

THE MORTALITY OF INDUSTRIAL POLICYHOLDERS  
1950 TO 1955

EDWARD A. LEW AND MORTIMER SPIEGELMAN

INTRODUCTION

**T**HE present report is the fourth in a series describing the mortality experience of Industrial policyholders of the Metropolitan Life Insurance Company for successive periods since 1911.<sup>1</sup> The earlier reports presented the mortality trends among these insured lives for the more important causes of death according to age, sex, and race during the four decades ending with 1950. This report extends the series to 1955, with emphasis on the trends during the postwar decade.

As a result of the control gained over the acute diseases, the cardiovascular-renal diseases and cancer have come to dominate the mortality picture in this recent period; together, these diseases accounted for almost 70 percent of the deaths among the Industrial policyholders in this experience. With so large a proportion of total deaths in these two broad disease categories, it becomes necessary to turn to an analysis of the specific morbid conditions included within them for a better understanding of recent mortality trends. At the same time, it is being increasingly recognized that consideration should also be given to the associated causes of death present when the cardiovascular-renal conditions and cancer are stated as the underlying cause.

Accidents have retained their importance in the total mortality picture, particularly at the younger ages, although some improvement is registered in recent years. On the other hand, an extraordinary record, during the postwar period, has been established in the reduction in mortality from tuberculosis. The decline in mortality from pneumonia and influenza is also noteworthy.

A common pattern observed in this survey of recent mortality trends according to cause of death is the slower rate of reduction in death rates for males than for females.

A feature of this report is an analysis of Industrial insurance mortality on the basis of the Sixth Revision of the International List of Causes of Death, adopted by the World Health Organization in 1948. Since this introduced radical changes in the procedure for certifying and coding causes

<sup>1</sup> For the last report, which contains references to the two earlier ones, see L. I. Dublin and M. Spiegelman, "Health Progress Among Industrial Policyholders, 1946 to 1950," *TSA* III, 294.

of death, their effect upon both the level and trend of death rates is examined.

The experience in this report from 1950 through 1955 is based upon nearly 110,000,000 life-years of exposure in the age range 1-74 last birthday. The distribution of this exposure according to age, sex, and race, is shown in Table 1.<sup>2</sup> Females constitute 58 percent of the total exposure and nonwhites 13 percent of the total.

TABLE 1

PERCENTAGE DISTRIBUTION OF PREMIUM-PAYING POLICYHOLDERS\*  
BY RACE, SEX, AND AGE--AGES 1 TO 74 YEARS

METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1950 TO 1955

(Total at Ages 1-74 Years: 109,366,877 life-years = 100%)

AGE PERIOD YEARS	TOTAL PERSONS	WHITE		NONWHITE	
		Males	Females	Males	Females
1-74.....	100%	36%	51%	6%	7%
1-4.....	7	3	3	1	†
5-14.....	20	9	9	1	1
15-24.....	17	7	8	1	1
25-44.....	28	9	16	2	1
45-64.....	22	6	12	1	3
65-74.....	6	2	3	†	1

\* The figures for 1950-1955 relate to weekly and monthly premium-paying business; 1955 in addition includes Ordinary monthly premium policies for less than \$1,000.

† Less than 0.5 percent.

## MORTALITY FROM ALL CAUSES

To provide a perspective for the recent situation, the trend of total mortality among Metropolitan Industrial policyholders from 1911 through 1955 is shown in Chart I.<sup>3</sup> In 1955, the age-adjusted death rate

<sup>2</sup> The experience relates to weekly and monthly premium-paying business; 1955 includes, in addition, the experience of Ordinary monthly premium policies for less than \$1,000.

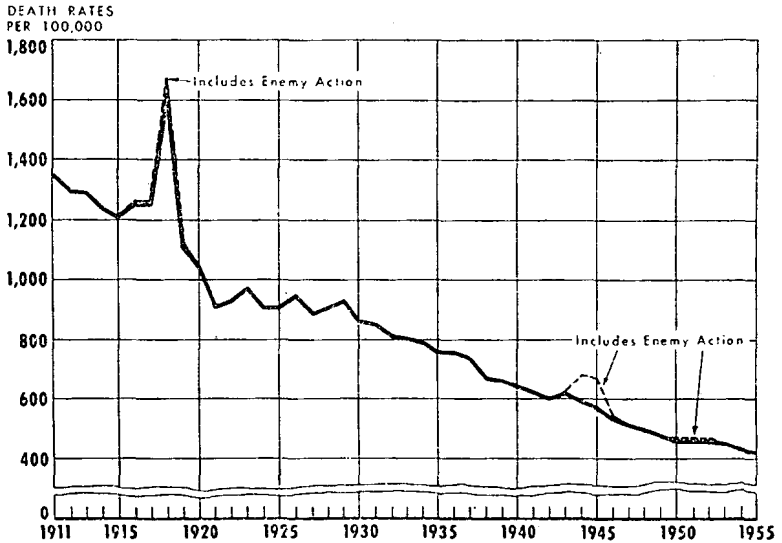
<sup>3</sup> In order to avoid recomputing the entire series of data, the practice of using the Standard Million of England and Wales, 1901, as a basis for the age-adjustment of death rates was continued for the recent period under review. Age-adjusted death rates for each race-sex category were weighted by their proportions in the general population in the Death Registration States of 1920 to obtain age-adjusted rates for the total of Industrial policyholders, following the procedure used in the earlier reports. In the report for the period 1946 to 1950 it is stated that experiment with the age-race-sex distribution of Industrial policyholders of 1947 as a standard for adjustment has little effect upon the trend comparisons in most instances over a short range of years although the level of the age-adjusted rates is affected.

at ages 1-74 was 421.2 per 100,000, a drop of 9 percent since 1950 and of 20 percent from the level of 1946, the first postwar year. Compared with the average for the prewar period 1936-1940, the death rate in 1955 showed a decrease of 39 percent. As is evident from the chart, the decline in mortality has continued with little interruption since 1930.

## CHART I

ANNUAL AGE-ADJUSTED DEATH RATES FROM ALL CAUSES  
TOTAL PERSONS AT AGES 1-74 YEARS

METROPOLITAN LIFE INSURANCE COMPANY, INDUSTRIAL DEPARTMENT  
1911 TO 1955

*Race, sex, and age*

Continuing earlier trends, the rates of decrease in the period from 1950 through 1955 were relatively more rapid for females than for males and for nonwhites than for whites. The pertinent data are shown in Table 2. Among females in each race category, the death rates were reduced in each age group within the range 1-74 years, with a tendency for the rates of decline to be relatively smaller at the older than at the younger ages. Among white males, the death rates for each age group rose from 1950 to a peak in 1952 and then declined by 1955 to a level generally somewhat below that of 1950. Nonwhite males showed appreciable reductions in mortality from 1950 to 1955 at practically all ages.

Compared with 1946-1950, the death rates for 1955 show marked reductions in each age group except for white males over age 45. The largest

**TABLE 2**  
**DEATH RATES FROM ALL CAUSES\***  
**BY RACE, SEX, AND AGE**  
**METROPOLITAN LIFE INSURANCE COMPANY**  
**INDUSTRIAL DEPARTMENT, 1936 TO 1955**

AGE PERIOD YEARS	DEATH RATES PER 100,000								PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950	1946- 1950	1936- 1940	1946- 1950	1936- 1940
<b>Total Persons</b>										
1-74†.....	421.2	427.2	449.5	461.9	462.5	463.2	496.0	695.6	-15%	-39%
<b>White Males</b>										
1-74†.....	545.0	548.5	569.7	582.2	573.6	569.1	599.6	776.2	-9%	-30%
1-4.....	99.9	105.2	113.0	120.1	112.4	109.0	140.7	278.6	-29	-64
5-14.....	48.8	49.2	55.8	57.0	57.9	60.3	69.1	120.1	-29	-59
15-24.....	125.0	126.1	130.2	132.6	125.5	118.7	141.1	193.1	-11	-35
25-44.....	259.6	254.9	271.7	287.8	280.5	279.4	305.8	469.0	-15	-45
45-64.....	1,711.9	1,755.7	1,817.1	1,830.6	1,816.5	1,792.4	1,727.3	2,097.7	-1	-18
65-74.....	5,170.9	5,073.1	5,279.3	5,334.2	5,293.6	5,240.4	5,372.3	6,552.7	-4	-21
<b>White Females</b>										
1-74†.....	286.7	292.0	313.1	322.5	328.4	334.0	365.5	554.3	-22%	-48%
1-4.....	71.9	78.3	87.2	102.2	97.6	89.2	113.8	243.7	-37	-70
5-14.....	31.7	31.4	36.3	39.4	35.2	38.9	43.8	90.5	-28	-65
15-24.....	50.0	45.2	50.3	56.0	57.1	59.9	70.8	149.1	-29	-66
25-44.....	136.5	135.7	148.4	149.1	157.7	163.3	182.2	335.0	-25	-59
45-64.....	804.7	837.8	899.2	914.4	937.4	931.6	950.6	1,371.7	-15	-41
65-74.....	3,150.4	3,186.3	3,359.5	3,444.5	3,462.7	3,550.3	3,775.4	5,110.4	-17	-38
<b>Nonwhite Males</b>										
1-74†.....	603.4	612.8	663.9	686.9	711.4	695.8	743.7	1,151.1	-19%	-48%
1-4.....	145.1	141.2	128.2	185.8	149.9	192.1	199.1	460.2	-27	-68
5-14.....	70.1	71.0	74.4	62.0	91.9	68.1	91.4	177.6	-23	-61
15-24.....	169.3	190.0	205.4	249.0	227.3	208.1	240.8	459.3	-30	-63
25-44.....	371.7	400.4	446.2	465.2	473.7	469.1	494.1	965.5	-25	-62
45-64.....	1,689.5	1,680.5	1,829.8	1,845.8	1,907.5	1,856.2	1,997.3	2,763.3	-15	-39
65-74.....	5,206.8	5,141.0	5,514.5	5,539.9	5,884.4	5,803.3	5,837.9	7,668.5	-11	-32
<b>Nonwhite Females</b>										
1-74†.....	451.2	487.2	507.7	542.4	557.8	572.5	628.5	988.5	-28%	-54%
1-4.....	106.8	147.5	112.6	142.0	133.1	141.0	157.2	379.2	-32	-72
5-14.....	32.2	32.6	42.6	52.8	56.5	61.6	69.2	158.1	-53	-80
15-24.....	94.0	113.2	119.8	149.4	152.2	183.7	230.0	513.3	-59	-82
25-44.....	307.1	353.2	363.1	382.4	398.1	408.2	447.1	808.4	-31	-62
45-64.....	1,277.5	1,337.5	1,391.2	1,478.1	1,517.2	1,531.0	1,635.3	2,283.0	-22	-44
65-74.....	3,960.3	4,097.4	4,341.1	4,476.0	4,572.3	4,605.3	4,840.7	6,586.4	-18	-40

\* Exclusive of deaths from enemy action.

