

CAUSES OF DEATH RESPONSIBLE FOR RECENT INCREASES IN SEX MORTALITY DIFFERENTIALS IN THE UNITED STATES

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FOR nearly every country in the West, the male excess in mortality has been rising persistently since about World War I.³ In 1938, Wiehl noted this trend for the United States.⁴ Subsequently, Bowerman recorded considerable increases in ratios of male to female death rates for the period 1900–1945, with the greatest increase in the age groups 15–24 and 45–64.⁵ Sowder and Bond have called attention to a steady rise in the ratios of male to female death rates as each generation goes through life. This rise is becoming progressively steeper.⁶

It is the purpose of this paper to present recent data on trends in sex mortality differentials in the United States; to identify age groupings where the increases in sex mortality differentials have been greatest; and, in these age groupings, to determine which causes of death have been mainly responsible.

TRENDS IN THE UNITED STATES

Figure 1 presents annual age-adjusted death rates for white males and females for the period 1900 to 1958.⁷ During most

¹ Division of Public Health Methods, United States Public Health Service.

² The writer is indebted to Nicholas E. Manos for helpful suggestions on this manuscript. Some of the material presented is from the writer's unpublished dissertation: *A Study of Factors Associated with Male-Female Differentials in Mortality*, The American University, Washington, D. C., 1960.

³ Stolnitz, G. L.: *A Century of International Mortality Trends*, II. *Population Studies*, July, 1956, x, pp. 17–42.

⁴ Wiehl, D. G.: *Sex Differences in Mortality in the United States*. *Milbank Memorial Fund Quarterly*, April, 1938, xvi, pp. 145–155.

⁵ Bowerman, W. G.: *Annuity Mortality*. *Transactions of the Society of Actuaries*, June, 1950, II, pp. 76–102.

⁶ Sowder, W. T. and Bond, J. O.: *Problems Associated with the Increasing Ratio of Male over Female Mortality*. *Journal of the American Geriatrics Society*, October, 1956, IV, pp. 956–962.

⁷ Death rates have been age-adjusted by the direct method to the total 1940 United States population. For the period 1900 to 1933, death rates are for the expanding death-registration States. Death rates for United States nonwhites have followed much the same pattern as death rates for whites. To facilitate this presentation, death rates will be studied for whites only.

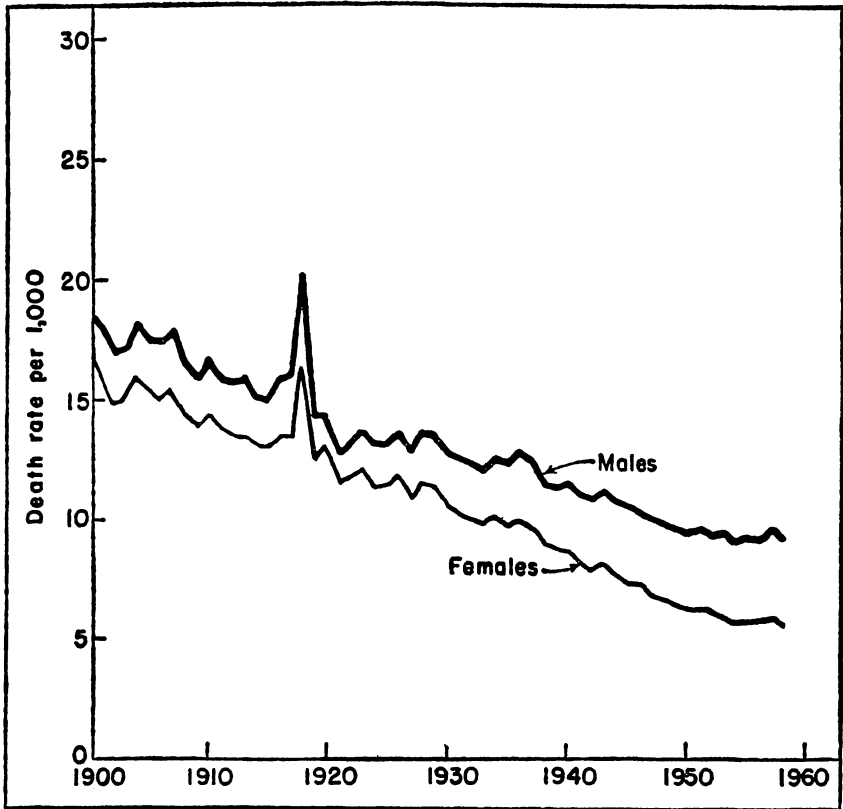


Fig. 1. Age-adjusted death rates per 1,000 population for white males and females, United States, 1900-1958.

of this period, death rates have declined for both sexes. The effect of the flu pandemic in 1918 is evident, causing a somewhat greater increase in the male than in the female death rate. Around 1920, death rates for males and females did not differ greatly. Starting in 1922, however, death rates started to diverge and have been diverging fairly steadily ever since.

