# MORTALITY OF PERSONS WITH LEPROSY PRIOR TO SULFONE THERAPY, CORDOVA AND TALISAY, CEBU, PHILIPPINES

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In leprosy, as in other diseases of long duration, it is difficult to separate the specific element in mortality from other causes of death. It is not surprising, therefore, that the literature on this subject is sparse. There is general agreement among leprologists, however, that the lepromatous type of the disease definitely shortens life and that the tuberculoid type probably does not. For example, Rogers and Muir (13) state:

"The prognosis is much more favourable in the neural than in the lepromatous type... Even a patient with widespread and conspicuous tuberculoid lesions must be considered a more favourable case than one with early, slight lesions of a distinctly lepromatous type."

Gray and Bancroft (<sup>9</sup>) compared the deaths from all causes and from tuberculosis at the United States Public Health Service Hospital (National Leprosarium), Carville, Louisiana, for the period 1942 to 1950, with those expected on the basis of age-specific death rates of 1940 for the state of Louisiana. A high proportion of the patients at Carville suffer from the lepromatous type. For all patients, the actual deaths from all causes were 136, as compared to an expectancy of only 52. That is, 2.6 times as many deaths occurred as would have been expected if the general death rate of Louisiana had prevailed. For patients not treated with sulfones, the ratio of actual to expected deaths was 4.8:1.0. For those treated with sulfones, the comparable ratio was 1.1:1.0. The lower mortality of patients under sulfone therapy was attributed in considerable part to fewer deaths from tuberculosis.

Doull et al. (<sup>5</sup>), using data collected in Cordova and Talisay, Cebu, Philippines, in 1933 and 1936-37, respectively, made a comparison between actual prevalence of all forms of leprosy at various ages and the prevalence estimated by summation of attack rates for preceding years of life, as derived from historical records. It was found that the agreement was close from early life to about 30 years of age, after which actual prevalence fell below that which was estimated. They state (p. 117): "But if the cumulation [of attack rates] be continued beyond 30 years of age the earlier disappearance of leprosy patients from the population, presumably by death, is evident from the disagreement between estimated and actual prevalence rates."

Takasima (14) observed that the duration of life of leprosy patients in Japan was much shorter than that of healthy persons. The statistics relate to the presulfone era. He tabulated the deaths of patients by intervals from onset of the disease to death. The peak of the intervals was at 8 years, and the arithmetical average was 13.4 years. Apparently all forms of leprosy were included.

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There can be little doubt that mortality rates of leprosy patients have improved greatly since the advent of sulfone therapy, although statistical evidence is found only in the report of Gray and Bancroft. Sulfones were first used in leprosy treatment by Faget *et al.* at Carville in 1941 (8), but in the Philippines they were used rarely before 1947, and at Cebu they were used only in selected cases and usually in very small quantities until 1951.

## SOURCES OF DATA

The data used in the present analysis were collected in the course of field studies of leprosy which have been carried on in Cordova since 1933 and in Talisay since 1936 by the Leonard Wood Memorial and the Department of Health of the Philippines, except for an interruption of about five years caused by the Japanese occupation. Cordova is one of the two municipalities of Mactan Island, which is separated from the mainland of Cebu by Cebu Channel. The municipality of Talisay is situated on the Cebu mainland, about eight miles south of the city of Cebu. Several reports of these studies have been published (1-7, 10-12). Almost the entire population of Cordova was subjected to physical examination in 1933, in 1941, and in 1948; and that of Talisay in 1936-37 and in 1950-51.

In each instance the physical examinations were preceded by a house-to-house census of the community. The record forms were designed to provide data essential for the construction of life tables. The schedules prepared during the original surveys gave the history of each household from its establishment, listing those living at the time of examination and all former members with dates of births, deaths and departures. On each resurvey the records were verified, entries were made of all changes which had occurred, and new households were added. Dates of births, deaths and removals were carefully checked. In 1949, the church registries of births, marriages and deaths for Cordova, which are exceptionally complete, were copied for the period 1866 to 1947. Cards for approximately 35,000 individuals were prepared from these registries and matched against listings on the household records of the surveys of 1933, 1941 and 1948. Remarkably few corrections were necessary. In Talisay, both church and municipal registries were destroyed or lost during hostilities of World War II. It is considered, however, that the records of Talisay are as accurate as those of Cordova.

