

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1973 REPORTS**

V. MORTALITY DIFFERENTIALS BY SEX

AS A result of recent requests for information on mortality differentials by sex, the Committee on Ordinary Insurance and Annuities of the Society of Actuaries has prepared this summary of the relevant mortality experience for the general population, for insured lives, and for life annuitants.

GENERAL POPULATION

At birth female life expectancy generally exceeds that of males in practically every country of the world, covering a wide diversity of cultures.¹ In the United States general population, female life expectancy has exceeded that of males at virtually all ages at least since 1900, and the differential in life expectancy has widened (see the accompanying tabulation).

LIFE EXPECTANCY (YEARS) BY SEX*

Age	Year of Table	Males (M)	Females (F)	Difference [(F) - (M)]
0	1900-1902	47.9	50.7	2.8
	1939-41	61.6	65.9	4.3
	1949-51	65.5	71.0	5.5
	1959-61	66.8	73.2	6.4
	1971	67.4	74.8	7.4
1	1900-1902	54.4	56.1	1.7
	1971	67.9	75.1	7.2
21	1900-1902	41.3	42.9	1.6
	1971	48.9	55.7	6.8
65	1900-1902	11.5	12.2	0.7
	1971	13.2	16.9	3.7

* *Vital Statistics of the United States, 1971* (U.S. Department of Health, Education, and Welfare, Public Health Service, National Center for Health Statistics), Vol. II, sec. 5, p. 11; and *United States Life Tables* for the years shown prior to 1971 (U.S. Department of Commerce, Bureau of the Census, Government Printing Office).

For the United States in 1971, female life table mortality rates by age vary between 30 and 85 per cent of the corresponding male rates (see Table 1). At attained ages 0-5, the female rates average about 80 per cent of the male rates, grading to roughly 35 per cent at ages 20-25, 50-60 per cent at ages 30-75, and 80 per cent at ages 80-85. A female advantage in mortality is also evident in perinatal mortality experience

¹ *Demographic Yearbook, 1971* (United Nations, 1972), pp. 746-65, Table 34.

TABLE 1
RATIO OF FEMALE TO MALE MORTALITY RATES
(United States, 1971)

AGE INTERVAL	LIFE TABLE DEATH RATE DURING INTERVAL*		RATIO OF FEMALE TO MALE RATE
	Males	Females	
0-1 . . . . .	.0213	.0166	78%
1-5 . . . . .	.0035	.0029	83
5-10 . . . . .	.0024	.0017	71
10-15 . . . . .	.0025	.0015	60
15-20 . . . . .	.0079	.0031	39
20-25 . . . . .	.0109	.0037	34
25-30 . . . . .	.0100	.0043	43
30-35 . . . . .	.0112	.0059	53
35-40 . . . . .	.0155	.0089	57
40-45 . . . . .	.0232	.0137	59
45-50 . . . . .	.0358	.0202	56
50-55 . . . . .	.0561	.0298	53
55-60 . . . . .	.0861	.0428	50
60-65 . . . . .	.1307	.0646	49
65-70 . . . . .	.1827	.0958	52
70-75 . . . . .	.2637	.1540	58
75-80 . . . . .	.3585	.2313	65
80-85 . . . . .	.4434	.3450	78

* From *Vital Statistics of the United States, 1971* (U.S. Department of Health, Education, and Welfare, Public Health Service, National Center for Health Statistics), Vol. II, sec. 5, p. 7.

(i.e., experience relating stillbirths and early infant deaths to live births). In 1958-59 perinatal mortality among females was 82 per cent of that among males.²

The sex differential in mortality is apparent in the experience by cause of death as well as by age. Female mortality rates are less than the comparable male rates for most causes of death. Female death rates are considerably below the male rates for accidents, homicides, suicides, and heart disease, with notable variations in the experience by age and racial origin.³ These findings, especially with regard to mortality from heart disease, strongly suggest that sex differentials in mortality are due

² "Reduction in Perinatal Mortality," *Metropolitan Life Statistical Bulletin*, XLIII (May, 1962), 6-8.

³ "Sex Differentials in Mortality Widening," *Metropolitan Life Statistical Bulletin*, LII (December, 1971), 3-6.

to biological as well as environmental factors and that the relative importance of the biological component varies by age and social circumstances.

INSURED LIVES

The mortality differential by sex under standard ordinary life insurance policies follows essentially the same pattern as that in the general population. Female mortality is lower than male mortality at all ages, averaging about 60 per cent of male mortality rates based on amount for both medically examined and nonmedical issues in the select period (first fifteen policy years) and for all issues combined in the ultimate period (policy years 16 and over) (see Tables 9, 10, and 12 of the annual study in *TSA, 1973 Reports*). Individual company results vary from the over-all results for all contributing companies.

LIFE ANNUITANTS

Female mortality under insured life annuities is likewise lower than comparable male mortality, and female survivorship is correspondingly greater. In the study of the 1967-71 intercompany experience under individual immediate annuities which appears in *TSA, 1973 Reports*, female mortality rates based on amounts of annual income average about 55 per cent of the corresponding male rates during the first ten contract years and about 80 per cent of the male rates during contract years 11 and over (see Table 2). As in the case of insured lives, individual company results vary from the over-all results for all contributing companies.

TABLE 2
MORTALITY RATES BY SEX ON INDIVIDUAL IMMEDIATE ANNUITIES
(Intercompany Issues of 1931-70;
Experience between 1967 and 1971 Anniversaries;
Nonrefund and Refund Annuities Combined)

CONTRACT YEARS	ATTAINED AGES	ACTUAL DEATHS NO. OF CONTRACTS		DEATH RATE PER 1,000 ON AMOUNTS OF ANNUAL INCOME		RATIO OF FEMALE TO MALE RATE
		Males	Females	Males	Females	
1-10	To 49	8	17	19.95	5.47	27%
	50-59	60	83	18.55	8.29	45
	60-69	681	539	23.87	11.08	46
	70-79	1,562	1,574	51.71	24.03	46
	80-89	1,262	1,568	95.43	59.27	62
	90 and over	203	238	166.23	154.96	93
	All	3,776	4,019	51.53	27.95	54%
11 and over	To 49	2	9	3.44	6.91	201%
	50-59	26	34	9.57	8.35	87
	60-69	219	218	28.46	13.30	47
	70-79	1,236	2,081	59.03	38.07	64
	80-89	2,748	7,868	129.11	96.28	75
	90 and over	1,340	6,037	206.00	201.72	98
	All	5,571	16,247	99.21	80.07	81%

SOURCE: Prepublished data used in the study of "Mortality under Individual Immediate Annuities between 1967 and 1971 Anniversaries," *TSA, 1973 Reports*.