† Death rates standardized for age.

were about 30 percent at ages 1-4 in each race-sex category. For white persons, the reductions tended to decrease with advance in age; for nonwhites, they were greatest at ages 15-24. The decreases, at ages 45-64, were one percent for white males, 15 percent for white females and nonwhite males, and 22 percent for nonwhite females. At ages 65-74, the reduction amounted to 4 percent for white males, 17 percent for white females, 11 percent for nonwhite males, and 18 percent for nonwhite females.

#### *Comparison with general population*

The Industrial policyholders in this experience are mainly urban wage-earners and their families resident in the United States and Canada. Since the standards of selection for Industrial insurance are considerably less stringent than those for Ordinary insurance, their effect upon mortality is not long-lasting, with the result that the aggregate experience of Industrial policyholders differs little from the ultimate experience.

According to the comparison in Table 3, covering the period 1951-1953, the aggregate mortality of white Industrial policyholders at ages 1-74 is now practically identical with that of white persons in the general population of the United States; there is, however, an advantage for the insured concentrated at ages 15-24. For nonwhites the insurance mortality is 80 percent that of the general nonwhite population. This advantage of nonwhite insured lives is found at all ages, particularly under 65 years. While the standards of selection on Industrial insurance are the same for white and nonwhite lives, the relatively low mortality of the insured nonwhites compared with the general nonwhite population may reflect, essentially, the experience of that social-economic stratum of the nonwhites interested in insurance and able to afford it.

The lower tiers of Table 3 compare the relative changes in mortality for Metropolitan Industrial policyholders and for the general population between 1946-1950 and 1951-1953, the last period for which comparable data are available. Except for white males, the insured lives generally had the greater rate of decline in death rates within the age range 1-74.

In the short period from 1950 to 1955, the average length of life of Industrial policyholders rose 1.73 years to reach 70.00 years, practically identical with that for the general population of the United States. As indicated in Table 4,<sup>4</sup> the average lifetime has increased by almost 10 years in the two decades since 1935, and by 23.4 years since 1911-1912.

<sup>4</sup>The mortality records of premium-paying Industrial policyholders in the first year of life and at ages 75 and over are not adequate for the computation of mortality rates for the preparation of a life table. In their place were substituted population data; see Appendix I of *Twenty-five Years of Health Progress*, by L. I. Dublin and A. J. Lotka, published by the Metropolitan Life Insurance Company, New York, 1937.

TABLE 3

MORTALITY OF METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT AND GENERAL POPULATION  
OF UNITED STATES COMPARED IN 1951-1953, AND  
CHANGE SINCE 1946-1950: BY RACE, SEX, AND AGE

AGE PERIOD YEARS	WHITE MALES	WHITE FEMALES	NONWHITE MALES	NONWHITE FEMALES
Ratio of Death Rates: M.L.I. Co. to U.S., 1951-1953				
1-74* .....	1.05	1.00	.79	.81
1-4 .....	.92	.91	.58	.59
5-14 .....	.86	1.00	.89	.71
15-24 .....	.81	.71	.82	.78
25-44 .....	1.04	.94	.71	.76
45-64 .....	1.17	1.10	.76	.76
65-74 .....	1.10	1.09	.96	.97
Percentage Change: 1951-1953 since 1946-1950 Metropolitan Life Insurance Company				
1-74* .....	- 3%	-14%	- 7%	-14%
1-4 .....	-14	- 9	-25	-19
5-14 .....	-14	0	-11	-29
15-24 .....	- 7	-29	- 4	-42
25-44 .....	- 7	-17	-10	-19
45-64 .....	- 1	- 8	- 6	-10
65-74 .....	- 1	- 9	- 3	- 7
Percentage Change: 1951-1953 since 1946-1950 General Population of the United States				
1-74* .....	-10%	- 9%	- 3%	-11%
1-4 .....	-19	-15	- 7	- 8
5-14 .....	-13	-20	-18	-22
15-24 .....	- 6	-13	-15	-33
25-44 .....	-10	-16	- 8	-18
45-64 .....	- 3	- 9	- 2	- 7
65-74 .....	-†	- 7	+10	+ 5

\* Based on standardized death rates.

† Less than 0.5 percent.

NOTE.—Deaths from enemy action are excluded from the Metropolitan Industrial experience; deaths among the armed forces overseas are excluded from the general population experience.

COMPARABILITY OF THE FIFTH AND SIXTH REVISIONS OF THE  
INTERNATIONAL LIST OF CAUSES OF DEATH

An integral part of the Sixth Revision of the International List of Causes of Death was the adoption of a new form of the death certificate and, along with this, a change in the procedures of classifying the cause of death selected for tabulation where more than one is stated on the certificate.<sup>5</sup> Under this new procedure the physician is required to indicate which disease or condition is the underlying cause, and, except in certain specific circumstances, his decision is accepted. In earlier practice, the primary cause was selected by a set of rules prescribed in the manual of Joint Causes of Death.

TABLE 4  
EXPECTATION OF LIFE AT BIRTH  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT 1911-1912 TO 1955\*

Calendar Year	Expectation in Years	Calendar Year	Expectation in Years	Calendar Year	Expectation in Years
1955†	70.00	1943†	63.86	1931	57.90
1954†	69.76	1942†	64.26	1930	57.36
1953†	68.86	1941	63.42	1929	55.78
1952†	68.48	1940	62.93	1928	55.88
1951†	68.42	1939	62.50	1927	56.42
1950†	68.27	1938	61.94	1926	55.02
1949	67.72	1937	60.71	1925	55.51
1948	67.16	1936	60.31	1924	55.62
1947	66.50	1935	60.25	1923	54.55
1946†	65.57	1934	59.45	1922	55.04
1945†	64.95	1933	59.19	1921	55.08
1944†	64.40	1932	58.80	1919-1920	51.14
				1911-1912	46.63

Gain, 1955 since 1911-1912, 23.4 years.

\* The figures for 1948 to 1955 relate to the total Industrial Department, weekly and monthly premium-paying business combined; 1955 includes, in addition, Ordinary monthly premium policies for less than \$1,000. Prior to 1948, the figures pertain to the weekly business alone.

† Excludes deaths from enemy action.

Some important changes were also made in the classified list of causes itself. For the first time all cancers and allied conditions (malignant neoplasms) were placed in a single broad category which included the leukemias and Hodgkin's disease. A new major classification of arteriosclerotic heart disease was established to include not only cases so described on the death certificate, but also deaths ascribed to coronary heart disease and angina pectoris.

The Sixth Revision was first used in 1949 by the National Office of

<sup>5</sup> In this connection, see M. Spiegelman, *Introduction to Demography*, Society of Actuaries, 1955, pp. 22-24 and 51-52.

Vital Statistics for coding deaths in the general population. Its use for coding deaths of Metropolitan Industrial policyholders began in 1950.

To ascertain the effect of these changes in certification and coding procedures, the deaths of Industrial policyholders for 1950 were classified by cause according to both the Fifth and the Sixth Revisions of the International List. The results are shown in Table 5. For comparability, the table shows also the corresponding results of tabulations made in the National Office of Vital Statistics from a 10 percent sample of deaths in the general population of the United States in 1949. The data are presented in the form of ratios of deaths for specific titles classified on the basis of the Sixth Revision to the number for the closest corresponding titles according to the Fifth Revision. The comparability of the two experiences is affected by the use of old forms of death and claim certificates by the Metropolitan in the early months of 1950. These did not provide for an indication of the underlying cause of death by the attending physician, but instead asked the physician to specify the primary and contributory causes of death. The forms used by the Metropolitan differed from the earlier standard death certificate inasmuch as the latter provided for an indication of the underlying cause of death.

The major disease categories most affected by the introduction of the Sixth Revision were diabetes mellitus, and nephritis and nephrosis; appreciably fewer deaths are now ascribed to each of these categories. Among other disease categories similarly affected under the new system are syphilis, ulcer of the stomach or duodenum, and cirrhosis of the liver. On the other hand, the new system classes many more deaths with vascular lesions of the central nervous system, hypertension without mention of heart disease and general arteriosclerosis, and influenza. For many of the broad categories of causes of death, the change from the Fifth to the Sixth Revision did not affect appreciably the total numbers in the category, examples being diseases of the heart, malignant neoplasms, tuberculosis, and accidents. However, even though the totals may not differ much, in some instances, particularly in the case of diseases of the heart, there have been significant differences in specific morbid conditions included. This resulted mainly from the classification of many specific morbid conditions under the category of diseases of the heart by the Sixth Revision which were allocated elsewhere under the Fifth Revision; for some specific morbid conditions, the transfer was in the other direction.<sup>6</sup> Thus, the Sixth Revi-

<sup>6</sup> C. L. Erhardt and L. Weiner, "Changes in Mortality Statistics Through the Use of the New International Statistical Classification," *American Journal of Public Health*, vol. 40, p. 6, January 1950; National Office of Vital Statistics, "The Effect of the Sixth Revision of the International Lists of Diseases and Causes of Death Upon Comparability of Mortality Trends," *Vital Statistics—Special Reports*, vol. 36, p. 151, December 3, 1951.