The population included in the present study consists only of those persons who were living when the original schedules were prepared or who entered Cordova or Talisay either by birth or immigration between the first and final surveys. The patients included are those who were alive when the original household schedules were prepared, those who developed the disease between the first and final surveys, and a few immigrant patients who entered in the intervals between the surveys.

The periods covered are the intervals between the midpoints of census-taking in each locality. These intervals were: for Cordova, from the first enumeration in 1933 to the second in 1941, slightly under 8 years; from the second in 1941 to the third in 1948, 7 years; and from the first to the third, slightly under 15 years; for Talisay, from the first in 1936-37 to the second in 1950-51, approximately 14 years.

The total number of persons included in the study for all or some portion of the intervals was 30,306. The number of lepromatous cases included in this total was 272, and, of nonlepromatous cases, 346. Six cases that originally were nonlepromatous but later became lepromatous are included in the lepromatous group. The average periods of observation were: for all residents, 8.8 years; for lepromatous patients, 8.0 years, and for nonlepromatous patients, 6.6 years.

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The total number of deaths among these persons was 5,218. Of the patients with lepromatous leprosy, 148 died, and of the nonlepromatous patients, 39 died.

## METHOD OF ESTIMATING EXPECTED MORTALITY

A modified life-table procedure was used to measure mortality during the various intervals for the total population, and the "normal" or expected mortality for persons with leprosy. Separate life-experience tables were prepared for Cordova and Talisay by sex and age groups, as follows: Each person who was living at the time of the first enumeration was given one-half year of life experience at the age stated on the original schedule, and one year at each successive year of age until the year of his departure or death, or of the midpoint of the next survey, whichever came first, for which he was given one-half year at his attained age. Thus, in Cordova, the maximum period of observation could not exceed 15 calendar years for any person and, in Talisay, 14 years. Persons entering a household during the intervals between surveys were given one-half year of life experience at age of entrance, and persons taken off the household roster during the intervals because of death or removal from the community were given one-half year at age of departure.

The same procedure was used to obtain the life experience of persons suffering from lepromatous or from nonlepromatous leprosy. All persons having the disease at the time of the original surveys, or entering either Cordova or Talisay after onset, were allotted life experience in precisely the same manner as other individuals. If the disease developed during the intervals between surveys, the approximate date of onset was determined from the history and physical examination, and the patient was given one-half year of life experience at the age at which he developed the disease. The six cases originally classed as indeterminate or tuberculoid that became lepromatous were considered as lepromatous from onset.

In Appendix A there are shown the person years of life experience, by sex and age groups, for the total population of Cordova for the periods 1933 to 1941 and 1941 to 1948; and for Talisay for the period 1936-37 to 1950-51, together with corresponding data for persons suffering from lepromatous or from nonlepromatous leprosy. The deaths from all causes for the total population and for persons suffering from any form of leprosy were obtained for time periods corresponding to the intervals between surveys and tabulated by sex and age groups. These are shown in Appendix B.

The method of obtaining years of life experience is illustrated in Table 1, using the age group 30 to 39 years. This group comprises a total of 685 years of life experience of persons of both sexes suffering from lepromatous leprosy in Cordova and Talisay taken together, and corresponds with the total of this age group shown in Appendix A. Among these

persons, 65 deaths are shown, corresponding with the number in Appendix B.

Year of age	Present at	Number entering study by year of age	Number wi	thdrawing by r specified reas	Person years of	
	beginning by vear of age		Deaths	End of observation	Total	$\frac{\text{(at risk of death)}}{\text{Lx}=}$ $\frac{1x+\frac{1}{2}nx-\frac{1}{2}(dx+wx)}$
	lx	nx	dx	wx	dx+wx	
30	91	7	2	8	10	89.5
31	88	10	8	2	10	88.0
32	88	3	4	4	8	85.5
33	83	6	10	4	14	79.0
34	75	5	12	4	16	69.5
35	64	5	6	4	10	61.5
36	59	5	6	2	8	57.5
37	56	8	7	3	10	55.0
38	54	3	6	2	8	51.5
39	49	3	5	3	7	48.0
-		Total death	ns 65		Total person	years 685.0

TABLE 1.—Life experience of persons suffering from lepromatous leprosy for Cordova,1933 to 1948, and for Talisay, 1936-37 to 1950-51, for ages 30 to 39 years.ª

*a* Average annual death rate, ages 30-39 years  $=\frac{\text{Number of deaths}}{\text{Person years of risk}} \times 1000 = 65$ 

 $\frac{60}{685.0}$  × 1000 = 94.9 per 1,000 person years.

