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UNIVERSITY OF LOUISVILLE

TUBERCULOSIS IN LOUISVILLE AND JEFFERSON COUNTY

A Dissertation

Submitted to the Faculty

Of the Graduate School of the University of Louisville

In Partial Fulfillment of the

Requirements for the Degree

Of Master of Arts

Department of Political Science

By

Anna J. Haines

Year

1942

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and Jefferson County"

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TUBERCULOSIS IN LOUISVILLE AND JEFFERSON COUNTY

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I. Introduction

TUBERCULOSIS IN LOUISVILLE AND JEFFERSON COUNTY

I. Introduction

There is an easy complacency in Louisville about tuberculosis. Some years ago the city and Jefferson County jointly built a beautiful and spacious sanatorium at Waverley Hills. Visiting physicians praise its adequate equipment and staff. Hospital statistics prove that it supplies the city and county with more than the standard number of beds for tuberculous patients; its provision for Negro patients is unusually generous. These pleasing truths tend to dull anxiety over tuberculosis as a local menace. Other social and health problems may be admitted, but it is not generally considered that tuberculosis presents any difficulties.

To what extent is this satisfaction justified? Is tuberculosis no longer an important health problem? Do Louisville and Jefferson County compare favorably with other parts of the country in this respect? What is the financial cost of the disease to the community? Is expenditure of tax money and private contributions for tuberculosis control resulting in decreased incidence?

Since there are no generally available answers to these questions the following study of tuberculosis in Louisville and Jefferson County was undertaken. It is essentially a study of the social and economic factors connected with tuberculosis and makes no attempt to approach the medical aspects of the disease.

Tuberculosis was found to present very different problems when studied in detail than when seen as a whole. Particularly was this true in regard to its incidence among white and Negro peoples. Other

classifications showing variations were those involving sex, age, marital condition, geographic distribution, occupation, economic status and institutional residence. An inquiry into all of these factors, as they apply to the tuberculous, forms one section of this report. Other sections are devoted to the facilities for the care and prevention of tuberculosis in Louisville and Jefferson County, to the cost in terms of taxation and contributions by private agencies working in this field, and to the problem of tuberculosis among non-residents.

As the local tuberculosis statistics for any one year may show atypical variations and as trends are of especial value in health studies, it was decided to collect and analyze the statistics of a five year period. The most recent available local figures were those from 1934 to 1938 inclusive, but national figures desirable for comparison could be obtained in detailed breakdown only for the census years. Although some of the 1940 Census data were issued before the final draft of this study was finished, other required national data were not yet ready nor had any reports been published by national tuberculosis agencies based on the 1940 Census material. Therefore the basic data used in this study were the United States Census figures for 1930 and the local death certificates giving tuberculosis as the cause of demise during the five years 1934 to 1938.

All original death certificates for Louisville and Jefferson County are preserved in the vaults of the State Department of Health, but copies of those indicating tuberculosis as the cause of death are sent to the Louisville Tuberculosis Association. Local tuberculosis figures and

rates in the statistical tables of the report are based on these official copies made by employees of the State Health Department. References to other original sources are credited in the footnotes.

A survey of tuberculosis based on active cases as well as on deaths might seem to have more significance, especially in computing the cost of the disease to the community. It is, however, impossible to obtain data on all current cases; private physicians are unwilling to furnish information which concerns their patients; death certificates are the first public record of many cases, although officially tuberculosis is a reportable disease. Authorities in this field, however, believe that there is a direct relation between the number of tuberculosis deaths and the incidence of the disease in a community, and that the findings which¹ relate to the deceased are true for the entire number of cases involved.

1. Hiscock, Ira V., Community Health Organization, p. 99

II. General Extent of Tuberculosis in Louisville
and Jefferson County

II. General Extent of Tuberculosis in Louisville and Jefferson County

The 1930 U.S. Census gives the total population for Louisville and Jefferson County as 355,350, of whom 304,382 were white and 51,168 were Negro. Local rates throughout this report are based on these population figures.

During the period from January 1, 1934 through December 31, 1938 there were 1378 deaths from tuberculosis in Louisville and Jefferson County. Of these, 145 were deaths of persons whose residence was outside of the city and county. Since the original source of infection of this group is beyond local control and since the group presents other features peculiar to itself, the problems of the non-resident will be considered in a later section of the report. For the years included in the study it was impossible to obtain the number of deaths of residents of the city and county who died outside of that area.

The 1233 persons, therefore, who were residents of Louisville and Jefferson County and who died there from tuberculosis in the years 1934 to 1938 inclusive, are the primary subject of this study. The following table gives the number of deaths and the deathrates for each year, as well as the annual average for the entire period. Because only legal residents who died locally are being considered the rates are slightly lower than those found in the official reports. While the local rate fell during these five years from 78.2 to 66.7 per 100,000 population, the annual deathrate from tuberculosis in the entire state of Kentucky fell from 74.7 to 66.1, and in the United States as a whole from 56.1 to 48.6 per 100,000 population.

TABLE I

Tuberculosis Deaths and Deathrates, Louisville and Jefferson County
1934-1938

<u>Year</u>	<u>Number Deaths</u>	<u>Rate per 100,000 Pop.</u>
1934	279	78.2
1935	209	58.8
1936	233	65.5
1937	275	77.3
1938	237	66.7
Total	1233	-
Annual Average	247	69.3

From this uneven succession of figures no very definite trend can be established, although figures for the later years are never as high as for the first; in view of the fact that the population during the later years was certainly somewhat higher than during the early years, although the 1930 Census population was consistently used as a divisor in finding rates it is probable that there may have been a greater decline than is apparent.

When compared with other cities within its population class Louisville, exclusive of Jefferson County, shows a high tuberculosis death rate. Of the 237 deaths registered for both city and county in 1938 there were 218 reported to the New York Tuberculosis and Health Association from the city itself, giving a local city deathrate in that year of 71 per 100,000 population. In the same year the local resident tuberculosis death rates of the thirteen other cities in the United States with populations from 300,000 to 400,000 ranged from 20 to 99. Only two, Houston with 78

1

and Atlanta with 99, were higher than Louisville. It may be noted, however, that most of these cities were in the northern part of the United States where both climate and small proportion of Negro citizens contributed to a lower deathrate.

In the most recent (1939) edition of Community Health Organization, Dr. Hiscock states that

" It is customary to estimate that there should be five known cases (diagnosed as active tuberculosis) under supervision for each annual death, on the average. With the present size of family there are at least three contacts of each active case. It may therefore be figured that the tuberculosis problems of a community concern roughly 24 people for each annual death, i.e., the fatal case, (its) three contacts, five (other) active cases, and fifteen contacts of these cases." 2

On the basis of these figures Louisville and Jefferson County would have each year, in addition to 247 deaths from tuberculosis, 1235 active cases of the disease and 4446 persons who were contacts. These 5928 persons annually in need of medical examinations and supervision represent almost 2% of the combined population of the city and county. The medical, social and financial problems presented by such a group make no small demands on total community resources. In order to appreciate what these demands are it is necessary to ascertain the prevalence of the disease among various age groups, racial groups, geographic areas and social and economic strata. "Unless we appreciate the effect of age, sex,

1. New York Tuberculosis and Health Association, Tuberculosis Mortality In Forty-six Large Cities of the United States During the Year 1938, p.1

2. Hiscock, Ira V., op.cit., p.100

race and nationality, marital status, occupation and the other factors which influence vital phenomena, we may encounter the fallacy of concealed classification in our interpretation of vital facts. The most serious error comes in the interpretation of rates based on unlike age groupings.¹ Results of inquiry into these fields are presented in the following paragraphs.

1. Hall, M.F., Public Health Statistics, p. 81

III. Extent of Tuberculosis Among Special Groups and Areas

- A. According to Race
- B. According to Sex
- C. According to Sex and Race
- D. According to Age Groups
- E. According to Geographic Area
- F. According to Occupation
- G. According to Marital Status
- H. According to Place of Death
- I. Community Agencies and Tuberculosis

III. Extent of Tuberculosis Among Special Groups and Areas

A. Tuberculosis According to Race

Tuberculosis has long been accepted as an especially serious threat to Negroes, a fact substantiated by local figures. Although they make up only 14.3% of the local population, 37.5% of local deaths from tuberculosis were among Negroes, as is shown in the following table.

TABLE II

Deaths from Tuberculosis According to Race
Louisville and Jefferson County Residents, 1934-1938

	<u>White</u>	<u>Negro</u>	<u>Total</u>
Population	304,382	51,168	355,350
Percent of total population	85.7%	14.3%	-
Deaths	770	463	1233
Percent of total deaths	62.5%	37.5%	-

These proportions are not very different from those obtaining in the country as a whole where Negroes, who make up approximately 10% of the population supply 25% of the deaths from tuberculosis. ¹ Almost everywhere the Negro deathrate is from three to five times higher than the white rate. The local average annual deathrates were 40.6 for the white and 180.5 for the Negro population, or a ratio of 1 to 4.

These general figures, however, mask the more ^fsignificant and spotty spread of rates which is revealed in the breakdown by age and sex, as well as race.

1. Drolet, Godias J., Epidemiology of Tuberculosis, Journal of Preventive Medicine, March, 1930

B. Tuberculosis According to Sex

Of the 1233 total deaths there were 700 males and 533 females, or a ratio of 56 males to 43 females. In the general population of Louisville and Jefferson County there is a ratio of 49 males to 51 females. A comparison of these ratios indicates special hazards for men in connection with infection and death from tuberculosis. This deduction is corroborated by the local and national tuberculosis deathrates which are, for Louisville and Jefferson County 81.1 for males and 58.5 for females, and for the nation¹ as a whole in 1930, 77.0 for males and 58.2 for females.

