IMPAIRMENTS IN A RURAL POPULATION

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IV. PREVALENCE OF IMPAIRMENTS BY AGE AND SEX

BEFORE attempting to evaluate the significance of variations in the medical examination data with respect to age and sex, it will be necessary to review some of the factors which influence these variations only indirectly. While the exact effect of these factors must remain undetermined, there is a strong probability that they influence the data at more than one point. Some are psychological and affect the interpretation of the history findings more than that of the physical and laboratory findings. Among such factors may be mentioned the awareness of and apprehension about symptoms, modesty and secretiveness on the part of the patient. These vary quite definitely with age and to some extent with sex as well. Again, the form of examination given varies quite definitely with age and to a more limited extent with sex. This is only in part because of anatomical changes and differences. Finally, the extent to which a given condition may be identified varies with both age and sex; with age because a complete examination requires a certain degree of cooperation from the patient and this, particularly at the extremes of life, is not always forthcoming; with sex because of the more frequent occurrence of somatic limitations on diagnosis, notably adiposity among females of this study.

The above do not constitute limitations in the interpretation of these data alone but are common to most of the reported medical examination data and must be kept in mind when interpreting them. A specific limitation of these data, however, is that clinic sessions were usually held in the afternoon and that women were,

* This is the fourth in a series of notes on the physical status of a rural population. The first and second appeared in the July and October, 1937, issues of The Milbank Memorial Fund *Quarterly*, and the third in the January, 1938, issue.

in general, more readily able to attend. They may therefore constitute a more random sample than the men for whom attendance often entailed a sacrifice of working time. Clinics were also held in the evening in an effort to counterbalance this factor but it seems unlikely that they were started soon enough to make up wholly for the possible defect.

Only the total sample data are given in this section, notable variations between the figures for this sample and those for the true sample being indicated textually. The same differentiation between data from history alone and data from other sources as well has been maintained here as in former sections.

The prevalence data here presented are almost unique in two respects: they cover the entire life span and they were derived from a rural population, not wholly free from selective errors but far more so than hospital or ordinary diagnostic clinic records. Comparative data are therefore hard to find and must be taken from a number of sources. This introduces errors due to differing methods of observation and due to the fact that urban populations, for which the most extensive data have accumulated, show somewhat different findings.[1]

With these qualifications in mind, brief comparisons have been made of the present findings with those of other studies.

Data on the prevalence of certain specific chronic conditions from the field survey of the Committee on the Costs of Medical Care have been presented in detail for age by Collins.[2] Comparison of trends with age only can be made as sex-specific data for that study have not as yet appeared and a discussion of the differences in degree shown by the two studies is beyond the scope of the present section. Because a morbidity survey of the type reported

[1] Sydenstricker, Edgar: HEALTH AND ENVIRONMENT. New York, McGraw-Hill Publishing Company (Social Trends Monographs), 1933. *See* Chapter IV, a discussion of urban-rural differences in morbidity, specifically Table 12, p. 63.

[2] Collins, Selwyn D.: Age Incidence of Specific Causes of Illness. *Public Health Reports,* United States Public Health Service, October 11, 1935, 50, No. 41, pp. 1404-1427. Further reference in this section to the Costs of Medical Care study pertain to data cited in this article.

by Collins includes a great many acute conditions as well as chronic ones and does not offer detailed data on physical findings, the comparison can only be made for certain categories, but these in general agree in trend with the data presented here.

More detailed comparisons may be made with the results of studies based on medical examinations but these have usually been conducted with populations restricted in some degree as to age, sex, occupation or residence, and such comparisons are fraught with qualifications. The most notable analysis of this type is that of the records of the Life Extension Institute, from which data on ages from twenty years to the end of life have been made available by Sydenstricker and Britten.[3] A detailed presentation of findings by sex and by age after the age of twenty years has been made by Britten,[4] and shows some correspondence with the findings of the present study.

A. HISTORY DATA

The age and sex specific rates for persons mentioning certain leading symptoms are given in Table 6 and are shown graphically in Figure 2. The figures show, with few exceptions, an increasing prevalence with age. This trend is, however, lacking for *frequent or prolonged coughs or colds,* and for *chronic or recurring skin trouble.* The symptom of *headache* seems to be mentioned more frequently by persons in the middle ages of life, and this trend is also evident in the rates for this symptom from the Costs of Medical Care study.

The most striking fact about these symptom data, however, are the relatively high rates for females. These are probably not wholly to be explained upon an intrinsic sex-difference in prevalence as

3 Sydenstricker, Edgar and Britten, Rollo H.: Physical Impairments of Adult Life. *American Journal of Hygiene,* January, 1930, xi, No. 1, pp. 73-135. The reference includes Parts 1 and 2 of this extensive study giving important data from examinations of 100,924 males.

4 Britten, Rollo H.: Sex Differences in the Physical Impairments of Adult Life. *American Journal of Hygiene,* May, 1931, xiii, No. 3, pp. 741-770. Further reference in this section to the Life Extension Institute records pertain to data cited in this article.

there are a number of psychological factors which may have contributed to the excess rates among females. The leading symptom record, for example, was taken by the clinic nurse whose acquaintance many of the women had made before coming for examination and with whom they could more freely discuss their symptoms. The corresponding data for the Life Extension Institute records were collected somewhat differently, the men being questioned by male examiners and women by female examiners, and excess rates for females appear chiefly for *constipation* and *frequent or painful urination.*

Table 6. Number and percentages of examined persons, by age and sex, mentioning specified leading symptoms; total sample.

Symptom	Sex	Rates, Per Cent							Cases						Examined All Ages
		All Ages Standardized[1]	All Ages Crude	0-14	15-29	30-44	45-59	60+	Total All Ages	0-14	15-29	30-44	45-59	60+	
Dizziness	M	11.0	11.6	1.8	6.4	19.6	20.9	28.6	65	4	6	19	18	18	560
	F	18.9	20.3	4.0	20.1	23.8	37.0	47.3	135	9	30	30	40	26	664
Headache	M	19.3	19.5	9.5	16.0	37.1	31.4	15.9	109	21	15	36	27	10	560
	F	32.1	33.3	13.7	38.3	48.4	48.1	36.4	221	31	57	61	52	20	664
Frequent or Prolonged	M	22.1	21.8	16.8	24.5	30.9	19.8	23.8	122	37	23	30	17	15	560
Colds or Coughs	F	21.5	21.7	17.3	26.8	17.5	25.0	29.1	144	39	40	22	27	16	664
Shortness of Breath	M	14.9	15.9	2.3	6.4	24.7	39.5	31.7	89	5	6	24	34	20	560
	F	20.1	22.4	1.8	13.4	33.3	49.1	54.5	149	4	20	42	53	30	664
Cardiac Pain	M	7.4	7.5	0.9	7.4	9.3	11.6	22.2	42	2	7	9	10	14	560
	F	12.8	13.9	2.2	14.1	12.7	28.7	34.5	92	5	21	16	31	19	664
Constipation	M	16.7	17.1	9.6	12.8	23.7	30.2	22.2	96	21	12	23	26	14	560
	F	29.1	30.9	10.2	32.2	34.1	52.8	61.8	205	23	48	43	57	34	664
Periodic or Habitual	M	13.4	13.7	5.0	10.6	24.7	20.9	22.2	77	11	10	24	18	14	560
Use of Laxatives	F	24.6	26.1	9.3	27.5	28.6	42.6	52.7	173	21	41	36	46	29	664
Abdominal Complaints	M	15.5	15.7	4.6	14.9	23.7	20.9	36.5	88	10	14	23	18	23	560
	F	23.2	25.0	8.0	20.1	34.9	47.2	41.8	166	18	30	44	51	23	664
Frequent Urination	M	8.7	9.5	5.5	4.3	7.2	16.3	25.4	53	12	4	7	14	16	560
	F	10.8	11.9	4.9	5.4	11.9	23.1	36.4	79	11	8	15	25	20	664
Difficult or Painful	M	2.7	2.9	0.4	1.6		9.3	6.3	16	1	0	3	8	4	560
Urination	F	5.5	6.2	0.4	2.7	7.9	13.0	21.8	41	1	4	10	14	12	664
Chronic or Recurring	M	6.6	6.2	3.2	9.6	8.2	8.1	6.3	35	7	9	8	7	4	560
Skin Trouble	F	8.9	9.0	8.0	7.4	11.9	10.2	9.1	60	18	11	15	11	5	664
"Rheumatic" Pains	M	20.3	21.4	1.8	11.7	34.0	47.7	49.2	120	4	11	33	41	31	560
	F	21.2	23.6	4.4	10.1	34.1	47.2	69.1	157	10	15	43	51	38	664

[1] Standardized to rural white population, United States Census, 1930.
Each sex was standardized to the age distribution of the corresponding sex; the age distribution in the two sexes showed very slight differences.

