

A Follow-up Study of Tuberculosis Incidence and General Mortality in Various Occupational-Social Groups of the Danish Population*

OLE HORWITZ & JØRGEN KNUDSEN

The aim of this study (which was prospective, as opposed to retrospective) was to determine, for the tuberculosis case-finding programme in Denmark, whether grouping the population in eight broad occupational-social classes would reveal groups with a high tuberculosis incidence. The procedure was to examine the incidence of respiratory tuberculosis in the various groups during a 6-year follow-up period. The study comprises the total male population outside the metropolitan area and aged 15-34 years in 1950-52.

The incidence of respiratory tuberculosis was found to be lower among persons in agriculture than in the other groups. In other occupations and among persons not gainfully occupied or with occupation not stated, the rates were rather similar. Further break-down among those gainfully employed revealed, at most, only minor differences between wage-earners and self-employed persons. The current occupational-social classification in use in Denmark was thus of little help in pin-pointing high-risk groups.

The general mortality rates were the same in agriculture and in other occupations, and in these groups the rates were much lower than among those not gainfully employed or with occupation not stated. Within the rural population a higher mortality was observed among wage-earners than among the self-employed.

INTRODUCTION

Traditionally, tuberculosis has been a much heavier burden for the poor than for the rich. Many reports in the medical literature have described marked differences in tuberculosis morbidity and mortality rates between various socio-economic and urban-rural groups, even in the more prosperous countries (D'Arcy Hart & Wright, 1939; MacDougall, 1949; Rich, 1951). In Denmark, for example, Lindhardt (1939) showed that thirty years ago the tuberculosis rates were considerably higher among wage-earners than among farmers and other groups who owned or operated their own business.

The purpose of this paper is to re-examine the problem in the present-day population of Denmark in order to determine whether or not the differences that existed in the past are still evident in the face of the striking reduction in tuberculosis in recent

years and the marked improvement in economic conditions, particularly for the poorer segments of the population. Information on this question should help pin-point the high-risk groups requiring special attention in our over-all efforts to eradicate tuberculosis in Denmark.

Material for the study is derived from the records of the Danish Tuberculosis Index. Unlike most investigations on this subject, the present study is prospective: the population was classified according to occupational-social status at the beginning of the observation period. Thus, new cases of tuberculosis arising during the follow-up period of six years could be allocated to the occupational-social status of the patients before their disease appeared. This would seem to have advantages over other studies in which cases are classified according to occupation at the time of diagnosis, at which time occupation may have been influenced by the disease itself. In addition to dealing with the incidence of tuberculosis, the present paper includes an analysis of deaths during the follow-up period.

* From the Danish Tuberculosis Index, Copenhagen; Chief: E. Groth-Petersen, M.D. The study was supported by a grant from the National Institutes of Health, United States Department of Health, Education, and Welfare.

MATERIAL AND METHODS

STUDY POPULATION

The tuberculosis mass campaign of 1950-52 was specifically directed towards the young adult population and pre-school children. A total of 783 000 persons between 15 and 34 years of age were personally invited, by mail, to have a tuberculin test and photofluorogram of the chest, and BCG vaccination if indicated. Persons outside that age-group were also welcome to come for examination, though they were not sent personal invitations. Mobile units, travelling from county to county, covered the entire country, exclusive of metropolitan Copenhagen, the island of Bornholm and some small areas. The campaign was directed by the Danish Tuberculosis Index, an office created in 1950 for long-range epidemiological studies of tuberculosis in the Danish population. Details about the background of the campaign, the campaign itself, and subsequent follow-up studies have been reported previously (Groth-Petersen, Knudsen & Wilbek, 1959).

The study population for the present report is limited to the male population of the area covered by the campaign who were 15-34 years of age at that time, regardless of whether or not they attended the campaign for examination. While it is difficult enough to classify men according to occupation, it is even more difficult to classify women. Women were therefore not included in the present study population. The only exclusions were 3200 men in the 15-34 year age-group who had previously been reported as cases of tuberculosis. The present study population thus comprises a total of 390 600 men.

RECORDS

Demographic information about the study population is based on the records of the Municipal Registration Offices, located in all boroughs and parishes throughout the country. The files in these offices contain records for the local population, including current data on marital status, occupation, movements in and out of the community and so on.

Individual record cards for the mass campaign, with spaces for detailed identification data, occupation and other items, were sent to the Municipal Registration Offices to be filled out for all persons 15-34 years of age who were living in the community. Instructions on how to fill out the cards were sent together with the cards from the Danish Tubercu-

losis Index. The Index, in addition, assigned several of its statistical staff to supervise this work and, later, to rectify discrepancies and omissions on the cards of persons who attended the campaign by questioning them directly.

All the record cards for the mass campaign were coded under close supervision by the clerical staff of the Danish Tuberculosis Index, and the information on the cards was transferred to punch cards. The punch cards were then assembled into a permanent file, or roster, of all persons who attended the mass campaign as well as those in the invited age-groups who did not attend. This roster, which consists of nearly 1.5 million punch cards, became the basic population for studies subsequently carried out by the Index. It is out of this basic population that the present study population was drawn.