It is a curious and unexplained fact that "The tuberculosis deathrate for males is higher than that for females in England and Wales, Australia, Austria, Belgium and Scotland, but in the Netherlands, Sweden, Switzerland and Japan it is usual for the female tuberculosis rate to be² higher than the male."

C. Tuberculosis According to Sex and Race

Breaking the figures down along racial as well as sex lines, it appears that these hazards are not equally distributed between white and Negro men. While there is the same ratio between men and women in both the white and colored races, i.e., 49 men to 51 women, there is a ratio

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1. National Tuberculosis Association, New and Supplementary Facts and Figures About Tuberculosis, p. 10
 2. National Tuberculosis Association, Facts and Figures About Tuberculosis, p. 10

among those dying from tuberculosis of 53 white males to 47 white females, compared to a ratio of 64 Negro males to 36 Negro females. The following table gives the figures on which these ratios are based.

TABLE III

Deaths From Tuberculosis by Sex
Louisville and Jefferson County Residents, 1934-38

	White			Negro			Total	Total
	Male	Female	Total	Male	Female	Total	Male	Female
Five Year Total	406	364	770	294	169	463	700	533
Annual Average	81	73	154	59	34	93	140	107

Although the general statement that locally more men than women die from tuberculosis is true for both races, the difference in favor of the Negro female is marked. This difference holds consistently for Negroes in each separate year of the study, while among whites there was one year when more females died than males. In one age group, however, the general statement does not hold; among young white adults from 15 to 24 years of age there are more than twice as many deaths of females as of males. Curiously this variation is not true for Louisville Negroes, although in other parts of the country the excess of female over male deaths at this age is outstanding in both races.

Many explanations have been made for the generally recognized fact of the greater susceptibility of young women to tuberculosis, but none has been fully accepted by the medical profession; nor has any theory been advanced as to the cause for the unusual freedom from tuberculosis enjoyed by the young Negro women of Louisville and Jefferson County.

In the following table the average annual deathrates from tuberculosis for Louisville and Jefferson County in the years 1934 to 1938, broken down by sex and race are compared with corresponding rates for the United States as a whole in the year 1930, the most recent year for which similar national data are available.

TABLE IV

National and Local Tuberculosis Deathrates per 100,000 Population

	<u>White</u>			<u>Negro</u>		
	Male	Female	Total	Male	Female	Total
Louisville and Jefferson County Annual Average 1934-1938	55.0	46.5	40.6	233.4	127.0	180.5
1						
United States 1930	64.9	52.3	57.9	199.3	190.2	183.6

According to these figures the local rates compare favorably with the national in all the items except the Negro male and the total male population. This last figure would seem to be determined entirely by the excessively high rate for Negro males since the local white male rate is lower than the national male rate. The unusually small number of deaths among Negro women brings the local general Negro rate close to the national Negro rate. Only a detailed breakdown of the statistics reveals the real nature of the problem confronting local public health workers, namely, the abnormally high number of deaths among local Negro men.

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1. National Tuberculosis Association, New and Supplementary Facts and Figures About Tuberculosis, p. 16 (The "Total" Negro rate seems incorrect, but is so given.)

D. Tuberculosis According to Age Groups

The factors of race and sex are so inextricably associated with the factor of age in connection with tuberculosis that they are considered jointly in the following paragraphs. In studying deaths from tuberculosis by age group there are two lines of inquiry which must be kept separate; first, within what age groups are there the most deaths? and second, within what age groups is the rate of death the highest, taking into consideration the total population for that age group?

The age groupings recommended by the American Public Health Association as practical for such studies are as follows:

Birth through four years	- the preschool group
Five through fourteen years	- school age group
Fifteen through twenty-four years	- young adult group
Twenty-five through forty-four years	- active work group
Forty-five through sixty-four years	- middle age group
Sixty-five years and over	- old age group
Age Unknown	- a small group

However, the number of local individuals dying in the age group from birth through four years and from five through fourteen years was so small that it seemed statistically more sound to combine these two into one "childhood age group", including all those under fifteen years of age. In computing rates the insignificant local "age unknown" group was omitted.

Table V presents the total number of resident deaths from tuberculosis in Louisville and Jefferson County in the five year period 1934-1938, according to age, sex and race.

TABLE V

Total Deaths from Tuberculosis by Age, Sex and Race, 1934-1938
Louisville and Jefferson County Residents

<u>Age Group</u>	<u>White</u>			<u>Negro</u>			<u>Grand</u>
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Total</u>
Birth through 14 years	26	21	47	8	12	20	67
15 through 24 years	22	51	73	45	46	91	164
25 through 44 years	165	145	310	121	78	199	509
45 through 64 years	134	95	229	106	21	127	356
65 years and over	57	50	107	9	7	16	123
Age Unknown	2	2	4	5	5	10	14
Total	406	364	770	294	169	463	1233

The figures in this table show that the largest number of local victims of tuberculosis are men and women within the twenty-five to forty-four year span, whether we consider the totals or the individual columns of white male and female or of Negro male and female. This fact is of particular importance because of the lost economic value of these men and women stricken down in the prime of life. Most old people and children are not self-supporting; their relatives or public funds must be responsible for their support. The difference in cost of their upkeep, sick or well, is in degree only. Tuberculosis, however, takes its highest toll from the ranks of those who are normally not only self-supporting, but who support others beside themselves. The cost to the community of their illness does not end with the care given to them individually.

Do Louisville and Jefferson County have a disproportionate number of tuberculosis deaths in the young adult and active working age group? A comparison between the percentage of deaths in the various age groups and the percentage of people in the total population in those age groups is shown in Table VI, for both ~~xx~~ local and national population.

TABLE VI

Distribution by Age Group of the Total Population (1930)
And of Tuberculosis Deaths (1934-1938)

United States and Louisville and Jefferson County

<u>Age Group</u>	<u>United States</u>		<u>Louisville & Jeff. Co.</u>	
	<u>% of Total Population</u>	<u>% of Tuberculosis Deaths</u>	<u>% of Total Population</u>	<u>% of Tuberculosis Deaths</u>
Birth through 14	29	5	25	5
15 " 24	18	16	17	14
25 " 44	30	40	33	42
45 " 64	18	28	19	29
65 years & over	5	11	6	10
Total	100%	100%	100%	100%

According to this table Louisville's proportion of deaths by age group shows very slight deviation from the proportions existing in the nation as a whole; where there are differences in proportion of deaths there are usually corresponding differences in proportion of total population.

The figures in Tables V and VI are based on actual number of deaths. Comparative death rates, however, are a more significant index of health conditions and a sounder guide for remedial action. The following table shows that in all the age groups the local tuberculosis death rates are higher than the corresponding national rates. Both locally and nationally the figures progressed consecutively from the lowest rate at the youngest age to the highest rate at the oldest age.

TABLE VII

Tuberculosis Death Rate per 100,000 Population; Annual Average 1934-1938

<u>Age Group</u>	<u>United States</u>	<u>Louisville & Jeff. Co.</u>
Birth through 14 years	9.8	15.0
15 " 24 "	49.3	53.0
25 " 44 "	76.2	88.0
45 " 64 "	89.1	104.6
65 years and over	107.4	123.3

Since most studies show that the Negro race has higher tuberculosis death rates than the white race and since the percentage of Negroes in the population of Louisville and Jefferson County is higher than in the country as a whole (the local ratio is 1 Negro to 6 white persons; the national ratio is 1 Negro to 9 white persons), it seemed possible that the local population make-up might account for the higher local death rates. The rates for each race therefore, have been computed separately in the attempt to discover where the most serious local problems might be.

TABLE VIII

White Tuberculosis Death Rate per 100,000 Population by Age and Sex
United States and Louisville and Jefferson County
Annual Average 1934-1938

<u>Age Group</u>	<u>Male</u>		<u>Female</u>	
	<u>U.S.</u>	<u>Local</u>	<u>U.S.</u>	<u>Local</u>
Birth through 14 years	7.1	13.1	7.2	10.8
15 " 24 "	25.0	17.6	39.9	35.9
25 " 44 "	65.4	70.2	52.5	58.5
45 " 64 "	111.3	95.7	48.1	63.8
65 years and over	122.2	144.2	88.0	101.3

TABLE IX

Negro Tuberculosis Death Rate per 100,000 Population by Age and Sex
United States and Louisville and Jefferson County
Annual Average 1934-1938

<u>Age Group</u>	<u>Male</u>		<u>Female</u>	
	<u>U.S.</u>	<u>Local</u>	<u>U.S.</u>	<u>Local</u>
Birth through 14 years	28.1	29.4	34.9	44.7
15 " 24 "	155.5	237.5	208.5	194.8
25 " 44 "	259.7	263.6	207.2	155.6
45 " 64 "	225.9	400.4	134.2	84.4
65 years and over	184.1	178.7	109.2	119.9

As these tables show, the local rates for both male and female children under fifteen years of age are higher than the national rates; the

two rates approach most closely in the case of Negro male children.

In the age group 15 through 24 years Louisville and Jefferson County have a slightly better rate than the country as a whole, except in the case of the Negro males.

In the age group 25 through 44 years the local rates are slightly worse than the national, except in the case of Negro females who have a distinctly favorable rate.

In the age group 45 through 64 years the white men and the Negro women have lower rates locally than nationally; the local white women have somewhat higher rates than the national rate for white women of this age; but an outstanding divergence is shown in the case of the Negro male, who has a death rate of 400.4 per 100,000 population as compared with the corresponding national rate of 225.9.