Sex mortality differentials are customarily measured by the ratio of the male death rate to the female death rate.⁸ This will

⁸ This is sometimes expressed as the percentage the male death rate is of the female death rate. The choice of ratios of male to female death rates rather than absolute differences is arbitrary. Ratios of death rates remain unchanged only if death rates change by the same percentage. Where one death rate exceeds the other, if death rates decline by the same absolute amount ratios will increase. For a discussion relevant to this, see: Sheps, M. C.: An Examination of Some Methods of Comparing Several Rates or Proportions. *Biometrics*, March, 1959, xv, pp. 87-97.

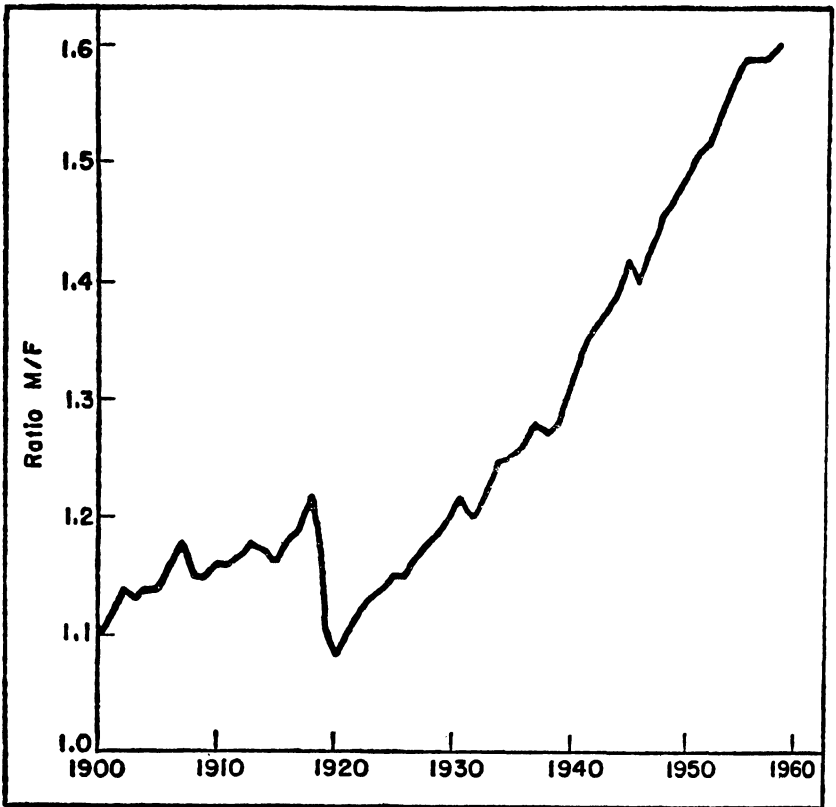


Fig. 2. Sex mortality ratio, age adjusted death rates, for white persons, United States, 1900-1958.

be referred to here as the sex mortality ratio and is shown in Figure 2 for the United States white population for the period 1900 to 1958. Three different linear trends appear: a trend for the period 1900 to 1918; a trend for the period 1920 to 1939; and a trend for the period 1940 to 1958. During the period 1920 to 1958 the ratio of white male to white female age-adjusted death rates increased from 1.08 to 1.60.

TRENDS IN SELECTED AGE GROUPINGS

Figure 3 shows average annual sex mortality ratios by age for the United States white population for the years 1929-1931, 1939-1941, 1949-1951, and 1956-1958.⁹ These ratios have in-

⁹ Sex mortality ratios are based upon average annual death rates for the three-
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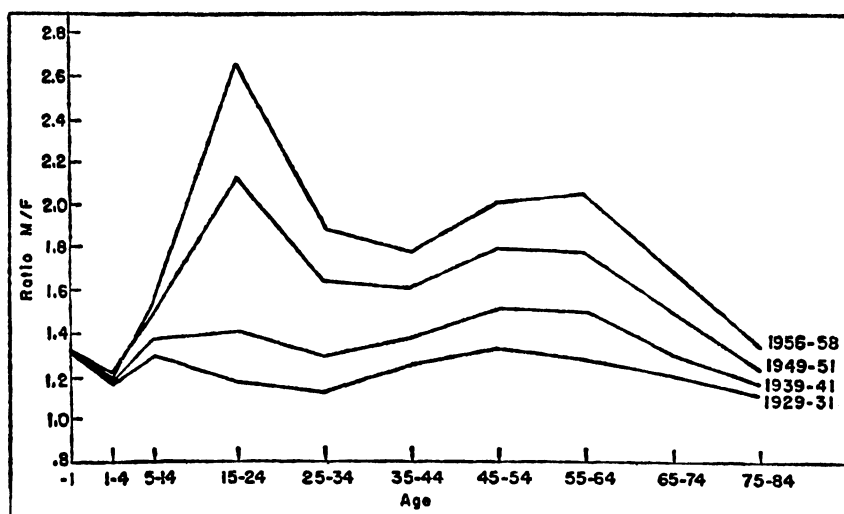


Fig. 3. Average annual sex mortality ratios for white persons for selected age groups, 1929-31, 1939-41, 1949-51, and 1956-58.

creased rather steadily at most ages. An exception is the age group 15-24, where a considerable jump occurred between 1939-1941 and 1949-1951. Since 1929-1931 the increase in the age group 15-24 has been the largest of those shown. In 1956-1958, the male death rate was over $2\frac{1}{2}$ times the female death rate. Large increases also occurred in the age groups 45-54 and 55-64. In these age groups the 1956-1958 male death rate was twice the female death rate. There was relatively little change in the ratio of male to female death rates in the youngest and oldest age groups shown.