CLASSIFICATION OF OCCUPATIONAL-SOCIAL GROUPS

The information on occupation given on the individual record cards was coded according to a detailed list, dividing the population into four main occupational groups: (A) agriculture, (B) other occupations, (C) not gainfully employed, (D) not stated. The first two groups were further subdivided into broad categories which represent a type of social grouping: self-employed, salaried employees, and wage-earners. Thus, the study population was divided into the following groups:

A. Agriculture, fishery, forestry. As the number of persons working in fishery and forestry is very small, this group will be designated hereafter simply as "agriculture".

Self-employed: primarily farmers who own the land on which they work.

Wage-earners: the majority of this group are farm labourers.

B. Other occupations. All persons who are gainfully employed in occupations other than agriculture.

Self-employed: persons owning their own business, such as shopkeepers; professional persons in private practice, such as lawyers and doctors; owners of industries, factories and the like.

Salaried employees: persons such as civil servants, "white-collar" workers, shop foremen, teachers, professors, and doctors employed by hospitals.

Wage-earners: factory workers, day labourers, apprentices etc. Within this group, the traditional separation was made between *skilled* and *unskilled* workers because, at least in former times, they constituted fairly distinct social groups.

C. *Not gainfully employed*. Students; persons living on their own means; persons institutionalized or under care, such as mental defectives; or persons receiving public aid, such as the physically disabled.

D. *Occupation not stated*.

These social subgroups have been in use for many years in Denmark for official statistical reports on the population. While they undoubtedly provided a satisfactory grouping of the population for many purposes some years ago, the classification can no longer be regarded as providing more than a rough grouping, with obvious inconsistencies and overlapping.

CLASSIFICATION ACCORDING TO RESIDENCE

Traditionally, in Denmark, the population is divided into three main groups according to place of residence: the capital, the provincial towns and the rural districts. The capital, which includes not only the city of Copenhagen but the surrounding suburbs, is a metropolitan area with a population of 1.3 million persons in 1955. The "provincial towns" are a specified group of cities and towns with a total population of 1.2 million persons, the population of the towns ranging from 1000 to 119 000 persons, and averaging 14 000 persons. The "rural districts", with a total population of 2.0 million persons, comprise the rest of the country. At one time the rural districts probably represented only rural areas; today, however, they include some towns with populations as large as 11 000. Thus, while the population of the "provincial towns" is entirely urban, residents of "rural districts" represent a mixture of rural, semi-rural and urban.¹

Since the capital was not included in the mass campaign, the present study population consists of persons who could be classified as residents of either provincial towns or rural districts, in accordance with the definition of those two terms as used in Denmark. Those two groups will hereafter be referred to simply as the "urban" and the "rural" study population.

¹ Thus, 31% of the 2.0 million persons in the "rural districts" lived either in the suburbs of the "provincial towns" or in other urbanized areas, these being defined as densely built-over areas, not in direct connexion with a "provincial town", and having 250 inhabitants or over (Denmark, Statistiske Departement, 1959).

SOURCE OF CASE REPORTS

For a long time notification of tuberculosis has been compulsory in Denmark. Cases are reported by the doctors, through the local chest clinics, to the National Health Service, and from there to the Danish Tuberculosis Index. The notification forms provide identification data as well as information on bacteriological and radiological examinations. As far as can be determined, most of the diagnosed cases are reported (Horwitz, Rossen & Wilbek, 1960).

The present study comprises only new cases of tuberculosis; that is, patients in whom pulmonary tuberculosis was diagnosed for the first time. Whether or not the case is reported for the first time is stated directly on the notification form and is further checked by a careful search of the central files of all previously reported cases. Cases are then matched to the mass campaign roster to identify the ones occurring in the study population.

Altogether, 744 new cases of tuberculosis have been reported in the present study population during the 6-year follow-up period. A total of 436 of these new cases were persons who attended the campaign: 119 were diagnosed as a direct result of the campaign; the remainder developed during the following years. The other 308 cases out of the 744 were reported during the follow-up period among persons who were invited to attend the campaign but did not appear — the so-called non-attenders. As a mass campaign influences the morbidity rates, it is pertinent for the present study that attendance at the mass campaign in 1950-52 was similar for the various occupational-social groups (Horwitz & Knudsen, 1960).

SOURCE OF DEATH REPORTS

The State Statistical Department sends the Danish Tuberculosis Index a copy of the death certificate for every death in Denmark among persons born in 1900 or later. Death certificates, signed by physicians, give the cause or causes of death; this information is coded by the Bureau of Medical Statistics, National Health Service, according to the *International Classification of Diseases* (World Health Organization, 1957). Deaths occurring in the study population are identified by searching the mass campaign roster.