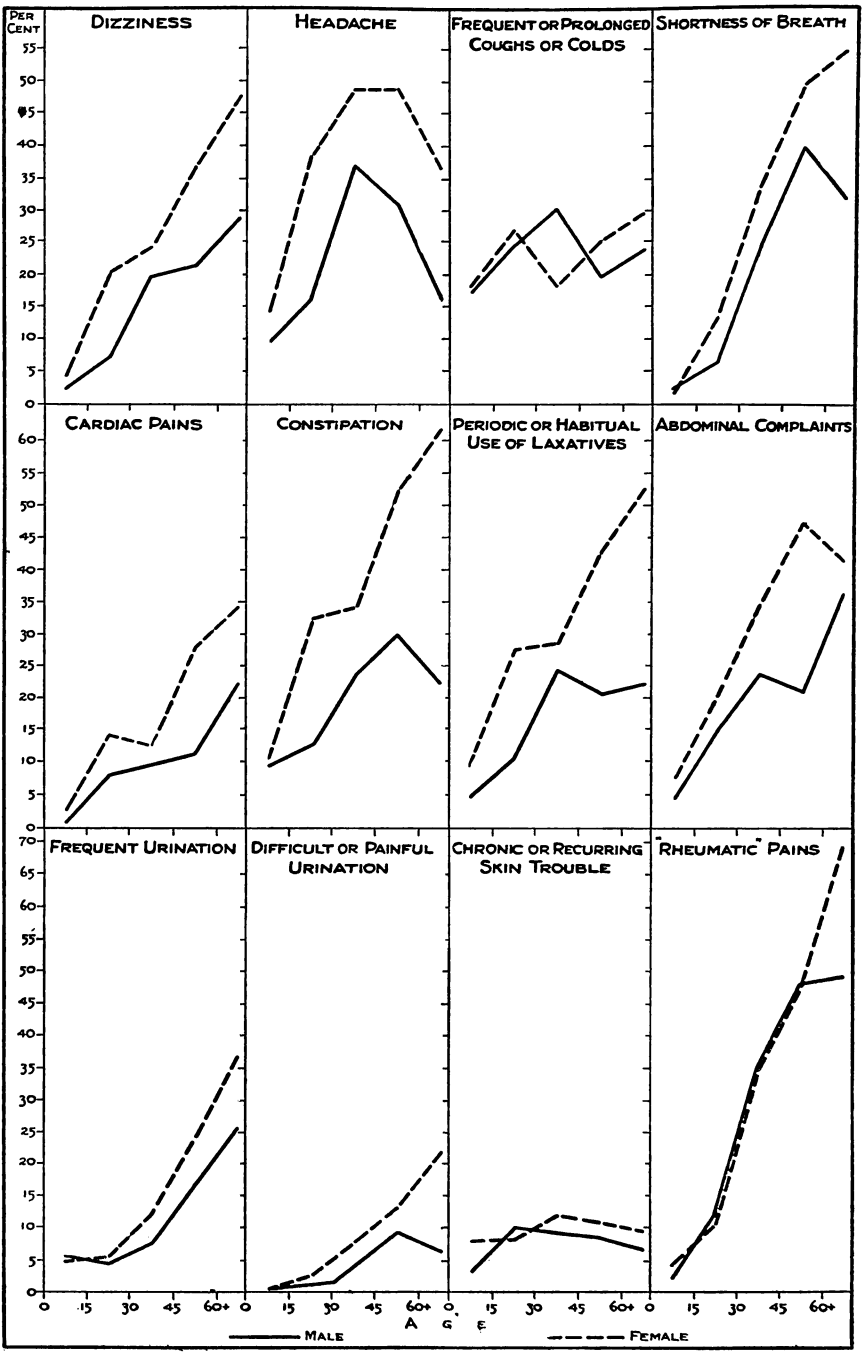


Fig. 2. Percentages of males and of females mentioning leading symptoms at different ages; total sample.

It was this unspecific symptom group which showed the most definite differences between true sample and total sample rates. The true sample rates fall quite consistently lower than those shown in Table 6 and in Figure 2. The curve for any given symptom for females of the true sample usually lies between the corresponding curves for females and for males of the total sample, and the curve for males of the true sample lies consistently below the corresponding curve for males. The differences shown by these two samples are therefore rather of degree than kind.

The age and sex prevalence of conditions diagnosed upon the basis of history record is presented in Table 7 and in Figure 3, and in general offers a very different picture from that outlined in the discussion of symptoms. The variations here are somewhat harder to evaluate in view of the relatively small case totals but rates tend to show the highest figures in the middle ages of life and to decline at the older ages. This is especially true of psychoneurosis, diseases of women, and of lumbago and backache. The Costs of Medical Care data show the same trend for the last two of these conditions.

The absence of cases upon which to obtain rates for *mental deficiency* at the older ages of life may be an artifact, traceable to the difficulty of evaluating, during a routine examination, a person's mental status after the school period. There is also the possibility that such as have not been able to learn to live under rural conditions have died or have been placed in institutions.

The excess rates appearing for females in the leading symptom group are here only in evidence for psychoneurosis; bronchitis, indeed, shows an excess among males.

When comparison of these data are made with the Life Extension Institute findings, a most significant difference appears for *diseases of women*. Rates in that study for dysmenorrhea, leukorrhea, and for profuse and irregular menstruation (essentially a combination of the two categories shown here) decrease from 19.3 per cent at ages 20-29 to 0.9 per cent at 60 years and over, while the

Condition or Class of Condition	Sex	Rates, Per Cent							Cases						
		All Ages Standardized[1]	All Ages Crude	0-14	15-29	30-44	45-59	60+	Total All Ages	0-14	15-29	30-44	45-59	60+	Examined All Ages
Nervous System															
Mental Deficiency	M	—	1.1	1.8	2.1	—	—	—	6	4	2	0	0	0	560
	F	—	1.5	2.2	2.7		0.4		10	5	4	0	1	0	664
Psychoneurosis	M	3.1	3.0	0.9	3.2	7.2	3.4		17	2	3	7	5	0	560
	F	5.4	5.7	1.3	6.0	11.1	9.3	3.6	38	3	9	14	10	2	664
Other	M	2.4	2.5	0.6		7.2	4.6	1.6	14	0	2	7	4	1	560
	F	1.9	2.1	0.5		3.2	4.6	5.4	14	0	2	4	5	3	664
Respiratory System															
Bronchitis	M	9.2	8.9	2.3	11.7	15.5	10.5	15.9	50	5	11	15	9	10	560
	F	5.0	5.3	2.6	4.7	6.3	6.5	12.7	35	6	7	8	7	7	664
Asthma	M	1.2	1.2	0.4	1.1	3.1	1.2	1.6	7	1	1	3	1	1	560
	F	1.1	1.2	0.4	0.7	2.4	1.8	1.8	8	1	1	3	2	1	664
Gastrointestinal System															
Hemorrhoids	M	5.0	5.2	1.4	3.2	10.3	10.5	6.3	29	3	3	10	9	4	560
	F	6.7	7.4	0.4	6.0	10.3	13.9	20.0	49	1	9	13	15	11	664
Other	M	2.3	2.5	0.6	0.6	4.1	7.0	3.2	14	0	2	4	6	2	560
	F	1.6	1.7	0.9	2.0	2.4	1.8	1.8	11	2	3	3	2	1	664
Diseases of Women															
Menstrual	F	—	5.1	a	6.7	3.2	a	a	14[2]	a	10	4	a	a	275[2]
Other	F	1.6	1.5	0.4	2.7	3.2	0.9		10	1	4	4	1	0	664
Skeletal System															
Lumbago and Backache	M	4.3	4.3	0.4	4.3	8.2	9.3	4.8	24	1	4	8	8	3	560
	F	4.5	4.8	0.4	5.4	8.7	9.3	3.6	32	1	8	11	10	2	664

a No data at these ages.

[1] Standardized to rural white population, United States Census, 1930. Each sex was standardized to the age distribution of the corresponding sex; the age distribution in the two sexes showed very slight differences.

[2] Only ages 15-44 are considered here.

Table 7. Number and percentages of persons examined, by age and sex, with specified conditions diagnosed primarily on the basis of history; total sample.

combined rates of the two exclusive categories for the present study fall only from 9.4 per cent at ages 15-29 to 0.9 per cent in the oldest age group.

The true sample data for this group of conditions reveal a somewhat lower prevalence for both males and females, but a higher incidence does appear for lumbago and backache.