CONTRIBUTIONS OF SELECTED CAUSES OF DEATH TO INCREASES IN SEX MORTALITY RATIOS IN THE AGE GROUP 15-24

During the period 1929-1931 to 1956-1958, the sex mortality ratio in the age group 15-24 increased from 1.164 to 2.646, an increase of 1.482. Table 1 shows the contribution of selected causes of death to this increase during three periods: 1929-1931 to 1939-1941; 1939-1941 to 1949-1951; and 1949-1951 to 1956-year periods shown. Here and in the remainder of this presentation, sex mortality ratios will be studied starting in 1929. This largely eliminates any bias which might be introduced because of the expanding death-registration area.

1958, and shows the sum of these contributions for the period 1929–1931 to 1956–1958.¹⁰ The death rates upon which these computations are based appear in Appendix Table A. Causes of death shown are those constituting 3 per cent or more of all white male or female deaths in the age group 15–24 in either 1930 or 1950.

Over a third (36.3 per cent) of the increase in the sex mortality ratio was due to trends in death rates for tuberculosis. This is because, in the past, tuberculosis was an important cause of death among young females; now, it causes relatively few deaths. In 1929–1931, over a quarter of all deaths among white females and 13 per cent of deaths among white males aged 15–24 were due to tuberculosis. In 1956–1958, only 0.9 per cent of white female deaths and 0.3 per cent of white male deaths in the age group 15–24 were due to tuberculosis.

In much the same manner, the decline in death rates from diseases associated with childbearing has affected the sex mortality ratio for all causes in the age group 15–24. In 1929–1931, deaths from deliveries and complications of pregnancy, childbirth, and the puerperium accounted for 15 per cent of all deaths among white females in the age group 15–24; whereas in 1956–1958, this cause of death accounted for less than 5 per cent of all deaths in this age group. As Table 1 shows, nearly a third (30.6 per cent) of the increase in the sex mortality ratio during the period 1929–1931 to 1956–1958 was due to the decline in maternal mortality.

¹⁰ Estimates in Tables 1, 2, and 3 are based upon the derivative of the ratio of male to female death rates (calculus):

$$\Delta r = R \left[\frac{\Delta m_1}{M} - \frac{\Delta f_1}{F} \right] + R \left[\frac{\Delta m_2}{M} - \frac{\Delta f_2}{F} \right] + \dots + R \left[\frac{\Delta m_n}{M} - \frac{\Delta f_n}{F} \right]$$

where:

Δr = absolute change in ratio for all causes during period.

R = average ratio for all causes during period.

Δm = absolute change in male death rate for selected cause during period.

Δf = absolute change in female death rate for selected cause during period.

M = average male death rate for all causes during period.

F = average female death rate for all causes during period.

This formula is exact only for small time intervals. For the time intervals shown it is approximate, and contributions by individual causes do not add exactly to the total increment in the sex mortality ratio. Reasonable estimates of the relative contribution of selected causes are provided, however.

Motor vehicle accident deaths have also been a factor in increases in sex mortality ratios in the age group 15–24. Unlike tuberculosis and maternal mortality, however, this cause of death has become increasingly important. Its contribution to the increase in the all-cause sex mortality ratio is the result both of a general increase in death rates for motor vehicle accidents and an increase in the ratio of male to female death rates for motor vehicle accidents. Between 1929–1931 and 1956–1958 the white male death rate (per 100,000) in the age group 15–24 rose from 43.3 to 66.9 while the white female death rate rose from 12.5 to 15.2. The sex mortality ratio for motor vehicle accidents rose from 3.46 to 4.40 during this period.

Other causes of death shown on Table 1 did not contribute greatly to changes in the sex mortality ratio during the period 1929–1931 to 1956–1958. Deaths from malignant neoplasms, influenza and pneumonia, and suicide had virtually no effect while heart disease tended to increase and accidents, other than motor vehicle, to decrease the sex mortality ratio.

The “All other causes” grouping, shown in Table 1, is making an increasing contribution to the all-cause sex mortality ratio, accounting for nearly a quarter of the total increase during the period 1949–1951 to 1956–1958. An examination of this category reveals some contribution by many causes of death, with the largest coming from deaths due to rheumatic fever. Here, female death rates have declined more sharply than male death rates, with the result that the sex mortality ratio has increased.

In general, it would appear that the medical and public health advances which have caused declines in death rates from tuberculosis and maternal mortality have been an important factor in the increase in the sex mortality ratios in the age group 15–24. In view of the low death rates now achieved for these causes (see Appendix Table A), it seems unlikely that they will be of any great importance in determining future changes in sex mortality ratios. A factor which is likely to be important in the future is deaths from motor vehicle accidents. The general increase in deaths from this cause among our youth is probably a

Table 1. Contribution of selected causes of death to change in ratio of male to female death rates. White persons aged 15-24.