In the age group 65 years and over the local rate is slightly higher in every case except the Negro male, where it is slightly lower.

In summary, the local Negro male shows almost consistently higher death rates than does the Negro male nationally; the local Negro female shows a markedly lower than national death rate except in the case of little girls and old women where the differences, although adverse to the local group, are not wide; the local white rates follow the national white rates fairly closely, being sometimes better and sometimes worse.

It would seem that both races contribute to placing the local tuberculosis death rates above the national rates, but that the Negro male presents the most serious problems, with the Negro female showing a surprisingly favorable status.

In general the local female rates are considerably lower than the local male rates. The only groups showing the reverse ratio are the white females between 15 and 24 years of age who have a death rate twice as high as white males of similar age, and Negro female children under 15 years old who have a much higher death rate than Negro male children.

The major deduction from the foregoing evidence is that the Negro male from 15 to 65 years and to a lesser extent the young Negro female are the local groups most needing intensive health effort.

E. Tuberculosis According to Geographic Area

Poor environmental sanitation has long been considered one of the predisposing factors in tuberculosis. Dark and damp dwellings make good breeding places for bacteria of all kinds and when they are overcrowded with human beings communicable disease has excellent opportunities to spread.

Of the total 1233 persons dying from tuberculosis in Louisville and Jefferson County during the period studied there were 155 who lived in the county outside of Louisville. The housing conditions where these deaths occurred are not known; within the city, however, it is possible to know whether the homes of these tuberculous patients were in areas of good, fair or poor housing condition.

Louisville has been divided by the United States Census Bureau into eighty-nine small geographic units known as census tracts. Unfortunately, since the 1930 Census was not taken by census tracts it is not possible to compute, by means of comparative densities of population, the comparative tuberculosis death rates of the different tracts. However, the map on page 19 shows the number of deaths occurring in each tract from 1934 to 1938.

There were three tracts, #12, #14 and #86 which furnished no deaths from tuberculosis throughout the five year period. These tracts are very thinly populated with much park and other open space.

The number of tuberculosis deaths is consistently lowest in the outer areas of the city. The majority of the tracts which make up Crescent Hill, the Highlands, South Louisville and the West End had from one to nine deaths, or an average of two deaths a year. As one travels in toward the center of the city the number of deaths increases, with an annual average

LOUISVILLE

Census Tract Map

of four. In the heart of the city is census tract #30, bounded by Jefferson Street and Broadway from Tenth to Fourteenth Streets, with the highest number of deaths -69- in the five year period. At the time of the study it was a densely populated Negro tenement district. It provided the highest number of Negro deaths -67- and the highest number of children's deaths -6- of any tract in the city.

The census tracts having the next highest number of deaths were the adjacent #31 with 45 deaths, and the nearby #49 and #59, each with 40 deaths. The area included in these four census tracts had an average of 9 white and 30 Negro deaths from tuberculosis each year.

The role played by the Negro in increasing the total death rate is clearly shown by the fact that the highest number of white deaths -26- did not occur in any of these four tracts, but in #55 in Highland Park. This tract also furnished the highest number -5- of white children's deaths. It is largely inhabited by families who have recently moved into Louisville from rural areas where there have been few facilities for tuberculosis control.

In 1938 the Municipal Housing Commission surveyed the condition of all dwelling units in Louisville, later classifying them as in "good condition", "needing minor repair", "needing major repair", and "unfit for human habitation". There were only three out of the total eighty-nine tracts in the city which were found to contain more than two hundred houses "unfit for human habitation". These three tracts were #30, #31 and #59, the same three tracts which also had the highest number of tuberculosis deaths. Among the group of tracts having between one and two hundred houses "unfit for human

habitation" was #49, the fourth highest tract when measured by tuberculosis deaths. Tracts #31 and #49 contained more houses in the category "unfit for human habitation" than in any other category.

Other housing data were collected about the ten tracts having the highest number of deaths from tuberculosis. These were tracts # 24, 25, 30, 31, 49, 50, 55, 58, 59 and 62. Seven of these ten contained more than 100 dwelling units classified as "unfit for human habitation". It would have been interesting to know to what extent the tuberculous patients dwelt in the worst houses of the tracts, but this information was impossible to find.

Six of these ten tracts were in the group having the greatest number of dwelling units with three or more persons per room. Two persons per room is supposed to represent the highest occupancy compatible with minimum adequate housing standards.

In the amount of indoor plumbing the houses in these congested, infected areas ranked fairly well. Most of the houses were tenements converted from former large one-family homes and they contained indoor toilets and running water more frequently than the scattered small cottages in the census tracts nearer the outer city boundaries. The individual use of these toilets and sinks by one family was, however, very rare.

The following ten tracts had the fewest number of deaths from tuberculosis: # 1, 12, 14, 45, 54, 70, 84, 85, 86 and 87. Eight of these tracts contained no dwellings "unfit for human habitation". None of them had dwelling units where the occupancy was as high as three or more persons per room. Four of these tracts, lying on the outskirts of the city, fell in the group with the least proportion of dwellings with indoor plumbing.

It is evident, therefore, that in Louisville there is a positive relation between areas of good housing and low tuberculosis deaths, and a complete correlation between the areas of worst housing and highest number of tuberculosis deaths.

The correlation between low rent and increased amount of tuberculosis is not so evident. A most frequent rental of less than \$10 per month was found in four of the ten tracts with few tuberculosis deaths, and in five of the ten tracts with the highest number of deaths from tuberculosis. A most frequent rent of from \$10 to \$20 was found in one tract with few deaths and in three tracts with many deaths. A most frequent rent of over \$30 per month was found in four of the tracts with few deaths and in one tract with many deaths. Those census tracts having low rentals and also low number of deaths from tuberculosis - #13, 14 and 54 - represented sparsely populated peripheral areas where comparatively few people live in small scattered houses.

In three of the four worst tracts the prevalent rents were very low. In # 30, 31 and 59 the most usual rent was less than \$10 per month per housing unit. In #49 most of the units paid from \$30 to \$50 per month, but there were numerous very low rentals in alley dwellings. In general it might be said that these rundown areas, heavily infected with tuberculosis are not areas of high income value to their owners or to the city. These considerations played a part in the decision of the Municipal Housing Commission to locate their slum clearance projects in such areas. More than one-third of tract #59 is now included in the Clarkdale Housing Project for white families, while fully one-third of tract #30 and about one-eighth

of tract #31 will soon be occupied by similar model homes for Negroes.

In Louisville low rentals are found in two widely different types of houses. The same rent may be paid for a small three-room cottage with large surrounding yard and individual, but outside, toilet and water facilities, as for a two-room furnished apartment in a crowded, dark tenement where several, possibly transient families use a common hallway, toilet and sink. It is thought that this fact accounts for the lack of correlation between frequency of tuberculosis deaths and low rentals, since the conditions first described, although obtainable for low rent, do not constitute really bad housing.

F. Tuberculosis According to Occupation

Occupation is popularly considered an important factor in the incidence of tuberculosis. The long-continued breathing of air overladen with soot or sharp-edged dust has a distinctly injurious effect in the lungs. Where detailed studies of the past occupation of tuberculous patients have been made, direct correlation has been found between the disease and occupations involving these and some other employment hazards.¹

It is difficult, however, from the occupational information furnished on a death certificate to determine the actual conditions of the occupation as encountered by the patient. The report that the deceased was a "foreman" or a "salesman" does not reveal much about the physical conditions surrounding his work, nor does the term "railroad employee" indicate

1. National Tuberculosis Association, Facts and Figures About Tuberculosis, p. 18

whether the man had an indoor mechanic's job or was watchman at a crossing. Confusion also results from the shift in occupation frequently made by tuberculous patients from the hazardous employment which may have accelerated the disease to an easy type of work which the patient may have felt himself able to perform, but under which he may have finally succumbed. All of these factors, and others which appear later, make it impossible to draw reliable conclusions from any study of the occupation as stated on the death certificates of persons who have died from tuberculosis. Certain figures can be presented indicating in what general occupational groups the greatest number of deaths occur.

Of the 1233 persons dying from tuberculosis in Louisville and Jefferson County in the years 1934-1938 there were 1166 over fifteen years of age and presumably able to have worked at some time prior to their deaths. On 375 certificates, representing practically one-third of these persons, there was no report regarding occupation. It is not known whether the deceased had never worked or whether there was negligence in filling out the death certificate.

The highest number of those whose occupation was recorded were housewives, of whom there were 217 or 19% of the total number of deaths of persons over fifteen years of age. Not much significance, however, can be attached to this finding since all married and unmarried women not employed outside of their own homes were probably listed as housewives.

Among the other definitely stated occupations, unskilled labor had the highest number of deaths, 155 or 13% of the total. When rates for the races were separately computed it was seen that 25% of Negro deaths

TABLE XI

Occupation of Those Over 15 Years Dying from Tuberculosis
Louisville and Jefferson County, 1934-1938

Occupation	White			Negro			Total		Grand Total	% of Total
	Male	Female	Total	Male	Female	Total	Male	Female		
Business Owner	12	1	13	0	0	0	12	1	13	1.1
Clerical Work	28	19	47	0	0	0	28	19	47	4.1
Domestic Service	1	9	10	13	17	30	14	26	40	3.4
Factory Work	8	5	13	0	2	2	8	7	15	1.3
Farmer	28	0	28	3	0	3	31	0	31	2.7
Housewife	0	180	180	0	37	37	0	217	217	18.6
Personal Service	21	5	26	48	3	51	69	8	77	6.6
Professions	15	11	26	1	1	2	16	12	28	2.4
Salesmen	27	0	27	1	0	1	28	0	28	2.4
Skilled Trades	87	3	90	14	0	14	101	3	104	8.9
Unskilled Labor	45	0	45	110	0	110	155	0	155	13.3
Miscellaneous	33	1	34	2	0	2	35	1	36	3.1
No Report	75	109	184	94	97	191	169	206	375	32.1
Total	380	343	723	286	157	443	666	500	1166	100.0

were listed as unskilled laborers, compared with 6% of the white group. This fact calls attention to the accompanying factors of low income and poor housing conditions which make the unskilled laborer an easy target for disease.

