

American Journal of Public Health

and THE NATION'S HEALTH VOL. X NO. 9

VOLUME XVIII

September, 1928

Number 9

A Sickness Survey of Winchester, Mass.

Part I: General Mortality

HERBERT L. LOMBARD, M. D., M. P. H.; FELLOW A. P. H. A

Massachusetts Department of Public Health, Boston, Mass.

IN THE spring of 1927, the Massachusetts Department of Public Health conducted a morbidity study in the town of Winchester, Mass. This town, one of a group of cities and towns which comprise Metropolitan Boston, is about eight miles north of downtown Boston. Winchester is largely residential, although there are a few manufactories, industries, and small stores. The estimated population of the town in November, 1926, was 11,890. It has a 55-bed hospital, and a very active Visiting Nurse Association. The schools of Winchester are among the best in the state, and for a number of years they have used the physical examination records which comply with the standards as set forth by the State Departments of Education and of Public Health. The Board of Health is a most progressive one, and is doing a very satisfactory piece of work. There are 28 physicians living in Winchester, 14 of whom practice in the town.

METHOD OF APPROACH

The surveyors made a house-to-house canvass of the town and obtained from each person interviewed the following information concerning every member of the family: the name, address, and position in the family, the country of birth, the age, sex, whether or not the individual was a wage earner, the present illness and illnesses during the past year, the type of treatment secured, and the amount of time lost from work. For all individuals under 20 years of age, additional information was sought relative to diphtheria, chicken pox, German measles, mumps, scarlet fever, measles, and whooping cough. A history

NOTE: The results of the Winchester studies will be published in the JOURNAL in three parts. The second part dealing with the contagious diseases, and the third with the relation of physical defects to school absenteeism, will appear in the October issue.

of any of these diseases necessitated questions concerning the type of treatment and the year in which the disease occurred. An estimate was made of the economic status of the family, classifying all families in one of four groups: poor, moderate, comfortable, or wealthy.

If no member of the family was at home, blanks were left requesting that the desired information be forwarded, as the time allotted to the survey did not permit return visits. During one week of the survey, the practicing physicians in Winchester reported to the department the number of sick individuals whom they attended. This information, together with the records of the Winchester Visiting Nurse Association, was compared with the data collected by the investigators to check on the reliability of the survey. The death records were tabulated similarly to the morbidity records. A study of nursing and hospital facilities was made by consulting the records of the Winchester Visiting Nurse Association and those of the Winchester Hospital, as well as by the questionnaire method. The contagious disease records of the Winchester Board of Health were obtained to ascertain the number of diseases that were reported and the number hospitalized. The data contained on the physical record forms used in the Winchester schools was studied in relation to school absenteeism.

GENERAL DISCUSSION OF RESULTS

Records were obtained from 9,746 individuals. This comprised 82 per cent of the estimated population of the town at the time the survey was made. A census of the surveyed population is shown in Table I.

Winchester has an older population than the state. The proportion of foreign born population is less than that of the state as a whole, although the proportion of Irish and Italian is higher in Winchester than in Massachusetts as a whole. The sex ratio of Winchester differs materially from that of the state proper, since Winchester has 80.8 males for every 100 females, while Massachusetts has 96.3 males for every 100 females.

It is impossible to state mathematically the degree of reliability of the Winchester sample. The surveyed individuals were well distributed throughout the town, and in all probability furnish a very fair sample of the whole town. The accuracy of the answers given to the investigators varies considerably with the different questions. In the contagious disease part of the study the householder was asked specifically whether or not the individual members of the family had had the given diseases. The answers to these questions were largely correct, although there was some confusion between measles and German measles. The follow-up question regarding whether or not a

TABLE I
POPULATION OF WINCHESTER
(82 per cent of town)