The death rates which have been derived do not represent annual mortality in the ordinary sense of the term. They are rates per 1000 person years of life experience. These are equivalent to mortality rates per 1000 persons for one year. They do not apply to any calendar year, but are the average of what occurred during intervals between surveys.

## COMPARISON OF STANDARDIZED DEATH RATES, GENERAL POPULATION AND PERSONS WITH LEPROSY, FOR PERSONS 15 YEARS OF AGE AND OVER

The question of major interest is the risk of death of persons with leprosy, over and above that to which they would have been subjected if they had not contracted the disease. Because of the peculiar age and sex distribution of persons with leprosy, direct comparison of their crude death rates at all ages with such rates for the general population is not valid. In a larger experience than that here reported it would be advisable to compare the death rates for specific age and sex groups. As this

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was not practicable in the present instance, standardized death rates were computed.<sup>1</sup> Only two deaths of leprous persons occurred at ages under 15 years, and the comparison is therefore limited to the life experience of persons of 15 years and over. The units of life experience studied, in each instance for both sexes and for each sex, and in each for all the population, persons with lepromatous leprosy, and persons with nonlepromatous leprosy, were as follows: Cordova 1933 to 1948 and Talisay 1936-37 to 1950-51, combined; Cordova, 1933 to 1948; Cordova, 1933 to 1941; Cordova, 1941 to 1948, and Talisay, 1936-37 to 1950-51.

As a first approach, the standardized death rates for Cordova, Talisay, and both communities were examined. These are shown in Table 2, by sex, for the total population and for persons with each type of leprosy.

It will be seen that the death rates of the general population were somewhat higher in both sexes, especially in the females, in Cordova than in Talisay. The rates for persons with leprosy were likewise higher in Cor-

	Rates per 1,000 person years						
Group	Tetal nonulation	Persons with leprosy					
	Total population	Lepromatous	Nonlepromatous				
Cordova b							
Males	19.5	104.8	39.0				
Females	17.6	100.8	16.8				
Total	18.5	103.9	26.2				
Talisay c	-						
Males	18.7	92.7	15.1				
Females	14.5	58.9	14.5				
Total	16.5	81.1	14.8				
Both communities							
Males	19.0	97.2	23.3				
Females	15.7	69.0	15.4				
Total	17.2	88.9	19.1				

 

 TABLE 2.—Standardized death rates by sex, for ages 15 years and over, total population and persons with leprosy: Cordova, Talisay, and both communities.ª

a For a definition of "standardized death rates," see Footnote 1 of the text.

b Cordova, 1933 to 1948.

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c Talisay, 1936-37 to 1950-51.

<sup>1</sup> The "standardized death rate" is the product of the actual death rate of a given class and a standardizing factor which in each case is the ratio of the crude death rate for the total population (17.2) to the "index death rate" for the class. This index death rate is the sum of the deaths expected in each age group at the age specific rates prevailing in the total population, multiplied by 1,000 and divided by the population of the class.

dova. For the nonlepromatous forms, the exceptionally high rate for Cordova males (39.0) is based upon 392.5 person years of observation with only 12 actual deaths, and a standardizing factor of 1.28; that for females (16.8) is based upon 435.0 person years with only 7 actual deaths, and a standardizing factor of 1.05.

For both communities the standardized death rate for all persons suffering from lepromatous leprosy (88.9) was 5.2 times that for the total population (17.2). The excess rate of 71.7 per 1000 person years was presumably attributable to the disease. On the other hand, the death rate for persons with nonlepromatous leprosy was relatively little affected by the disease.

Sex.—The influence of sex on the death rate of persons suffering from lepromatous leprosy is of interest. It has long been known that in many regions this type of the disease is more common in males than in females. From data collected during the original surveys of Cordova and Talisay, i.e., incidence rates based upon histories, and prevalence rates based upon results of physical examinations (5), it was concluded that the observed higher prevalence in males was attributable to higher incidence rates and not to longer duration of the disease. The estimated duration was about the same in females as in males. Higher attack rates in males were observed in childhood as well as in later life. The higher prevalence of lepromatous leprosy in males was regarded as attributable chiefly to greater inherent susceptibility of males rather than to differences in occupation or other environmental factors.