CALCULATION OF RATES

In calculating tuberculosis incidence and mortality rates in the study population, account had to be

TABLE 1
INCIDENCE OF RESPIRATORY TUBERCULOSIS ACCORDING TO RESIDENCE AND OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Age-standardized number of cases during 6 years of follow-up			Age-standardized rates per 100 000 per year		
	Provincial towns	Rural districts	Total	Provincial towns	Rural districts	Total
Agriculture (total)	17.4	150.0	169.2	55	21	22
Self-employed	1.2	30.0	30.2	^a	18	18
Wage-earners	16.2	123.0	142.8	58	22	24
Other occupations (total)	293.4	212.4	506.4	42	30	36
Self-employed	19.8	27.6	47.4	32	33	32
Salaried	77.4	50.4	127.8	41	34	38
Wage-earners	197.9	133.8	331.8	45	28	36
Skilled	102.2	67.2	173.4	41	28	35
Unskilled	95.4	70.2	162.0	50	30	38
Not gainfully employed	19.2	10.2	30.6	53	28	42
Not stated	31.2	12.0	39.0	55	21	35
Total	361.2	379.2	743.9	44	25	32

^a Rate not calculated because of small numbers.

taken of the different age compositions of the various occupational-social groups. For example, in agriculture 43% of the self-employed were 15-29 years of age, and 57% were 30-34 years of age; whereas among wage-earners 89% were 15-29 years

old, and only 12% were 30-34 years. *Age-standardized rates*, based on the cases (or deaths) in separate 5-year age-groups, were therefore calculated for the present analysis, giving the number of cases (or deaths) per 100 000 persons per year.¹

RESULTS

MORBIDITY

Incidence of tuberculosis

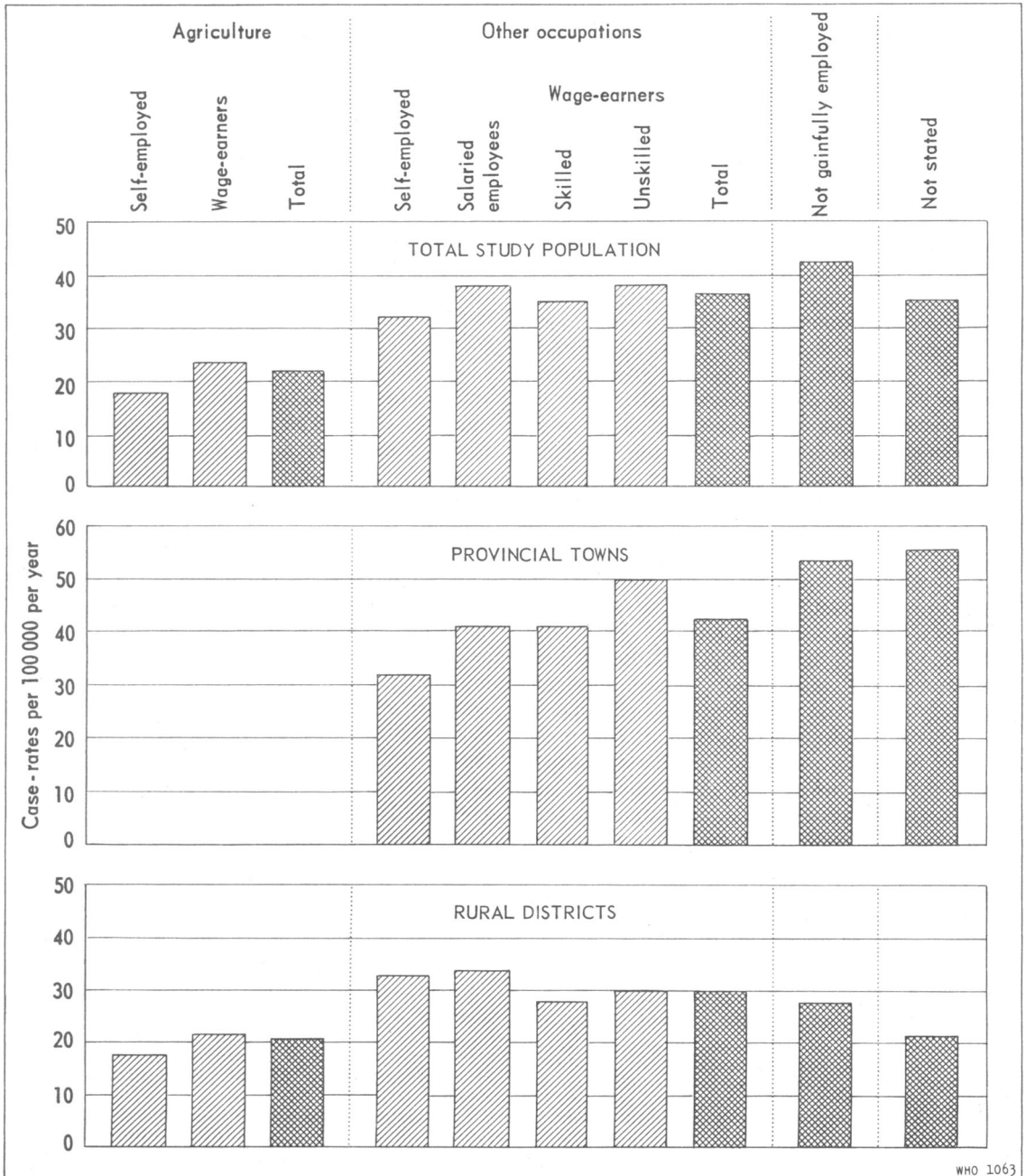
In the present study population of 390 600 males aged 15-34 years at the time of the mass campaign in 1950-52, a total of 744 new cases of respiratory tuberculosis were reported during the 6-year follow-up period. This corresponds to an average annual incidence of 32 per 100 000 persons. Table 1 and Fig. 1 (from Appendix Tables 1 and 2) show that the incidence was lowest in the agricultural group—22 per 100 000. In other occupations the rate was 1.6 times higher—36 per 100 000. Even within the rural districts there was still a higher morbidity in other occupations than in agriculture. For persons