	1929-1931 to 1939-1941		1939-1941 to 1949-1951		1949-1951 to 1956-1958		1929-1931 to 1956-1958	
	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution
Total Increment in Ratio	.274	100.0	.712	100.0	.492	100.0	1.482	100.0
<i>Contribution Made By:</i>								
Tuberculosis	.135	49.3	.230	32.3	.172	35.0	.537	36.3
Malignant Neoplasms	.002	.7	-.004	-.6	.017	3.5	.016	1.1
Heart Disease	.026	9.5	.049	6.9	.038	7.7	.112	7.6
Influenza and Pneumonia	-.011	-4.0	.025	3.5	-.020	-4.1	-.006	-4
Maternal Mortality	.127	46.4	.222	31.2	.104	21.1	.453	30.6
Motor Vehicle Accidents	.024	8.8	.094	13.2	.051	10.4	.170	11.5
Other Accidents	-.072	-26.3	-.032	-4.5	-.003	-.6	-.106	-7.2
Suicide	.010	3.6	.008	1.1	.015	3.0	.033	2.2
All Other Causes	.021	7.7	.091	12.8	.116	23.6	.229	15.5

Table 2. Contribution of selected causes of death to change in ratio of male to female death rates. White persons aged 45-64.

	1929-1931 to 1939-1941		1939-1941 to 1949-1951		1949-1951 to 1956-1958		1929-1931 to 1956-1958	
	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution	Algebraic Contribution	Relative Contribution
Total Increment in Ratio	.195	100.0	.299	100.0	.219	100.0	.713	100.0
<i>Contribution Made By:</i>								
Tuberculosis	.011	5.6	-.004	-1.3	-.023	-10.5	-.016	-2.2
Malignant Neoplasms	.029	14.9	.061	20.4	.068	31.1	.158	22.2
Diabetes	-.003	-1.5	.035	11.7	.016	7.3	.048	6.7
Strokes	.005	2.6	.016	5.4	.044	20.1	.065	9.0
Heart Disease	.121	62.1	.138	46.2	.086	39.3	.345	48.4
Chronic Nephritis	.018	9.2	.027	9.0	.007	3.2	.052	7.3
Influenza and Pneumonia	.005	2.6	.004	1.3	.001	.5	.010	1.5
Motor Vehicle Accidents	.003	1.5	-.012	-4.0	-.003	-1.4	-.012	-1.7
Other Accidents	-.017	-8.7	-.010	-3.3	-.008	-3.7	-.012	-4.9
Suicide	-.011	-5.6	-.005	-1.7	-.001	-.5	-.017	-2.4
All Other Causes	.032	16.4	.046	15.4	.032	14.6	.110	15.4

reflection of the increased availability of automobiles to them. It is not clear why young males have responded to this differently than females. Here would seem to be an important area for sociological investigation.

CONTRIBUTIONS OF SELECTED CAUSES OF DEATH TO
INCREASES IN SEX MORTALITY RATIOS
IN THE AGE GROUP 45-64

In the age group 45-64 the sex mortality ratio for white persons increased from 1.297 in 1929-1931 to 2.010 in 1956-1958, an increase of .713. The contribution of selected causes of death to changes in the sex mortality ratio for this age group is shown in Table 2. The death rates upon which these computations are based appear in Appendix Table A. The causes of death shown are those making up 3 per cent or more of all deaths among white males or females aged 45-64 in either 1930 or 1950.

None of the causes of death contributing heavily to increases in the sex mortality ratio in the age group 15-24 are important contributors to increases in the age group 45-64. It would not be expected, of course, that diseases associated with childbearing would be an important cause of death in this age group. Many deaths among middle-aged persons are caused by tuberculosis and motor vehicle accidents, but Table 2 shows that these did not contribute to the increase in the sex mortality ratio.

Deaths from heart disease made, by a considerable margin, the greatest contribution, accounting for nearly half of the total increase during the period 1929-1931 to 1956-1958. Deaths from malignant neoplasms also contributed heavily, with the greatest relative contribution in the more recent periods. Contributions by heart disease and malignant neoplasms are due mainly to a general increase in death rates for these diseases (see Appendix Table A) and an increase in the ratio of male to female death rates for these diseases. Figure 4 shows that for