The figures of Table 2 for both communities, however, show a higher excess mortality (78.2 per 1000 person years) for males suffering from lepromatous leprosy than for females (53.3). This may be interpreted as indicating shorter duration of lepromatous leprosy in the male. It should be pointed out, however, that in Cordova the difference in rates was small, although the death rate was slightly higher for males; the greater excess for males is contributed almost entirely from the experience of Talisay. For males, the death rate for Cordova is based upon 655.0 person years with 47 actual deaths, and a standardizing factor of 1.46; and that for Talisay upon 851.5 person years with 67 actual deaths, and a standardizing factor of 1.18. For females the death rate for Cordova is based upon 183.5 person years with 12 actual deaths, and a standardizing factor of 1.54; and that for Talisay upon 368.5 person years with 22 actual deaths, and a standardizing factor of 0.99. It may be questioned, therefore, that there is any substantial difference between the mortality of males and females suffering from lepromatous leprosy, apart from that which would be expected in consideration of the higher mortality of males from causes unrelated to leprosy.

Age.—The numbers of deaths which occurred at ages 15 to 29 years, 30 to 49 years, and at 50 years and over are compared in Table 3 with the numbers expected at the age specific rates for both communities.

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The ratios shown there highlight certain interesting points. Persons of 15 to 29 years of age suffering from lepromatous leprosy had suffered four times as many deaths as would have been expected if they had been

TABLE 3.—Numbers of deaths in persons with lepromatous and nonlepromatous leprosy, respectively, compared to those expected at age specific rates of the total population, for broad age groups; Cordova and Talisay combined.

	Deaths in persons with leprosy								
Age group (years)		Lepromatous		Nonlepromatous					
	Actual	Expected	Ratio A/E	Actual	Expected	Ratio A/E			
15-29	32	8.0	4.0:1	10	7.5	1.3:1			
30-49	97	13.5	7.2:1	11	8.5	1.3:1			
50+	19	7.5	2.5:1	16	17.5	0.9:1			

subjected only to rates prevailing in all persons of the same ages. Those of 30 to 49 years of age, in whom the disease was doubtless much further advanced, had more than seven times the expected number of deaths. Among those aged 50 years and over, 19 deaths occurred against an expectancy of 7 or 8, only a little more than twice the normal rate. Probably lepromatous patients who reach the age of 50 years possess relatively high resistance. For persons suffering from the nonlepromatous forms the ratios of actual to expected deaths indicate that these forms of the disease do not increase the risk of death in persons of 50 years and over, and probably not to an appreciable extent in younger persons.

## MORTALITY RATES FOR CORDOVA

The midpoint of the second Cordova survey (1941) is a critical point at which to separate the prewar life experience (1933 to 1941) from that of World War II and the years immediately following (1941 to 1948). Standardized death rates for these periods are given in Table 4.

It is clear from these figures that the death rates for Cordova were substantially higher for the war and postwar period than for the preceding

TABLE 4.—Standardized death rates for total population, persons with lepromatous leprosy, and those with nonlepromatous leprosy for ages 15 years and over Cordova, 1933-41 and 1941-48.

Period	Death rates per 1000 person years					
	Total population	Lepromatous	Nonlepromatous			
1933-41	14.1	93.3	20.9			
1941-48	23.2	117.7	30.9			
Excess in 1941-48 (%)	64.5	26.2	47.8			

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one. The increase, however, was much less for persons with lepromatous leprosy (26.2%) than for the total population (64.5%). The excess mortality of those with nonlepromatous leprosy for the later period (47.8%) was not significantly different from that for the total population.

For the lepromatous type, the rate for the period 1933 to 1941 is based upon a life experience of 495.5 person years, with 30 actual deaths, and a standardizing factor of 1.54; and, for the later period, upon a life experience of 343.0 person years, with 29 actual deaths, and a standardizing factor of 1.39. For the nonlepromatous forms the rate for the earlier period is based upon a life experience of 401.0 person years, with 7 actual deaths, and a standardizing factor of 1.20; and for the later period, upon a life experience of 426.5 person years, with 12 actual deaths, and a standardizing factor of 1.10.