not gainfully employed and occupation not stated, the rates deviated somewhat from the group "other occupations", but the differences are not statistically significant at the 5% level.

The subgroups within agriculture and other occupations had similar rates; the differences observed are not statistically significant at the 5% level. This was also found when the study population was divided according to residence at the beginning of the follow-up period. Within the urban study population there was a tendency towards higher rates with lower social level; however, this tendency was not seen in the rural study population (see Table 1 and Fig. 1).

¹ The age-distribution of the total study population (Appendix Table 1) was used as the standard.

FIG. 1
RESPIRATORY TUBERCULOSIS INCIDENCE ACCORDING TO RESIDENCE AND
OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD



On the basis of the earlier study by Lindhardt (1939), a higher morbidity was anticipated in wage-earners than in the self-employed of other occupations. This was not observed in the present study population, perhaps because the living standards of wage-earners have risen considerably in the course of time. It could also be because the present study does not include the capital, while Lindhardt's did; and furthermore, the present study is a prospective one, while hers was retrospective. The latter factor could be further examined by grouping the 744 cases of tuberculosis according to occupation *at the time of notification*, as was done by Lindhardt.

The results in Appendix Table 3 show, practically speaking, uniform rates in the individual subgroups of other occupations. In this material, therefore, the retrospective method gave the same result as the prospective method. There are, however, some differences between the rates in Table 1 and Appendix Table 3. These differences are partly due to the fact that changes in occupation had taken place for a number of persons in the study population in the course of the follow-up period. To this should be added that the occupation was almost always given on the notification form, and this information was derived from another source than in the prospective study.

The incidence of tuberculosis was higher for the urban study population than for the rural study population—on the average 1.8 times higher.¹ This higher morbidity in urban residents is found in all the occupational-social groups except the self-employed in other occupations. The higher morbidity in urban residents may be real, and represent the effect of factors associated with urban life itself, whatever those factors may be. However, the difference in rates may reflect, as least partly, the greater frequency with which the urban population is examined routinely for evidence of tuberculosis. In 1954, for example, 32% of the adult male population in the towns was examined, whereas only 13% of the corresponding rural population was examined. If, however, such differences in the examination rate were a major factor in producing the urban-rural differences found in the present study, one

would have expected relatively more cases to have been diagnosed in rural than in urban residents during the tuberculosis mass campaign. That expectation was not borne out. During the campaign, the rate of new cases diagnosed among males 15-34 years of age was 39 per 100 000 for the rural population and 70 per 100 000—almost twice as high—for the urban population. It should also be stressed that the higher morbidity in urban residents *cannot* be attributed to persons who moved from the rural districts to the towns and then became ill, as all cases of tuberculosis were classified according to residence at the beginning of the study period.

Severity of disease

Among the 744 patients with respiratory tuberculosis, tubercle bacilli were demonstrated in 612, or 82%, and the diagnosis of tuberculosis can therefore be considered correct in the majority of cases. The lower percentage of bacteriologically verified cases in agriculture (77%) was brought about by cases of pleural tuberculosis, which were bacteriologically verified in only half of the patients, and which occurred relatively more frequently in agriculture than in the other groups (21% and 10%, respectively).

Of the 744 patients, 653 had pulmonary tuberculosis² and 91 had pleural tuberculosis.

The severity of the pulmonary tuberculosis may be judged according to whether or not a cavity, or cavities, were present at the time of notification; this information was given on the notification form. Definite cavitory disease was present in 183 patients (8 per 100 000 per year);³ suspected cavities in 62 patients (3 per 100 000 per year); and no evidence of cavitation in 408 patients (17 per 100 000 per year) (Table 2). Rates for the various occupational groups differed least for cavitory disease and most for non-cavitory; thus, in other occupations, the incidence of cavitory cases was 1.4 times higher for urban than rural residents, whereas the incidence of non-cavitory cases was 1.7 times higher.

The incidence of pleural tuberculosis in the various occupational groups was fairly uniform—on an average 4 per 100 000 per year (Table 2). The

¹ The difference in morbidity between the urban and rural study population was in fact somewhat less than stated because of a deficit in the matching of notifications to the register of the study population; and this deficit was less for the urban than for the rural study population—8% and 17% respectively. If the rates are corrected for these deficits, the incidence of respiratory tuberculosis is 48 per 100 000 and 30 per 100 000, respectively. The rate is thus 1.6 times higher for the urban than for the rural population.

² In the *International Classification of Diseases* (World Health Organization, 1957) practically all of these cases would be coded 002.