TABLE 5

COMPARABILITY OF CAUSES OF DEATH CLASSIFIED ACCORDING TO BOTH THE FIFTH AND SIXTH REVISIONS  
OF THE INTERNATIONAL LISTS OF CAUSES OF DEATH(A) INDUSTRIAL POLICYHOLDERS OF THE METROPOLITAN LIFE INSURANCE COMPANY, 1950 AND  
(B) GENERAL POPULATION OF THE UNITED STATES, 1949

CAUSE OF DEATH (SIXTH REVISION)	CODE NUMBERS		COMPARABILITY RATIO <sup>1</sup> AT STATED AGES														
	Sixth Revision	Fifth Revision	All Ages			Under 15		15-24		25-44		45-64		65-74		75 and over	
			A	B <sup>2</sup>	B	A	B <sup>2</sup>	A	B	A	B	A	B	A	B	A	B
Tuberculosis (all forms).....	001-019	13-22	.97	.96	.96	1.01	.99	1.00	.99	.99	.98	.97	.95	.91	.92	1.03	.91
Tuberculosis of respiratory system.....	001-008	13	.97	.96	.96	1.00	.91	1.00	.98	1.00	.98	.97	.95	.92	.93	1.03	.92
Tuberculosis, other forms.....	010-019	14-22	.94	.97	.99	1.02	1.06	.98	1.07	.88	1.03	.97	.98	.78	.81	*	.73
Syphilis.....	020-029	30	.78	.74	.73	*	*	*	.78	.71	.80	.73	.75	.73	*	*	.71
Acute poliomyelitis.....	080	36	.98	.98	.98	1.01	1.01	.96	.96	1.00	.95	*	*	—	—	—	—
Malignant neoplasms.....	140-205	45-55	1.03	1.01	1.00	1.99	2.21	1.66	1.57	1.11	1.11	1.02	1.01	.99	.97	.96	.94
Diabetes mellitus.....	260	61	.58	.57	.58	.91	.90	.94	1.03	.77	.75	.56	.57	.57	.56	.57	.58
Vascular lesions of central nervous system.....	330-334	83	1.15	1.13	1.13	.74	.57	1.00	.83	1.09	1.09	1.14	1.11	1.16	1.14	1.15	1.16
Diseases of heart.....	410-443	90-95	1.09	1.09	1.09	.83	.86	.97	.95	1.05	1.07	1.09	1.09	1.10	1.10	1.08	1.10
Hypertension without mention of heart and general arteriosclerosis.....	444-450	97, 102	1.92	1.52	1.53	*	—	*	*	2.87	3.41	2.26	2.11	1.72	1.55	1.58	1.42
Nephritis and nephrosis.....	590-594	130-132	.39	.39	.39	1.07	.95	.84	.83	.56	.60	.38	.44	.31	.35	.37	.31
Pneumonia.....	490-493	107-109	.97	.85 <sup>4</sup>	—	.96	—	.81	—	.94	—	.96	—	1.01	—	.96	—
Influenza.....	480-483	33	1.24	1.25 <sup>4</sup>	—	1.08	—	*	—	1.43	—	1.35	—	1.30	—	*	—
Ulcer of stomach and duodenum.....	540, 541 <sup>5</sup>	117	.87	.85	.87	*	—	*	1.00	.88	.95	.87	.90	.86	.82	*	.78
Appendicitis.....	550-553	121	.92	.92	.90	1.00	.97	1.00	1.03	.89	.85	.91	.85	.87	.97	*	.85
Hernia and intestinal obstruction.....	560, 561, 570	122	1.02	1.06	1.07	.86	.94	*	.95	1.17	1.05	1.03	1.04	1.02	1.01	.95	.98
Gastritis, duodenitis, enteritis, etc.....	543, 571, 572	119, 120	1.16	1.01	.98	.81	.91	*	1.20	1.39	1.48	1.87	2.67	3.14	2.71	*	2.32
Cirrhosis of liver.....	581	124	.88	.82	.83	*	.57	*	.60	.94	.95	.89	.86	.81	.75	.83	.66
Complications of pregnancy, child-birth.....	640-689 <sup>6</sup>	140-150	.98	.91	.90	*	*	.94	.94	1.00	.88	*	.67	—	—	—	—
Suicide.....	E963, E970-E979	163, 164	1.00	1.00	1.00	*	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	*	1.00
Homicide.....	E964, E980-E984 <sup>7</sup>	165-168 <sup>7</sup>	1.00	1.00	1.02	*	1.00	1.01	1.03	1.00	1.01	1.00	1.04	1.00	1.00	*	.92
Accidents—total.....	E800-E962	169-195 <sup>8</sup>	.97	.95	.95	1.00	1.00	1.00	1.00	1.00	1.00	.97	.99	.88	.91	.81	.83
Motor vehicle.....	E810-E835	170	.99	1.00	1.00	1.00	1.00	1.00	1.01	1.00	1.00	.99	1.00	.99	1.00	.97	1.01
All other accidents.....	E800-E802, E840-E962	169, 171-195 <sup>8</sup>	.94	.93	.93	1.01	1.00	1.00	1.00	1.00	1.00	.95	.98	.83	.88	.77	.81

\* Less than 25 deaths by Sixth Revision.

<sup>1</sup> Ratio of deaths classified by the Sixth Revision to deaths classified by the Fifth Revision.<sup>2</sup> Based upon a 10 percent sample of death certificates for 1949 and 1950; in all other instances, the United States sample is based upon deaths for 1949 alone.<sup>3</sup> These ratios relate to ages 1-14 only.<sup>4</sup> Frequencies are from the 1950 sample only. United States data for 1949 were not used because changes in coding rules were made during the time the sample was being<sup>5</sup> Code 542 included in Metropolitan data.<sup>6</sup> Code 660 omitted from United States data for 1949.<sup>7</sup> Codes E965 and E990-E999 added to the United States data for 1949 alone; for 1949 and 1950 combined, code E985 is added for the Sixth Revision and code 198 for the Fifth Revision.<sup>8</sup> Code 177 omitted from United States data for 1949 and 1950 combined.Source for United States ratios: National Office of Vital Statistics, *Current Mortality Analysis*, vol. 7, no. 13, November 29, 1950, and *Vital Statistics of the United States*,

sion brought into the category of diseases of the heart many deaths that would have been ascribed to nephritis and diabetes, among other causes, according to the Fifth Revision. On the other hand, a lesser number of deaths that would have been included with diseases of the heart on the basis of the Fifth Revision were classed as nephritis, general arteriosclerosis,<sup>7</sup> or intracranial lesions of vascular origin in the Sixth Revision.

There is generally close agreement in the comparability ratios for most causes of death between Metropolitan Industrial policyholders and the general population of the United States. Notable exceptions are the aggregate of hypertension (without mention of heart disease) and general arteriosclerosis, pneumonia, gastritis and allied conditions, and complications of pregnancy and childbirth. These differences may arise from a number of circumstances. Differences in age distribution of deaths in the two experiences may influence the comparisons since, in some instances, the ratios vary with age. For example, there are relatively few deaths among Metropolitan Industrial policyholders under one year of age and at ages 75 and over. The coding offices of the Metropolitan and of the National Office of Vital Statistics probably also differed to some extent in their interpretation of the procedure rules for classifying the causes of death in the initial stages of the use of the Sixth Revision.<sup>8</sup>

In this paper, all comparisons of death rates for specific causes of death during the period from 1950 to 1955 with those for earlier years are made on the basis of death rates adjusted to the Sixth Revision by means of the comparability ratios for 1950. This introduces some degree of error in the adjustment which increases the further back in time these ratios are applied.

#### LEADING CAUSES OF DEATH

The rank of the five leading causes of death in each age group among Industrial policyholders is shown in Table 6, which relates to the period 1950-1955.

Accidents outranked every other cause of death at ages under 25, accounting for about one-fourth of all deaths at ages 1-4 in each race-sex category and for a like proportion among white females at ages 5-24. However, accidents caused one-half of all deaths among white males at ages 5-24 and among nonwhite males at ages 5-14.

<sup>7</sup> The category "general arteriosclerosis" does not include arteriosclerotic heart disease and cerebral and coronary arteriosclerosis.

<sup>8</sup> Early in 1950, the coding office of the Metropolitan followed the Sixth Revision very closely and interpreted problem cases in the light of the Instruction Manual provided by the National Office of Vital Statistics for 1949. Later in 1950, an expanded Instruction Manual was received from the National Office of Vital Statistics which contained additional details not incorporated in the previous Instruction Manual.

TABLE 6  
RANK OF FIVE LEADING CAUSES OF DEATH IN SPECIFIED AGE GROUPS, BY RACE AND SEX  
METROPOLITAN LIFE INSURANCE COMPANY, INDUSTRIAL DEPARTMENT, 1950 TO 1955

RANK	WHITE				NONWHITE			
	MALES		FEMALES		MALES		FEMALES	
	Cause of Death	% of All Causes	Cause of Death	% of All Causes	Cause of Death	% of All Causes	Cause of Death	% of All Causes
1-74 Years								
1.....	Diseases of the heart	41%	Diseases of the heart	36%	Diseases of the heart	34%	Diseases of the heart	35%
2.....	Malignant neoplasms	18	Malignant neoplasms	24	Malignant neoplasms	15	Malignant neoplasms	18
3.....	Accidents†	9	Intracranial lesions*	12	Intracranial lesions*	11	Intracranial lesions*	15
4.....	Intracranial lesions*	7	Diabetes mellitus	4	Accidents†	7	Tuberculosis	3
5.....	Tuberculosis	2	Accidents	4	Tuberculosis	5	Nephritis and nephrosis	3
1-4 Years								
1.....	Accidents	29%	Accidents	22%	Accidents	27%	Accidents	25%
2.....	Malignant neoplasms	12	Malignant neoplasms	13	Pneumonia	17	Pneumonia	16
3.....	Pneumonia	10	Pneumonia	11	Tuberculosis	7	Malignant neoplasms	7
4.....	Congenital malformations	7	Congenital malformations	8	Malignant neoplasms	5	Tuberculosis	6
5.....	Gastritis and duodenitis	3	Gastritis and duodenitis	3	Meningitis (not cerebral)	4	Congenital malformations	4
5-14 Years								
1.....	Accidents	46%	Accidents	26%	Accidents	46%	Accidents	25%
2.....	Malignant neoplasms	13	Malignant neoplasms	17	Malignant neoplasms	9	Pneumonia	8
3.....	Poliomyelitis	4	Pneumonia	5	Diseases of the heart	5	Tuberculosis	8
4.....	Pneumonia	4	Congenital malformations	5	Pneumonia	3	Malignant neoplasms	7
5.....	Congenital malformations	3	Poliomyelitis	4	Tuberculosis	3	Diseases of the heart	6