Persons suffering from nonlepromatous forms remained at home and presumably were subjected to the same degree as other persons to those factors which resulted in an increase in mortality. These included malnutrition, malaria and intestinal diseases. On the other hand, some patients with lepromatous leprosy were in the more protected environment of Eversley Childs Sanitarium continuously; others for part of the time, and a few were at home throughout.

The effect of the war on the death rates of Cordova and Talisay is being subjected to further study. It is probable that some increase in mortality occurred also in Talisay during the war and postwar period. The standardized death rates for Talisay for 1936-37 to 1950-51 were higher than for Cordova for 1933-41, being, for males, 18.7 as compared to 14.7 for Cordova, and for females, 14.5 as compared to 13.5 for Cordova. There were few direct war casualties in either community. The food supply, derived chiefly from agriculture and fishing, was apparently not reduced. The question is of unusual interest because malaria, which had not been present for several decades, was introduced into Cordova in 1945 and became widespread, more than 70 per cent of the population being attacked. Malaria is not known to have occurred in Talisay.

## SUMMARY

1. A study is reported of the mortality of leprosy patients in Cordova and Talisay, Cebu Province, Philippines. The data are regarded as exceptionally accurate, having been derived from records of households included in three surveys of Cordova (1933, 1941 and 1948) and two of Talisay (1936-37 and 1950-51), all made by the staff of the Leonard Wood Memorial in cooperation with the Department of Health of the Philippines. For Cordova, there are included 15 years of experience, 1933 to 1948, and for Talisay, 14 years, 1936-37 to 1950-51. Most of the bacteriologically positive patients had been treated for some years at the Eversley Childs Sanitarium. Sulfones were rarely used in therapy at that institution before 1947, and only for a few selected patients until 1951. 2. Standardized death rates have been computed for persons 15 years of age and over for each community and for both combined, by sex, for the total population, and for persons suffering from lepromatous or from nonlepromatous (tuberculoid or indeterminate) leprosy. For Cordova the second survey fortunately divided the experience at a critical point, and rates were obtained for the period 1933 to 1941, which are compared with those of the World War II period and the years immediately following, 1941 to 1948.

3. During the intervals between the initial and last surveys, for both communities combined, the average annual mortality for persons with lepromatous leprosy was 5.1 times that of the general population; for male patients the ratio was 5.1:1.0, and for females 4.4:1.0. Excess mortality over that of the general population was 71.7 per 1000 per year for patients of both sexes—78.2 for male patients, and 53.3 for female. A larger experience is necessary to determine whether the observed greater excess mortality in males is a genuine characteristic or a chance variation. Patients suffering from the nonlepromatous forms did not have appreciably higher death rates than the general population.

4. Among lepromatous patients of both communities, the ratio of actual deaths to those expected at age specific rates prevailing in the general population was 4.0:1.0 for patients 15 to 29 years of age, 7.2:1.0 for those 30 to 49 years old, and 2.5:1.0 for those 50 years and over.

5. For Cordova, a comparison has been made of the period 1933 to 1941 with 1941 to 1948. During the latter period the average annual mortality for the general population was 64.5 per cent higher than that of the earlier period. For patients suffering from lepromatous leprosy, the increase was only 26.2 per cent, and for those suffering from the nonlepromatous forms 47.8 per cent. The causes which operated to produce increased mortality during the war years, therefore, certainly did not affect leprosy patients more than other persons. Lepromatous patients were in fact better off in this respect than the general population, probably because a considerable proportion of them returned to the Eversley Childs Sanitarium and thus escaped malaria and perhaps other hazards of the postwar years.

## RESÚMEN

1. Se presenta un estudio de la mortalidad de pacientes leprosos en Córdova y Talisay, Cebu, Filipinas. Los datos, considerados excepcionalmente correctos, se derivaron de 3 investigaciones en Córdova (1933, 1941, 1948) y 2 en Talisay (1936-37, y 1950-51), todas hechas por la facultad de Leonard Wood Memorial en cooperación con el Departamento de Salud de Filipinas. La investigación de Córdova incluye 15 años y la de Talisay 14 años. La mayoría de los pacientes positivos bacteriológicamente habían sido tratados por años en el Sanatorio Eversley Childs. La terapia con sulfonas se utilizó raras veces en aquella institución antes de 1947, y solo en algunos pacientes seleccionados hasta el 1951.