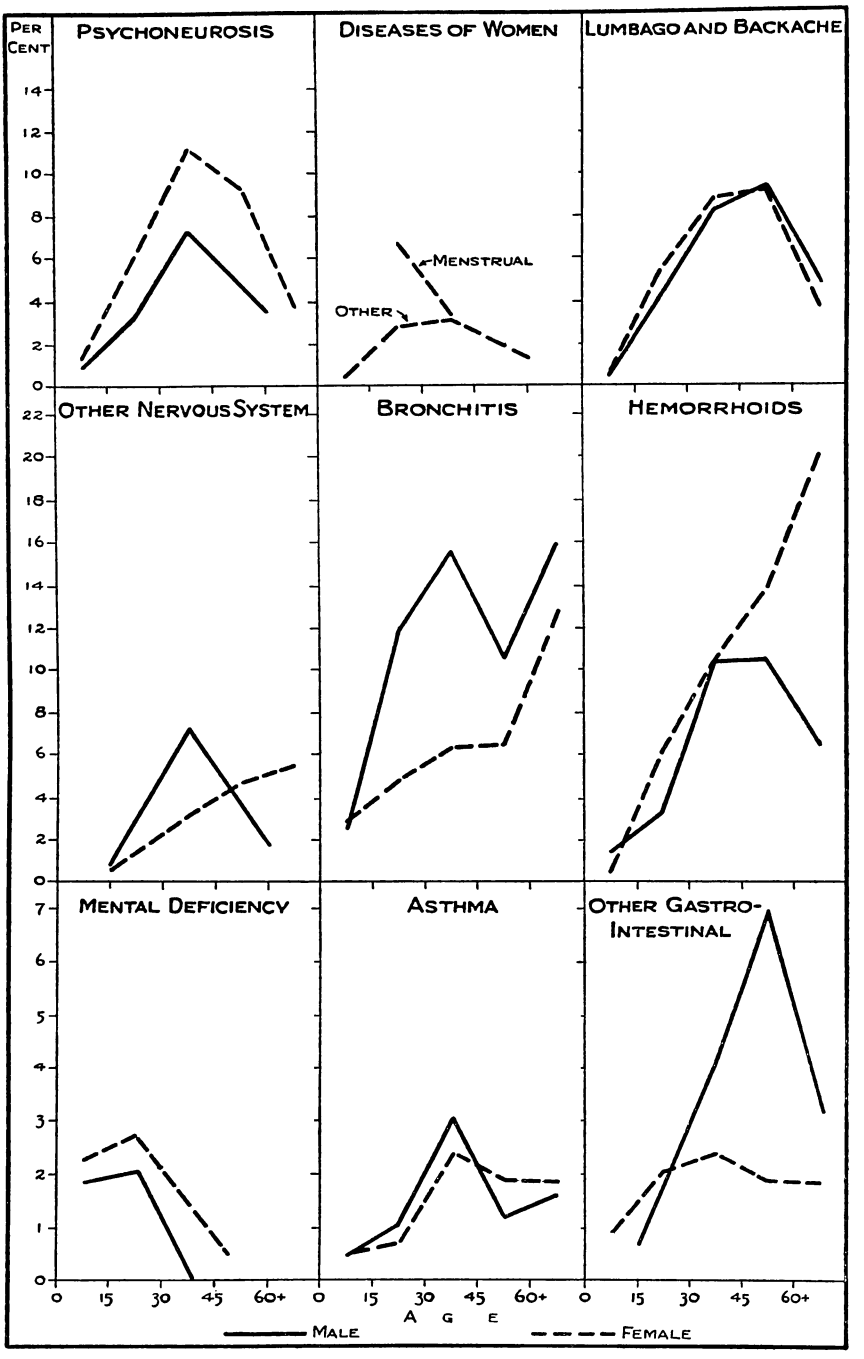


Fig. 3. Percentages of males and of females at different ages with specified impairment diagnosed on the basis of history; total sample.

B. PHYSICAL AND LABORATORY FINDINGS

The data presented in Table 8 detail the rates for, and the number of cases of, each of the conditions discussed in the previous section. The graphs in Figures 4-9, however, do not include certain conditions for which the data are of uncertain value from the point of view of the present analysis. Relative weight was one of the conditions thus omitted from the graphs because it is generally felt to be an uncertain index of under or overweight. It was the observation of at least one examiner, however, that persons "20 per cent or more overweight" did in fact tend to be obese, and that obesity was a far more common finding among females than among males in this area. The relative overweight data in Table 8 indicate that obesity, by this index at least, tends to increase in prevalence with age and predominates among females.

The various degrees of defective *distance vision* all show a definite relationship to age in their prevalence; some of the variations have, however, been concealed by the large age groups which it has been necessary to adopt for this study. More detailed data over the life span has been presented by Collins[5] for males and shows a progressive increase in prevalence with age only for the more severe degrees of defect.

The sex differences are definite in that females, particularly at ages under 60 years, show higher rates for all except the most extreme degree—blindness or virtual blindness. This excess has been recorded for school children by Collins,[6] and it appears for the classification 20/30 or worse in the Life Extension Institute data at ages from 20 to 50 years when an excess for males begins.

The rates for both sexes also tend to be higher than those given for men and women in Table 8. This latter is, however, a probable

5 Collins, Selwyn D.: Variations in Eyesight at Different Ages. *Public Health Reports,* United States Public Health Service, December 19, 1924, 39, No. 51, pp. 3189-3194.

6 Collins, Selwyn D.: Eyesight of the School Child as Determined by Snellen Test. *Public Health Reports,* United States Public Health Service, November 28, 1924, 39, No. 48, pp. 3013-3027.

urban-rural difference as Sydenstricker and Britten[7] have shown that there is a generally lower incidence of defective vision among agricultural as compared with other occupational groups drawn primarily from urban areas.

The prevalence of *impacted cerumen* appears to vary less definitely with age, but quite definitely at the older ages with sex. As these data are derived only from the group examined otoscopically, these sex-differences are probably actual ones. It has already been noted that small foreign bodies inserted in the ear were often found as a nucleus for the impaction. Many of the wax plugs removed from the ears of men contained hairs cut at both ends, quite probably blown into the ear by the barber when clearing the outer ears after haircuts, and some contained hayseed introduced in the course of farm work. These may have acted as irritants leading to a greater wax production.

The variations in *deafness* are rather more striking with age and are less conclusive as regards sex.

Variations in the prevalence of *deviated septum* are not easily interpreted. The nasal passages were examined only through the nostrils, and it is possible that the less frequent occurrence in childhood and among women may be explained in part by the fact that the smaller nostril of children and the usually smaller and narrower nostril in females permit a less complete examination. However, the differences are quite striking and this interpretation cannot entirely explain the discrepancies. Former fractures of the nose with resulting septal deviations were encountered only three times in men and do not account for the differences which would appear to be at least in part actual developmental ones. The Life Extension Institute findings show consistently higher rates for both sexes but the differences are less marked than in the present data and the trend is very definitely *downward* with age.

7 Sydenstricker, Edgar and Britten, Rollo H.: Physical Impairments and Occupational Class. *Public Health Reports,* United States Public Health Service, August 22, 1930, xlv, No. 34, pp. 1927-1962.

