. Of this number, 14,282, or 8.6 plus per cent, were found to be tuberculous. The medical classification of these cases is as follows:

		Per cent
Pulmonary	5,876	41.1
Glandular	7,269	50.8
Pulmonary and glandular	815	5.7
All other forms	322	2.2

You will note the large number of glandular cases recorded, many of them among children.

An analysis of 6,610 cases classified as first, second or third stage cases shows that 4,407, or 61 plus per cent, were incipient; 2,240, or 33 plus per cent, moderately advanced, and 323, or 4.8 per cent, were far advanced.

The method of differentiation between "open" and "closed" cases has already been described. Due to the fact that it was possible to secure sputa in only a small percentage of the cases, and the further fact that a case may be an open one this week and a closed case next week, I do not feel that the 1,030 cases tabulated as open cases represent the true percentage of the total of 11,361 cases considered.

Neither the colored belt nor the Chinese district were included in the survey, therefore only 156 colored and 30 of other races are among the 14,282 cases found, making 14,096 contributed by the white race.

The following table shows the birthplace of the 14,282 cases:

Chicago	7,216
U. S., elsewhere	1,965
Italy	1,590
Poland	816
Russia	693
Austria	368
Germany	345
Scandinavia	238
Ireland	210

Great Britain.....	185
Hungary.....	174
Bohemia.....	102
Lithuania.....	12
Other Slavic.....	52
Other Germanic.....	29
Other Latin.....	183
Other foreign.....	95

The length of residence in Chicago of 14,025 is as follows:

Since birth.....	7,180
Less than 1 year.....	397
1 to 5 years.....	1,718
5 to 10 years.....	1,792
10 to 20 years.....	1,890
Over 20 years.....	1,048

There were 734 more females than males. This is accounted for by the fact that in a house-to-house survey, such as this was, more women than men were examined.

Records of the ages of those found tuberculous were compiled from statements of the parents or some member of the family; it is obvious that data could not be verified from birth records. Of the number found to be tuberculous 932 were under 3 years of age; 6,432 between 3 and 14; 1,165 were between 14 and 21 years of age, while the adult years of life, or what might properly be called the productive period, from 21 to 40 years, showed 3,747 cases. The period from 40 to 60 showed 1,675, and over 60, 300 cases.

The large number of children examined accounts for the fact that 9,787 persons were classified as unmarried; 3,888 were married, 526 widowed and 81 were divorced.

Statistics as to religious belief show 71.7 per cent Catholic; 18.1 per cent Protestant; 8.2 per cent Hebrew, the balance being without history.

Catholic.....	10,250
Protestant.....	2,588
Hebrew.....	1,181
Without history.....	263

Great difficulty was experienced in securing data as to occupation, the Italian being particularly loath to give the nature of his employment. Information obtained in 6,069 cases showed 443 persons engaged in some manner in the handling, packing or preparation of food products, 282 were cooks or waitresses, 305 were engaged in the manufacture of clothing, 34 were barbers, 26 cigarmakers; other indoor occupations contributed 4,108, and outdoor occupations 871. Occupation is unaccounted for in 8,213 instances, which number includes 7,395 children under 14 years of age, nearly all of whom are without occupation. This brings the actual number unaccounted for down to 818. The housewife was tabulated as employed, her working conditions being the sanitary condition of the home. Her hours of employment and wages were, of course, not obtainable.

The hours of employment were tabulated in 2,740 cases, and it was found that of this number 24 were employed from 1 to 4 hours; 21 from 4 to 6 hours; 97 from 6 to 8 hours; 1,508 from 8 to 10 hours; 967 from 10 to 12 hours, and 83 over 12 hours, the hours of the housewife, of course, not being considered.

In 2,689 cases investigated it was found that the wages per day averaged about as follows: 17 received 50 cents per day or under; 159 received between 50 cents and \$1; 559 received between \$1 and \$1.50; 539 between \$1.50 and \$2.00; 578 between \$2 and \$2.50; 808 between \$2.50 and \$5.00, and 19 over \$5.00 per day.