RANK	WHITE				NONWHITE			
	MALES		FEMALES		MALES		FEMALES	
	Cause of Death	% of All Causes	Cause of Death	% of All Causes	Cause of Death	% of All Causes	Cause of Death	% of All Causes
15-24 Years								
1.....	Accidents†	49%	Accidents	25%	Accidents†	31%	Tuberculosis	21%
2.....	Malignant neoplasms	6	Malignant neoplasms	13	Homicide	11	Accidents	14
3.....	Diseases of the heart	4	Diseases of the heart	8	Tuberculosis	8	Pregnancy and childbirth	11
4.....	Suicide	3	Tuberculosis	5	Diseases of the heart	4	Diseases of the heart	8
5.....	Nephritis and nephrosis	2	Nephritis and nephrosis	4	Malignant neoplasms	3	Malignant neoplasms	6
25-44 Years								
1.....	Diseases of the heart	27%	Malignant neoplasms	29%	Diseases of the heart	20%	Diseases of the heart	20%
2.....	Accidents†	22	Diseases of the heart	17	Accidents†	16	Malignant neoplasms	17
3.....	Malignant neoplasms	11	Accidents	7	Tuberculosis	11	Tuberculosis	9
4.....	Tuberculosis	5	Intracranial lesions*	5	Homicide	9	Intracranial lesions*	8
5.....	Suicide	5	Tuberculosis	5	Malignant neoplasms	7	Accidents	5
45-64 Years								
1.....	Diseases of the heart	46%	Diseases of the heart	35%	Diseases of the heart	37%	Diseases of the heart	37%
2.....	Malignant neoplasms	19	Malignant neoplasms	29	Malignant neoplasms	17	Malignant neoplasms	20
3.....	Intracranial lesions*	7	Intracranial lesions*	11	Intracranial lesions*	11	Intracranial lesions*	16
4.....	Accidents	5	Diabetes mellitus	4	Tuberculosis	5	Diabetes mellitus	3
5.....	Tuberculosis	3	Accidents	2	Accidents	4	Nephritis and nephrosis	3
65-74 Years								
1.....	Diseases of the heart	47%	Diseases of the heart	45%	Diseases of the heart	42%	Diseases of the heart	44%
2.....	Malignant neoplasms	19	Malignant neoplasms	19	Malignant neoplasms	17	Intracranial lesions*	18
3.....	Intracranial lesions*	11	Intracranial lesions*	14	Intracranial lesions*	14	Malignant neoplasms	15
4.....	Accidents	3	Diabetes mellitus	4	Pneumonia	3	Diabetes mellitus	3
5.....	Pneumonia	2	Accidents	2	Accidents	2	Nephritis and nephrosis	3

Cancer and allied conditions ranked second as a cause of death among both white males and white females in each age period under 25, accounting for more than one-tenth of the total mortality at this stage of life. For nonwhite males and females at these young ages, cancer ranked among the first five causes. This high ranking of cancer and allied conditions at ages under 25 reflects primarily mortality from the leukemias.

Diseases of the heart come to the fore as a major cause of death at ages 25-44 years, with one-fourth of all deaths among white males and one-fifth among the nonwhites of each sex. Among white females at these ages, diseases of the heart ranked second to cancer, which accounted for well over one-fourth of all deaths. In this age group, tuberculosis still appeared among the leading causes of death in each race-sex category.

In the age ranges 45-64 and 65-74, diseases of the heart lead as a cause of death among both whites and nonwhites of each sex, with cancer second in each instance but one. Also with one exception, intracranial lesions of the central nervous system are third in rank at these older ages.

#### THE PRINCIPAL CARDIOVASCULAR-RENAL DISEASES

This broad category comprises, very largely, diseases of the heart and blood vessels, vascular lesions of the central nervous system, and nephritis and nephrosis.<sup>9</sup> In 1955, the principal cardiovascular-renal diseases accounted for one-half of the total deaths of Industrial policyholders at ages 1-74. The proportion is appreciably higher at the older ages, reaching about three-fifths of total deaths at ages 45-74.

For the cardiovascular-renal diseases in the aggregate, the change in practice from the Fifth to the Sixth Revision of the List produced only a small increase in the level of the death rates. A comparison of death rates on the two bases in 1950 for Industrial policyholders at ages 1-74 years showed a 4 percent rise.<sup>10</sup> However, this relatively small change masks rather substantial changes for specific conditions included in the cardiovascular-renal disease category. Thus, Table 5 shows that among Industrial policyholders at all ages 15 percent more deaths were classified as vascular lesions of the central nervous system by the Sixth Revision than by the Fifth Revision. The rise amounted to as much as 92 percent for the rubric consisting of hypertension without mention of the heart and general arteriosclerosis, but only to 9 percent for diseases of the heart. On

<sup>9</sup> In this report, the principal cardiovascular-renal diseases include code numbers 330-334, 410-468, and 590-594 of the Sixth Revision of the International List of Causes of Death.

<sup>10</sup> A rise of 4 percent was also noted for the general population at all ages in the United States on the basis of a comparison of a 10 percent sample of death certificates in 1949 and 1950; see source to Table 5.

the other hand, the deaths ascribed to nephritis and nephrosis by the Sixth Revision were only 39 percent of those by the Fifth Revision. Also, an appreciable proportion of deaths that would formerly have been ascribed to diabetes is now included with the cardiovascular-renal conditions.

Mortality from the cardiovascular-renal diseases, as a whole, declined in the period under review, most of the reduction occurring in the three years 1953-1955. For all Industrial policyholders at ages 1-74, the rate for 1955 was 12 percent less than the average annual rate for 1946-1950. The relative reductions were greater for females than for males, and also for nonwhites than for whites, as seen in Table 7. Generally, the rate of decline tended to be smaller at the older ages than at the younger. In fact, the death rates for white males at ages 25-64 were relatively stable for most years from 1950 through 1955. The same situation was observed in the previous report covering 1946-1950; as before, no explanation for this atypical trend is apparent, although a number of factors have been suggested to account for it without any convincing and generally accepted evidence. On the other hand, the sizable reductions for all persons at ages under 25 and for females in the age range 25-74 probably reflect several specific developments. Thus, younger people are benefiting from the control of the rheumatic and other infectious conditions which often affect the cardiovascular-renal system. Women at the higher ages may be benefiting from the reduced burdens in the modern household and from a lessened physiological strain in today's smaller family.

In 1955, the death rate from the cardiovascular-renal diseases for white females at ages 1-74 was one-half that for white males. However, non-white females had no such advantage, their death rate being only a little less than that for nonwhite males. The latter, in turn, had a somewhat higher mortality from the cardiovascular-renal diseases than white males.

The cardiovascular-renal mortality of white Industrial policyholders at ages 1-74 was almost 10 percent higher than that for the white population of the United States. However, the nonwhite Industrial policyholders compared with the nonwhite population show to advantage by almost 20 percent. A detailed comparison by age is shown in Table 8.

The postwar record of mortality for the specific morbid conditions constituting the cardiovascular-renal category is set forth in Table 9. The trends of these specific conditions are affected in some measure by changing medical concepts regarding their nature and etiology which are reflected in reporting on the death certificate. Many of these conditions are interrelated and frequently co-exist, particularly at the older ages, and a better understanding of the situation could come from studies of multiple

**TABLE 7**  
**DEATH RATES FROM THE CARDIOVASCULAR-RENAL DISEASES**  
**BY RACE, SEX, AND AGE**  
**METROPOLITAN LIFE INSURANCE COMPANY**  
**INDUSTRIAL DEPARTMENT, 1936 TO 1955**