Finding	Sex	Rates, Per Cent							Cases						
		All Ages Standardized[1]	All Ages Crude	0-14	15-29	30-44	45-59	60+	Total All Ages	0-14	15-29	30-44	45-59	60+	Examined All Ages
Weight															
20 per cent or more overweight, relative to height and age	M	7.0	7.3	4.7	4.6	8.7	13.4	9.8	39	10	4	8	11	6	536
	F	18.6	20.1	7.7	10.9	32.2	35.5	38.9	131	17	16	39	38	21	651
15 per cent or more underweight, relative to height and age	M	5.9	6.0	3.7	5.7	7.6	3.7	14.8	32	8	5	7	3	9	536
	F	9.4	9.4	6.3	12.9	9.9	7.5	14.8	61	14	19	12	8	8	651
Eyes, Distance Vision															
20/30 or worse, one or both eyes without glasses	M	35.7	40.4	21.4[2]	22.0	30.8	57.4	88.6	110	15[2]	13	16	27	39	272
	F	45.9	49.5	31.2[2]	34.1	44.3	78.9	86.1	155	23[2]	29	27	45	31	313
20/40 or worse, one or both eyes without glasses	M	25.9	30.0	11.4[2]	18.6	21.2	38.3	75.0	81	8[2]	11	11	18	33	272
	F	32.0	35.8	14.9[2]	24.7	26.2	61.4	80.6	112	11[2]	21	16	35	29	313
20/50 or worse, one or both eyes without glasses	M	19.6	23.2	7.1[2]	11.9	13.5	34.0	63.6	63	5[2]	7	7	16	28	272
	F	25.4	29.1	8.1[2]	22.4	16.4	49.1	77.8	91	6[2]	19	10	28	28	313
Blind or perceiving movement only, as above	M	2.3	2.7	1.4	0.5		2.3	14.3	15	3	0	1	2	9	560
	F	1.2	1.4	0.4	0.4		2.8	7.3	9	1	0	1	3	4	664
Ears															
Impacted cerumen	M	13.1	13.8	8.2	15.4	13.2	13.7	24.5	45	9	10	7	7	12	327
	F	8.2	8.2	10.8	7.0	4.8	6.8	10.0	31	14	6	3	4	4	378
Marked deafness	M	2.8	3.4	1.1		1.9	7.8	8.2	11	2	0	1	4	4	327
	F	1.3	1.6	0.5		0.8		10.0	6	0	1	1	0	4	378
Other ear	M	—	1.5	1.7		1.9	1.0		5	3	0	1	1	0	327
	F	—	2.1	0.9		3.2	3.4	5.0	8	0	2	2	2	2	378
Nose															
Deviated nasal septum, moderate or marked	M	15.0	15.6	5.7	12.0	30.4	19.5	25.4	81	11	11	28	16	15	519
	F	5.3	5.9	1.4	4.2	6.6	8.6	20.4	37	3	6	8	9	11	629
Deviated nasal septum, marked only	M	4.0	4.2	1.5	2.2	8.7	7.3	5.1	22	3	2	8	6	3	519
	F	0.4	0.5	0.3		—	—	—	3	0	1	0	0	2	629
Hypertrophy of turbinates	M	5.5	5.6	6.2	4.3	8.7	3.6	3.4	29	12	4	8	3	2	519
	F	3.8	3.6	2.9	6.3	3.3	2.9	1.8	23	6	9	4	3	1	629
Other nose	M	2.3	2.3	0.5	3.3	1.1	3.6	6.8	12	1	3	1	3	4	519
	F	1.6	1.6	1.9	1.1		1.9		10	4	3	0	3	0	629
Mouth															
Pyorrhea and gingivitis	M	17.2	17.3	2.8	14.0	34.4	34.1	25.4	94	6	13	31	28	16	542
	F	10.7	11.7	2.4	7.6	27.4	17.8	10.9	75	5	11	34	19	6	642
Dental caries, one or more cavities	M	40.5	40.6	43.7	37.2	45.9	40.7	27.4	217	93	35	39	33	17	535
	F	37.7	36.6	46.2	40.3	38.6	21.8	11.1	232	102	56	46	22	6	634
Dental caries, five or more cavities	M	12.0	12.7	11.3	4.2	21.2	14.8	16.1	68	24	4	18	12	10	535
	F	10.2	10.2	8.1	10.8	14.3	11.9	5.6	65	18	15	17	12	3	634
Teeth lost, one or more missing	M	51.5	53.2	11.0	45.2	84.4	96.3	98.4	281	22	42	76	79	62	528
	F	50.0	54.6	11.6	46.1	84.6	93.4	100.0	342	24	65	99	99	55	626
Teeth lost, one set or both	M	13.6	16.5	—	—	12.2	35.4	74.6	87	0	0	11	29	47	528
	F	19.8	23.8	—	5.0	27.4	59.4	85.4	149	0	7	32	63	47	626
Other mouth	M	2.5	2.4	1.9	3.2	4.4	1.2	1.6	13	4	3	4	1	1	542
	F	1.4	1.4	1.4	1.4	0.8	1.8		9	3	2	1	3	0	642
Throat															
Tonsils enlarged, buried or infected	M	44.6	44.7	45.2	39.4	41.7	43.5	57.4	244	95	37	40	37	35	546
	F	40.7	41.2	42.3	33.1	42.4	45.4	47.2	270	93	49	53	49	26	656
Tonsils enlarged	M	22.8	23.4	41.4	14.9	16.7	10.6	3.3	128	87	14	16	9	2	546
	F	23.1	22.1	38.2	16.2	12.8	13.0	12.7	145	84	24	16	14	7	656
Tonsils buried	M	17.7	17.9	2.4	19.1	20.8	29.4	49.2	98	5	18	20	25	30	546
	F	15.4	16.8	3.2	14.2	25.6	32.4	27.3	110	7	21	32	35	15	656
Tonsils infected	M	9.4	9.3	5.7	9.6	11.4	16.5	8.2	51	12	9	11	14	5	546
	F	6.9	7.2	5.0	6.1	9.6	10.2	7.3	47	11	9	12	11	4	656
Thyroid															
Diffuse or nodular enlargement	M	0.5	0.5	—	0.5	—	0.7		3	0	0	2	1	0	551
	F	5.0	5.5	0.5	4.7	8.8	10.3	11.1	36	1	7	11	11	6	652
Diffuse enlargement (simple goiter)	M	0.2	0.2	—	—	—	—	—	1	0	0	1	0	0	551
	F	3.1	3.4	0.5	3.4	4.0	8.4	3.7	22	1	5	5	9	2	652
Heart															
Heart disease, all forms	M	2.9	3.6	0.6		0.5		27.0	20	0	2	0	1	17	556
	F	3.4	3.6	1.3	2.0	2.4	2.8	22.6	24	3	3	3	3	12	657
Valvular and congenital	M	0.7	0.7	0.6		—	0.8	—	4	0	2	0	0	2	556
	F	1.4	1.4	1.3	2.0	—	1.0	—	9	3	3	3	0	0	657

Table 8. Number and percentages of examined persons, by age and sex, with specified conditions diagnosed prima[illegible]

Finding	Sex	Rates, Per Cent							Cases						
		All Ages Standardized[1]	All Ages Crude	0-14	15-29	30-44	45-59	60+	Total All Ages	0-14	15-29	30-44	45-59	60+	Examined All Ages
Blood Pressure															
Systolic pressure, 160 + mm.	M	7.0	9.9	0.7[2]		5.5	14.4	32.8	38	0[2]	1	5	12	20	385
	F	12.1	16.8	0.5[2]		7.6	35.0	64.8	80	1[2]	0	9	35	35	475
Lungs (including X-ray findings)															
Nontuberculous pulmonary disease	M	2.0	2.1	0.4	0.5		5.8	9.5	13	1	0	1	5	6	560
	F	0.6	0.8	—	0.4		1.8	3.6	5	0	0	1	2	2	664
Abdomen															
Findings interpreted as gastrointestinal	M	0.9	0.9	0.9	1.1	1.0	0.7		5	2	1	1	1	0	560
	F	1.7	1.8	0.4	2.0	4.0	1.8	1.8	12	1	3	5	2	1	664
Findings interpreted as female genital	F	1.5	1.5	0.5	2.7	2.5	0.9	1.8	10	1	4	3	1	1	648
Renal ptosis	M	0.5	0.6	0.3			0.9		3	1	0	2	0	0	525
	F	2.0	2.0	0.3		6.4	3.7	2.2	11	0	1	6	3	1	558
Hernia, all forms	M	7.2	8.5	3.6		7.6		29.8	[3]						
	F	1.7	2.0	0.7		0.8		5.5	[3]						
Hernia, inguinal	M	6.1	7.4	2.6		6.5		28.2	21	4	0	0	6	11	283
	F	0.9	1.0	0.4		—	3.0		4	0	1	0	3	0	385
Other hernia	M	—	1.1	1.0		1.1		1.6	6	3	0	1	1	1	554
	F	—	0.9	0.3		0.8	2.5		6	1	0	1	2	2	648
Male Genital															
Hydrocele	M	2.8	3.2	0.7		4.0	7.1	7.7	9	1	0	2	3	3	283
Varicocele	M	7.4	8.1	2.0		10.0	26.2	10.3	23	0	3	5	11	4	283
Other genital	M	5.7	5.6	7.6	5.0	4.0	4.9		16	7	3	2	4	0	283
Spine															
Kyphosis and scoliosis	M	6.4	7.0	1.2	4.7	8.1	12.0	19.3	33	2	4	7	9	11	471
	F	7.2	7.8	1.7	4.8	12.4	8.2	29.2	42	3	6	12	7	14	536
Other spine	M	1.9	2.1	0.4		3.5	5.3	3.5	10	0	1	3	4	2	471
	F	2.0	2.2	—	—	6.2	4.7	4.2	12	0	0	6	4	2	536
Extremities															
Flat foot and foot strain	M	3.1	3.7	0.9	1.5	3.8	5.9	10.4	12	1	1	2	3	5	324
	F	2.2	2.4	0.9		4.7	5.1	2.5	9	2	0	3	3	1	382
Varicose veins	M	2.5	3.1	0.9			7.8	8.3	10	0	0	2	4	4	324
	F	5.7	6.8	1.8			23.7	17.5	26	0	0	5	14	7	382
Arthritis, all forms	M	3.9	4.9	1.2		1.9	9.8	16.7	16	0	2	1	5	8	324
	F	3.3	3.9	0.5		6.2	5.1	17.5	15	1	0	4	3	7	382
Arthritis, hypertrophic or atrophic only	M	2.1	2.8	—		1.1		12.5	9	0	0	0	3	6	324
	F	2.8	3.4	0.5		4.7	5.1	15.0	13	1	0	3	3	6	382
Injuries	M	6.0	6.5	3.5		7.5	13.7	8.3	21	0	6	4	7	4	324
	F	0.5	0.5	0.4			1.0		2	0	0	1	0	1	382
Other extremities	M	2.4	2.8	0.6		5.7	3.9	6.2	9	0	1	3	2	3	324
	F	1.4	1.6	0.8	1.2	1.6	3.0		6	1	1	1	0	3	382
Central Nervous System															
All organic findings	M	1.8	1.6	0.4	3.2	1.0	2.3	3.2	9	1	3	1	2	2	560
	F	0.6	0.6	0.3		0.8	0.9	1.8	4	0	1	1	1	1	664
Skin															
All dermatological findings	M	11.5	12.2	8.1	12.3	13.2	9.8	22.4	40	9	8	7	5	11	329
	F	11.6	12.0	10.6	10.2	10.9	13.6	20.0	46	14	9	7	8	8	383
Laboratory (Urinalysis)															
Albumin (all degrees)	M	2.2	2.5	1.5	2.4		0.6		10.0	11	2	2	0	1	6	443
	F	5.4	5.4	7.4	3.3	3.9	7.1	3.8	28	11	4	4	7	2	523
Glycosuria (all degrees)	M	3.6	4.1	0.8	3.6	6.8	7.3	3.3	18	1	3	6	6	2	443
	F	4.9	5.7	2.7	1.6	6.9	9.2	15.1	30	4	2	7	9	8	523
Glycosuria (1 per cent or more)	M	—	0.2	—	—		0.7		1	0	0	0	1	0	443
	F	—	2.5	0.8			6.1	7.5	13	0	0	3	6	4	523
Sediment, white cells numerous	M	2.3	2.3	2.3		2.3	1.2	3.3	10	0	5	2	1	2	443
	F	6.1	6.3	6.7	1.6	9.8	10.2	1.9	33	10	2	10	10	1	523
General conditions															
Arteriosclerosis	M	—	6.1	—	—	1.0	4.6	46.0	34	0	0	1	4	29	560
	F	—	3.6	—	—	—	3.7	36.4	24	0	0	0	4	20	664
Nephritis, acute and chronic	M	1.5	1.8	0.8	1.2		0.6	8.3	8	1	1	0	1	5	443
	F	1.6	1.7	1.1		2.0	2.0	3.8	9	3	0	2	2	2	523
Diabetes	M	0.6	0.7	0.8		0.4		1.7	3	1	0	0	1	1	443
	F	1.8	2.3	0.4		2.9	5.1	5.7	12	1	0	3	5	3	523
Anemia	M	—	0.7	—	—	—	2.3	1.6	4	1	0	0	2	1	560
	F	—	1.4	0.4	2.0	1.6	1.8		9	1	3	2	3	0	664
Syphilis, clinically evident	M			—	—	—	—	—	1	0	0	0	0	1	330
	F			—	—	—	—	—	3	1	1	0	1	0	385
Cancer	M	—	0.4	—	—	—		3.2	2	0	0	0	0	2	560
	F	—	0.4	0.3		0.4		1.8	3	0	1	0	1	1	664