2. La mortalidad estandardizada se computó para personas mayores de 15 años en cada comunidad y en ambas comunidades por sexo, por poblacion total y por

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personas con lepra lepromatosa ó no lepromatosa (tuberculoide ó intermedia). En Cordova el segundo estudio se dividió en un punto crítico, y se obtuvo la mortalidad por el período 1933 al 1941, la cual se compara con la de la del período de la guerra mundial II y los años sucesivos 1941 al 1948.

3. Durante el intérvalo entre los estudios primero y último, en ambas comunidades combinadas la mortalidad anual promedio de personas con lepra lepromatosa fue 5.1 veces la de la población general; en varones fue 5.1:1.0 y en hembras 4.4:1.0. El exceso en mortalidad sobre la poblacion general fue de 71.7 por 1000 por año en pacientes de ambos sexos, 78.2 en varones y 53.3 en hembras. Se necesita una serie mayor para determinar si la mortalidad excesiva en varones es verdadera o falsa, Pacientes con formas no lepromatosas no demostraron mortalidad apreciablemente mayor.

Entre los pacientes lepromatosos de ambas comunidades la proporción de muertes actuales a muertes anticipadas en grupos de edad específicas en la población general fué de 4.0:1.0 en pacientes de 15-29 años, 7.2:1.0 en pacientes de 50 años.

5. En Córdova se hizo una comparación de los períodos 1933-1941 y 1941-1948 durante el último período la mortalidad anual promedio en la población general fue el 64.5% más alto que en el período anterior. En pacientes con lepra lepromatosa el aumento fue salo 26.2% y en aguellos con forma no lepromatosa fue 47.8%. Las causas que produjeron el aumento en la mortalidad durante los años de la guerra, por lo tanto no afectaron a los pacientes lepromatosos mas que a las otras personas. De hecho los pacientes lepromatosos aventajaron en éste respeto a la población general, probablemente por que un número considerable de ellos regresó al sanatorio por lo tanto escapando la malaria y otros peligros de la post-guerra.

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#### APPENDIX A.

Person years of life experience, by sex and age, for the total population, and for persons with lepromatous and nonlepromatous leprosy, Cordova and Talisay, Cebu, Philippines.