³ As the number of patients is small, it is not considered justifiable to calculate age-standardized rates. Nevertheless, a comparison of the crude rates of cavitory and non-cavitory cases is relevant as it was found that the incidence of the two types of the disease varied in parallel within the various age-groups.

TABLE 2
INCIDENCE OF PLEURAL AND PULMONARY TUBERCULOSIS (CLASSIFIED ACCORDING TO SEVERITY OF LESION)
ACCORDING TO OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Pleural tuberculosis		Pulmonary tuberculosis								Respiratory tuberculosis (total)		
	No. of cases ^a	Rate ^b	Definite cavity		Suspected cavity		No cavity		Total		No. of cases ^a	Rate ^b	
			No. of cases ^a	Rate ^b	No. of cases ^a	Rate ^b	No. of cases ^a	Rate ^b	No. of cases ^a	Rate ^b			
Provincial towns	Agriculture (total)	3	^c	5	16	1	^c	9	29	15	48	18	57
	Other occupations (total)	24	3	69	10	23	3	186	27	278	40	302	44
	Not gainfully employed	2	^c	3	^c	2	^c	18	50	23	64	25	69
	Not stated	2	^c	9	16	—	^c	10	18	19	34	21	37
	Total	31	4	86	11	26	3	223	27	335	41	366	45
Rural districts	Agriculture (total)	31	4	43	6	13	2	61	8	117	16	148	20
	Other occupations (total)	25	4	49	7	21	3	116	16	186	26	211	30
	Not gainfully employed	1	^c	3	^c	—	^c	4	^c	7	19	8	22
	Not stated	3	^c	2	^c	2	^c	4	^c	8	14	11	20
	Total	60	4	97	6	36	2	185	12	318	21	378	25
Provincial towns and rural districts	91	4	183	8	62	3	408	17	653	28	744	32	

^a Total number of cases reported at the mass campaign and during 6 years of follow-up.

^b Rate per 100 000 per year.

^c Rates not calculated because of small numbers.

incidence of pleural tuberculosis thus did not vary in parallel with the incidence of pulmonary tuberculosis, although the reason for this finding is not clear.

MORTALITY

General mortality

A total of 2448 deaths occurred in the study population during the 6-year follow-up period, an average annual mortality rate of 104 per 100 000. Table 3 and Fig. 2 (based on Appendix Tables 1 and 4) indicate that the rates in agriculture and other occupations were about the same, 98 and 100 per 100 000 respectively. The mortality was 3 times higher for those who were not gainfully employed—a group in whom the incidence of tuberculosis was not particularly high. For the small group of 19 000 persons whose occupation was not stated, the mortality figure took an intermediate position of 150 per 100 000.

General mortality was higher among wage-earners than among the self-employed—about 1.5 times higher—both for agriculture and for other occupations. When the study population is grouped according to residence, however, it is seen that the higher rates in wage-earners occurred largely in the rural population: there were only small differences in rates for the various subgroups of the urban population.

Mortality for corresponding occupational-social groups was higher in the urban than in the rural population—on the average 1.2 times higher.¹ The difference may, however, be overstated because of

¹ The only exception was the not gainfully employed for whom the urban rate was lower than the rural one. This might reflect a different composition of the groups, the urban one comprising more healthy not gainfully employed (e.g., students) than the rural one. This interpretation is supported by the finding that mortality from causes other than violence is lower for urban persons not gainfully employed than for the rural persons (Table 4).

FIG. 2
 GENERAL MORTALITY ACCORDING TO RESIDENCE AND OCCUPATIONAL-SOCIAL CLASSIFICATION
 AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