Age	United States		Ireland		Italy		Canada		Others		Total		Both Sexes	Per cent Survey	Per cent State, Federal Census 1920
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
0-5	508	510	0	2	0	1	3	8	5	2	516	523	1039	10.7	12.0
6-15	850	892	1	2	11	6	4	9	12	9	873	918	1796	18.5	18.0
16-25	573	677	21	73	27	34	16	68	22	34	659	886	1545	15.9	16.2
26-35	428	595	17	56	49	49	23	60	36	57	553	817	1370	14.1	16.9
36-45	455	501	44	78	61	52	32	77	44	46	636	754	1390	14.3	14.0
46-55	361	431	58	79	36	29	34	62	38	51	527	652	1179	12.2	11.2
56-65	239	262	45	58	19	8	30	55	39	34	372	417	789	8.1	6.8
66-75	95	193	14	20	2	1	20	27	9	19	140	260	400	4.1	3.7
Over 75	29	91	3	8	0	0	10	13	5	5	47	117	164	1.7	1.2
Total	3549	4166	204	376	206	181	174	379	215	278	4353	5384	9746		
Total Both Sexes	7715		580		387		554		493		9746				
Percentage by nativity for survey	81.4		6.6		4.0		5.7		2.4						
Percentage by nativity for State 1920.	71.8		4.8		3.0		7.0		13.4						

NOTE: Totals include individuals for whom one or more items regarding age, sex and nationality are not complete.

doctor had seen the sick child was not so accurately answered, as many householders evidently confused the call of the Board of Health with that of the practicing physician.

In the morbidity study, the question whether the individual had had any illness in the past year was asked, and the answer depended on what the person answering the question considered an illness. Some considered the slightest pain an illness, while others did not consider themselves sick unless they were confined to bed; consequently, the morbidity figures are more accurate in the more severe conditions than in the minor ailments. But, as the survey was primarily intended to ascertain the extent of real illnesses rather than to catalogue the many aches and pains which are present in the majority of individuals, it is felt that the main object has been attained, and that the Winchester Survey gives a representative picture of the extent of real illnesses, as well as some indication of the extent of minor ailments.

During the year preceding the survey, 3152 individuals were reported as sick. This comprised 32.4 per cent of the surveyed population of Winchester. About one-sixth of those sick had more than one illness during the year, as 2581 reported one illness, 465 reported two illnesses, 87 reported three illnesses, and 4 reported five illnesses.

The nomenclature of diseases is that which was furnished the investigators by the householder. No attempt was made by the surveyors to make these causes conform with those of the International Classification of Causes of Death. The morbidity nomenclature tells what the people, themselves, complained of as sickness. Of striking interest is the fact that only one-half of the mothers who bore children during the year considered normal childbirth an illness. Upon questioning, mothers would repeatedly say that childbirth was a normal function and that they were not sick. In the Italian district this was particularly marked, as only one-seventh of the childbirths were reported to the surveyors.

During the period covered by the survey, 149 residents of Win-

TABLE II
MORBIDITY IN WINCHESTER

Diseases	Mortality	Crude Mortality Rate per 1000	Morbidity in Survey	Crude Morbidity Rate per 1000 in Survey	Crude Morbidity Rate per 1000 in Winchester
Pneumonia	10	0.8	56	5.8	6.6
Tuberculosis	11	0.9	12	1.2	2.1
Other respiratory	1	0.1	1477	151.8	151.9
T. & A. Operation			83	8.5	8.5
Other Operations			45	4.6	4.6
Infectious Diseases	5	0.4	397	40.8	41.2
Cancer	21	1.8	13	1.3	3.1
Nephritis	4	0.3	38	3.9	4.2
Apoplexy	19	1.6	11	1.1	2.7
Heart	35	2.9	128	13.1	16.0
Stomach			182	18.7	18.7
Intestines	1	0.1	132	13.6	13.7
Rheumatism			202	20.8	20.8
Nervous condition (Including headache)	2	0.2	161	16.5	16.7
Female Genitals			38	3.9	3.9
Childbirth			96	9.9	9.9
Tired Feeling			35	3.6	3.6
Accidents	3	0.3	122	12.5	12.8
Swelling			4	*	*
Pain			6	*	*
Loss of Weight			9	*	*
Diabetes	3	0.3	13	1.3	1.6
Convalescence			5	*	*
Chronic Invalidism			33	3.4	3.4
Adenitis			15	1.5	1.5
Mental			13	1.3	1.3
High Blood Pressure	11	0.9	53	5.4	6.3
Syphilis			5	*	*
Ill-defined			8	*	*
Other conditions	23	1.9	460	47.3	49.2
All causes	149	12.5	3852	396.0	408.5

* No rates computed where the crude morbidity rate in Winchester would be less than 1.0.