[1] Standardized to rural white population, United States Census, 1930. Each sex was standardized to the age distribution of the corresponding sex; the age distribution in the two sexes showed very slight differences.

[2] Children 0-4 years of age have not been included.

ned by addition of the rates for inguinal

nt population bases.

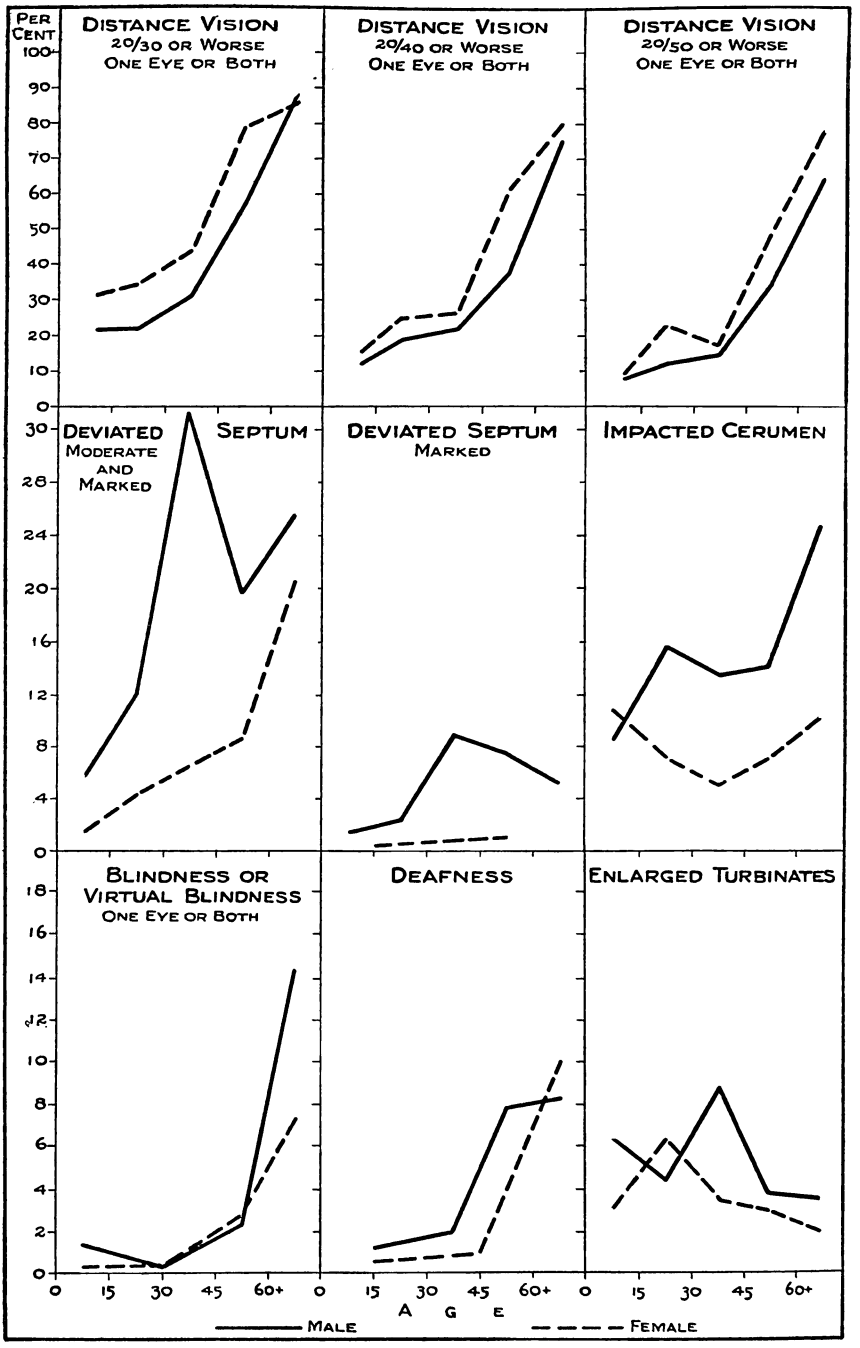


Fig. 4. Percentages of males and of females with specified impairments at different ages; total sample.

These data reveal relatively few variations of note in the prevalence of *enlarged turbinates.*

The prevalence of *pyorrhea and gingivitis* bears a fairly definite relation to both age and sex, as shown in Figure 5. The downward trend of both curves in the later years of life is probably due to the relatively large number of persons at older ages whose teeth have been lost. The lower figures for females may be due to better habits of oral hygiene rather than to intrinsic sex differences in incidence. The Life Extension Institute study shows very similar data for these two conditions (given, however, separately) within the narrower age range considered.

The curves for *dental caries* of all degrees show high proportions at ages under fifteen years. This is in part because of the neglect of deciduous teeth which are being replaced during most of this period. The curve for females then declines progressively while that for males reaches a maximum in the age group 30-44 and then declines. The difference in the behavior of these two curves probably is traceable to a number of factors some of which would be differences in number of teeth lost and in care of the teeth, including both home and professional dental care.[8]

Extensive dental caries as indicated by the discovery of five or more cavities is apparently much less common in this area and considerably less dependent upon age and sex.

The data showing one or both sets of *teeth lost* are of no little interest. The prevalence here increases quite rapidly with age, but at least the most general category of tooth-loss shows no sex differences. This similarity between male and female rates persists

[8] In connection with professional dental care, fillings and inlays were enumerated but have not been included in the caries analysis for obvious reasons unless there was evidence of caries about the filled cavity. At ages 15-29 a higher proportion of females showed dental care of this sort than of males, the proportions being 66.4 and 55.0 per cent. A more exact measure of the prevalence of caries would include as caries not only present cavities but fillings, inlays, and extractions, the great majority of the latter in this area having been for extensive caries of teeth. Data of this sort would give a better indication of the prevalence of dental caries although it would not reveal the prevalence of existing impairments which the present data are designed to show.