Next in rank came the skilled trades, then those engaged in personal service including janitors, porters, waiters, bartenders and chauffeurs. Clerical workers were sixth in percentage and persons engaged in domestic household services were seventh. The exact number of people engaged in the different occupations is shown in Table XI on page 25.

Unfortunately it is not possible to compare this local ranking with the rank of the respective occupations in the total population. The U.S. Census reports the industry in which a man is employed rather than the actual type of work that he does. For example, the "Chemical Industry" might include common laborers, clerical workers and professional men, each of them exposed to varying hazards. If the medical specialists should become convinced of the importance of occupation as a predisposing factor in the incidence of tuberculosis, it would be well for health authorities to insist on a more accurate recording of occupations and industry in which the deceased had been engaged. Such findings as are reported in the preceding paragraphs merely corroborate the popular impression that those in the lower economic brackets are the most frequent victims of tuberculosis.

G. Marital Status of Persons Dying from Tuberculosis

The marital status of tuberculous patients has significance in two directions. First, from the communicable disease angle; a person who is married and may have children has greater opportunity to spread the dis-

TABLE XII

27.

Marital Status of Persons ~~Over~~ 15 Years Old^{*} Dying From Tuberculosis
Louisville and Jefferson County, 1934-1938

<u>Race & Sex</u>	<u>Single</u>	<u>Married</u>	<u>Widowed</u>	<u>Divorced</u>	<u>No Report</u>	<u>Total</u>
White Male	121	196	37	19	7	380
White Female	93	166	59	21	4	343
Negro Male	122	117	23	18	6	286
Negro Female	62	60	25	9	1	157
Total	398	539	144	67	18	1166

TABLE XIII

Marital Status of Total Population
And of Persons Dying From Tuberculosis, by Percentage
Louisville and Jefferson County Residents ~~Over~~ 15 Years of Age ^{& Older}

<u>Race And Sex</u>	<u>Single</u>		<u>Married</u>		<u>Widowed</u>		<u>Divorced</u>		<u>No Report</u>	
	% in total population, 1930	% among tuberculosis deaths 1934-1938	% in total population, 1930	% among tuberculosis deaths 1934-1938	% in total population, 1930	% among tuberculosis deaths 1934-1938	% in total population, 1930	% among tuberculosis deaths 1934-1938	% in total population, 1930	% among tuberculosis deaths 1934-1938
White Male	31.6	31.8	62.1	51.6	4.7	9.8	1.5	5.0	0.1	1.8
White Female	28.2	27.1	57.2	48.4	12.7	17.3	1.8	6.1	0.1	1.1
Negro Male	29.3	42.6	57.8	40.9	9.8	8.1	2.8	6.3	0.3	2.1
Negro Female	20.4	39.6	54.4	38.2	21.9	15.8	3.1	5.7	0.2	0.7
Total	29.1	34.1	59.1	46.2	9.9	12.4	1.8	5.8	0.1	1.5

TABLE XIV

Death Rates per 100,000 Pop. of Tuberculous, By Marital Status
Louisville and Jefferson County, 1934-1938

<u>Race And Sex</u>	<u>Single</u>	<u>Married</u>	<u>Widowed</u>	<u>Divorced</u>
White Male	71	58	144	234
White Female	56	49	75	199
Negro Male	423	210	249	707
Negro Female	290	105	109	281
Total	103	67	108	275

ease because of the close contact of family life. Second, from the point of view of economics; a married tuberculous patient is apt to have dependants for whom relatives or the community must provide if the breadwinner or housekeeper is incapacitated.

It is therefore interesting to note that among the 1160 persons over fifteen years of age who died from tuberculosis in Louisville and Jefferson County from 1934 to 1938 there were 539 persons, or over 46% of the total who were married. This is a lower percentage than obtains among the general population. The 1930 Census showed that 59% of the total population of marriageable age in Louisville and Jefferson County were married. Among the white tuberculous patients a higher proportion were married than among the Negroes, the figures being 49% of the whites and 40% of the Negroes, as compared with 60% married among the total adult white population and 56% married among the total adult Negro population. It is not known whether the fact of having tuberculosis acted as a deterrent to marriage in a sufficient number of cases to cause this reduction. However, since the greatest number of tuberculosis cases was found in the most overcrowded areas of the city, the fact that fewer than average of these cases were married has probably meant that they have caused fewer new infections than would have occurred if there had been the average proportion of marriages among them. We do not know how many children were involved in such marriages as did exist.

In addition to the 539 who were married at the time of their death, there were 211 persons who were widowed or divorced. These also may have had families living with them while their disease was in an

active stage. The percentage of those widowed was approximately equal for both the white and Negro races. In each race, however, a higher number of women than of men had lost their spouse, only 9% of the men having been widowers whereas 17% of the women were widows. This same difference is seen in the general population, where 6% of the men were widowers and 14% of the women were widows; one explanation may be the fact that more women than men live on into the upper age groups. This fact was shown to be true for tuberculous patients by the figures in Table V.

On a small number of the death certificates there was no record of marital status, but 398 or 34% of the total over fifteen years of age were registered as single. This is a higher proportion of unmarried persons than obtains in the general population as found by the 1930 Census, which gave 29% as the proportion of the local unmarried. A considerably larger percentage of Negro than of white tuberculous patients was single. Only 30% of the whites were unmarried, which was the exact percentage of single persons in the total population. Among the Negroes 42% were single as compared with 25% single in the total Negro population.

The data on which these statements are based are shown in Table XII and Table XIII on page 27.

A comparison of the average annual tuberculosis death rates for those of different marital status, presented in Table XIV, shows that the married group has the lowest death rates, both for white and Negro and for male and female. Married white females have the lowest rate for any group, while the married Negro females have the lowest rate for any group of their race. Much the highest rate of all was for the divorced

and the single Negro male, indicating the probability that the most neglected individual in the community, from the point of view of health, is the drifting, adult male Negro. The difference in the tuberculosis death rates of the two races is most apparent in the rates for single men, the rate for single Negroes being six times that for single white men. In general rates for the divorced were the highest of any group, but there were comparatively few persons involved in that group.

H. Tuberculosis According to Place of Death

The preceding sections of this report have presented data on the group of those dying from tuberculosis in Louisville and Jefferson County, indicating that this disease affects those in the lowest income levels more frequently than those who are self-supporting or affluent. The material in the next two sections gives more definite information as to the number of those persons who were a direct charge on the city, the county or the state for their complete or partial maintenance either in institutions or by relief agencies.

The first item to be considered will be the place of death as registered on the death certificates. Of the 1233 deaths in Louisville and Jefferson County from tuberculosis there were 848 or 69% who died in hospitals and 385 or 31% who died at home.

A relatively small number of tuberculous patients died in private hospitals - 7% of the total white deaths and 2% of the total Negro deaths. There are two major reasons for this fact; tuberculous patients are ill for a long time before death and few families can meet the corres-

pondingly high cost of private hospital care; in the second place private hospitals are reluctant to admit known cases of tuberculosis because of the infectious nature of the disease.

The only free tuberculosis sanatorium in the community, available to local patients, is Waverley Hills, where 502 or 41% of the total deaths occurred. Throughout the United States in 1933 only 22% of tuberculosis deaths occurred in sanatoria.¹ Some communities, however, send early rather than terminal cases to their tax-supported institutions, cases which after some weeks of residence can be discharged to the community as practically cured. Such communities might have a smaller proportion of deaths in their sanatoria yet an equally good tuberculosis control record.

Although Waverley Hills is the local specialized hospital for tuberculosis there were also 204 deaths from that disease at City Hospital. Some of these had been persons on the waiting list for the sanatorium, others were patients brought to City Hospital with some other acute condition, who were found to be tuberculous after admission.

Another large group of tuberculous patients was found at Lakeland, the Central State Hospital for the Insane. There were 82 deaths of Louisville and Jefferson County residents at Lakeland, or approximately 16 deaths a year, although the average number of local patients there at any one time is only 120 and the turnover is slow. One of the deaths from tuberculosis there was that of an attendant who had been giving constant daily care to the mental patients.

1. Journal of the American Medical Association, Dec. 7, 1935. p.1855

All three of these institutions, City Hospital, Waverley Hills, and Lakeland are tax-supported and together they cared for 788 persons or 64% of those who died from tuberculosis in the five year period. Separating the percentages by race we find that 79% of the Negro deaths and 55% of the white deaths occurred in these three institutions. The number of deaths at Waverley Hills and City Hospital holds fairly constant for each of the five years; at Lakeland, however, there was an increase with succeeding years, especially among female Negroes.

Institutions do not measure all of a community's responsibility for tuberculous families. There are other public and private social and health agencies which give relief and service to such families.