** In the subsequent tables, morbidity is represented by data from the survey alone.

chester died. These cases represented morbidity during the year but were not included in the tabulation of the survey. In order to obtain the correct morbidity rate, the mortality rates have been added to the morbidity rates obtained from the survey in Tables II and III.**

The incidence of most of the diseases is too small to make adjusted rates for age and sex. The same applies to nativity adjustments. In Table III an attempt has been made to give some idea of the age and nativity distribution in all types of illness. This table shows that the Irish and the Italians have lower rates than the native born and the Canadians. While these differences for "total all ages" are statistically significant, it is believed that other errors than mere chance enter in, as we find that the total time lost from sickness for these respective groups is larger among the nativity groups that give the lower incidence. The error, doubtless, is due to the probability that the Irish and the Italians reported only the more severe illnesses, although it is admitted that there may be real differences.

TABLE III
MORBIDITY IN WINCHESTER: BY AGE AND NATIONALITY
(Rates per 1000)

Age	United States	Irish	Italian	Canadian	Others	Total		Total	Ratio Morbidity Rate Females to Males
						Male	Female		
Under 5	388	*	*	*	*	371	406	388	1.09
5-15	412	*	*	*	*	394	423	408	1.07
16-25	282	181	229	381	250	255	293	277	1.15
26-35	346	247	235	373	269	268	358	334	1.34
36-45	385	229	292	312	367	303	402	356	1.33
46-55	457	248	400	366	326	348	465	413	1.34
56-65	518	514	444	494	288	400	573	491	1.44
66-75	756	588	*	659	785	588	815	736	1.39
Over 75	1034	*	*	*	*	808	977	929	1.21
Male (All ages)	354	231	291	411	302	359			
Female " "	452	343	304	422	348		446		1.24
Total " "	407	303	297	418	335			407	

* No rates computed where the population of the age groups is very small.

In all the age groups the females have higher morbidity rates than the males. The ratios of the rates vary from 1.07 in the 16-25 year group, to 1.44 in the 56-65 year group, with the ratio for all ages of 1.24. A second ratio for all ages was computed, omitting childbirth and diseases of the female genitals. This ratio (1.20) shows that sickness is more common among women even under these conditions. This phenomenon is not confined to Winchester alone. Sydenstricker¹ shows in his morbidity study of Hagerstown that the ratio of sick females to males was 1.28; and omitting childbirth and diseases of the

female genitals the ratio was 1.16. The ratio of the death rates among females to that among males in Winchester for the past 23 years is 0.94. Females apparently have more sicknesses than males, but the death rate is less. The relation between sickness and time lost is shown in Table IV.

The total number of days lost from illness in Winchester was 12,904. Accidents accounted for 2898 days, respiratory diseases 2570 days, intestinal diseases 1244 days, stomach complaints 965 days, heart affections 923 days, and the remainder were distributed among various other conditions.

The types of illnesses were studied in relation to the economic status of the individuals. When all diseases are considered collectively, there are significant differences between the rates for the various economic groups, the poor having the lowest rate, and the comfortable and wealthy, the highest. Whether this depicts real differences or merely indicates that more minor complaints were reported by the well-to-do is difficult to ascertain. The only individual diseases where significant differences were found were in the respiratory group, accidents among males, and rheumatism and stomach complaints among females. In the respiratory group the reporting of colds for both sexes increased with better economic conditions. Accidents among males were more common in the moderate wage groups. This would be expected, as mechanics, electricians, and men exposed to hazardous occupations are largely in this group.