AGE PERIOD YEARS	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1936-1940†	1946-1950	1936-1940
						6th Rev.	5th Rev.				
<b>Total Persons</b>											
1-74* . . . . .	212.9	209.1	222.6	228.7	230.0	229.3	220.3	242.2	303.0	-12%	-30%
<b>White Males</b>											
1-74* . . . . .	279.2	272.0	286.1	290.1	288.0	285.0	277.7	293.2	335.0	-5%	-17%
1-4 . . . . .	4.2	4.2	4.1	5.1	4.8	4.6	4.5	5.8	8.9	-28	-53
5-14 . . . . .	3.5	2.0	4.0	3.1	4.0	4.2	4.8	4.6	11.0	-24	-68
15-24 . . . . .	9.2	9.7	9.9	11.4	10.5	11.2	11.5	14.6	25.8	-37	-64
25-44 . . . . .	88.1	89.6	96.5	99.8	93.3	91.7	91.1	95.5	119.2	8	-26
45-64 . . . . .	925.4	962.4	1,011.0	1,010.8	1,011.7	995.9	969.1	1,000.5	1,008.0	8	8
65-74 . . . . .	3,106.9	3,066.1	3,244.7	3,282.2	3,291.7	3,243.5	3,145.3	3,352.9	3,995.8	-7	-22
<b>White Females</b>											
1-74* . . . . .	140.7	139.3	150.6	158.0	161.2	163.2	152.4	178.3	248.3	-21%	-43%
1-4 . . . . .	2.6	3.3	3.0	3.7	3.6	5.8	5.1	6.3	9.6	-59	-73
5-14 . . . . .	3.1	2.7	3.4	3.4	3.3	4.2	4.7	4.8	12.8	-35	-76
15-24 . . . . .	8.6	7.1	8.5	8.8	10.0	10.8	10.3	12.5	24.6	-31	-65
25-44 . . . . .	36.4	38.0	41.3	43.7	43.3	45.7	46.2	50.0	82.0	-27	-56
45-64 . . . . .	383.0	402.0	439.8	465.3	480.7	474.1	437.2	515.7	676.0	-26	-43
65-74 . . . . .	1,979.6	2,015.1	2,157.1	2,227.0	2,245.5	2,280.2	2,114.6	2,466.7	3,300.1	-20	-40
<b>Nonwhite Males</b>											
1-74* . . . . .	298.3	283.2	312.3	318.1	333.1	323.2	318.7	336.8	462.7	-11%	-36%
1-4 . . . . .	5.5	1.7	8.5	5.4	9.0	3.8	5.7	5.6	10.0	-2	-45
5-14 . . . . .	6.4	6.6	5.5	4.4	7.5	7.8	8.5	9.4	18.3	-32	-65
15-24 . . . . .	12.6	15.0	15.9	24.5	21.9	25.9	27.7	20.6	25.3	-39	-50
25-44 . . . . .	128.0	125.3	141.4	139.4	149.7	136.4	137.9	137.0	222.8	-7	-43
45-64 . . . . .	926.1	901.3	971.6	997.7	1,011.0	978.4	963.0	1,043.2	1,401.9	-11	-34
65-74 . . . . .	3,268.8	3,135.8	3,520.9	3,516.4	3,738.2	3,682.0	3,596.4	3,769.5	4,923.3	-13	-34
<b>Nonwhite Females</b>											
1-74* . . . . .	244.5	256.8	276.0	289.5	291.1	293.8	283.0	318.7	436.9	-23%	-44%
1-4 . . . . .	3.8	6.8	6.8	4.1	5.4	9.7	11.6	6.7	12.2	-43	-69
5-14 . . . . .	3.1	4.6	4.7	3.7	5.8	6.1	8.8	7.0	13.6	-56	-77
15-24 . . . . .	15.1	16.5	23.4	26.1	22.6	20.8	24.0	20.9	33.0	-28	-54
25-44 . . . . .	112.1	131.4	149.4	142.3	145.8	140.3	134.2	159.1	228.0	-30	-51
45-64 . . . . .	735.5	782.6	817.6	898.1	894.0	895.6	855.0	983.8	1,316.9	-25	-44
65-74 . . . . .	2,723.1	2,815.1	3,045.8	3,094.6	3,141.6	3,242.0	3,123.6	3,447.3	4,561.0	-21	-40

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

causes on the death certificate. This situation is especially significant with regard to the differences in trend between hypertensive disease and nephritis on the one hand, and arteriosclerotic and degenerative heart disease (largely coronary artery disease) on the other.

The major component of the cardiovascular-renal group is diseases of the heart; because it comprises such a large part of the total cardiovascular-renal mortality, it shows a similar trend. Increasingly, use is being made of the descriptive term "arteriosclerotic heart disease" which includes coronary artery disease. The rubric "arteriosclerotic and degenerative heart disease" shows a gradual upward trend in mortality from 1950 to 1955 for white males, practically no change in level for nonwhite males,

TABLE 8

DEATH RATES FROM THE CARDIOVASCULAR-RENAL DISEASES  
METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT  
AND GENERAL POPULATION OF UNITED STATES COMPARED  
IN 1951-1953, BY RACE, SEX, AND AGE

AGE PERIOD YEARS	MALES			FEMALES		
	Death Rates per 100,000		Ratio M.L.I. Co. to U.S.	Death Rates per 100,000		Ratio M.L.I. Co. to U.S.
	M.L.I. Co.	U.S.		M.L.I. Co.	U.S.	
White						
1-74* . . . . .	288.1	267.5	1.08	156.6	143.8	1.09
1-4 . . . . .	4.7	4.2	1.12	3.4	3.6	.94
5-14 . . . . .	3.7	3.5	1.06	3.4	3.3	1.03
15-24 . . . . .	10.6	12.0	.88	9.1	9.6	.95
25-44 . . . . .	96.5	83.4	1.16	42.8	39.9	1.07
45-64 . . . . .	1,011.2	868.4	1.16	461.9	393.4	1.17
65-74 . . . . .	3,272.9	3,045.5	1.07	2,209.9	1,979.2	1.12
Nonwhite						
1-74* . . . . .	321.2	393.8	.82	285.5	349.3	.82
1-4 . . . . .	7.6	8.4	.90	5.4	6.2	.87
5-14 . . . . .	5.8	5.7	1.02	4.7	5.6	.84
15-24 . . . . .	20.8	23.9	.87	24.0	29.1	.82
25-44 . . . . .	143.5	185.9	.77	145.8	185.7	.79
45-64 . . . . .	993.4	1,322.8	.75	869.9	1,150.9	.76
65-74 . . . . .	3,591.8	3,694.9	.97	3,094.0	3,152.3	.98

\* Death rates standardized for age.



TABLE 9

DEATH RATES FROM EACH OF THE MAJOR CARDIOVASCULAR-RENAL DISEASES  
BY RACE AND SEX, AGES 1-74 YEARS\*METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1946 TO 1955

CAUSE OF DEATH	DEATH RATES PER 100,000								PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1950	1946-1950
						6th Rev.	5th Rev.			
White Males										
All cardiovascular-renal diseases . . . . .	279.2	272.0	286.1	290.1	288.0	285.0	277.7	293.2	- 2%	- 5%
Vascular lesions, central nervous system . . . . .	38.0	35.5	38.9	42.0	39.4	39.5	35.0	41.8	- 4	- 9
Diseases of the heart . . . . .	224.2	218.6	228.2	228.0	227.4	224.6	212.7	228.8	‡	- 2
Arteriosclerotic and degenerative heart disease . . . . .	190.1	181.8	188.1	185.1	183.7	179.6	§	§	+ 6	§
Hypertension without mention of heart and general arteriosclerosis . . . . .	6.2	6.5	7.4	7.7	8.2	8.0	4.3	9.1	-23	-32
Other circulatory diseases . . . . .	4.7	4.6	3.8	3.9	3.5	3.6	3.2	3.2	+31	+47
Nephritis and nephrosis . . . . .	6.1	6.8	7.8	8.5	9.5	9.3	22.5	10.3	-34	-41
White Females										
All cardiovascular-renal diseases . . . . .	140.7	139.3	150.6	158.0	161.2	163.2	152.4	178.3	-14%	-21%
Vascular lesions, central nervous system . . . . .	30.9	31.3	33.7	36.2	35.6	36.0	30.9	40.8	-14	-24
Diseases of the heart . . . . .	98.6	96.3	104.1	107.9	110.6	110.9	99.6	119.7	-11	-18
Arteriosclerotic and degenerative heart disease . . . . .	71.9	67.4	72.2	73.1	74.9	74.0	§	§	- 3	§
Hypertension without mention of heart and general arteriosclerosis . . . . .	3.9	4.3	4.9	5.5	5.5	6.1	3.1	6.9	-36	-43
Other circulatory diseases . . . . .	2.9	2.8	2.6	2.1	2.6	2.9	2.3	2.5	0	+16
Nephritis and nephrosis . . . . .	4.4	4.6	5.3	6.3	6.9	7.3	16.5	8.4	-40	-48
Nonwhite Males										
All cardiovascular-renal diseases . . . . .	298.3	283.2	312.3	318.1	333.1	323.2	318.7	336.8	- 8%	-11%
Vascular lesions, central nervous system . . . . .	63.4	60.4	66.4	67.6	69.9	63.6	56.7	72.6	‡	-13
Diseases of the heart . . . . .	202.2	191.4	210.4	210.7	222.7	217.8	200.2	221.7	- 7	- 9
Arteriosclerotic and degenerative heart disease . . . . .	136.3	125.3	137.9	130.0	141.9	137.2	§	§	- 1	§
Hypertension without mention of heart and general arteriosclerosis . . . . .	14.6	14.2	15.6	17.0	18.2	17.9	8.5	18.1	-18	-19
Other circulatory diseases . . . . .	6.3	4.6	5.1	5.1	4.1	4.8	4.4	4.1	+31	+54
Nephritis and nephrosis . . . . .	11.8	12.6	14.8	17.7	18.2	19.1	48.9	20.3	-38	-42
Nonwhite Females										
All cardiovascular-renal diseases . . . . .	244.5	256.8	276.0	289.5	291.1	293.8	283.0	318.7	-17%	-23%
Vascular lesions, central nervous system . . . . .	65.2	68.4	74.0	74.7	71.8	71.0	64.7	79.9	- 8	-18
Diseases of the heart . . . . .	151.9	154.1	168.7	177.6	182.2	186.5	163.8	198.3	-19	-23
Arteriosclerotic and degenerative heart disease . . . . .	86.5	84.7	91.8	92.5	97.1	94.3	§	§	- 8	§
Hypertension without mention of heart and general arteriosclerosis . . . . .	11.6	15.3	12.7	15.6	14.8	15.6	6.6	17.3	-26	-33
Other circulatory diseases . . . . .	4.6	5.5	4.9	5.4	4.1	3.7	3.0	3.9	+24	+18
Nephritis and nephrosis . . . . .	11.2	13.5	15.7	16.2	18.2	17.0	44.9	19.3	-34	-42

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

‡ Less than 0.5 percent.

§ Not available.

and a downward tendency among white and nonwhite females. Among white persons in 1955, the death rate from arteriosclerotic and degenerative heart disease for males at ages 1-74 was almost  $2\frac{2}{3}$  times that for females, but among nonwhites the ratio was only  $1\frac{1}{2}$ . Although the death rate for white males was greater than that for nonwhite males, the ratio being  $1\frac{1}{2}$ , the white female rate was only  $\frac{5}{8}$  of that for nonwhite females.<sup>11</sup>

A number of developments in therapy give promise for at least a small degree of control of some of the various cardiovascular-renal diseases. The outlook for rheumatic fever and rheumatic heart disease has been helped by the routine use of sulfa drugs and antibiotics.<sup>12</sup> Operations on heart defects due to congenital and rheumatic heart disease are helping many persons affected by them. The outlook for patients with severe hypertension has also improved as a result of the development of a series of new drugs; some cases appear to have been helped by surgery.<sup>13</sup> Anticoagulants have been useful in the treatment of selected patients with coronary thrombosis and cerebral vascular disease.<sup>14</sup> Recent years have witnessed greatly increased emphasis on research into coronary artery disease, with exploration into clinical, pathological, nutritional, and social influences. Investigations into these and the other cardiovascular-renal conditions are receiving support from many public and private agencies, among

<sup>11</sup> For a more detailed analysis of the mortality from arteriosclerotic heart disease, see E. A. Lew, "Some Implications of Mortality Statistics Relating to Coronary Artery Disease," presented at the Conference on Atherosclerosis and Coronary Heart Disease, sponsored by the New York Heart Association, New York, January 15, 1957.