I. Community Agencies Serving the Tuberculous

The Social Service Exchange is an information bureau with which many social and health agencies register some or all of the families coming under their care, in order to be able to exchange information about the families and to know what other agencies are helping them. The agencies using the Exchange fall into three groups: those giving relief; those providing a health service; and certain other social agencies providing recreational and character-building opportunities or corrective care for their clients.

All of the names of persons dying from tuberculosis during the five year period 1934-1938 were checked through the master index at the Exchange to find out if their families were known to any of the agencies using the Exchange. Although the Exchange is being used to an increasing

extent some agencies do not register all of the families known to them. The following findings, therefore, must be taken as a conservative estimate of the contacts of the families of the tuberculous with the relief, health and other social agencies of the city and county.

Of the 1233 tuberculous persons involved, the families of 379, or 31% of the total, were found to have been known to relief agencies, including the Municipal Bureau of Social Service, the Jefferson County Department of Welfare, the Aid to Dependant Children, the Family Service Organization, the Jewish Welfare Federation, the St. Vincent de Paul Society, the Salvation Army and a few others. The proportion known to these agencies closely approximates the "one-third of a nation" often estimated to belong to the underprivileged group. The number of families known to relief agencies increased with succeeding years, having been 24% of the total in 1934 and 34% in 1938. A higher proportion of Negroes than of white persons was known to these agencies, 38% of the former and 26% of the latter. Each race, however, showed a progressive increase in registration for dependancy. It would be interesting to know whether the increase in dependancy among the general public during this period was as great as the increase among the tuberculous, or whether the latter were peculiarly unable to continue successful competition for self-support under the difficult conditions of these depression years.

Although the census tract with the highest number of deaths from tuberculosis also had the highest number of those families on relief, it did not have the highest percentage of its tuberculous families on relief. Tracts #45 and #87 had 100% of the families in which there had been

deaths from tuberculosis on relief, but as they each had only one death the actual number of families was small and probably insignificant. In the following census tracts, scattered widely throughout the city, 50% or more of the families having deaths from tuberculosis were known to relief agencies: # 4, 18, 20, 22, 29, 33, 35, 36, 39, 48, 70, 72 and 74. Of these #22 had the highest proportion on relief, 13 out of a total of 19 families.

Inquiry into the marital status of the tuberculous patients known to relief agencies reveals that except for the Negro male the unmarried person was less likely to be known to relief agencies than any other group. Among the Negroes there was a smaller percentage of widowed and divorced men on relief than of single men. There was a higher percentage of tuberculous white widowers known to relief agencies than any other white male group, although the white married men had almost as high a proportion. The married white female and the married Negro of both sexes were known to relief agencies more frequently than the single, widowed or divorced of their respective groups. These facts confirm and reemphasize the earlier findings that tuberculosis deals its heaviest blows at persons in the early and middle years of life when responsibility for the support of others is heaviest.

Unfortunately it is not possible to learn just how much in dollars and cents was spent on the families known to relief agencies. Some of them were totally dependent, others were visited by the relief worker in order that a member of the family might be certified for WPA, others may have been known to the agency but not considered in need of relief.

Even among those accepted for relief there would be considerable variation in the grants received, depending on what assets the family itself possessed and which agency was helping them. All that can be stated with certainty is that over a period of five years a third of the families of Louisville and Jefferson County in which there were deaths from tuberculosis considered themselves in need of financial assistance. This proportion has increased progressively throughout the five years.

There were 250 tuberculous families, approximately 20% of the entire number, known to social agencies other than relief; for example those agencies interested in the correction and prevention of social breakdown, including settlement houses, the Louisville and Jefferson County Children's Home, the Juvenile Court and a few others. The proportion of families coming to the attention of these agencies also increased during the five year period, from 16% in 1934 to 24% in 1938. A higher proportion of Negroes than of whites were known to these agencies and the rate of increase was also faster for them.

The census tracts having the highest number of tuberculosis deaths and of relief agency registrations had also the highest number of families known to other social agencies. Tracts # 30, 31 and 59 had ten or more such registrations. Curiously, tract #49, which is in one of the most congested Negro sections of the city, had only three of its forty tuberculous families known to relief agencies and only two known to other social agencies.

The health agencies were naturally the group registering the highest number of tuberculous families at the Social Service Exchange,

although they do not register all the cases known to them. These agencies include the Visiting Nurse Association of Louisville, the Louisville Tuberculosis Association, the City Health Department and City Hospital, the Waverley Hills Sanatorium and Clinics and the Central State Hospital. Altogether they registered 473 families, or 38% of the total number of families with tuberculosis deaths. It is interesting to note that 37% of the families they registered were known to health agencies only, while 23% of the families registered by relief agencies were known to relief agencies only, and 12% of the families registered by other social agencies were known only to that group. From these figures it would seem probable that many of the families known to Waverley Hills, Central State Hospital, etc., do not have problems outside of the health field, while those families known to relief and other social agencies are apt to need health services also. In other words, poor health as evidenced by tuberculous infection, although ranging through all economic levels, is more consistently found to accompany poverty, overcrowded living conditions and parental neglect of children.

Over the five year period there was a slight increase in the number of families known to the health agencies and registered with the Social Service Exchange. There were 35% of the total tuberculous families so known in 1934 and 39% in 1938. This increase occurred almost entirely among the Negro families and may reflect the increasing knowledge about the families on the part of the health agencies due to the intensive health education campaign among the Negroes in recent years.

The isolation of certain groups from contact with community

forces which might be helpful to them in combatting the handicap of tuberculosis is most clearly brought out by the enumeration of those who apparently had never been known to any social or health agency. Among both white and Negro, male and female, the married patients were more apt to be known to health agencies than the single, widowed or divorced. There were fewer unmarried females registered as known to health agencies in 1935, 1936, 1937 and 1938 than in 1934. Since there were numerous deaths in all these years among young unmarried women it would seem that more attention could well be paid by health agencies to them. Attention should also be given to the divorced and single males of both races; men with families were apparently reached through their families; the single, the divorced and the widowed are more apt to be unknown in the community, a danger to themselves and a potential danger to others.

There were three areas in the city containing a number of deaths from tuberculosis in families who had never been registered by any health agency. These areas were: the South End, including census tracts # 42, 44, and 45; the West End, with census tracts #8, 9, 11 and 17; and the Highlands, with tracts # 84 and 85. These are predominately white residential neighborhoods, without residents of great wealth. Tract # 64 in Germantown with six deaths and tract # 61 in the central part of the city with seven deaths, none in families registered by health agencies, would also seem good fields for more intensive preventive health work.

As was mentioned earlier in this section, there were many of the 1233 total persons dying from tuberculosis who were known to social and health agencies, but were never registered by them with the Social

Service Exchange. It is possible, however, to allocate some of these persons to charitable institutions when the death certificate gives such institutions as the place of death. In order to obtain the total picture of the community's financial responsibility for tuberculosis one must, therefore, add to the list of unduplicated registrations at the Exchange the names of non-registered persons reported as dying in Louisville tax-supported or community-supported institutions. A count of the former group shows that there were 627 different persons whose families were registered as known to one or more of the local health, relief or other social agencies. In addition there were 368 individuals not known to the Social Service Exchange, but shown by their death certificates to have died from tuberculosis in some public or charitable institution. The total of these two groups is 995 persons, revealing that 80% of the total deaths from tuberculosis in Louisville and Jefferson County, over a five year period, were of persons who had been dependent, to greater or less degree or for shorter or longer periods on community resources. Only 238, or 20% of the total deaths, were of persons known exclusively to private hospitals and family physicians. Of course it is not true that tuberculosis alone caused all of the community expense represented by that situation, but the conclusion is inescapable that tuberculosis was responsible for a large part of it.

Among the white patients the reliance on the community is increasing. In 1934 there were 72% of the total number of persons dying from tuberculosis who had been treated in publicly supported clinics or hospitals or were known to some social or health agency, whereas in 1938 there were 78% who had such contacts. Among the Negroes, however, the trend was

in the opposite direction; 92% had been cared for by public or private agencies in 1934 and only 85% in 1938. The difference is mainly accounted for by the progressively smaller number of male Negroes dying in public institutions, the decrease during the five year period being from 90% to 63%. The percentage of Negro females dying in public institutions was the same in 1938 as in 1934, while the percentage for both sexes of the white race cared for in public institutions increased during this period. It is only in the institutional care of the male Negro that there is a decrease of public expense, since we saw in a preceding paragraph that more male Negroes were known to relief and social agencies in 1938 than in 1934. It would probably in the end be less expensive to the community to search out and hospitalize these sick men rather than to let them continue to live in homes scattered throughout the city, supported in increasing numbers by social and relief agencies and spreading the infection of their disease.

Throughout this study we have used the combined figures of Louisville and Jefferson County, but it may be of interest to present the information contained in this section separately for city and county. The following table shows that the county had a smaller registration.

TABLE XV

Registration of Tuberculous Patients at Social Service Exchange
Louisville and Jefferson County, 1934-1938

	<u>Percent of Total Tuberculous Families</u>	
	<u>Louisville</u>	<u>Jefferson County</u>
Registered by relief agencies	33	16
Registered by other social "	20	10
Registered by health "	40	26
Known to some agency or institution	82	74
Unknown to any " " "	18	26

IV. Agencies Responsible for Tuberculosis and
Their Cost

IV. Agencies Responsible for Care of Tuberculosis and Their Cost

There are two agencies in Louisville and Jefferson County whose primary responsibility is the treatment and prevention of tuberculosis in that area. One of these is supported by public funds and one by private contributions. The public agency is the Board of Tuberculosis Hospital (responsible for Laverley Hills Sanatorium and Clinics), created under a permissive State Statute, quite separate from the City or County Health Departments. Its budget is met from joint city and county taxes and appointments to the Board are made by the City Health Officer and the County Judge.¹ The Board maintains the only free sanatorium, available for local patients, situated in the county; it also maintains several tuberculosis clinics, situated within the city limits; city and county patients are admitted to the sanatorium after examination at the clinics and recommendation by the clinic director. Only bona fide residents of the city and county are eligible for admission, although there have been a few instances of emergency non-resident admission.