Stomach complaints and rheumatism are both significantly high in the comfortable and wealthy female groups, but this again may only indicate differences in reporting. The rates for the diseases with significant differences are given in Table V.

There are slightly significant differences in the per cent of cases that employed physicians in the different groups (Table VI).

There is no significant difference between the percentage of sick males and females who consulted physicians; the respective rates being 78.8 for the males and 77.8 for the females.

Of the total cases of sickness 78.4 per cent employed a physician. There are no significant differences between the various nativity groups in regard to the employment of physicians, but the Italians and Canadians show lower rates than the other groups. There is a possibility that if the native born children of these various nativity groups were included with their parents, these differences might be significant. The percentage of physicians employed varied considerably with the different complaints. Table VII shows this for the more common diseases.

TABLE IV

Country of Birth	TIME LOST: BY NATIVITY GROUPS			Average Time Lost ¹		
	Wage Earners			(Days per year)		
	Male	Female	Total	Male	Female	Total
United States	1245	517	1762	5.9	2.7	5.0
Ireland	147	117	264	8.7	2.5	6.0
Italy	124	10	134	9.5	3.7	9.1
Canada	93	89	182	7.1	1.8	4.5
Other Countries	122	61	183	3.5	1.2	2.7
Not Stated	6	9	15			
Total	1737	803	2540	6.3	2.5	5.1

TABLE V

	MORBIDITY RATES: BY ECONOMIC STATUS								
	Poor			Moderate			Comfortable & Wealthy		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Population	1152	1106	2258	1477	2026	3503	1643	2114	3757
Total Illnesses	243	324	567	487	830	1317	728	1146	1874
Rate per 1000	211	293	251	330	408	371	443	542	499
Respiratory Diseases	96	98	194	197	287	484	359	480	839
Rates per 1000	83	89	86	134	142	138	218	227	223
Accidents	12	4	16	39	24	63	14	27	41
Rates per 1000	10	4	7	26	12	18	9	13	11
Rheumatism	21	21	42	12	39	51	23	80	103
Rates per 1000	18	19	19	8	19	15	14	38	27
Stomach	8	14	22	19	34	53	39	65	104
Rates per 1000	7	13	10	13	17	15	24	31	28

TABLE VI

	PERCENTAGE OF PHYSICIANS EMPLOYED: BY ECONOMIC STATUS		
	Poor	Moderate	Comfortable & Wealthy
Male	75.3	77.9	80.6
Female	71.9	76.4	80.8
Total	73.6	76.7	80.7

TABLE VII

Disease	TYPE OF TREATMENT			
	Registered Practitioner	Christian Science Healer	Chiropractor	None
Other respiratory	67.2	0.4	0.1	32.3
Infections	90.0	0	0	10.0
Heart	90.4	0	0	9.6
Stomach	72.0	0	0	28.0
Intestines	88.0	0	0	12.0
Rheumatism	73.4	0	0	26.6
Nervous	81.1	0	0	18.9
Accidents	94.8	0	0	5.2
All causes	78.4	0.5	0.1	21.0

Six physicians reported attending 235 cases during the week of June 1 to 7, 1927. If the physicians who did not report their cases had seen a similar number of cases to those who furnished reports, there would have been 548 cases attended by physicians during that week. If this represents 78.4 per cent of all the cases, there would have been 699 people ill in Winchester at that time. Our surveyors found

705 illnesses at the time the call was made. This gives added weight to the conclusion that the data collected is fairly representative of the true conditions in the town.

An attempt was made to determine the hospital and nursing facilities in Winchester by studying the records of the Visiting Nurse Association, by ascertaining the number of admissions to the Winchester Hospital, and by questioning a sample group of the surveyed population. The results indicate that Winchester is meeting the present demand for hospital and nursing care.

In the last fiscal year, the Winchester Hospital admitted 365 patients who were residents of the town, comprising about 3 per cent of the population. The proximity of Boston leads to the belief that many other patients went to other hospitals. Of these admissions, 87, or 23.8 per cent of the total Winchester admissions, were for childbirths, comprising 44.3 per cent of the births in Winchester. An additional 19.1 per cent of the births were hospitalized in out-of-town hospitals, making 63.4 per cent of the births in Winchester hospital cases. The per cent hospitalized by nativity is shown in Table VIII.