The working conditions in 1,591 cases

out of 5,710 instances investigated were considered good; 3,177 cases were found to be medium, and 942 cases bad.

The kind of dwelling place was noted in 13,607 instances, and it was found that 2,671 were domiciled in separate houses and 10,936 in tenements. The Chicago ordinance makes no distinction between a tenement house (which may be roughly stated to be a building in which two or more families live, keeping house separately) and an apartment house, but in an effort to differentiate between these two classes, which are recognized in some cities, the number given may be divided approximately as 3,463 in apartments and 7,473 in tenements. I may say that the classification in the latter instance was made as to condition of building, crowding, rate of rent, a tenement being a low grade apartment house.

Housing Conditions

Kind of dwelling	
House.....	2,671
Apartment.....	3,463
Tenement.....	7,473
Hotel.....	132
Jail.....	202
Front.....	7,515
Rear.....	5,063
Floor	
Basement.....	715
First.....	4,325
Second.....	5,678
Third.....	2,072
Fourth.....	401
Attic.....	78
Total.....	13,269
Number of rooms in the home	
One.....	661
Two.....	656
Three.....	1,872
Four.....	5,901
Five.....	1,942
Over Five.....	2,665
Total.....	13,697

Number of occupants in the home	
One.....	503
Two.....	713
Three.....	1,230
Four.....	2,250
Five.....	2,409
Six or over.....	6,690
Total.....	13,795

Rent per month	
Under \$5.00.....	237
\$5.00 to \$8.00.....	2,099
\$8.00 to \$12.00.....	5,585
\$12.00 to \$15.00.....	2,212
\$15.00 to \$18.00.....	1,231
\$18.00 to \$22.00.....	756
\$22.00 to \$25.00.....	237
Over \$25.00.....	409
Owner.....	751
No rent.....	90
Jail.....	202
Hotel.....	107
Total.....	13,916

Classification as to sanitary conditions was as follows:

	Good	Bad	Total
Plumbing.....	10,109	3,800	13,909
Ventilation.....	9,232	4,705	13,937
Cleanliness.....	8,202	4,711	12,913
Garbage disposal...	11,479	2,125	13,604

What does our survey show with reference to tuberculosis in these blocks? In the block bounded by Milton, Townsend, Chicago and Locust Streets, we found 90 cases of pulmonary and 133 cases of glandular tuberculosis. In the block bounded by Milton, Cambridge, Division and Elm Streets we found 68 cases of pulmonary and 123 cases of glandular tuberculosis. In the block bounded by Milton, Cambridge, Hobbie and Oak Streets, we found 20 cases of pulmonary and 26 cases of glandular tuberculosis.

The examination of the employes of some of the large business houses yielded interesting and sometimes startling information. In one candy factory where over 1,000 people were

employes, examination was made of 698. Of this number 100, or 14 per cent, were found to be tuberculous—this in a candy factory which distributes its product over almost the entire civilized world. The same general conditions were found to prevail in all the candy and confectionery factories included in the survey.

We examined 1,514 employes of the United States Government in the Chicago Post Office, and found 70, or 4.6 per cent, suffering with tuberculosis. We have learned that many of the employes evaded examination for fear of losing their positions if pronounced tuberculous.

The Chicago Telephone Company's employes showed 49 cases in 520 examined, or 9.4 per cent.

The employes of every restaurant and hotel, and this includes the very best hotels in our city, showed from 8 to 20 per cent suffering with easily detected tuberculosis.

The Cook County Jail was included in our survey. The jail building is an old one, poorly ventilated, and with no sunlight penetrating to 99 per cent of the cells, which are cement cubicles, with iron grating doors.

Out of 427 regular inmates and 317 transients examined, 102 of the regular inmates were diagnosed tuberculous, and 100 cases of tuberculosis were found among the transients. All told, 27.1 per cent of the population of the jail at the time the survey was made were found to be tuberculous.