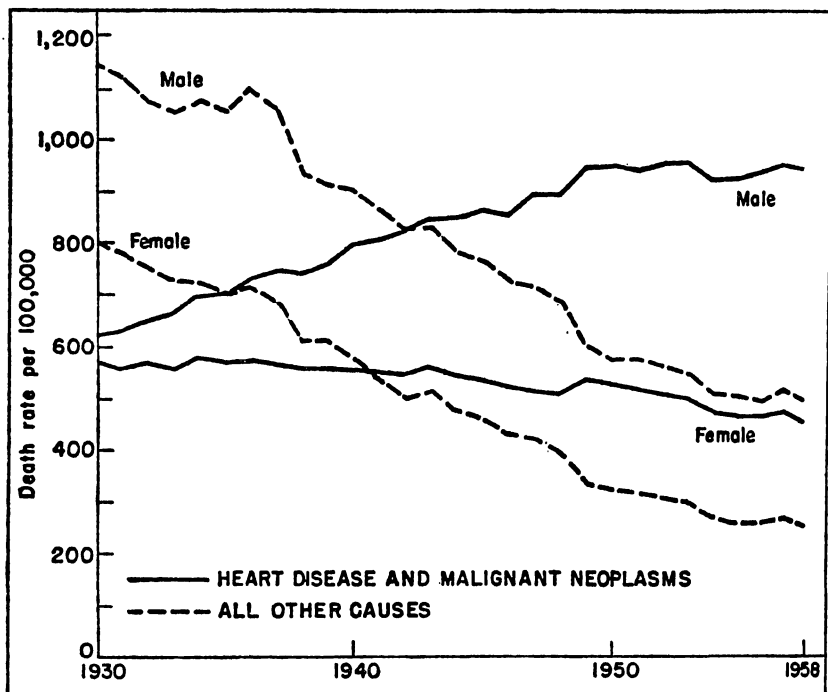


Fig. 4. Death rates per 100,000 population for heart disease and malignant neoplasms and for all other causes, by sex, white persons aged 45-64, United States, 1930-1958.

middle-aged white males death rates for heart disease and malignant neoplasms increased rather steadily during the period 1930-1958; whereas for females death rates for these diseases declined. For all other causes of death combined, the trends in male and female death rates were quite similar. Sex mortality ratios for heart disease and malignant neoplasms rose sharply during the period 1929-1931 to 1956-1958—from 1.50 to 2.99 for heart disease, and from .70 to 1.14 for malignant neoplasms.

Table 3 shows the contribution made by selected categories of heart disease and malignant neoplasms to increases in the sex mortality ratio during the period 1949-1951 to 1956-1958. The death rates upon which these computations are based appear in Appendix Table B. Data for previous periods are not shown because the manner in which deaths from the heart diseases were classified for statistical purposes prior to 1949 is

	ALGEBRAIC CONTRIBUTION	RELATIVE CONTRIBUTION
Total Increment in Ratio	.2194	100.0
<i>Contribution Made By:</i>		
<i>Cancer</i>		
Mouth, Pharynx, and Esophagus	.0004	.2
Stomach	-.0007	-.3
Intestines and Rectum	.0075	3.4
Pancreas	.0016	.7
Lung	.0274	12.5
Prostate	-.0009	-.4
Kidney	.0010	.5
Bladder	-.0001	-.05
Breast	-.0025	-1.1
Uterus	.0256	11.7
Lymphoma	-.0003	-.1
Leukemia	.0003	.1
Other Cancer	.0089	4.1
<i>Heart Disease</i>		
Rheumatic	.00002	.01
Coronary	.0533	24.3
Myocardial Degeneration	.0026	1.2
Hypertensive	.0304	13.9
Other Heart Disease	-.0009	-.4

Table 3. Contribution of selected heart and neoplastic diseases to change in ratio of male to female death rates. White persons aged 45-64, 1949-1951 to 1956-1958.

not comparable to the method used starting in 1949, nor is it as satisfactory or meaningful.

Trends in four causes of death shown in Table 3 made large contributions to the increase in the sex mortality ratio. Trends in death rates for cancer of the lung and of the uterus were responsible for about a quarter of the increase; trends in death rates for coronary heart disease and hypertensive heart disease were responsible for another 38 per cent.

The contribution by cancer of the uterus was due to a decline in the white female death rate from 43.6 to 33.0 per 100,000. The contribution by hypertensive heart disease was due to a large decline in the death rate for this relatively low sex mortality ratio disease, coupled with an increase in the sex

mortality ratio—from 1.11 to 1.23. The contributions by lung cancer and coronary heart disease were due to increases in death rates among males—from 55.1 to 78.8 per 100,000 for lung cancer, and from 519.9 to 561.6 per 100,000 for coronary heart disease—while female death rates for these diseases changed only slightly.

Combining information shown on Tables 2 and 3 gives some clues as to factors responsible for increases in the sex mortality ratio among middle-aged persons during the past few years. Table 2 shows that trends in death rates for strokes made a contribution to the increase in the sex mortality ratio during the period 1949–1951 to 1956–1958. This was due to trends in death rates similar to those which have taken place for hypertensive heart disease. Death rates declined for both sexes, with the greater decline among females.

A major factor in strokes as well as hypertensive heart disease is high blood pressure. The decline in mortality from these diseases may well be the effect of the blood pressure lowering drugs introduced in this country around 1950. It is not clear why females should benefit more than males. Even if this were not so, however, a decline in mortality from strokes and hypertensive heart disease in excess of the decline from other causes would increase the sex mortality ratio for all causes of death combined. This is because of the relatively low sex mortality ratios observed for strokes and hypertensive heart disease and a decline in the weight applied by these diseases in the all-cause complex.