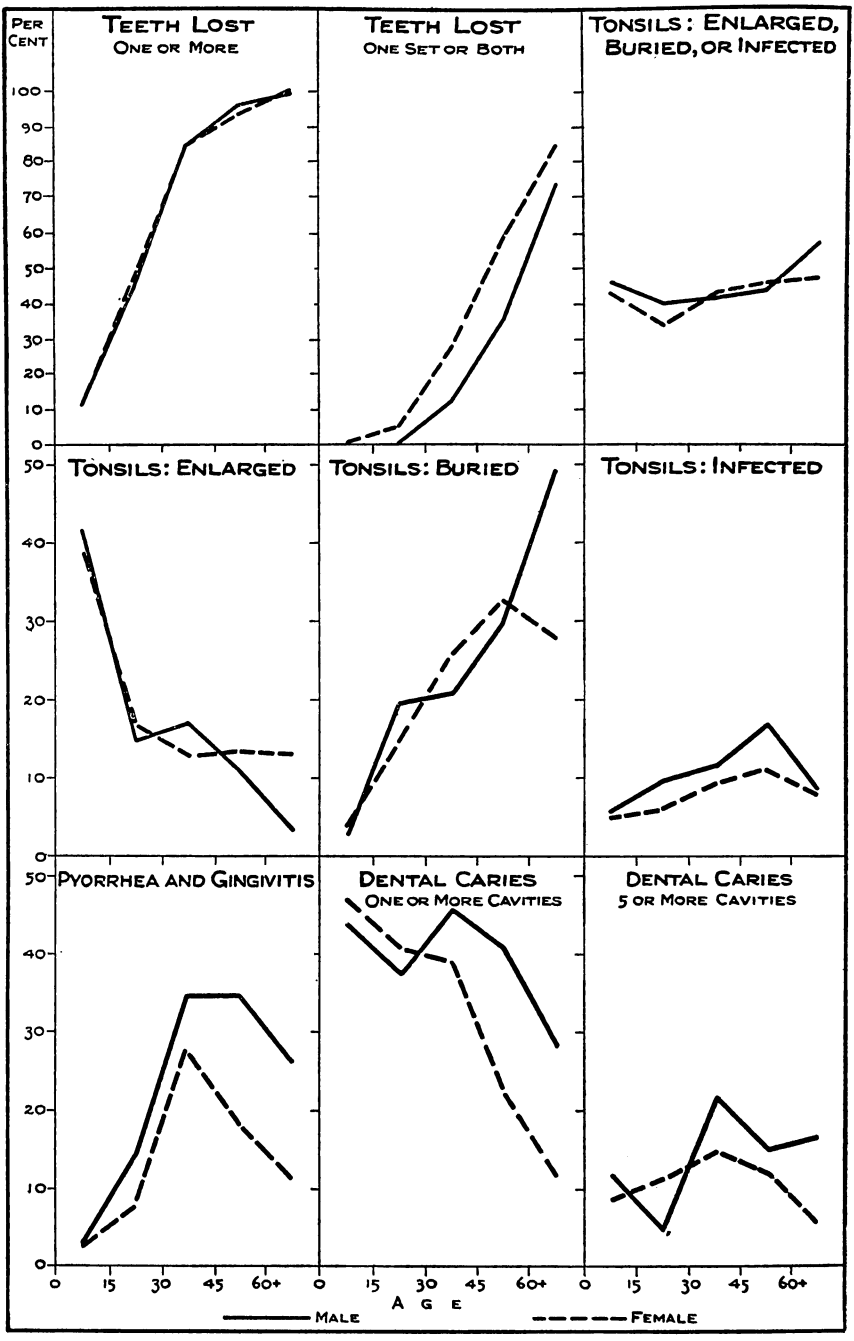


Fig. 5. Percentages of males and of females with specified impairments at different ages; total sample.

through all grades of the condition up to that of five or more lost (but not one set or both). These data have been omitted because of lack of space but the standardized rates for males and females for this more extensive degree of tooth-loss are, respectively, 15.1 and 12.0 per cent. The final category—one set or both lost—does, however, show a rather marked preponderance in females. In a field where there are so many complicating factors, conclusions from these limited data must be guarded, but the implication is definite that when tooth-loss has reached a certain degree, women are more prone than men to resort to removal of one set or both with a view to artificial replacements.

Tonsillar data may be controversial but those offered here are in some respects unique, showing first in combination and then in detail a uniform medical opinion on the tonsillar status of a relatively unselected population covering a whole life span. It is quite true that there might be differences in the size of the individual rates with different examiners owing to different criteria of tonsillar pathology, but it seems probable that the general trend would be very similar to that shown by these data for any community where, as here, relatively few persons have had the tonsils removed.[9]

The prevalence of *enlarged, buried, or diseased tonsils* shows little relationship to age or sex but the individual conditions combined in these curves show very definite relationships to age with the possible exception of *infected* tonsils.

9 The present study is primarily one of impairment with less emphasis upon correction; however, the data on removal of tonsils have some bearing upon the prevalence of tonsillar impairment and may therefore be included here.

By age and sex, number and per cent of examined persons whose tonsils have been removed.

Sex	All Ages Crude	Rates, Per Cent					Number					
		0-14	15-29	30-44	45-59	60+	Total All Ages	0-14	15-29	30-44	45-59	60+
M	9.3	12.4	14.9	7.3	2.4	3.3	51	26	14	7	2	2
F	12.7	6.8	27.0	15.2	0.9	7.3	79	15	40	19	1	4

Had numbers been sufficient to permit a more detailed analysis of the 0-14 year age group in the case of both dental caries and enlarged tonsils, the prevalence of both conditions would of course be very low at the earliest ages of life, rising rapidly thereafter. Detailed data for enlarged tonsils have been assembled for the life span by Collins,[10] showing that the highest prevalence occurs between the ages of five and ten years.

The prevalence of *thyroid enlargement* increases with age and shows a very marked excess among females, one of the most outstanding sex differences in the whole series. *Diffuse enlargement* is seen to make up about half the total number of cases. A noteworthy difference between these findings and those of the Life Extension Institute study is that the trend is consistently downward in the latter with increasing age.

It may be recalled that chronic myocarditis comprises the bulk of the cases of *heart disease, all forms,* so that the curves for this inclusive category show rather an abrupt rise at the older ages. As most of the cases of myocarditis were incipient, the true sample incidence does not show marked differences when compared to that of the total sample for all forms of heart disease. There were, however, only three cases with *valvular and congenital heart trouble* in the true sample so that the true prevalence of these conditions may be considerably lower than the total sample data indicate.

Comparative data on heart defects are quite abundant but largely based upon urban populations. The data of the Heart Council of Greater Cincinnati[11] covers the ages of fifteen years and over for males in various occupational groups and offers prevalence data

[10] Collins, Selwyn D.: An Epidemiological and Statistical Study of Tonsillitis. *Public Health Bulletin* No. 175, United States Public Health Service, July, 1927. On page 51 the observed incidence of enlarged tonsils through the entire life span is shown graphically, and while the rates do not accord entirely with those shown here, the general trend is well indicated.

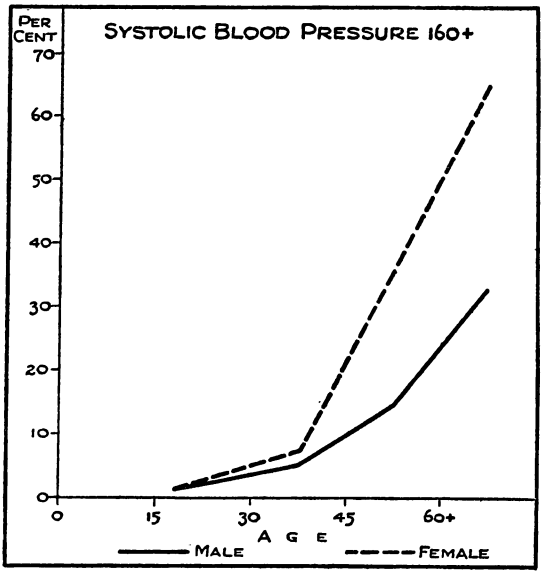
[11] Life Conservation Studies I, II and III, published by the Heart Council of Greater Cincinnati, 312 West Ninth Street. These studies deal with physical impairment among: (I) 1,000 white male office workers, (II) 1,000 white male machine and hand-tool operators, and (III) 1,000 colored male factory workers.

for many other conditions as well. The cardiac findings agree in trend for those of males in the present study but tend to show uniformly higher prevalence.

Early in life organic heart defects are predominantly valvular or congenital in character and comparable data are not easily found. Goodman and Prescott[12] have reported prevalence among a group of New York City children at 0.57 per cent, and add to that an estimated number of children unable to come for examination, bringing the total prevalence to 0.9 per cent. It seems probable that the prevalence would be somewhat lower at these ages in the present study bcause acute rheumatic fever, as a cause of valvular heart disease, was relatively uncommon.

The curves for *systolic blood pressure* of 160 or over are shown separately in Figure 6 and disclose apparently definite relationships to both age and sex. The hypothesis at once suggests itself that, these figures being based largely upon one observation only, the excess female rates are due to greater apprehensiveness on the part of women undergoing examination and to a resulting artificial increase in blood pressure. While this possibility cannot be excluded, the limited data from retesting blood pressures in this group indicate that the male and not the female

Fig. 6. Percentages of males and of females with systolic blood pressure of 160 mm. or more at different ages; total sample.



12 Goodman, Morris and Prescott, Josephine W.: Heart Disease among Adolescent School Children of New York City. *Journal of the American Medical Association,* July 21, 1934, ciii, pp. 157-161. The data are for children between 14 and 17 years of age applying for working papers.