<sup>12</sup> B. F. Massell, "ACTH and Cortisone Therapy of Rheumatic Fever and Rheumatic Carditis," *New England Journal of Medicine*, vol. 251, pp. 183, 221, 263, July 29, August 5 and 12, 1954.

G. H. Stollerman, "The Use of Antibiotics for the Prevention of Rheumatic Fever," *American Journal of Medicine*, vol. 17, p. 757, December, 1954.

C. P. Bailey and H. E. Bolton, "Criteria for and Results of Surgery for Mitral Stenosis," *New York State Journal of Medicine*, vol. 56, pp. 649, 825, March 1 and 15, 1956.

E. A. Mortimer, Jr. and C. H. Rammelkamp, Jr., "Prophylaxis of Rheumatic Fever," *Circulation*, vol. 14, p. 1144, December, 1956.

<sup>13</sup> R. H. Smithwick and J. E. Thompson, "Splanchnicectomy for Essential Hypertension," *Journal of the American Medical Association*, vol. 152, p. 1501, August 15, 1953.

K. S. Grimson, "Drugs Recently Introduced for Hypertension," *Journal of the American Medical Association*, vol. 158, p. 359, June 4, 1955.

H. A. Schroeder and H. M. Perry, Jr., "Current Status of Therapy in Hypertension," *Journal of the American Medical Association*, vol. 162, p. 1382, December 8, 1956.

<sup>14</sup> W. T. Foley and I. S. Wright, "The Use of Anticoagulants," *Medical Clinics of North America*, p. 1339, W. B. Saunders Company, Philadelphia, 1956.

S. A. Skillicorn and R. B. Aird, "The Treatment of Cerebrovascular Accident," *ibid.*, p. 1355.

which the Life Insurance Medical Research Fund has been an important contributor.

#### DIABETES MELLITUS

The recorded mortality for diabetes mellitus was radically altered by the procedures introduced with the Sixth Revision of the International List, as is evidenced from Tables 5 and 10.<sup>15</sup> Actually, the disease is more important than is indicated by recent mortality statistics because probably less than half of the deaths among diabetics are ascribed to the disease. The majority of the remainder are classified under cardiovascular-renal conditions. Complications of this type now account for most deaths among diabetics.<sup>16</sup>

The effect of the new procedures of classification varies with regard to race, sex, and age, and accordingly has altered the ratios of male to female and white to nonwhite mortality. Nevertheless, the characteristic excess of female over male rates, particularly at the older ages, still persists.

During the period 1950 to 1955 the death rates from diabetes mellitus at ages 1 to 74 years have shown a downward trend. According to Table 10, the reduction has been greater in females than in males and generally greater in nonwhite than in white persons. In part, this trend reflects the continuing decline in the proportion of deaths among diabetics that are ascribed to the disease. However, diabetics have benefited not only from the improvement in control of the disease made possible by the development of new types of insulin and by the increasing skill of physicians in diabetic therapy, but also by advances in medical science generally.<sup>17</sup> This has brought about improvement in treatment of infections and in the management of arteriosclerotic complications including coronary disease and gangrene. A factor of growing importance is the increased emphasis on early diagnosis, particularly through diabetes detection campaigns. On the other hand, because complications due to arteriosclerosis develop earlier and progress faster in diabetics than in nondiabetics, the increasing longevity of diabetics will produce a growing proportion of persons with such complications in the general population.

#### MALIGNANT NEOPLASMS<sup>18</sup>

As noted in Table 6, the malignant neoplasms rank among the leading causes of death at all stages of life. Among Industrial policyholders at

<sup>15</sup> H. H. Marks, "Diabetes and the Revised International List of Causes of Death," *Proceedings of the American Diabetes Association*, vol. 9, p. 347, 1949.

<sup>16</sup> A. Marble, "Coronary Artery Disease in the Diabetic," *Diabetes*, vol. 4, p. 290, July-August, 1955.

<sup>17</sup> E. P. Joslin, "Status of Living Diabetics With Onset Under Forty Years of Age," *Journal of the American Medical Association*, vol. 147, p. 209, September 15, 1951.

<sup>18</sup> The malignant neoplasms include leukemia and Hodgkin's disease as well as the other cancers.

**TABLE 10**  
**DEATH RATES FROM DIABETES MELLITUS**  
**BY RACE, SEX, AND AGE**  
**METROPOLITAN LIFE INSURANCE COMPANY**  
**INDUSTRIAL DEPARTMENT, 1946 TO 1955**

AGE PERIOD YEARS	DEATH RATES PER 100,000								PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946- 1950†	1950	1946- 1950
						6th Rev.	5th Rev.			
<b>Total Persons</b>										
1-74*.....	8.1	8.6	9.1	8.7	9.2	9.6	16.5	9.2	-16%	-12%
<b>White Males</b>										
1-74*.....	6.4	7.0	7.1	6.6	6.8	6.9	11.8	6.2	- 7%	+ 3%
15-24.....	.3	.5	.8	.5	.9	.4	.5	.8	-25	-63
25-44.....	3.1	3.6	3.2	3.0	3.3	2.8	3.9	2.6	+11	+19
45-64.....	19.6	22.7	22.3	20.0	22.6	21.9	35.8	19.7	-11	- 1
65-74.....	74.0	71.3	81.2	74.8	71.0	82.2	141.4	71.7	-10	+ 3
<b>White Females</b>										
1-74*.....	9.5	9.8	10.9	10.4	11.1	11.7	20.5	11.7	-19%	-19%
15-24.....	1.0	1.2	1.0	1.2	1.3	1.1	1.1	1.4	- 9	-29
25-44.....	1.8	1.7	2.4	1.8	1.8	2.2	2.6	2.5	-18	-28
45-64.....	29.2	30.6	36.6	33.6	36.2	37.8	62.4	37.1	-23	-21
65-74.....	132.7	135.3	140.3	139.4	149.1	153.8	277.5	154.2	-14	-14
<b>Nonwhite Males</b>										
1-74*.....	7.0	8.8	7.1	6.6	8.0	8.0	12.4	6.7	-13%	+ 4%
15-24.....	.7	2.0	.6	1.9	1.8	2.4	2.3	1.9	-71	-63
25-44.....	5.6	6.1	4.9	4.2	5.0	4.2	5.4	3.6	+33	+56
45-64.....	24.9	22.7	24.3	17.3	25.1	22.0	38.0	17.9	+13	+39
65-74.....	46.7	92.5	54.3	68.4	67.9	83.5	125.3	70.7	-44	-34
<b>Nonwhite Females</b>										
1-74*.....	12.2	12.8	12.9	12.7	14.7	16.5	24.8	15.3	-26%	-20%
15-24.....	2.4	.....	1.2	1.7	1.7	2.7	2.6	2.3	-11	+ 4
25-44.....	3.5	3.5	6.8	5.5	7.3	7.4	8.8	6.5	-53	-46
45-64.....	41.6	46.1	46.4	44.4	48.7	56.0	85.1	54.4	-26	-24
65-74.....	132.2	133.5	106.1	111.9	136.7	150.2	244.1	129.5	-12	+ 2

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

ages 1-74 combined, the malignant neoplasms accounted for about one-sixth of all deaths among white males and among nonwhites of each sex; for white females, the ratio was almost one-fourth. The relative importance of the malignant neoplasms in the total mortality picture is greatest among white females at ages 25-64, where it included nearly 30 percent of the deaths from all causes.

For the general population of the United States, it has been estimated that at any time about 700,000 persons are under medical care for cancer and that about 450,000 new cases arise annually.<sup>19</sup> Surveys conducted by the Public Health Service in ten large cities in 1947 showed an annual incidence rate of 3.2 per 1,000 population and a prevalence rate of 4.3 per 1,000.<sup>20</sup> These rates are, very likely, an understatement of the actual situation since some cases with the disease may not yet have been diagnosed at the time of the survey and others may have been missed.

The trend of the recorded death rates from cancer is influenced in several ways. Intensified use of new diagnostic techniques is bringing to light cases with the disease that would not have been recognized earlier. At the same time, hospital and clinical facilities for the treatment of the disease are increasing in number, and improvements are being made in the treatment of this disease. These advances are reflected in improved certification of the primary site, thereby influencing the level of the death rates and the trends. In like manner, they are among the factors that are producing reductions in the case fatality of cancer of certain sites. For all sites of cancer, experience in Connecticut shows that the five-year survival rate for male patients rose from 19 percent in 1935-1940 to 25 percent in 1947-1951; the corresponding rise for females was from 29 to 38 percent.<sup>21</sup>

The level of death rates from malignant neoplasms among Industrial policyholders is not much different from that in the general population in the United States, according to the comparison for 1951-1953 shown in Table 11. For white females and nonwhite males at ages 1-74, the two experiences are practically identical. However, among white males the insurance experience is higher by 14 percent, but for nonwhite females it is the lower by 7 percent. For each race-sex category, the insurance experience had the higher death rates at ages 1-4 and again at ages 65-74.

The comparison, in Table 12, of the death rates from malignant neoplasms for 1950, according to the Fifth and Sixth Revisions of the Inter-

<sup>19</sup> "1957 Cancer Facts and Figures," American Cancer Society, New York City.

<sup>20</sup> H. F. Dorn and S. J. Cutler, "Morbidity from Cancer in the United States: Part I, Variations in Incidence by Age, Sex, Race, Marital Status, and Geographic Region," Public Health Monograph No. 29, Public Health Service, Washington, 1954.