DISCUSSION

The increase in sex mortality differentials has been attributed by some to biological rather than environmental factors.¹¹ It is generally believed that females have a greater constitutional resistance to degenerative diseases than men and that this is now coming to light as the result of declines in the infectious

¹¹ United Nations. *DEMOGRAPHIC YEARBOOK*, 1957. New York, United Nations, 1957, p. 7.

diseases. This theory was proposed by Lenz to explain upward trends in sex mortality ratios for infants.¹² Later, it was extended by Herdan to all ages,¹³ and more recently was presented by Madigan as the most likely explanation for increasing sex differentials in the United States.¹⁴

The data presented here lend little support to a biological explanation for the increase in the sex mortality ratio. Death rates for certain infectious conditions which have been unfavorable to the young adult female in the past have declined and this decline is responsible for much of the increase in the sex mortality ratio in the age group 15-24. It is not degenerative diseases which have emerged as the leading causes of death in this age group, however, but rather it has been deaths due to motor vehicle accidents. Traditionally, male accident death rates have been high, and a slight increase in this male excess combined with a decline in death rates for which a lower male excess or a female excess prevailed has been an important factor in increases in the sex mortality ratio among young adults. The male excess mortality from motor vehicle accidents is probably more a socio-environmental than a biological effect.

An important trend in death rates, particularly as it affects trends shown in Figure 2, is the trend in the age group 45-64. Death rates are high in this age group relative to the age group 15-24 and thus weigh more heavily in the all-age death rate.¹⁵ Infectious diseases do not seem to be importantly involved in increases in the sex mortality ratio in the age group 45-64. Rather, trends in death rates for malignant neoplasms and the cardiovascular diseases are making a major contribution. While it seems reasonable to explain static sex differences in mortality

¹² Lenz, F.: Die Übersterblichkeit der Knaben im Lichte der Erblichkeitslehre. *Archiv für Hygiene und Bakteriologie*, xciii, pp. 126-150, 1923.

¹³ Herdan, G.: Causes of Excess Male Mortality in Man. *Acta Genetica*, 1952, iii, pp. 351-375.

¹⁴ Madigan, F. C.: Are Sex Mortality Differentials Biologically Caused? *Milbank Memorial Fund Quarterly*, April, 1957, xxxv, pp. 202-223.

¹⁵ From a computation similar to that described in Footnote 10, it can be shown that the age group 15-24 made only a minor contribution. The greatest contributions to increases in the sex mortality ratio at all ages (not age-adjusted) were by the age groups 45-54, 55-64, and 65-74.

from such degenerative diseases on biological grounds, it is difficult to explain trends in sex differences on this basis.

In general, an examination of causes of death responsible for increases in sex differentials in mortality suggests that two kinds of forces are at work. On the one hand, social, medical, and public health advances have caused death rates for certain female diseases, or diseases with low sex mortality ratios—tuberculosis, diseases associated with childbearing, cancer of the uterus, and diseases associated with high blood pressure—to decline. At the same time, some factors have caused increases in male death rates for motor vehicle accidents, lung cancer, and coronary heart disease. It would seem important to identify those factors responsible for increases in death rates, and to counteract the growing imbalance in mortality patterns.

SUMMARY

1. In the United States, during the period 1920 to 1958, the ratio of white male to white female age-adjusted death rates increased from 1.08 to 1.60.

2. During the period 1929–31 to 1956–58, the largest increases in sex mortality ratios occurred in the age groups 15–24 and 45–64.

3. Trends in death rates for tuberculosis, maternal mortality, and motor vehicle accidents were primarily responsible for increases in the age group 15–24.

4. Trends in death rates for cancer of the lung, cancer of the uterus, coronary heart disease, and diseases associated with high blood pressure were important causes for increases in the age group 45–64.

5. Two kinds of trends in death rates have affected sex mortality ratios: declines in causes of death importantly affecting females (tuberculosis, maternal mortality, cancer of the uterus, and diseases associated with high blood pressure), and increases in male death rates for motor vehicle accidents, lung cancer, and coronary heart disease.

6. While increases in sex mortality ratios are frequently attributed to biological factors, an examination of the causes of death responsible, in the age groups where the greatest increases have occurred, suggests that environmental factors may be considerably more important.

Appendix Table A. Average annual death rates for selected causes per 100,000 population, white persons, age groups 15-24 and 45-64, for the periods 1929-1931, 1939-1941, 1949-1951, 1956-1958.