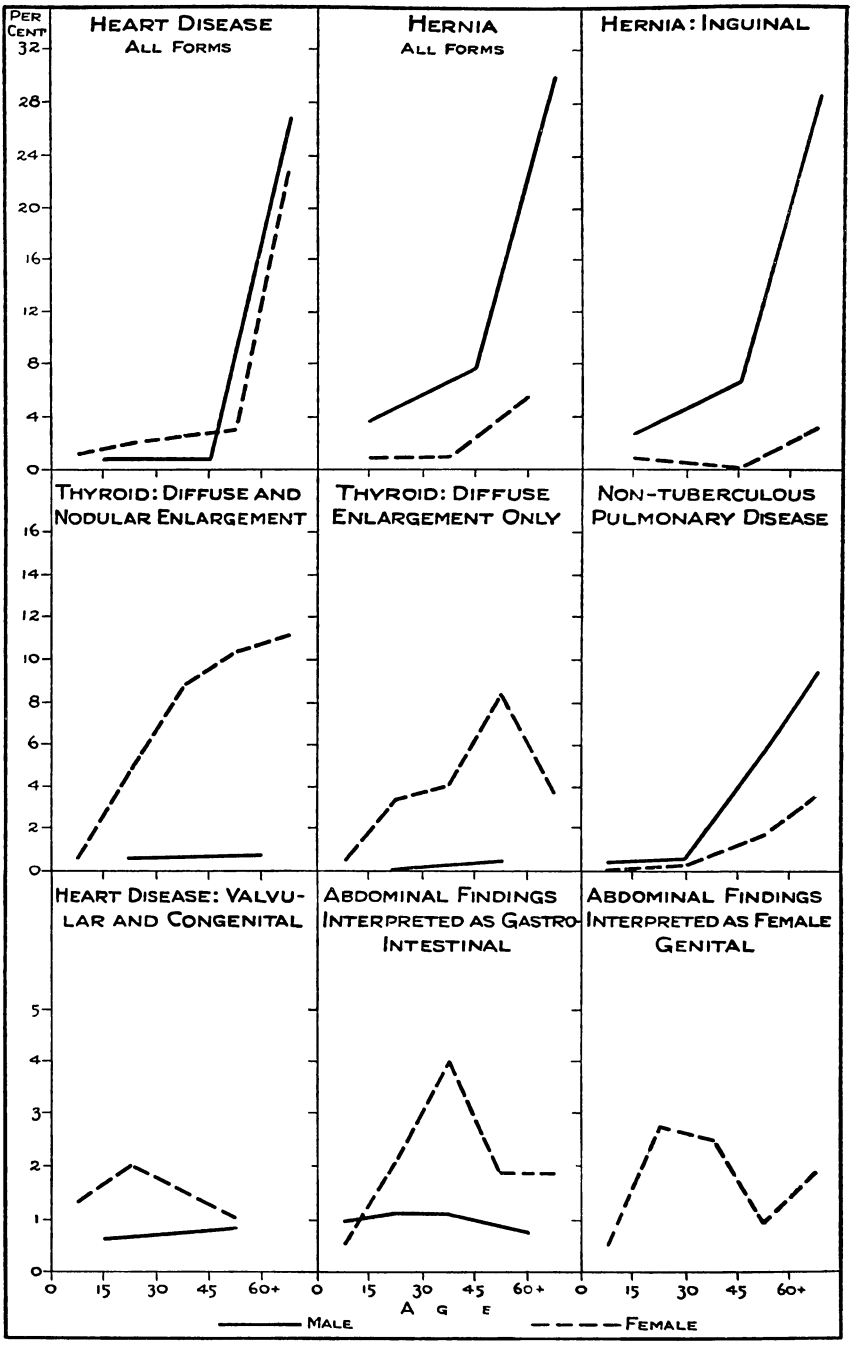


Fig. 7. Percentages of males and of females with specified impairments at different ages; total sample.

showed instability of blood pressure.[13] A possible factor in producing the sex difference shown here is the greater prevalence of obesity among females of this area. A definite relationship between systolic blood pressure and overweight has been shown for males by Britten[14] and would appear to be even more pronounced for females in the present data.[15]

The findings for *nontuberculous pulmonary disease* were quite limited at the younger ages and the differences which appear between the sexes at the older ages are rather difficult to evaluate in view of the smaller numbers examined at these ages. The true sample cases comprise only four of the eighteen cases in the total sample, and it seems probable that in this group, as in that of valvular and congenital heart disease, the true prevalence is considerably lower than is shown by the total sample figures here presented.

The *abdominal findings,* both gastro-intestinal and *female genital,* are not easily interpreted. The differentiation between these two cannot be satisfactorily made, and it is possible that the excess which appears for the former may in part be due to conditions which may properly belong to the latter. In both, also, the true sample data show considerably lower prevalence, suggesting a packing of the total sample due to apprehension about symptoms. The caution has been made above but bears repetition—that actual organic findings do not tell the whole story of impairments where, as in the abdomen, so many are of a functional character.

The prevalence of *renal ptosis* shows a very definite female preponderance after the early years of life, but the significance of the decline in the later years is not clear. A history of treatment for this

[13] Of fourteen females retested, seven showed an average increase of 8 mm.; three showed no change, and four an average decrease of 13 mm. Of six males retested, one showed an increase of 5 mm. while five showed an average decrease of 38 mm.

[14] Britten, Rollo H.: Physical Impairment and Weight. *Public Health Reports,* United States Public Health Service, August 4, 1933, 48, No. 31, pp. 926-944.

[15] A more extended study of this subject is planned, but the preliminary analysis shows that, at ages under sixty years, females 20 per cent or more overweight have systolic blood pressures 160 mm. or more far more frequently than those with lower degrees of overweight or with underweight.

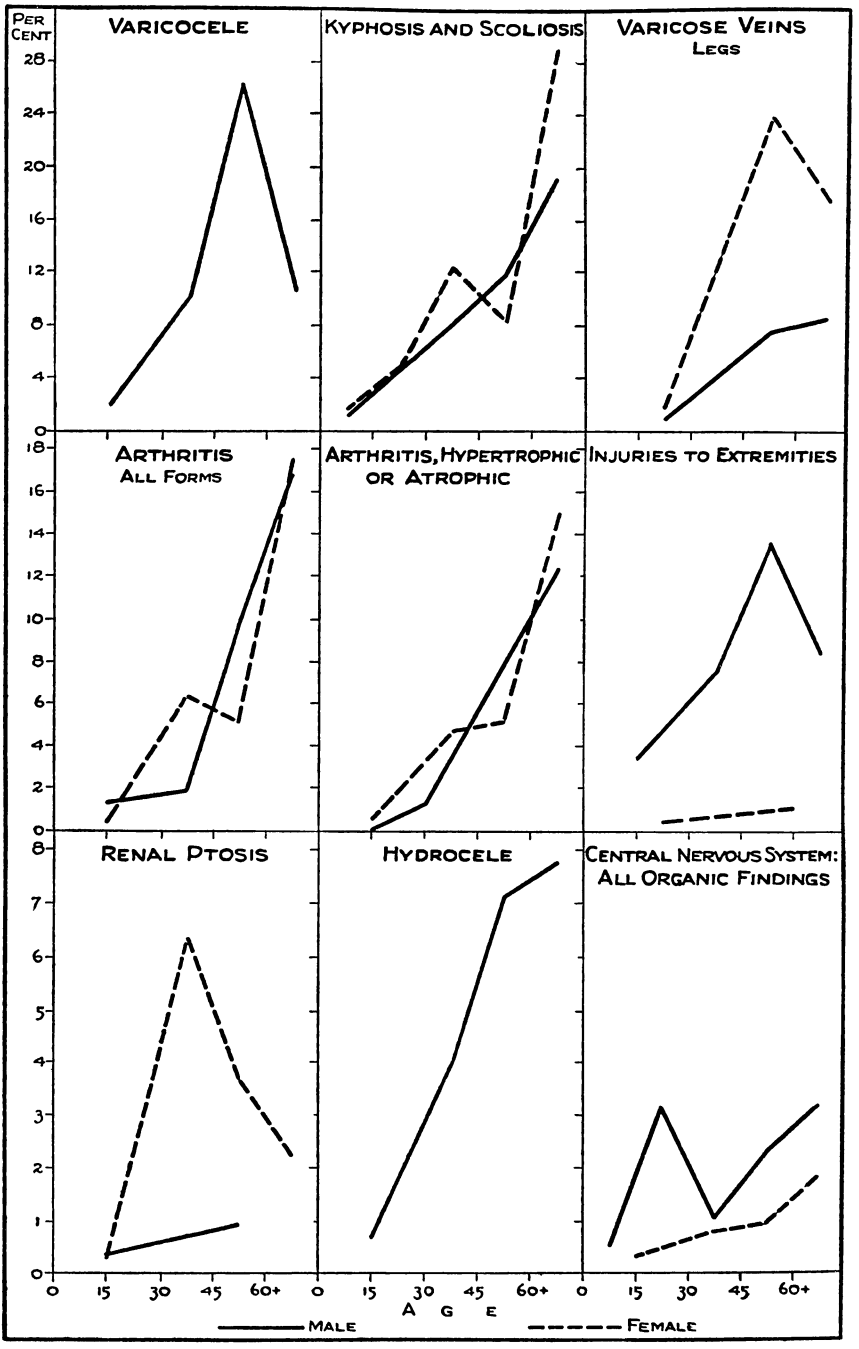


Fig. 8. Percentages of males and of females with specified impairments at different ages; total sample.

condition was decidedly uncommon, and it is possible that identification of renal ptosis was less exact in these later years owing to the prevalence of obesity.

The occurrence of *hernia, all forms,* bears a definite relationship to age and sex. The greater part of the excess in males is due to *inguinal hernia* which was encountered occasionally in women but very frequently in males, particularly at the older ages. The prevalence of hernia, other than inguinal, was much more nearly uniform between the two sexes but cases were too few to show reliable rates.

The prevalence of *hydrocele* bears a more definite relationship to age than that of *varicocele,* but these data were from the population examined by one examiner only and variations in the last age group have little significance.

The prevalence of *kyphosis and scoliosis* of the spine is related primarily to age.