<sup>21</sup> W. H. Griswold *et al.*, "Cancer in Connecticut, 1935-1951," Connecticut State Department of Health, Hartford, 1955.

national List, shows that relatively small changes were produced by the new procedures. During the period from 1950 through 1955, the death rates for white males were appreciably higher than for white females at all ages except 25-44. In the case of nonwhites, males have had the higher rates since 1951, also with the principal exception of ages 25-44.

Among both white and nonwhite males, the death rates showed a slight tendency upward and, for most age groups, were higher in 1955 than in 1950. A contrary situation is observed for females, both white and nonwhite, the rates for 1955 being well below those for 1950 at practically every age group.

TABLE 11

DEATH RATES FROM MALIGNANT NEOPLASMS†  
METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT  
AND GENERAL POPULATION OF UNITED STATES COMPARED  
IN 1951-1953, BY RACE, SEX, AND AGE

AGE PERIOD YEARS	MALES			FEMALES		
	Death Rates per 100,000		Ratio: M.L.I. Co. to U.S.	Death Rates per 100,000		Ratio: M.L.I. Co. to U.S.
	M.L.I. Co.	U.S.		M.L.I. Co.	U.S.	
White						
1-74* . . . . .	96.8	84.7	1.14	77.3	78.2	.99
1-4 . . . . .	13.3	13.0	1.02	11.5	11.0	1.05
5-14 . . . . .	7.1	7.6	.93	6.3	6.0	1.05
15-24 . . . . .	9.4	11.1	.85	7.2	7.4	.97
25-44 . . . . .	31.0	30.9	1.00	43.6	45.3	.96
45-64 . . . . .	346.5	272.5	1.27	267.4	259.0	1.03
65-74 . . . . .	996.1	819.9	1.21	639.2	606.2	1.05
Nonwhite						
1-74* . . . . .	89.5	90.4	.99	86.5	93.4	.93
1-4 . . . . .	9.3	7.8	1.19	10.4	6.8	1.53
5-14 . . . . .	6.2	4.9	1.27	2.9	4.2	.69
15-24 . . . . .	7.9	9.6	.82	7.1	7.4	.96
25-44 . . . . .	30.1	36.1	.83	61.4	70.4	.87
45-64 . . . . .	306.4	321.0	.95	289.4	323.0	.90
65-74 . . . . .	889.6	764.6	1.16	652.1	567.5	1.15

\* Death rates standardized for age.

† The malignant neoplasms include leukemia and Hodgkin's disease as well as other cancers.

TABLE 12  
DEATH RATES FROM MALIGNANT NEOPLASMS§  
BY RACE, SEX, AND AGE  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE PERIOD YEARS	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946- 1950†	1936- 1940†	1946- 1950	1936- 1940
						6th Rev.	5th Rev.				
Total Persons											
1-74*.....	84.6	86.7	86.3	87.2	87.0	86.5	88.1	85.8	88.7	- 1%	- 5%
White Males											
1-74*.....	97.0	100.1	96.4	98.2	95.9	94.3	96.1	92.3	90.3	+ 5%	+ 7%
1-4.....	14.3	11.6	12.7	12.4	14.7	11.5	11.0	13.4	9.9	+ 7	+44
5-14.....	7.3	7.3	7.3	6.7	7.3	8.0	7.7	7.5	6.2	- 3	+18
15-24.....	9.8	9.3	7.5	10.2	10.5	9.0	8.8	9.0	8.5	+ 9	+15
25-44.....	30.0	31.6	31.2	29.5	32.4	31.4	31.1	30.5	31.2	- 2	- 4
45-64.....	341.2	359.7	350.1	346.6	342.7	329.4	306.2	325.0	316.0	+ 5	+ 8
65-74.....	1,016.7	1,024.1	983.2	1,042.3	962.7	973.4	1,016.3	942.1	954.8	+ 8	+ 6
White Females											
1-74*.....	72.5	73.4	76.9	76.7	78.3	78.6	80.0	79.9	88.7	- 9%	-18%
1-4.....	9.9	9.3	9.7	11.3	13.5	12.2	11.9	10.9	9.0	- 9	+10
5-14.....	6.2	5.2	6.2	5.8	7.0	6.1	5.9	5.3	4.4	+17	+41
15-24.....	7.5	5.8	7.0	7.0	7.6	7.0	6.9	6.5	5.9	+15	+27
25-44.....	42.9	40.8	44.4	41.0	45.4	44.9	43.5	45.9	55.5	- 7	-23
45-64.....	248.4	255.6	269.6	265.8	266.9	261.8	253.3	273.2	313.6	- 9	-21
65-74.....	599.8	628.5	626.5	655.5	635.7	671.5	697.8	665.3	730.8	-10	-18
Nonwhite Males											
1-74*.....	92.0	95.0	87.9	89.9	90.7	87.5	88.5	82.3	68.1	+12%	+35%
1-4.....	7.3	10.0	8.4	14.0	5.4	5.8	3.8	9.9	10.4	-26	-30
5-14.....	5.8	5.3	6.1	6.6	6.0	8.5	8.5	4.9	3.7	+18	+57
15-24.....	10.5	8.9	8.3	8.2	7.3	3.5	3.5	6.9	7.4	+52	+42
25-44.....	30.3	35.8	29.1	27.9	33.3	31.3	30.2	30.4	31.6	†	- 4
45-64.....	311.4	311.5	310.6	303.2	305.4	284.6	288.9	271.3	213.0	+15	+46
65-74.....	958.8	997.8	846.1	918.5	904.3	914.5	927.7	825.1	676.8	+16	+42
Nonwhite Females											
1-74*.....	82.7	86.3	83.7	87.8	88.1	91.1	92.7	87.5	92.3	- 5%	-10%
1-4.....	11.2	3.4	10.1	12.1	9.0	5.8	5.8	6.0	4.6	+87	+143
5-14.....	1.9	4.6	3.4	3.0	2.2	4.1	3.3	5.0	3.6	-62	- 47
15-24.....	5.5	7.3	8.2	8.7	4.5	11.0	10.5	8.8	7.3	-38	- 25
25-44.....	58.2	65.6	59.2	59.8	65.1	72.0	66.5	67.1	86.1	-13	- 32
45-64.....	286.7	288.9	279.7	290.1	298.4	301.0	305.4	293.0	296.6	- 2	- 3
65-74.....	609.5	639.9	612.9	689.4	654.0	623.9	649.8	599.3	635.5	+ 2	- 4

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

‡ Less than 0.5 percent.

§ The malignant neoplasms include leukemia and Hodgkin's disease as well as other cancers.

NOTE.—Rates in italics are based on fewer than 10 deaths.

**TABLE 13**  
**DEATH RATES FROM MALIGNANT NEOPLASMS ACCORDING TO**  
**ORGAN OR PART AFFECTED**  
**BY RACE AND SEX, AGES 1-74 YEARS\***  
**METROPOLITAN LIFE INSURANCE COMPANY**  
**INDUSTRIAL DEPARTMENT, 1936 TO 1955**

RACE, SEX	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1936-1940†	1946-1950	1936-1940
						6th Rev.	5th Rev.				
<b>Digestive Organs and Peritoneum</b>											
White Males.....	34.3	36.1	35.0	38.6	37.7	38.1	39.6	39.5	45.9	-13%	- 25%
White Females....	22.5	24.0	23.5	24.3	25.3	25.8	26.7	27.5	33.8	-18	- 33
Nonwhite Males...	37.7	40.7	37.5	40.6	39.8	41.0	42.4	39.0	36.9	- 3	+ 2
Nonwhite Females.	24.3	27.5	25.2	26.9	27.2	27.1	28.1	26.6	26.4	- 9	- 8
<b>Respiratory System, excluding Larynx</b>											
White Males.....	25.0	25.8	24.5	21.6	21.0	20.7	21.5	18.0	9.8	+39%	+155%
White Females....	2.8	2.7	3.0	2.9	2.9	2.7	3.0	2.9	2.3	- 3	+ 22
Nonwhite Males...	18.1	19.2	17.2	15.2	16.4	14.4	14.9	12.4	5.4	+46	+235
Nonwhite Females.	3.9	2.9	2.4	3.7	3.3	3.8	4.0	3.1	1.6	+26	+144
<b>Buccal Cavity</b>											
White Males.....	3.7	3.9	4.0	4.3	4.3	4.3	4.1	4.3	5.6	-14%	- 34%
White Females....	.5	.6	.7	.7	.6	.6	.6	.6	.6	-17	- 17
Nonwhite Males...	3.6	2.9	2.1	2.5	3.3	2.1	2.2	2.3	2.4	+57	+ 50
Nonwhite Females.	.9	.8	.5	1.3	.8	1.1	.9	1.0	.7	-10	+ 29
<b>Prostate</b>											
White Males.....	5.1	5.3	5.3	5.5	5.1	5.1	6.0	4.8	5.4	+ 6%	- 6
Nonwhite Males...	11.1	9.1	9.1	9.3	9.7	8.4	9.1	8.4	7.4	+32	+ 50
<b>Breast</b>											
White Females....	14.2	13.8	15.3	14.9	14.3	14.3	14.8	14.0	14.8	+ 1%	- 4%
Nonwhite Females.	14.2	14.3	14.1	13.3	15.2	14.3	15.1	13.2	14.4	+ 8	- 1
<b>Female Genital Organs</b>											
White Females....	15.1	15.8	17.2	16.6	17.7	18.1	18.7	18.7	22.7	-19%	- 33%
Nonwhite Females.	23.1	26.0	24.3	26.5	25.9	28.6	29.3	29.0	36.9	-20	- 37
<b>Kidney, Bladder, and Other Urinary Organs</b>											
White Males.....	5.7	6.0	5.5	5.8	5.9	5.2	5.3	5.5	5.9	+ 4%	- 3%
White Females....	2.1	2.1	2.1	2.5	2.2	2.1	2.2	2.3	2.7	- 9	- 22
Nonwhite Males...	3.8	4.1	4.3	5.2	4.0	3.9	3.6	4.0	3.9	- 5	- 3
Nonwhite Females.	1.8	2.2	3.5	2.5	2.3	3.2	3.2	2.9	2.2	-38	- 18

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.