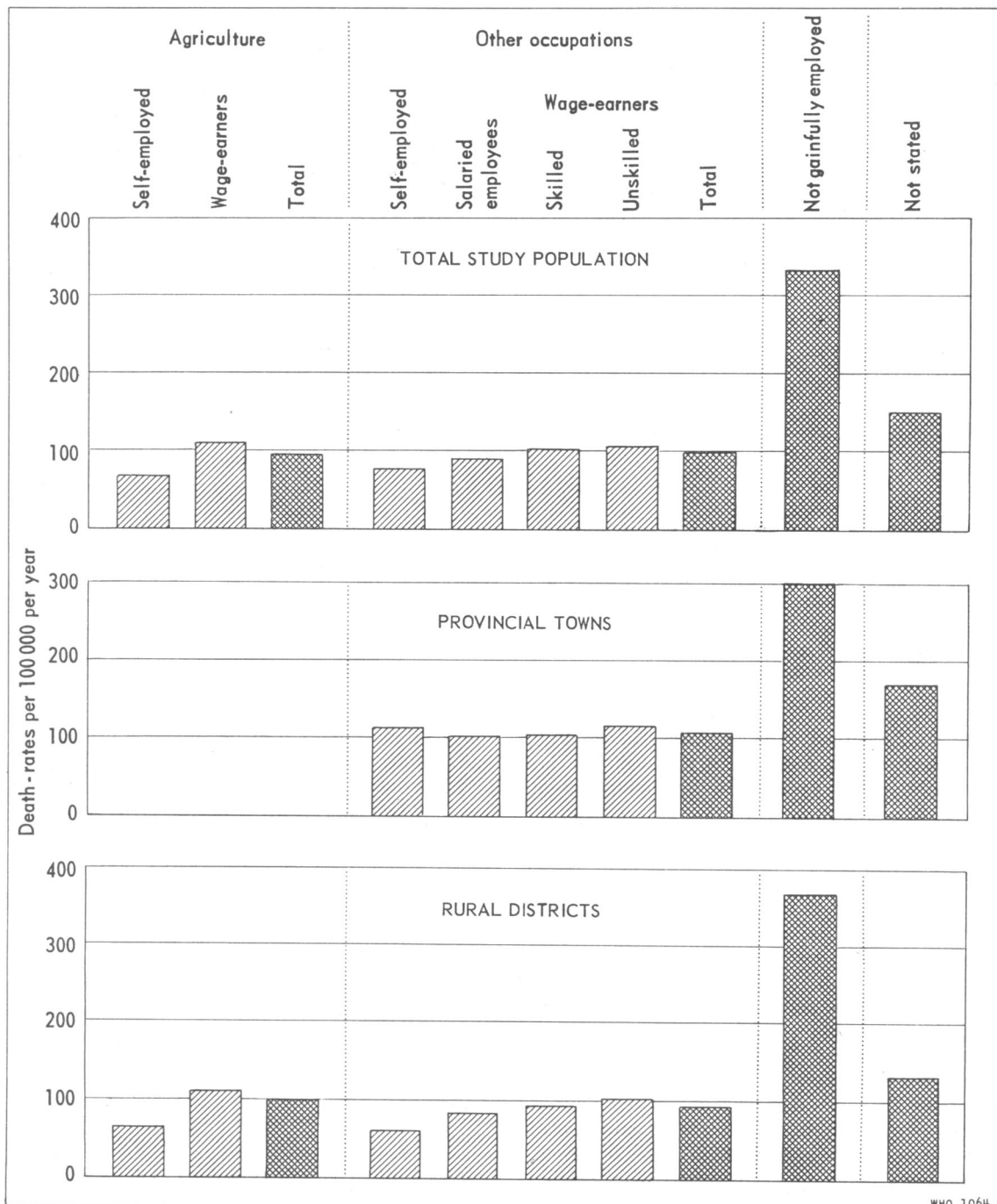


TABLE 3
MORTALITY, ALL CAUSES, ACCORDING TO RESIDENCE AND OCCUPATIONAL-SOCIAL CLASSIFICATION
AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Age-standardized number of deaths during 6 years of follow-up			Age-standardized rates per 100 000 per year		
	Provincial towns	Rural districts	Total	Provincial towns	Rural districts	Total
Agriculture (total)	41.9	699.6	743.4	134	96	98
Self-employed	3.3	107.4	111.6	^a	65	66
Wage-earners	37.1	623.4	659.4	133	111	112
Other occupations (total)	726.6	664.8	1 393.8	105	94	100
Self-employed	69.6	50.4	115.8	111	59	79
Salaried	190.2	124.2	312.1	100	85	93
Wage-earners	479.4	481.2	960.6	109	101	105
Skilled	256.8	234.2	499.8	102	97	101
Unskilled	221.9	241.8	457.2	117	103	108
Not gainfully employed	108.1	137.4	244.2	300	371	334
Not stated	95.8	75.2	168.6	170	134	150
Total	937.6	1 501.8	2 447.9	115	98	104

^a Rate not calculated because of small numbers.

TABLE 4
MORTALITY, FROM VIOLENCE ^a AND ALL OTHER CAUSES, ACCORDING TO RESIDENCE AND
OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Age-standardized number of deaths during 6 years of follow-up				Age-standardized rates per 100 000 per year			
	Provincial towns		Rural districts		Provincial towns		Rural districts	
	Violence	Other causes	Violence	Other causes	Violence	Other causes	Violence	Other causes
Agriculture (total)	25.1	16.8	375.6	323.8	80	54	52	45
Self-employed	2.2	2.9	48.7	59.0	^b	^b	30	36
Wage-earners	22.1	14.0	333.0	290.6	79	49	59	52
Other occupations (total)	368.1	358.4	376.9	287.8	53	52	53	41
Self-employed	30.4	39.4	22.0	28.4	49	63	26	33
Salaried	79.8	110.4	61.7	62.5	42	58	42	43
Wage-earners	263.1	216.5	286.7	194.2	60	49	60	41
Skilled	132.7	123.9	141.9	92.4	53	49	59	38
Unskilled	128.4	93.6	135.6	106.5	68	49	58	45
Not gainfully employed	26.7	81.4	18.2	119.5	74	226	49	323
Not stated	38.1	57.8	22.6	52.6	68	103	40	94
Total	447.6	490.0	791.3	710.9	55	60	52	47

^a Violence: the causes of death with code numbers 801-999 in the *International Classification of Diseases* (World Health Organization, 1957).