The data for *flat foot and foot strain* show a gradual rise with age, but no sex differences of definite significance. Women, it was noted, used arch supports far more frequently than men, and it is probable that this reduced the number of complaints as to the present status of foot trouble, equalizing what might otherwise have been a genuine sex difference.

The prevalence of *varicose veins* in the leg bears a definite relationship to age and shows a very definite excess among females. The Life Extension Institute findings agree quite closely with those presented here, not only in degree but in trend.

The curves for *arthritis, all forms,* are very similar to those for *hypertrophic or atrophic arthritis,* of which the former is largely composed. In both, the relationship to age is clear and no sex differences appear. The trend of these curves bears some resemblance to that for kyphosis and scoliosis, and, had there been the X-ray basis for diagnosis which the spinal conditions had, the degree of these latter might have been equalled or exceeded, as well.

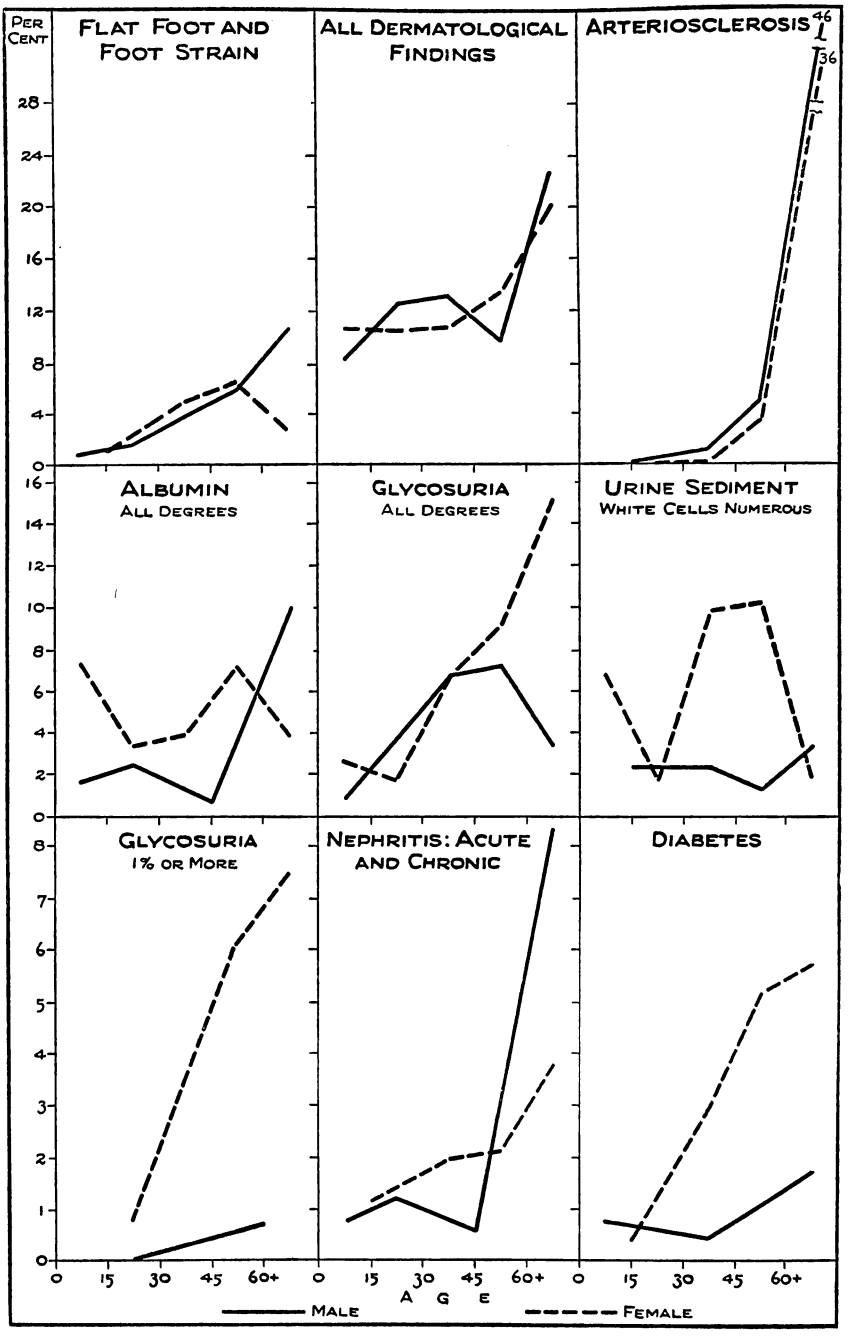


Fig. 9. Percentages of males and of females with specified impairments at different ages; total sample.

The data for *injuries to extremities* show one of the most definite excesses for males in the series. The injuries among men were, for the most part, sustained in the course of heavy manual labor or hunting while those for women were the consequence of falls in and about the home.

The limited data on *organic findings of the central nervous system* do not permit of close analysis, although some significance may be attached to the consistent excess in males.

The findings for all *dermatological conditions* show very little in either trend or sex variation. The individual skin impairments, of which these rates are formed, have individual age, and in some cases sex differences which are of course concealed in the general curve.

The laboratory urinalysis data must be considered as isolated observations with only the value that attaches to an objective finding not wholly free from error. The age trends are not readily discernible except in *glycosuria,* 1 per cent or more, and the sex differences are of debatable significance, also with the exception of this last.

The two most important diagnoses dependent upon the urinalysis are *nephritis* and *diabetes,* listed in Table 8 under "General Conditions." The figures for the prevalence of nephritis approximate those for individuals showing albumin only in the oldest age group, the impairment status of the others with albuminuria remaining uncertain. The prevalence of diabetes, however, does closely approximate that of glycosuria, 1 per cent or more, there being slight differences due to the fact that a few individuals with this degree of urinary sugar were found not to have diabetes, and a few known to have the disease either had no urinalysis report or, receiving insulin, showed no sugar. Undoubtedly, a number of individuals with amounts of glycosuria under 1 per cent would have been found to have either low-grade or incipient diabetes, had this group been studied with as much care as those showing the

more significant amounts. The very definite excess for females at the older ages is not easily understood in view of the commonly expressed opinion that diabetes is more prevalent in males. It does, however, accord with the distribution of overweight or obesity, a condition which is often associated with the diabetes of later life.

A quite inexplicable fact is that, with only two exceptions, all the diabetics are in the true sample. Such a distribution weakens somewhat the basis for considering the true sample a relatively unselected group. However, this is the only one of the more serious impairments which shows such an extreme distribution.

The only other general condition permitting of individual study by age and sex is *arteriosclerosis*. This finding is seen to be very definitely limited to the older ages and to show a male preponderance which is not striking but is quite uniform. It may, however, legitimately be questioned whether this excess in males is an actual one or whether it can be attributed to the greater difficulty of making observations upon the superficial arteries of females because of the more common occurrence of adiposity. The prevalence of "arterial thickening" in the Life Extension Institute series is higher at the younger ages of adult life and does not reveal the consistent excess in males that these data show.

DISCUSSION

In general, the prevalence of conditions for which data have been presented above tends to increase with age, although the rate of increase may vary markedly. A limited number (and upon close inspection they are usually found to be groups of conditions) show no marked variation with respect to age. These are history of frequent or prolonged coughs or colds, history of chronic or recurring skin trouble, enlarged turbinates, tonsils (enlarged, buried, or infected), valvular and congenital heart disease, and dermatological findings. In one instance, the tonsil group, it was possible to show rates for the individual components, and when this was done rather striking age relationships appeared.

A still more limited number of conditions were found to *decrease* in prevalence with age. This was true of enlarged tonsils and dental caries, especially in females. Had there been sufficient numbers of cases to make a separate study of the prevalence of more of the conditions in grouped categories, notably of congenital heart disease, further instances might have been found.

A final type of variation with age is shown by history of headache, psychoneurosis, diseases of women, lumbago and backache, and by pyorrhea and gingivitis. Here the conditions rise to a maximum in middle life and decline again at the older ages.

These variations with age are in general well recognized in morbidity literature, but the extent to which conditions may be found at various ages is not so definitely established, particularly for rural populations.

Sex differences are a somewhat more difficult field to analyze. In the present data consistent and often significant excess rates appear for males in history of bronchitis, impacted cerumen, deviated septum, pyorrhea and gingivitis, dental caries, nontuberculous pulmonary disease, inguinal hernia, injuries to extremities, and arteriosclerosis. Reasons have been given above, however, for regarding the excess in the case of dental findings (pyorrhea and gingivitis, and caries), and possibly also in septal deviations and arteriosclerosis, as inconclusive or only indirectly related to sex.

Excess rates for females were found for most of the leading symptoms for the history diagnosis of psychoneurosis, for overweight, defective distance vision, one or both sets of teeth lost, thyroid defects, high blood pressure, renal ptosis, varicose veins of legs, and for the higher degrees of glycosuria as well as for diabetes.

In the discussion of these subjects it was pointed out that there were possible objections to the view that the leading symptoms, higher grades of tooth-loss and high blood pressure, were actually more prevalent among females, although the collateral data lend some support to the findings in the case of high blood pressure.