			Core	lova		Talisay		Total			
Α	ge group (Yrs.)	1933 to 1941		1941 t	1941 to 1948		1936-37 to 1950-51		(Cordova & Talisay)		
and class		Male	Female	Male	Female	Male	Female	Male	Female	Total	
0-4	Tot. pop.	4,523.0	4,567.5	3,887.5	4,069.5	13,631.5	12,568.5	22,042.0	21,205.5	43,247.5	
	Leprom.	0	0	1.5	0	1.5	3.0	3.0	3.0	6.0	
	Non-Lep.	0	0	1.0	4.0	2.5	4.0	3.5	8.0	11.5	
5-9	Tot. pop.	3,560.0	3,634.5	3,342.0	3,466.5	11,367.5	11,041.0	18,269.5	18,142.0	36,411.5	
	Leprom.	2.5	2.5	1.0	1.5	9.5	5.0	13.0	9.0	22.0	
	Non-Lep.	0	5.0	11.5	20.5	52.0	30.5	63.5	56.0	119.5	
10-14	Tot. pop.	3,135.5	3,236.5	2,830.0	2,938.0	9,949.5	10,099.0	15,915.0	16,273.5	32,188.5	
	Leprom.	24.5	8.0	11.5	9.5	24.5	13.5	60.5	31.0	91.5	
	Non-Lep.	18.0	23.0	38.0	30.5	72.5	66.0	128.5	119.5	248.0	
15-19	Tot. pop.	2,723.5	2,780.5	2,486.5	2,609.5	8,725.0	9,036.0	13,935.0	14,426.0	28,361.0	
	Leprom.	53.5	20.0	47.0	9.0	58.0	32.0	158.5	61.0	219.5	
	Non-Lep.	46.0	30.0	41.0	26.5	83.5	55.5	170.5	112.0	282.5	
20-29	Tot. pop.	4,298.0	4,531.0	3,818.0	4,248.0	13,891.5	14,667.0	22,007.5	23,446.0	45,453.5	
	Leprom.	198.5	56.0	74.5	29.0	275.0	91.5	548.0	176.5	724.5	
	Non-Lep.	79.5	80.0	85.5	56.5	168.5	180.0	333.5	316.5	650.0	
30-39	Tot. pop.	3,125.5	3,116.0	2,784.5	3,142.0	9,274.5	10,241.0	15,184.5	16,499.0	31,683.5	
	Leprom.	94.0	19.5	99.5	21.0	328.5	122.5	522.0	163.0	685.0	
	Non-Lep.	16.0	41.0	45.5	62.0	112.0	94.0	173.5	197.0	370.0	
40-49	Tot. pop.	2,140.0	2,101.0	1,978.0	2,031.0	5,980.5	6,595.5	10,098.5	10,727.5	20,826.0	
	Leprom.	33.0	6.0	31.0	19.5	116.0	62.0	180.0	87.5	267.5	
	Non-Lep.	26.0	37.0	12.5	36.0	59.0	49.5	97.5	122.5	220.5	
50+	Tot. pop.	2,469.5	2,962.0	2,438.5	2,773.5	8,550.5	9,937.0	13,458.5	15,672.5	29,131.0	
	Leprom.	12.0	3.0	12.0	0.5	74.0	60.5	98.0	64.0	162.0	
	Non-Lep.	22.5	23.0	18.0	43.0	126.0	145.5	166.5	211.5	378.0	
Total	Tot. pop.	25,975.0	26,929.0	23,565.0	25,278.0	81,370.5	84,185.0	130,910.5	136,392.0	267,302.5	
	Leprom.	418.0	115.0	278.0	90.0	887.0	390.0	1,583.0	595.0	2,178.0	
	Non-Lep.	208.0	239.0	253.0	279.0	676.0	625.0	1,137.0	1,143.0	2,280.0	

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# APPENDIX B.

	Cord				ova		Talisay		Total		
Age group (Yrs.) and class		1933 t	o 1941	1941 to 1948		1936-37 to 1950-51		(Cordova & Talisay)			
		Male	Female	Male	Female	Male	Female	Male	Female	Total	
0-4	Tot. pop. Leprom. Non-Lep.	300 	258 	275 	222 	604 	443 	1,179	923 	2,102	
5-9	Tot. pop. Leprom. Non-Lep.	25 	28 	<b>40</b> 	37	101 	73 	166 	138 	304	
10-14	Tot. pop. Leprom. Non-Lep.	10 	10 	12 	11 	50 i	39 ``i	72 … 1	60 i	132 2	
15-19	Tot. pop. Leprom. Non-Lep.	15 1 	11 i	16 2 	21 1 	46 2 	48 1 	77 5 	80 2 1	157 7 1	
20-29	Tot. pop. Leprom. Non-Lep.	44 9 4	40 2 	51 5 	42 2 2	127 4 3	108 3 	222 18 7	190 7 2	412 25 9	
30-39	Tot. pop. Leprom. Non-Lep.	34 6 	46 3 	$\begin{smallmatrix} 51\\11\\2\end{smallmatrix}$		$\begin{smallmatrix}&132\\&35\\&1\end{smallmatrix}$	92 8 1	217 52 3	194 13 3	411 65 6	
40-49	Tot pop. Leprom. Non-Lep.	33 6 1	19 	48 5 1	32 ···· 2	123 15 	99 6 1	$\begin{array}{r}204\\\cdot26\\2\end{array}$	150 6 3	$\substack{\begin{array}{c}354\\32\\5\end{array}}$	
50+	Tot. pop. Leprom. Non-Lep.	83 2 1	95 1 	164 3	174 1 	430 11 5	400 4 7	677 13 9	669 6 7	1,346 19 16	
Total	Tot. pop. Leprom. Non-Lep.	544 24 6	507 6 1	657 23 6	595 6 6	1,613 67 10	$1,302 \\ 22 \\ 10$	2,814 114 22	2,404 34 17	$5,218 \\ 148 \\ 39$	

Deaths from all causes, by sex and age, for the total population, and for persons with lepromatous and nonlepromatous leprosy, Cordova and Talisay, Cebu, Philippines.