The sanatorium has a total capacity of 520 beds, of which 413 are for white patients and 117 for Negroes. According to the accepted de-

1. Early in 1942, between the time of writing this thesis and its acceptance by the faculty of the University of Louisville, the Kentucky State Legislature passed a bill which abolished the Louisville and Jefferson County Health Departments and the Board of Tuberculosis Hospital and created a new agency, the Louisville and Jefferson County Board of Health, with responsibility for all the duties of the three former agencies. This Board consists of seven members, the County Judge and the City Mayor, ex-officio, and five citizens appointed jointly by the ex-officio members; the appointed members will serve for staggered four-year terms. This Board will form policies for all health work of the city and county, including the City Hospital and Laverley Sanatorium; it will appoint a director of health who will administer the amalgamated services.

sirable ratio of two sanatorium beds for each annual death from tuberculosis, the area studied would require only 494 beds, 308 for white patients and 186 for Negroes. Although the local provision for Negroes is not in accord with the standard, it is more generous than is found in any other city in the South.

The average length of stay of each patient at the sanatorium in the years 1934-1938 was 368 days or slightly over a year per patient. The length of stay increased during the five years of the study, being 342 days per patient in 1934, 368 days in 1935, 397 days in 1936, 359 days in 1937 and 375 days in 1938. This period was considerably longer than the average¹ stay of 173 days per patient, reported for public sanatoria in 1934.

During the five years studied the annual average cost of maintenance of the sanatorium was \$378,813, or \$2.07 per day per patient. This is a slightly lower figure than the \$2.42 given by Dr. Hiscock as the mean cost per patient day in twenty-five public city tuberculosis sanatoria in² 1935. It is disturbing, however, to find that the highest expense of the sanatorium in any year, \$386,895, and the highest cost per patient day, \$2.14, both occurred in 1938, when next to the lowest number of patient days' care was given. In this same year the percentage of Negro male deaths in their own homes was twice as high as in any other year, while the Negro male deaths at Waverley Hills Sanatorium was the lowest of any year.

Although the daily cost per patient at Waverley Sanatorium was lower than average, the longer than average stay of patients there made the

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1. Journal of the American Medical Association, Dec.7, 1935; No. 105; p. 1855
 2. Hiscock, Ira V., Community Health Organization, p. 121

cost per patient amount to \$762, compared with the average cost per patient in the public sanatoria of other cities, as computed from Dr. Hiscock's figures, of approximately \$420.

The Board of Tuberculosis Hospital also supports the clinics where suspected tuberculous patients are examined and active or arrested cases are given periodic physical recheck. Nurses on the payroll of these clinics visit the homes of the patients giving bedside care where needed, reminding clinic absentees to return, and teaching health principles with especial emphasis on the prevention of the spread of tubercular infection. The average annual cost of the clinic and nursing service in the years 1934-1938 was \$32,843. The appropriation allotted to clinic services rose gradually during the five year period, from \$30,499 in 1934 to \$34,898 in 1938. It is interesting to note that the Health Survey of Louisville made by the American Public Health Association in 1935 recommends that a larger proportion of the Board of Tuberculosis Hospital funds be spent on the preventive and clinic services.

Altogether Louisville and Jefferson County assigned an average annual sum of \$411,656 of public tax money, equivalent to \$1.16 per capita of the total population, for the prevention and cure of tuberculosis.

It is impossible to estimate the additional sum of public money spent for care of the tuberculous in the City Hospital and at Central State Hospital, but it was a considerable amount since the records show that an annual average of 57 patients died from tuberculosis in those public hospitals.

1. Survey and Appraisal of the Health Activities and Needs of Louisville, Kentucky, (1935) pp. 36 and 37

While the hospitalization, clinic and home nursing care of the tuberculous is provided out of tax funds, the most active program of health education directed specifically at the prevention of tuberculosis^{is} carried on by a privately supported agency, the Louisville Tuberculosis Association. This agency derives its income partly from the Community Chest and partly from the Christmas Seal Sale. Its average annual expenses for the five year period 1934-1938 were \$17,490. Its program during this period included tuberculosis case-finding through free physical examinations of industrial workers and selected groups of school children; visits to the families of those who had died from the disease, in an attempt to get all contacts examined; vocational rehabilitation of discharged sanatorium patients; health education through moving pictures, radio talks, lectures, institutes, newspaper articles, posters, window displays, essay contests and individual interviews; many pamphlets and letters to special groups were also distributed.

It is impossible to make rational comparisons between the costs of different agencies engaged in this type of work. Wide variety in the training and consequent salaries of personnel, and in equipment for educational work, flexibility in the promotion of one phase of the work in one year and another in another year, add to the value of the private agency's contribution to control of tuberculosis, but render comparison along financial lines of little value. The national reputation of the Louisville Tuberculosis Association for the scope of its program is excellent; its budget among that of private tuberculosis agencies of other Southern cities is high.

V. Non-Resident Tuberculosis

V. Deaths From Tuberculosis Among Non-Residents

During the five-year period 1934-1938 there were 145 persons listed as non-residents who died from tuberculosis in Louisville and Jefferson County. Since only residents of the city and county are eligible for admission to the sanatorium it is worth while to inquire what was the status of these non-residents and whether they constituted an especial source of infection to the community because of inadequate facilities for their care.

The death certificates show that 52, or 36%, of the 145 died at Central State Hospital. This hospital receives mental patients from the entire eastern portion of the state and it is inevitable that there should be some tuberculous among them. Since the patients do not leave the hospital grounds they are not apt to be of much danger to the general population of the area. However, during the period of this study there was no attempt to segregate the tuberculous from the other patients within the hospital; in fact one of the deaths from tuberculosis at the hospital was that of an attendant who had been on active duty with the patients until shortly before his death. Under such conditions it may well be that some of the Louisville and Jefferson County residents (some of whom go to the hospital as children) may have contracted the disease there. To this extent the non-resident tuberculosis patients at Central State Hospital were a menace to Louisville and Jefferson County residents.

Hazelwood, the only state-supported tuberculosis sanatorium in Kentucky, is located within Jefferson County, although local residents are not usually admitted to it. During the ~~the~~ years 1934-1938 there died in that

institution 34 persons, or 23% of the total non-resident tuberculosis deaths. Since this hospital is equipped specifically for the treatment of tuberculosis it is improbable that its patients would be a danger to the community.

There was another group of 34 persons, 23% of the total non-resident tuberculosis deaths, who died in private hospitals in Louisville. It is not the practice of these hospitals to admit tuberculous patients, nor is it usual, because of the expense, for persons with long chronic illnesses to go to these hospitals. It may therefore be assumed that these deaths were of people who had come to the hospital already seriously ill from tuberculosis or some other disease. Because of their probably short sojourn in the city and of the trained nursing care given in a hospital these people would not have had opportunity to infect many local persons.

These three hospital groups accounted for 120 patients, or 82% of the non-resident tuberculosis deaths in Louisville and Jefferson County during the five years under study. Although non-resident they cannot be considered irresponsible transients, nor do they constitute a problem for whom the local health authorities need feel concern.

Findings on the remaining twenty-five non-residents who died from tuberculosis are not so satisfactory. Eight died in the Children's Hospital, four each at the City Hospital and at the Marine Hospital, three at Waverley Hills Sanatorium, one at the Kentucky Children's Home, one at the Puritan Apartments, and concerning four the death certificates failed to report the place of death. Nineteen out of the twenty-five were residents of the state of Kentucky, five were from other states and the original home

of one person was recorded as unknown. All of the institutions where these non-residents died are maintained out of taxes or charitable funds for the low-income group and, in an emergency, will admit transients. Since free hospitalization of the tuberculous is practically non-existent in other parts of the state, the twenty persons who died in these institutions may have come or been brought to the city in the hope of receiving such care there. How long they may have lived with relatives or in boarding houses before entering the institutions is not known, but there is a great possibility of their having infected numerous local people during that period. Of the four persons who died at unreported addresses within the city nothing definite is known, but it may be assumed that they too had been a source of danger to their associates for some time prior to their death.

This section of the study indicates that approximately five non-residents annually come to Louisville in an advanced stage of tuberculosis without financial means to care for themselves, and die in some public or charitable institution or at an unknown address in the city.

VI. Problems Presented by Tuberculosis in
Louisville and Jefferson County

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The foregoing pages have given in some detail the outstanding facts in the tuberculosis situation in Louisville and Jefferson County during the years 1934-1938. From them a summary balance sheet can be drawn up with items on both the asset and liability sides. Among the assets the following items may be listed:

1. Although the total tuberculosis death rate is higher locally than nationally, detailed breakdown by sex, race and age shows several local groups with rates better than the corresponding national rates.
2. There is an especially low local rate for female Negroes from 15 to 65 years of age.
3. There is a low local rate for young white adults of both sexes.
4. The local sanatorium, jointly supported by city and county, provides more than the standard requirement of beds for tuberculous patients.
5. There is an unusually generous proportion of beds for the use of Negro patients.
6. The sanatorium has a good reputation for the quality of its medical care.
7. During the period studied there was a continuous rise in public and private funds appropriated for preventive services in the control of tuberculosis.
8. The program of the privately supported Tuberculosis Association has a high national reputation.