In a study of the Michigan tuberculosis survey for the twelve months from October 1, 1915, to October 1, 1916, I note that it included an examination of

11,528 people, 2,914 of whom were diagnosed as positive tuberculosis, 2,231 as "suspicious cases" and 404 as arrested cases. In other words, of the number examined, 44.6 per cent were found either tuberculous, suspicious or arrested. But in comparing these findings with those of the Chicago survey it must be borne in mind that the Michigan survey was not a house-to-house survey, but largely a clinic, or travelling dispensary, which examined only those persons who felt sick and had some reason for going to the survey clinic, while the Chicago survey was made from house to house, in a territory where three dispensaries had been located for a period of approximately ten years.

This survey has shown us where to locate our dispensaries so as to be in close proximity to the known cases, and has shown the utter futility of the old dispensary clinics standing alone, and the necessity for reorganizing the field service on an all-time medical basis instead of a part-time basis as heretofore. It has caused the board to halt in a contemplated plan of expending \$600,000 for an additional hospital, and to rest upon our oars and consider whether it is wise to provide extra beds on the Sanitarium grounds for 1 per cent of our tuberculosis patients and leave little or nothing for the care of the 99 per cent left in the field.

The tuberculosis load is much more than heavy enough for our present budget, and when we consider the experience of France and England in the present war I feel that we should be ready for any emergency which may arise and have money in our exchequer

to care for the extra burden which is sure to be imposed because of our participation in the war.

The conclusions which may be drawn from our survey are many, and those arrived at depend, I feel, upon the viewpoint of the individual who makes the appraisal. If I were to ask the housing expert to solve the tuberculosis problem, he would doubtless say, "The house should carry the greater part of the blame." The union labor man would tell you, "The unfairness of capital is the cause." The employer would say, "Shiftlessness." The charity worker would say, "Poverty is the cause of it all."

In looking at the housing situation I think a distinction should be made between the house, as such, and the condition in which a good house may be put to an improper use. What has the house and the vacant air spaces in the district surveyed to do with the tuberculosis found therein? The figures show that in a number of instances too many people sleep in one room; that the windows are frequently kept closed, and that the rooms are dark in numerous instances on account of narrow areaways. In a large number of instances the house was all right in all the above respects, but the house *per se* was not to blame if six or eight people slept in one room, with the windows shut and the curtains tightly drawn.

Referring to previously noted figures, it will be seen that 51.5 per cent of the cases discovered were among children under fourteen years of age. The large number of Italian children found infected, and the fact that Italians live largely upon a carbohydrate diet,

and the small number of Jewish children discovered, although the survey included the Chicago Ghetto, compels me to conclude that the character of the food consumed is one important factor.

On the other hand, we must not forget that these Italians come from the warm climate of Italy, whereas a large number of the Jewish children and their forebears come from Russia, a cold climate, and just as the negro coming from the southern United States to the north becomes an easy prey to tuberculosis, just so does the Italian from sunny Italy.

A study of the amount paid for rent and the low wages received would convince many that lack of money was the root of the trouble.

It was noted that a history of measles or other contagious disease was present in a very large percentage of the children. Therefore many people will conclude that contagious diseases had prepared the soil for the infection of tuberculosis, and that infections were spread by close contact due to overcrowding. As I see it, the greater part of the tuberculosis in the district surveyed was caused by repeated infections due to close contact. This close contact was brought about largely by overcrowding in the rooms of the tenements, and by overpopulation in the district as well.

We cannot get away from the consumptive. Several millions of them are now living in the United States. The tubercle bacillus is everywhere, and we must conclude that the community free from almost universal infection is rare. Cobbett in his "Causes

of Tuberculosis," just off the press, intimates that perhaps it is well that all of us should become infected with tuberculosis in small, immunizing doses, as we are now being infected. Perhaps if we were to carry our propaganda too far—clean up too much, so that there is not frequent opportunity for us to get our immunizing dose—we would soon have a race as susceptible to tuberculosis as was the American Indian in his primeval forest. Therefore it is probably desirable that we should become immunized and gain a certain measure of protection from a small dose of tubercle bacilli well resisted. These early, latent infections no doubt bestow an immunity against the effects of larger doses which one may later unfortunately experience. Too much comfort must not be derived from this, however, for in young children any degree of infection may become generalized and rapidly fatal. It is obvious that to measure scientifically our dosages against individual resisting powers is the problem to be solved by the laboratory worker and the clinician. To neglect our sanitary precautions, all our known methods of fighting the spread of tuberculosis, on the theory that its prevalence means protection, would be folly.