^b Rates not calculated because of small numbers.

deficits in matching death-certificates to the study roster, which amounted to 5% for the urban population and 14% for the rural population. If the mortality rates in Table 3 are corrected for these deficits, the mortality would be 121 per 100 000 for the urban study population and 114 per 100 000 for the rural population. The difference between these rates is not significant at the 5% level.

Causes of death

As the number of deaths in the various occupational-social groups was too small for a detailed analysis by specific causes of death, the material has been divided into two broad groups, one comprising deaths from violent causes (suicides, accidents etc.), the other comprising all other causes (i.e., deaths due to diseases *sensu stricto*).

As shown in Table 4, half the deaths were due to violent causes, the rates being almost the same for the urban and rural study populations. While the

rates were rather uniform for the various occupational-social groups, however, among those gainfully employed the rate was highest for wage-earners.

Rates for deaths due to causes other than violence were higher for the urban than the rural population; the difference is significant at the 5% level. (This also holds when the rates are corrected for the matching deficits previously mentioned.) The rates differed only slightly among the gainfully employed groups, although in the rural population a lower rate is observed among the self-employed than in the other groups. An especially high rate was found among the not gainfully employed—275 per 100 000, i.e., about five times higher than among employed persons. Thus, the higher crude mortality in this group was due to illness; and it is reasonable to assume that disease was often a determining factor in the individuals' not being gainfully employed at the time of the mass campaign.

DISCUSSION

It is becoming increasingly evident that our efforts must be directed towards high-risk groups if we expect to eradicate tuberculosis within the foreseeable future. The present study was undertaken to determine whether or not the occupational-social groups who had the highest tuberculosis rates thirty years ago in Denmark are still high-risk groups in the present-day population; whether, in fact, the traditional system of classifying persons according to information on occupational status, which is readily obtainable from the Municipal Registration Offices throughout the country, could help to identify groups in whom the disease is highly concentrated.

The present, prospective study showed that the incidence of tuberculosis was higher in the urban than in the rural population, and higher in other occupations than in agriculture. However, further break-down among those gainfully employed revealed only minor differences, if any, between wage-earners and self-employed and between skilled and unskilled wage-earners. The social division used to

classify the population thus appears to be of little help in pin-pointing high-risk groups. This might be because socio-economic factors no longer have much effect on the risk of developing tuberculosis. On the other hand, the classification used here may not adequately reflect real differences in occupational-social groups of the population. This question might have been clarified if the study of deaths due to causes other than violence had revealed large differences in the rates for the various subgroups, because it then could have been concluded that the present classification effectively separated the population into groups with different risk for fatal diseases. Since such differences were not observed, it is possible that a different type of classification—one based on real income, for example—might be helpful in selecting high-risk groups. However, in view of the general improvement in living standards, it would seem more profitable to look for other criteria than those associated with occupation and social status in trying to identify groups of persons in whom tuberculosis is most likely to develop.

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APPENDIX TABLE 1
STUDY POPULATION ACCORDING TO AGE, RESIDENCE, AND OCCUPATIONAL-SOCIAL CLASSIFICATION
AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Provincial towns					Rural districts				
	Age (years)				Total	Age (years)				Total
	15-19	20-24	25-29	30-34		15-19	20-24	25-29	30-34	
Agriculture (total)	1 127	1 271	1 419	1 413	5 230	38 891	29 081	27 069	25 997	121 038
Self-employed	144	23	126	266	559	2 592	1 126	7 937	15 793	27 448
Wage-earners	983	1 248	1 293	1 147	4 671	36 299	27 955	19 132	10 204	93 590
Other occupations (total)	22 278	24 155	32 721	36 200	115 354	26 804	23 782	31 706	35 804	118 096
Self-employed	1 419	358	2 832	5 808	10 417	2 220	756	3 716	7 464	14 156
Salaried	4 904	7 140	9 496	10 032	31 572	6 639	5 572	6 325	5 906	24 442
Wage-earners	15 955	16 657	20 393	20 360	73 365	17 945	17 454	21 665	22 434	79 498
Skilled	10 363	10 931	10 413	10 059	41 766	13 853	11 558	8 108	6 842	40 361
Unskilled	5 592	5 726	9 980	10 301	31 599	4 092	5 896	13 557	15 592	39 137
Not gainfully employed	3 028	1 742	945	293	6 008	4 007	1 167	595	404	6 173
Not stated	5 801	2 291	852	436	9 380	3 712	3 207	1 547	896	9 362
Total	32 234	29 459	35 937	38 342	135 972	73 414	57 237	60 917	63 101	254 669

APPENDIX TABLE 2

NUMBER OF NEW CASES OF TUBERCULOSIS IN THE STUDY POPULATION ACCORDING TO AGE, RESIDENCE
AND OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD

Occupational-social groups	Provincial towns					Rural districts				
	Age (years)				Total	Age (years)				Total
	15-19	20-24	25-29	30-34		15-19	20-24	25-29	30-34	
Agriculture (total)	2	4	5	7	18	40	36	38	34	148
Self-employed	—	—	—	2	2	5	—	8	19	32
Wage-earners	2	4	5	5	16	35	36	30	15	116
Other occupations (total)	43	62	89	108	302	45	52	58	56	211
Self-employed	1	1	6	13	21	1	2	11	14	28
Salaried	10	22	23	24	79	13	13	10	14	50
Wage-earners	32	39	60	71	202	31	37	37	28	133
Skilled	22	21	26	32	101	22	24	18	6	70
Unskilled	10	18	34	39	101	9	13	19	22	63
Not gainfully employed	6	17	2	—	25	3	3	2	—	8
Not stated	8	9	1	3	21	1	7	1	2	11
Total	59	92	97	118	366	89	98	99	92	378

**APPENDIX TABLE 3
INCIDENCE OF RESPIRATORY TUBERCULOSIS IN THE STUDY
POPULATION ACCORDING TO OCCUPATIONAL-SOCIAL
CLASSIFICATION AT THE TIME OF NOTIFICATION**

Occupational-social groups	Provincial towns and rural districts		
	Observed number of cases during 6 years of follow-up	Age-standardized number of cases	Age-standardized rates per 100 000 per year
Agriculture (total)	146	149.2	20
Self-employed	44	68.5	41
Wage-earners	102	113.0	19
Other occupations (total)	557	554.5	40
Self-employed	56	65.6	44
Salaried	138	137.5	41
Wage-earners	363	361.4	39
Skilled	179	180.4	37
Unskilled	184	184.3	43
Not gainfully employed	36	36.1	49
Not stated	5	8.8	8
Total	744	744.0	32

**APPENDIX TABLE 4
NUMBER OF DEATHS IN THE STUDY POPULATION ACCORDING TO AGE, RESIDENCE AND
OCCUPATIONAL-SOCIAL CLASSIFICATION AT BEGINNING OF 6-YEAR FOLLOW-UP PERIOD**

Occupational-social groups	Provincial towns					Rural districts				
	Age (years)				Total	Age (years)				Total
	15-19	20-24	25-29	30-34		15-19	20-24	25-29	30-34	
Agriculture (total)	6	11	14	12	43	225	158	143	170	696
Self-employed	1	—	—	4	5	12	3	25	79	119
Wage-earners	5	11	14	8	38	213	155	118	91	577
Other occupations (total)	99	144	226	287	756	127	155	165	222	669
Self-employed	8	3	20	35	66	8	1	13	41	63
Salaried	23	46	53	75	197	20	32	37	35	124
Wage-earners	68	95	153	177	493	99	122	115	146	482
Skilled	46	55	75	79	255	78	77	42	40	237
Unskilled	22	40	78	98	238	21	45	73	106	245
Not gainfully employed	22	17	19	10	68	20	12	17	18	67
Not stated	45	23	10	5	83	20	23	13	10	66
Total	172	195	269	314	950	392	348	338	420	1 498

RÉSUMÉ

L'opinion courante considère la tuberculose comme une maladie affectant diversément les classes de la population, suivant leur niveau de vie et la nature de leurs occupations. C'est ainsi qu'au Danemark, il y a 30 ans, on avait montré que le taux de morbidité était beaucoup plus élevé chez les salariés que chez les paysans et d'autres groupes ayant leur propre exploitation.

Les auteurs de cet article ont remis en question ces données pour la période actuelle, cherchant à préciser l'influence, au cours des récentes décennies, de la diminution de l'infection tuberculeuse, et de l'élévation générale du niveau de vie. Ils se sont demandé si le classement fondé sur les critères sociaux et la nature de l'emploi, utilisé pour les statistiques au Danemark, correspondait à une réalité sur le plan de la morbidité tuberculeuse et s'il pouvait être utile en révélant des groupes de population plus vulnérables que d'autres. Ils ont examiné, d'après les fiches du Bureau danois de la Tuberculose, la fréquence de la tuberculose dans ces divers groupes au cours d'une période de 6 ans.

L'étude a porté sur 390 600 personnes, toutes de sexe masculin, vivant hors de la région métropolitaine, âgées de 15-34 ans en 1950-52, et divisées en huit classes.

Durant la période de 6 ans, 744 nouveaux cas de tuberculose respiratoire ont été signalés. Dans le groupe « agricole », la fréquence globale annuelle était de 22 pour 100 000; dans les autres groupes, elle était de 36 pour 100 000. En ville, mais non pas à la campagne, le taux paraissait en sens inverse du niveau social. Dans le même groupe social, le taux était plus élevé dans les villes que dans les zones rurales, se traduisant par une fréquence globale plus élevée des formes cavitaires et non cavitaires. La forme pleurale était aussi fréquente à la campagne qu'en ville.

Les taux de mortalité générale étaient les mêmes dans les groupes agricoles que dans les autres, et très inférieurs à ceux des groupes oisifs ou sans occupation précise. Dans la population rurale, les taux parmi les employés étaient plus élevés que parmi les travailleurs autonomes, ce qui peut s'expliquer par un plus grand nombre de morts par accidents.

D'une façon générale, les auteurs estiment que le classement utilisé au Danemark, à d'autres fins, ne permet pas de déceler des groupes de population plus fortement exposés que d'autres à l'infection tuberculeuse.

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