CAUSE OF DEATH ^a	AGE GROUP 15-24										AGE GROUP 45-64					
	1929-1931		1939-1941		1949-1951		1956-1958		1929-1931		1939-1941		1949-1951		1956-1958	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL CAUSES	300.7	258.3	201.1	139.4	154.9	71.9	151.1	57.1	1776.6	1369.5	1677.0	1124.0	1524.6	851.5	1447.1	720.0
Tuberculosis, All Forms (001-019)	40.7	67.0	17.2	27.8	4.7	6.9	.5	.5	111.1	57.6	90.7	32.9	55.6	13.7	20.6	4.8
Syphilis and its Sequelae (020-029)	1.4	1.5	.8	1.1	.2	.1	.1	0	44.9	13.1	38.6	10.2	13.3	3.4	5.2	1.4
Typhoid Fever (040)	6.8	4.6	1.3	1.0	0.0	0.0	0	0	3.5	2.2	1.0	.5	.1	0.0	0.0	0
Dysentery, All Forms (045-048)	.2	.2	.2	.1	.1	0.0	0	0	1.1	1.0	.6	.6	.3	.2	.1	.1
Diphtheria (055)	.7	.8	.1	.2	0.0	.1	0	0	.4	.7	.2	.2	.2	0.0	0.0	0
Whooping Cough (056)	0.0	.1	0.0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
Meningococcal Infections (057)	5.4	1.9	.6	.3	.4	.2	.2	.1	1.6	.9	.4	.3	.3	.2	.1	.1
Acute Poliomyelitis (080)	1.5	.8	1.1	.5	2.5	1.7	.3	.4	.2	.1	.1	.1	.2	.1	.1	0.0
Measles (085)	.6	.6	.3	.3	.1	.1	.1	.1	.2	.4	.1	.2	0.0	0.0	0	0
Malignant Neoplasms (140-205)	4.9	3.9	6.0	4.4	10.7	7.4	10.6	6.9	199.6	283.9	222.0	274.4	255.3	258.3	273.7	239.8
Diabetes Mellitus (260)	2.9	2.8	2.0	2.3	.9	1.3	.9	1.3	32.6	58.4	33.7	62.3	18.7	28.9	17.5	21.5
Vascular Lesions Affecting Central Nervous System (330-334)	1.8	1.8	1.7	1.4	1.5	1.3	1.9	1.5	142.6	135.6	114.3	110.8	105.9	96.2	88.2	68.8
Rheumatic Fever (400-402)	1.9	2.1	1.3	1.2	1.2	1.2	.4	.3	2.3	2.1	.5	.6	.9	.6	.7	.5
Diseases of Heart (410-443)	18.7	20.3	13.7	12.4	6.4	5.2	4.3	3.3	419.0	279.4	566.4	277.1	687.7	268.9	670.1	224.0
Hypertension without Mention of Heart (444-447)	0.0 ^b	0.0 ^b	0.0	.1	.2	.2	.1	.1	.6 ^b	.6 ^b	1.5	1.4	9.4	7.0	6.5	4.5
Genital Arteriosclerosis (450)	0.0 ^b	0.0 ^b	0.0	0.0	0.0	0.0	0	0	15.1 ^b	9.9 ^b	8.8	5.7	6.7	3.6	5.9	3.0
Chronic and Unspecified Nephritis and Other Renal Sclerosis (592-594)	5.4	6.1	4.0	4.0	2.9	2.1	2.2	1.5	143.6	127.9	103.1	82.8	20.3	15.3	10.8	7.5

Influenza and Pneumonia, Except Pneumonia of Newborn (480-493)	29.5	21.6	10.4	8.2	2.9	2.3	3.3	3.0	147.6	100.5	77.7	45.2	30.0	13.1	30.4	12.9
Ulcer of Stomach and Duodenum (540, 541)	1.5	.6	.9	.2	.3	.1	.2	.1	23.8	6.3	28.1	4.4	19.9	3.3	18.1	3.8
Gastritis, Duodenitis, Enteritis, and Colitis, Except Diarrhea of Newborn (543, 571, 572)	.7	1.0	.7	.7	.6	.6	.5	.4	4.0	3.8	2.2	2.0	3.0	2.2	3.7	2.5
Cirrhosis of Liver (581)	.3	.3	.3	.4	.2	.4	.2	.3	25.5	12.2	29.7	12.6	32.3	14.5	39.1	16.7
Acute Nephritis and Nephritis with Edema, including Nephrosis (590, 591)	1.4	1.5	1.0	.8	1.0	.6	.5	.3	5.3	4.0	2.8	1.5	2.8	1.9	1.7	1.1
Deliveries and Complications of Pregnancy, Childbirth, and the Puerperium (640-689)	—	37.6	—	18.2	—	5.2	—	2.4	—	1.3	—	.6	—	.1	—	.1
Congenital Malformations (750-759)	.7	.6	2.1	1.1	2.1	1.6	2.6	1.9	.1	.1	.6	.5	2.7	2.1	3.0	2.4
Symptoms, Semility, and Ill-Defined Conditions (780-795)	1.4	1.7	1.1	1.2	1.1	.7	1.4	.7	15.4	8.0	15.8	6.2	13.1	4.6	12.8	4.5
Motor Vehicle Accidents (E810-E835)	43.3	12.5	48.5	12.9	57.0	12.4	66.9	15.2	53.2	18.9	51.7	15.3	35.7	12.4	33.8	12.8
Accidents, Except Motor Vehicle (E800-E802, E840-E962)	56.5	8.7	39.2	6.0	34.9	5.3	32.6	4.4	101.1	23.9	73.7	19.1	54.8	13.3	45.6	11.8
Suicide (E963, E970-E979)	9.2	6.1	8.4	4.0	6.7	2.5	6.7	2.1	60.8	13.9	47.2	13.5	37.3	10.3	35.2	9.8
Homicide (E964, E980-E985)	8.7	3.4	4.0	1.3	3.8	1.3	3.9	1.5	11.0	1.8	6.4	1.4	5.1	1.5	4.4	1.6
All Other Causes	54.6	48.2	34.2	27.3	12.5	11.1	10.7	8.8	210.4	201.0	159.1	141.6	113.0	75.8	119.8	64.0

0.0 rate is more than 0 but less than .05; — means not applicable.