On the side of liabilities there are some obvious problems with

equally obvious solutions; in other cases the problems are obvious, but the solutions require more careful consideration and more complicated action. The problems by themselves stack up somewhat as follows:

1. The local death rate from tuberculosis is higher than the national death rate and than the average for cities in the same population class as Louisville.

2. Only one-fifth of all local tuberculosis deaths come from the group able to provide private physicians and private hospital care; four-fifths of the families where tuberculosis occurs are known to social or health agencies or to public institutions.

3. Certain areas in the city having numerous deaths among low and middle income families seem, in spite of the foregoing statement, to be neglected by health and social agencies.

4. The death rate for Negro males is excessively high.

5. The death rate for all Negroes seems unreasonably higher than the death rate for the white race.

6. Certain groups in both races need special attention; for example, young females; old men; single, widowed and divorced people.

7. Provision for the care of the transient tuberculous is lacking.

8. The percentage of the tuberculous dying in a sanatorium is higher locally than in the country as a whole.

9. The number of days' care per patient and the total cost per patient is higher at the local sanatorium than at the average public sanatorium.

10. A high number of tuberculosis deaths occurs at the Central State Hospital.

11. In spite of much effort in the field of health education there is ignorance and indifference toward the local problems of tuberculosis on the part of many of those in position to help solve the problems.

12. There is little general interest in the improvement of housing conditions.

13. There is general opposition toward permitting relief grants to meet the minimum adequate standard of living.

All of these problems may be grouped under three headings as follows: Problems of Case-finding, numbers 1,2,3,4,5 and 6; Problems of Administration, numbers 7,8,9 and 10; Problems of Publicity, numbers 11, 12 and 13.

VII. Suggestions for More Effective Control
of Tuberculosis

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In submitting the following suggestions for more effective control of tuberculosis in Louisville and Jefferson County it is realized that the writer speaks somewhat as an outsider, perhaps not fully aware of all the obstacles in the way of putting the suggestions into effect. It is believed, however, that all of them are practical and that all of them are in successful operation in some locality, although not all in any one place.

Taking up first the suggestions to meet the problems of case-finding, we would point out that the evidence of all the statistics presented in the study under the headings of Race, Sex, Age, Marital Condition, Occupation and Community Agencies emphatically indicated the male Negro as the factor contributing most adversely to the local tuberculosis death rate; more specifically the unmarried male Negro from 15 to 65 years of age and most specifically to those within the age group 45 to 65 years. If the death rate for its male Negroes could be materially reduced Louisville would immediately gain in its tuberculosis status among other cities.

Since it is probable that the low rate for Negro females in the city and county is due in large part to the active health education and case-finding program carried on by Negro nurses and social workers in the homes of their patients and clients, and since tuberculosis takes its chief toll from the unmarried male Negro it is obvious that a male Negro health worker is needed to search out suspicious tuberculous cases in the haunts where they are most likely to be found. During the period of this study no male Negroes except doctors were employed by health agencies for anti-tuberculosis work.

A responsible person with the necessary mixture of qualities, including those of teacher, preacher and man-about-town welcome in pool-rooms, saloons and gambling joints, might be difficult to locate, but is probably more prevalent among the Negro than the white race. In any event a good male Negro health worker is needed if unmarried male Negro tuberculous cases are to be found, brought into clinics and hospitalized. Until these cases are brought under care Louisville's outstanding tuberculosis problem will not be met.

The next most important groups to work with are white men and women from 25 to 45 years of age. They provide more deaths than any other group, 25% of the total deaths; but they are especially important because every death in this age group represents the loss of actual or potential heads of families, persons of an age to make the highest social and economic contribution to the community. When they are ill over a long period of time and when they die, the community in approximately four cases out of five must support them and often their families. It is believed by medical authorities that most original cases of tubercular infection occur in young children and that the disease, quiescent until later in life, is usually traceable to contact as a child with some tuberculous adult. This fact makes tuberculosis doubly dangerous when it is active in the parents of young children, people who are usually in the 25 to 45 year age group. It is therefore both economically sound and good health procedure to reduce the amount of tuberculosis among these people.

The great majority of young adults in Louisville and Jefferson County who are suspicious tuberculous cases belong to the middle and lower

income class. While they are still in the early stages of the disease it is difficult to persuade them to go to a doctor or a clinic for a physical examination. They are naturally resistant toward losing a day's pay because of an indisposition which does not seem to them serious. Clinic attendance must be made easy for them. There should be more frequent evening tuberculosis clinics for both Negroes and whites, and these clinics should be held every few months in outlying neighborhoods so that people can attend without much loss of time or money in travel. Before tuberculosis can be eliminated the cure must go to the people. Apprehensive people gladly seize upon little excuses to avoid putting their fears to the test.

With tuberculosis the highest cause of death among young women of both races there should be a more intensive effort to reach them where they are. The present program of the Tuberculosis Association in giving free physical examinations in industrial plants should be extended either by them or by an official agency to include stores, office buildings and factories where many young women are employed. This is an expensive method of case-finding, but it is valuable not only in the field of tuberculosis, but as a means of making young women at work more aware of all their health assets and defects. Attendance at the clinic for domestic servants should be encouraged and the value of a good health report from it should be enhanced.

The map on page 19 showing the areas of the city where most tuberculosis is found and the information on page 37 showing which of these areas are least known by health and social agencies, should be

studied and more intensive visiting directed toward those neighborhoods in the interest of case-finding in the productive field of contacts.

Although the actual number of persons 45 years of age and over who die from tuberculosis was not so high as in the immediately lower age group, the death rates in these later years was higher than anywhere else. Moreover, among these older people there is apt to be a carelessness about their own habits and a callousness to the danger of infecting others with their disease; many instances of childhood infection have occurred through the presence of a tuberculous grandparent in the household. Consideration of tuberculosis as a family problem, not as a matter of concern to the patient alone, would seem to be the way to meet the situation when the older patient is a member of a family. Visits to the cheaper type of hotel, men's lodging house, nursing home and to the Transient Bureau in the interest of general health inspection would reveal many unreported cases of tuberculosis among middle aged and older residents.

The problem of case-finding is closely related to and often dependent upon the administrative policies of the agencies working in the field of tuberculosis. Changes in these policies are more difficult to achieve than minor changes in procedures, but they have more far reaching results.

The most frequent criticism of the tuberculosis program of Louisville and Jefferson County, made by visiting specialists in the health field, is that too much time and attention are given to institutional care of the chronic tuberculous patient and not enough to finding and hospitalizing the early remedial case. The high proportion of deaths at the local

sanatorium and the high number of day's care and consequent cost per patient, as compared with similar figures for other public sanatoria, substantiate this criticism. Discussion with the medical authorities in charge of admissions to the institution has brought out the fact that the present procedure is a definite policy and that there is no immediate intention to change that policy.

In line with this policy is the type of nursing personnel employed by the clinic. These nurses are responsible for all the field work in case-finding as well as for bedside care of the patients in the home and for assistance to the physician during the clinics. They are good hospital nurses, well trained by the clinic medical director in clinic administration and in care of the tuberculous patient, whether ambulatory or confined to bed. They have had no training in public health nursing, where emphasis is placed on community and family health as well as on the immediate patient; they lack supervised training in health teaching, cooperative work with other health and social agencies, basic nutritional education and modern psychologic and psychiatric information. There is a definite clinic policy not to employ trained public health nurses.

The remedy suggested for this situation is drastic and probably impossible to put into immediate effect. There would seem to be no doubt, however, that the tuberculosis death rate in the community would be lower if the Waverley Sanatorium and clinics could be amalgamated with the already proposed joint City-County Health Department. As a branch of City Hospital the sanatorium would be more readily accessible to tuberculous patients now frequently held for long intervals at the hospital or in their

homes, but the greatest advantage in the change would be in the more aggressive case-finding policy resulting from the larger number of better trained public health nurses, among them several Negro nurses, who would undoubtedly bring more suspicious cases to the tuberculosis clinics. Nurses who work constantly in child health conferences and in the public and parochial schools have an exceptional opportunity to meet and to discuss health problems with all types of families; their technique has been developed in the stimulation of families and individuals to assume responsibility for the health of themselves and of others. With the addition of tuberculosis to the official public health program the community would receive a more complete and progressive service in this field.¹

If this radical administrative change could be effected the bedside nursing care of tuberculous patients confined to bed in their own homes would have to be turned over to the Visiting Nurse Association. The Health Department should probably pay the Association for this care, which is at present being paid for out of tax funds.

An equally valuable and equally difficult administrative change would be the opening of a long needed chronic disease hospital for Louisville and Jefferson County, also as a branch of the present City Hospital, to which could be transferred many of the chronic tuberculous cases now occupying beds at Waverley Sanatorium. This sanatorium is well equipped medically and sur-

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1. The recent administrative change whereby this recommendation has already been put into effect should soon begin to show the beneficial results here outlined.

gically to care for serious, acute stages of tuberculosis. The more expensive service required for these cases is not needed for old chronic cases; adequate care for them could be provided in an institution whose cost would be at least one dollar per day per patient less than the sanatorium cost. The sanatorium wards should not be clogged with chronic cases for whom little but custodial care until death is required.