I plead for a control of tuberculosis through the vaccination methods used in smallpox, diphtheria and typhoid fever; a vaccination which can be measured and administered scientifically, with nothing left to chance in the size of the dosage.

But, while we may differ as to the most important contributing factor in the spread of tuberculosis, we must all

agree that there is no question regarding the necessity of caring for discovered cases.

In my dual rôle as commissioner of health and member of the board of directors of the Sanitarium I have had access to much information which would not have been easily obtained had I occupied only one of these positions. In attempting to outline a plan for controlling tuberculosis, therefore, I had in mind the experience which Chicago had in 1894, when it had a terrific epidemic of smallpox, and I studied the measures adopted at that time. I had in mind the fact that tuberculosis is contagious by contact, much as measles, scarlet fever and diphtheria are. I had in mind the powers possessed by the Department of Health to regulate diphtheria, scarlet fever and other contagious diseases, as outlined in the Chicago ordinances. An opinion from the Corporation Counsel of the City of Chicago, rendered May 19, 1917, stated that the Commissioner of Health of Chicago is charged with the control of contagious diseases by such methods as may to him seem proper, and that his powers may be exercised in the control of tuberculosis as well as in cases of scarlet fever, smallpox or diphtheria.

But what are the proper methods of preventing this disease and caring for cases after they develop? What steps will be productive of most good?

We have tried education. We have had our tuberculosis exhibits, our city, state and national societies for the study and dissemination of information regarding this disease. We have no doubt that much has been accom-

plished by these means; but do we depend entirely upon an educational campaign for the control of scarlet fever or diphtheria? Certainly not. We find it necessary to provide hospital facilities for these diseases. We find it necessary to establish quarantine where cases remain in the home, and to lay down certain more or less stringent rules regarding the conditions to be maintained in the home.

In the control of tuberculosis, education has not sufficed, nor has the care of patients in well built and wonderfully equipped sanatoria served to make any appreciable dent in the figures showing the morbidity and mortality of tuberculosis.

But we cannot, with our newly awakened social consciousness, say to these unfortunate people, "We have told you you must do thus and so, or suffer the consequences. You have not listened to our gospel of fresh air and sunshine, good food and proper shelter, therefore you must have tuberculosis." Rather we feel that we must put forth greater effort, and, if the mountain will not come to Mahomet, then Mahomet must go to the mountain, and so I have come to the conclusion that we must go into these homes, and, by a judicious use of education and a "big stick" seek to mend the situation.

I have in mind a plan, practically the Heiser plan, which I feel might be productive of results if faithfully and consistently carried out; something along this line:

When a case of tuberculosis comes to the attention of the health authorities, a physician or a nurse should be sent to visit the patient. The patient

will be advised as to the danger to his family and friends if he continues to expectorate upon the floor; of the danger to himself if he continually refuses to sleep outdoors; of the danger of over-indulgence in alcoholic drinks in his condition, and any other instruction which may be necessary in the particular case. Sputum cups will be supplied where the patient is unable to furnish them, or any other necessities of this kind which are required.

If, upon subsequent visits the nurse finds that the patient has his paper cup in his pocket, and is using it; that there are no signs of expectoration elsewhere; that at least the head of his bed is outdoors; that he apparently is following the instructions laid down not only for the protection of himself and his family, but the people with whom he mingles in his daily life, then he is permitted to remain at home and every possible aid is given him to further his recovery there.

But if, on the other hand, the nurse or quarantine officer finds that hygienic rules are not being observed, the patient is warned that further infractions will result in his being put in an ambulance and transported to the Municipal Tuberculosis Sanitarium. As I have said above, under the powers possessed by the commissioner of health we have the same right to do this that we have to hospitalize a case of smallpox.