¹ Death rates are age-adjusted in 10-year intervals to the 1940 United States population.

² Numbers in parentheses are 1948 International List numbers. For corresponding rubrics for years prior to 1948, see *Vital Statistics—Special Reports*, Vol. 43, National Office of Vital Statistics.

³ Average of 1930-31.

SOURCE: 1920-1951; *Vital Statistics—Special Reports*, Vol. 43, National Office of Vital Statistics. Deliveries and complications of pregnancy, childbirth, and the puerperium: from annual volumes of National Office of Vital Statistics.

1956, 1957; *Vital Statistics of the United States*, 1956, Volume I, and 1957, Volume I, National Office of Vital Statistics.

1958; Unpublished data from National Office of Vital Statistics.

Appendix Table B. Average annual death rates for malignant neoplasms and diseases of the heart per 100,000 population, white persons, age group 45-64,¹ for the periods 1949-1951 and 1956-1958.

CAUSE OF DEATH ²	1949-1951		1956-1958	
	Male	Female	Male	Female
Malignant Neoplasms (140-205)	255.3	258.3	273.7	239.8
Mouth, Pharynx, and Esophagus (140-148, 150)	17.4	3.8	18.1	4.0
Stomach (151)	32.1	15.7	22.1	10.7
Intestines and Rectum (152-154)	36.8	37.8	34.9	33.7
Pancreas (157)	14.1	8.2	16.5	8.8
Lung (162, 163)	55.1	8.8	78.8	10.0
Prostate (177)	10.3	—	9.6	—
Kidney (180)	7.0	3.4	7.6	3.3
Bladder (181)	9.2	3.2	8.0	2.6
Breast (170)	.6	56.6	.5	57.6
Uterus (171-174)	—	43.6	—	33.0
Lymphoma (200-203)	13.1	8.2	16.3	10.0
Leukemia (204)	10.1	7.2	10.7	7.4
Other Cancer	49.5	61.7	50.6	58.6
Diseases of the Heart (410-443)	687.7	268.9	670.1	224.0
Rheumatic (410-416)	27.6	25.9	25.5	24.8
Coronary (420)	519.9	146.9	561.6	146.9
Myocardial Degeneration (421-422)	50.5	28.2	24.7	13.5
Other Diseases of the Heart (430-434)	26.9	11.2	20.5	8.2
Hypertensive (440-443)	62.9	56.6	37.7	30.7

— means not applicable.

¹ Death rates are age-adjusted in 10-year intervals to the 1940 United States population.

² Numbers in parentheses are 1948 International List numbers.

SOURCE: 1949, 1951, 1956, 1957: *Vital Statistics of the United States*, Volume II for each year specified, National Office of Vital Statistics.

1950: *Vital Statistics of the United States, 1950, Volume III*, National Office of Vital Statistics.

1958: Unpublished data from National Office of Vital Statistics.

IMPLICATIONS OF PROSPECTIVE UNITED STATES POPULATION GROWTH IN THE 1960S

JOSEPH S. DAVIS¹

I. DEMOGRAPHIC BACKGROUND AND PROSPECTS SUMMARIZED

THE United States is entering the third decade of a demographic revolution of profound significance, which has already contributed much to transform our national position, outlook, and problems.²

The 1940s witnessed an unprecedented rise in the prevalence of the married state, a decline in the median age at first marriage, a marked rise in the "general fertility rate" (number of live births per 1,000 women aged 15-44),³ and first one and then another so-called "baby boom."⁴ These were proximately responsible for our wholly unexpected population upsurge.

These developments surprisingly continued in the 1950s, though at a slower pace. Births, instead of declining, flooded to a new high average of $4\frac{1}{4}$ million a year in 1956-1959. Hence our vigorous population increase was remarkably sustained through the past decade. It is hard to exaggerate the transformation of our population position and outlook between 1940 and 1960.

In the 1960s our population growth is likely to continue

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² The data on which my statements are based are mainly those of the Departments of Commerce, Labor, and Health, Education, and Welfare. Many of these are summarized in the STATISTICAL ABSTRACT OF THE UNITED STATES, 1959, HISTORICAL STATISTICS OF THE UNITED STATES (1960 edition), HEW TRENDS, 1960 edition, and *Economic Reports of the President*. Most of the details are in *Current Population Reports* (Series P-25, No. 187, Nov. 10, 1958, is especially important); in *Vital Statistics of the United States* and other publications of the National Office of Vital Statistics, Public Health Service; and in publications and press releases of the Office of Education, also in the Department of Health, Education, and Welfare.

³ Time series of *crude* birth rates, marriage rates, and death rates (i.e., number per 1,000 population) are misleading because of radical changes since 1940 in the age composition and marital status of the population.

⁴ The term "boom" is misleading for an upswing which is not followed by a "bust" or substantial recession. The terms "bomb" and "explosion" are still more inapt for even rapid population growth movements.