TABLE VIII
HOSPITALIZATION FOR CHILDBIRTH: BY NATIVITY OF MOTHER
(Rate per 100)

United States	Ireland	Italy	Canada	Other	Total
78.7	75	14.9	88.8	71.4	63.4

Since the numbers are so small, the maternal death rate by nativity is not included, as unwarranted inference for or against the quality of hospital service might be drawn.

Twenty-seven cases of respiratory diseases were hospitalized in the Winchester Hospital. This represents 1.5 per cent of the number obtained in the survey, and 7.4 per cent of the total admissions of Winchester patients to the hospital. The average length of stay for patients who were discharged alive from the hospital was 7.9 days, for those who died 3.4 days. The average length of stay for respiratory cases was 10.7 days, and for confinement cases 14.0 days. A large number of tonsil and adenoid cases made the average length of stay short.

About 10 per cent of the families in Winchester employed visiting nurses. These nurses cared for 1 patient in 193 homes, 2 patients in 69 homes, 3 patients in 3 homes, and 4 patients in 1 home. In the sample group interviewed by the surveyors, it was found that district nurses, practical nurses, and private nurses were employed about equally. As the surveyors queried only 63 families who had employed nurses, it is impossible to state whether the population at large would have shown a like distribution.

The private duty nurse received a salary ranging from \$42 to \$49 a week, being employed from a few hours in some instances to 83 days, the median time being 2 weeks. The practical nurse received from \$15 to \$35 per week, being employed from 4 days to 3 years, the median being 5 weeks. Nurses were employed for a great variety of causes, the chief one being childbirth. Two nurses were hired merely to help with the housework. As a general rule, the nurses employed were satisfactory, and there was no complaint of difficulty in securing their services.

CONCLUSIONS

1. The population of Winchester is not exactly representative of Massachusetts as a whole, as Winchester has an older population, an excess of females and fewer foreign born.

2. The findings of the survey are felt to be fairly accurate for the more serious illnesses, and considerably less accurate for such minor ailments as a headache, slight cold, etc.

3. Thirty-two per cent of the group surveyed reported being ill during the year preceding, an average of 1.2 times.

4. The crude morbidity rate for all reported illnesses was 409 per 1,000, the largest single group being colds and grippe with a rate of 152.

5. The Italians do not consider childbirth an illness, and most of the confinements occur at their homes.

6. Females have a higher morbidity rate than males, but a lower mortality rate.

7. The average time lost by wage earners for illness was 5.1 days. The average time lost by males was two and one-half times that lost by females.

8. There are apparent differences among the different nativity groups but these may be due to unknown errors. The Italians and Irish have low morbidity rates but have greater average time lost than the other nationalities. The Italians and Canadians employ doctors to a less extent than the other groups, but the small numbers make this finding insignificant statistically.

9. The number of illnesses reported increased with the economic status of the individual for all diseases as a whole, as well as for respiratory diseases, for rheumatism, and for stomach trouble among the females. Accidents were greater among males in the moderate economic group.

10. The percentage of physicians employed increased with the economic status.

11. Nursing and hospital facilities are apparently adequate to the present demand in Winchester.

12. The findings of this study emphasize the advisability of conducting similar surveys in connection with larger populations in order to eliminate the errors of chance fluctuation.

NOTE: Acknowledgment is made of the valuable aid given by the surveyors: Anna Crivello, Mary Cronin, Mrs. Filip Forsbeck, and Dr. Florence Hopkins. Without their indefatigable and intelligent services, together with their enthusiastic coöperation, this survey would not have been possible. Recognition is made of the assistance rendered by Estella L. Power in the compilation of the various tables, and by Dr. Carl R. Doering in their analysis.

REFERENCE

1. Sydenstricker. A Study of Illness in a General Population Group, U. S. Public Health Report, Volume 41, Number 39.