More dynamic case-finding should result in the discovery of more early cases of tuberculosis and these should be able to receive immediate hospitalization if it is medically recommended. Experience in other places has shown that many such patients can be returned to the community with their disease quiescent in a comparatively short time. Two valuable objectives are thus achieved - the acute case is removed from the possibility of infecting others, and a (usually) young person is returned to resume his place in the community with the knowledge of how to protect his own and other peoples' health, before extensive damage has occurred. This suggestion calls for a more rapid turnover in patients at Waverley Sanatorium and because of the greater amount of attention needed by such acute cases might result in a slightly higher per diem cost per patient. However, the reduction in ultimate cost of tuberculosis to the community and the immediate reduction in cost to both relief and health agencies (incident to the early removal of the patient to the hospital) should compensate for the slight additional expense at the sanatorium. It is believed such a deduction may reasonably be made from the instance previously cited, of the concurrent decrease in number of Negro male tuberculous patients at the sanatorium with a considerable increase in the

number of Negro male patients dying in their own homes and known to relief agencies.

A change in administrative policy affecting other than the public agencies is concerned with the nurses' training schools in private hospitals. About one-fifth of all deaths from tuberculosis in the area studied occur in families apparently able to provide medical and nursing care for themselves either at home or in hospitals. Most of the nurses giving such care are graduates of local private hospital training schools, yet none of these hospitals admit enough patients with recognized communicable disease to provide adequate training in this subject for their student nurses. It is therefore suggested that an affiliation in communicable disease nursing be set up at Waverley Sanatorium where students from private hospital training schools could be taught aseptic technique in any medical condition. These nurses would become acquainted with the symptoms of tuberculosis and with desirable procedures for its control. Their own future teaching would reach families of an economic level seldom visited by nurses of the official Health Department or of the Visiting Nurse Association.

A final suggestion in the field of administrative policy relates to the care of the tuberculous transient. Steps should be taken to make mandatory on some state office the financial support of these dangerous persons. It is now legally the responsibility of the county of which the patient is a resident, but the ability of many of these counties to meet their financial obligations is nihil. So long as there are no free beds for tuberculous patients in other parts of the state it is inevitable

that some of them will come to Louisville and Jefferson County seeking hospitalization. Here they are a danger to many people since they cannot legally be admitted to local institutions. It will probably require action at the state level to solve this deadlock, but the need clearly points to some such solution.

For transients from other states found to have tuberculosis temporary free care should probably be provided in a local institution, in the interest of safeguarding local citizens, until arrangements can be made to return the sick migrant to his own state. Other states are known to perform a like service for Kentucky.

A note should be made in this section on administrative problems regarding tuberculosis at Central State Hospital. No recommendation is necessary since it is understood that the new management there has recently segregated and given special attention to the tuberculous patients, so that they are no longer a source of infection to others.

Changes in administrative policy and in case-finding depend to a large extent on placing before those in authority or with influence in the community, information of the kind that convinces them the changes are possible and desirable. Since different people are motivated by different impulses the content of the information and the method of presenting it will vary, but the following suggestions are offered as meeting to some extent the needs in this field.

The necessary basis for the indicated approach would be the continuous collection and analysis of local tuberculosis statistics, as

compared with similar data from other places. At the present time the monthly and annual reports of Waverley Sanatorium and clinics are given practically no publicity. Neither they nor the annual reports of the Tuberculosis Association present information as to the fundamental criteria relating to tuberculosis. Although much general information about tuberculosis is presented to the public during Early Diagnosis Week and Negro Health Week there is little focus of attention on local conditions. While shot-gun scattering of health education material has its place there are certain educated and sophisticated groups who are bored by it. They are often composed of educated people who, it is believed, would respond to a documented and individualized appeal for their assistance in changing certain conditions where Louisville was admittedly below standard. Included among these groups should be the Board of Tuberculosis Hospital and the Board of the Tuberculosis Association. At the time when financial appeals for the support of tuberculosis institutions and agencies are presented to the City Council, the County Commissioners and the Community Chest a brief report should be made on conditions and trends in tuberculosis, both locally and nationally. Only with such a background of achievement and need can rational appropriations be made.

Since not all of the medical profession are aware of the place of the tuberculosis sanatorium and clinics in the community it might be well for one of the visiting tuberculosis specialists who address the local County Medical Society annually, to focus his talk specifically on local conditions. Louisville evinces a tolerance, not entirely confined to its lay citizens, toward the danger of tuberculosis.

Another group in constant contact with tuberculous families is composed of social workers. If their training could include more emphasis on the far-reaching social implications of tuberculosis the practicing social worker would probably be more alert to symptoms of early disease and quicker to see that clients obtained medical care and adequate relief to provide for hygienic living.

The general population is certainly more nutrition conscious than it was a few years ago, but if we are to prevent and to overcome childhood tuberculosis in Louisville and Jefferson County, it will be necessary to impress this public with the need for nutritious food among the groups who depend on the public for their food allowance.

Publicity is also needed to bring before the public the need for official housing inspection, now a missing item in the local health program. Although Louisville has very few tenements of the type found in large eastern cities it does have numerous old one-family houses now occupied by several families. Toilet and water facilities are inadequate for the present occupancy, plumbing is dilapidated and unsafe, rooms are overcrowded with people and halls are blocked with the apparatus of crowded living. At present the only cure for bad housing conditions being presented to the public is the expensive method of slum clearance and erection of new houses. There is another remedy for bad housing which, while only effecting a partial cure, is much less costly and more universally applicable. Periodic inspection of tenements, rooming and lodging houses by the local Health Department would make not only for the correction of insanitary conditions and bad housekeeping, but could also be the means

for revealing to an alert inspector many unreported cases of communicable disease. A law or city ordinance permitting such inspection should be passed. The inspection service, like the similar service to dairies, could be made to pay for itself by a system of licensing.

Briefly summarized the suggestions for control of tuberculosis in Louisville and Jefferson County are as follows:

1. Employment of a well-trained male Negro health worker.
2. Provision of additional evening tuberculosis clinics for both white and Negro patients and suspected cases.
3. Provision of tuberculosis clinics at regular intervals in outlying parts of the city and county.
4. Provision of free health examinations for young women in industries, offices and stores.
5. Expansion of the services of the clinic for domestic servants.
6. Intensive health education in geographic areas where considerable tuberculosis is known to exist.
7. Amalgamation of Waverley Sanatorium and clinics with the joint City-County Health Department.
8. Assignment to all nurses in this enlarged official health agency of responsibility for health education in the field of tuberculosis and for nursing service in tuberculosis clinics.
9. Assignment of responsibility for bedside nursing of tuber-

culous patients in their own homes to the Visiting Nurse Association, with payment for such service by the Health Department.

10. Removal of chronic tuberculous patients from Waverley Sanatorium to special wards in a new Chronic Disease Hospital.
11. Establishment in the curriculum of all nurses' training schools in private hospitals of a required course in nursing care of tuberculosis as a typical communicable disease.
12. Assignment to some department of the State government of the financial responsibility for care of tuberculous transients who are citizens of the state.
13. Assignment to the local Health Department of the responsibility for temporary care of tuberculous transients from other states.
14. Provision for collection, analysis and appropriate publicity of local tuberculosis statistics.
15. Presentation of these statistics and other material relating to local tuberculosis problems to various groups of citizens responsible for the health of the community.
16. Institution of legal and financial measures for sanitary inspection of tenements and other types of multiple dwellings.

VIII. Conclusion

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In the introduction to this report several questions were posed to which answers can now be given.

Is tuberculosis no longer an important problem for Louisville and Jefferson County? With an average of 247 deaths of local residents each year from tuberculosis and with 2% of the total population affected as patients or as contacts, tuberculosis still presents a serious health problem to the city and county.

Do Louisville and Jefferson County compare favorably in tuberculosis rates with other parts of the country? Although the local rates for a few age groups among whites and Negroes are better than the rates for comparable national groups, the local general tuberculosis death rate is considerably higher than the national death rate; Louisville has third from the highest death rate among the fourteen cities of its population class.

What is the financial cost of tuberculosis to the community? Local agencies dealing directly and exclusively with tuberculosis spent during 1934-1938 an annual average of \$429,146.00 or \$1.21 for each man, woman and child in Louisville and Jefferson County. The average patient hospitalized at Waverley Sanatorium cost the community \$762. The additional cost of tuberculous patients in other public institutions, and the support and supervision of the families of the tuberculous (80% of whom are visited by some social or health agency) cannot be accurately estimated, but it must approximate the known figure stated above. Together they result in a tremendous drain of finances now being spent on a disease

which could be practically eradicated by an intensive rational attack.

Is the expenditure of tax money and private contributions resulting in decreased incidence of tuberculosis? Local tuberculosis death rates are decreasing, but not so rapidly as in some other communities which are spending lesser amounts of money more intelligently.

Is Louisville's complacency regarding its tuberculosis problem justified? No community should be satisfied with spending more money on its tuberculosis program than other communities spend while getting less effective results. Where Louisville has waged its anti-tuberculosis campaign intensively and intelligently the results have merited satisfaction, but numerous other groups and areas show the result of neglect.

Repeated generalizations about any subject tend to dull interest in it. Tuberculosis was the first disease to be presented to the public as a subject of social responsibility; recurrent years of the campaign, however, have brought an inevitable apathy both to campaigners and campaigned. The objective of this report has been to dig beneath the routine, wellworn surface truths concerning tuberculosis and to bring up some sharp, pointed nuggets of local fact with which to prick local audiences to a greater degree of interest in and responsibility for the eradication of tuberculosis from Louisville and Jefferson County.

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Verbal comments and correspondence concerning Sections II and III of the
thesis, from Dr. Oscar C. Miller, Medical Director of Waverley Clinics
and Field Work, and from Dr. Benjamin L. Brock, Medical Director of Waver-
ley Sanatorium