The patient when taken to the Sanitarium is put into a cottage with other patients who are there likewise for training and education.

I believe that if every individual suffering with what is known as open

consumption were apprehended and, if necessary, by force compelled to conduct himself in the sanitary manner which we compel the patients at the Sanitarium to adopt, the spread of tuberculosis would be greatly reduced.

Every consumptive who is trained to follow the rules of hygiene in caring for himself and in protecting his family and associates against his disease is one of the strongest educational elements we can place in a community.

So, when a patient at the Sanitarium has become thoroughly familiar from daily drilling, instruction and observation, with the proper way of conducting himself, he should be permitted to return to his home if he so desires.

A certain number of beds in the institution should be reserved for just the purpose of training patients to make them safe for the community.

If there are, as has been estimated, between 60,000 and 70,000 cases of tuberculosis in the city of Chicago needing sanitarium supervision and control, and but 750 patients can be accommodated at the institution under our old system, this means that but 1 per cent of the cases could be hospitalized, 99 per cent remaining in the field to disseminate infection to others. But if, under the plan proposed, a certain number of beds be reserved for "educational" purposes, and these filled by patients whose length of stay varies from one week to a month or more, a very large number of patients can be accommodated during the course of the year.

The adoption of such a plan as this would necessitate changes in the pres-

ent rules of the Sanitarium, and would mean the expenditure of much larger sums of money for field work, the supplying of necessities for home care of the patient where the family is unable to furnish them, and would lead to an immense broadening of the "out-patient" department of the Sanitarium.

But it would also mean that the influence of the Sanitarium methods would be more widely distributed, among a steadily increasing number of people. I believe that it would *pay*—immediately and ultimately,—as the most effective measure which might be adopted. It would mean a more careful patient, a more careful family; it would mean that any other case which might develop in the family would be given earlier medical attention; it would mean a gradual lessening of infection; it would mean, I believe, a gradual elimination of the spread of tuberculosis.

I have little sympathy with those who counsel that we must go slowly, that the public is not yet ready for radical measures in stamping out tuberculosis, that we must educate some more, that the private physician's patient must not be brought under the control of the health authorities, that neither the doctor nor the public is ready for such a step. I ask, when will they ever be more ready? After years of preparation it seems to me that we have reached the psychological time for this "clean-up." Ten million young men are just having an audit made of their physical machinery. Specialists in every line are at work on 10 per cent of our population. The government is discarding the

tuberculous as unfit, and every registration area in the United States has its quota of this class. In Chicago we are getting them and looking after them. Every other district in the United States should do the same.

What would you think of a farmer who, having a field dotted with Canada thistles, would go over it, rooting out every third, or fifth, or tenth plant, leaving the balance to reseed the field? Would we not know that his field would still be infected? Why is not the same fact true of tuberculosis? We have seen the weeding out of the tenth, twenty-fifth, or seventy-fifth case, leaving the remainder to continue to spread infection faster than it can be detected and controlled. Why is not this the time to discover, supervise, direct—by force, if necessary—the tuberculous in our midst? Let us have done with the twaddle that the community should not act against a tuberculous patient the same as it does against one with any other contagious disease! Let us tackle the entire problem; let us weed the entire field!

We have spent much time and money "educating the profession." Well, if this is a hopeless task and does not secure the desired results, why not expend our time, money and energy along a different line? Let us act with decision, do what is right, and the doctor will be educated in this manner more quickly than in any other.

I feel that the value of the requirement of a health certificate by all employers of labor is forcibly demonstrated by our survey. Should this become a general custom it ought to be of material assistance to the health authorities in their efforts to control the situation with reference to tuberculosis. The establishment of welfare departments in connection with every large business would then follow as a matter of course. Chicago has taken a step in the right direction for two years past in requiring children to present health certificates before entering school.

The great need of regular medical examination of *all* persons is too evident to require comment.