TABLE 13—Continued

RACE, SEX	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1936-1940†	1946-1950	1936-1940
						6th Rev.	5th Rev.				
	Skin										
White Males.....	1.3	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.6	+ 8%	- 19%
White Females....	.9	.8	.7	.7	.7	.8	.7	.8	1.0	+13	- 10
Nonwhite Males...	.6	.5	.6	.5	.5	.7	.5	.6	1.3	0	- 54
Nonwhite Females.	.4	.4	.3	.4	.4	.5	.5	.5	.5	-20	- 20
	Leukemia										
White Males.....	5.3	4.8	5.3	5.0	5.7	5.2	5.2	4.5	3.4	+18%	+ 56%
White Females....	3.5	3.8	3.7	3.9	4.0	3.9	4.0	3.4	2.4	+ 3	+ 46
Nonwhite Males...	3.8	4.2	3.5	3.9	3.9	3.3	3.4	3.3	2.2	+15	+ 73
Nonwhite Females.	2.0	1.9	3.1	3.1	2.7	3.4	3.3	2.2	2.1	- 9	- 5
	Hodgkin's Disease										
White Males.....	2.0	1.9	1.7	2.0	1.9	1.8	2.0	1.5	1.6	+33%	+ 25%
White Females....	1.2	1.1	1.2	1.0	1.1	1.0	1.0	1.0	1.0	+20	+ 20
Nonwhite Males...	1.3	1.5	1.6	1.4	1.9	1.9	1.9	1.3	1.0	0	+ 30
Nonwhite Females.	.7	.7	1.1	.9	.6	1.0	1.0	.8	.8	-13	- 13

NOTE.—Rates in italics are based on fewer than 10 deaths.

About one-third of the deaths from malignant neoplasms among males, both white and nonwhite, at ages 1-74 in 1955 were attributed to cancers of the digestive organs and peritoneum. During the period under review, 1950-1955, the death rates for males at ages 1-74 were about  $1\frac{1}{2}$  times those for females of the same ages in each race category; also, nonwhite persons had somewhat higher death rates than white persons. As is evident from Table 13, the recorded death rates for these sites have been tending downward in the postwar decade, more rapidly for females than for males, and more rapidly for whites than for nonwhites. Although some of the decline may be due to an actual reduction in the frequency of these cancers, it is more likely that improvement in diagnosis and reporting may also play a part, with fewer deaths being ascribed to digestive cancer as the primary site.

In 1955, cancer of the respiratory system (excluding the larynx) accounted for more than one-fourth of all deaths from malignant neoplasms among white males, almost one-fifth among nonwhite males, but for only about one-twenty-fifth among females, both white and nonwhite. The rise in the death rate from this condition has been particularly rapid for males during the period under review, the level for 1955 being 39 percent

above the average for 1946-1950 among white males and 46 percent for nonwhite males. Nonwhite females also recorded a rapid rate of rise, but for white females there was practically no change in level. Although part of the rise in respiratory cancer reflects advances in diagnosis and reporting of the condition, particularly with regard to statement of the primary site, much of the increase is generally regarded as real.<sup>22</sup> The possible factors implicated in this upward trend are being studied intensively.

The death rate from cancer of the prostate among white males at ages 1-74 remained at a level somewhat over 5 per 100,000 from 1950 to 1955. During this period, the death rate for nonwhite males remained greater than that for white males.

Table 13 shows that the death rate from cancer of the breast has been about 14 per 100,000 for both white and nonwhite females at ages 1-74 throughout the period since 1936-1940. Although accessible for early diagnosis and the advantage of early treatment, there may be an increasing tendency to mention the breast as the primary site in reporting cancer. According to the Connecticut experience, there has been no improvement in the early survival rates among females with cancer of the breast.

Both white and nonwhite females have recorded substantial reductions in mortality from cancer of the genital organs, the death rates in 1955 being just one-fifth less than the average for 1946-1950. These declines reflect the increasingly successful treatment of some of these conditions, and the advantages of preventive measures and of early diagnosis and therapy. The measures include the prevention and repair of injuries sustained in childbirth; also, more effective diagnostic procedures lead to the discovery of cases in the early stages, which make possible prompt treatment by surgery and radiation. In recent years, the death rates from cancer of the female genital organs among nonwhites have been about 1½ times those for white females.

For each race-sex category, the death rates from leukemia have been relatively stable during the period 1950-1955. However, for white and nonwhite males, the recent level is above that for 1946-1950. The death rates from Hodgkin's disease remained low and have shown little change since 1946. During the same period, no changes of significance have been noted in the death rates from cancer of the buccal cavity, the skin, and of the kidney, bladder, and other urinary organs.

#### TUBERCULOSIS—ALL FORMS

The postwar period has been one of rapid advances in the control of mortality from tuberculosis. In 1955, the age-adjusted death rate was 6.2

<sup>22</sup> E. A. Lew, "Cancer of the Respiratory Tract," *Journal of International College of Surgeons*, vol. 24, p. 12, July, 1955.

per 100,000 Industrial policyholders at ages 1-74, only one-third that for 1950, one-fourth of the average for 1946-1950, and less than one-seventh of that for 1936-1940. It will be noted in Table 14 that the relative reductions were greater for females than for males, but not much different for whites and nonwhites. The reductions by age in the postwar period were relatively greatest at ages 5-24 among both white and nonwhite males, and at ages 1-24 among females of both race categories.

Among white persons at ages 1-74, the death rates from tuberculosis for males was four times that for females in 1955; in the case of nonwhites, the male rate was not quite double the female rate. Although nonwhite policyholders have shared with the whites in the recent reductions in mortality from tuberculosis, their record is still relatively poor; in 1955, the ratio of nonwhite to white death rates at ages 1-74 was 5 to 1 for females and more than 2 to 1 for males.

In recent years (1951-1953), the death rates from tuberculosis among Industrial policyholders have generally been lower than those for the general population of the United States. White males at ages 25-74 are an exception as may be seen in Table 15.

Soon after World War II, widespread use began to be made of mass X-ray examinations for the detection of cases of tuberculosis. At the same time, new medical and surgical advances in the treatment of the disease were introduced.<sup>23</sup> The rapid rate of decline in tuberculosis mortality during the period under review, 1950-1955, is in part the result of earlier diagnosis and in part due to a number of further advances in chemotherapy.<sup>24</sup> However, the incidence of morbidity from tuberculosis apparently has not kept pace with the reduction in mortality from this disease.

#### PNEUMONIA AND INFLUENZA

Although the long-term trend of mortality from pneumonia and influenza has been downward, its level within short periods is subject to cycli-

<sup>23</sup> J. Chamberlain et al., "Segmental Resection for Pulmonary Tuberculosis," *Journal of Thoracic Surgery*, vol. 26, p. 471, November, 1953.

F. H. Cole and F. H. Alley, "An Analysis of Pulmonary Resection in 513 Cases of Tuberculosis," *Surgery, Gynecology and Obstetrics*, vol. 101, p. 413, October, 1955.

J. L. Robinson et al., "The Surgery of Pulmonary Tuberculosis," *American Review of Tuberculosis and Pulmonary Diseases*, vol. 73, p. 690, May, 1956.

J. W. Gale et al., "Pulmonary Resection as an Adjunct in the Treatment of Pulmonary Tuberculosis," *American Review of Tuberculosis and Pulmonary Diseases*, vol. 74, p. 29, July, 1956.

<sup>24</sup> *Transactions of the 15th Conference on the Chemotherapy of Tuberculosis*, February, 1956, prepared and edited by the Department of Medicine and Surgery, Central Office, Washington 25, D.C., and the Veterans Administration Area Medical Office, St. Louis, Mo.

**TABLE 14**  
**DEATH RATES FROM TUBERCULOSIS—ALL FORMS**  
**BY RACE, SEX, AND AGE**  
**METROPOLITAN LIFE INSURANCE COMPANY**  
**INDUSTRIAL DEPARTMENT, 1936 TO 1955**

AGE PERIOD YEARS	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1936-1940†	1946-1950	1936-1940
						6th Rev.	5th Rev.				
Total Persons											
1-74*	6.2	7.2	8.2	11.7	15.2	18.3	18.8	24.0	46.8	- 74%	- 87%
White Males											
1-74*	8.9	10.2	10.7	15.7	19.1	23.8	24.4	29.4	50.0	- 70%	- 82%
1-4	.6	.6	1.4	2.1	1.8	4.5	4.5	5.3	11.5	- 89	- 95
5-14	.1	.1	.2	.5	.9	1.3	1.3	1.5	3.7	- 93	- 97
15-24	.2	.9	1.0	2.0	2.9	4.9	5.1	7.7	19.0	- 97	- 99
25-44	6.2	6.9	8.2	14.4	19.4	24.3	24.9	32.7	69.4	- 81	- 91
45-64	33.7	37.1	38.1	54.3	63.6	73.9	72.6	90.3	131.0	- 63	- 74
65-74	59.4	69.0	68.2	77.6	83.2	109.7	116.9	110.7	119.9	- 46	- 50
White Females											
1-74*	2.1	2.3	3.6	4.4	6.8	8.0	8.4	12.0	28.2	- 83%	- 93%
1-4	.2	.9	2.2	2.8	3.1	4.7	4.5	6.0	11.6	- 97	- 98
5-14	.1	.2	.6	.4	.6	1.8	1.8	2.2	4.2	- 95	- 98
15-24	.7	.8	1.5	2.5	4.8	6.3	6.4	12.3	36.1	- 94	- 98
25-44	2.9	3.4	5.7	6.4	10.2	12.2	12.4	18.6	42.5	- 84	- 93
45-64	4.9	4.1	5.3	7.4	11.0	10.3	11.3	14.2	31.2	- 65	- 84
65-74	9.9	11.6	14.1	15.0	19.1	21.9	26.0	25.5	44.1	- 61	- 78
Nonwhite Males											
1-74*	18.9	23.5	27.4	40.5	53.5	56.3	57.1	72.2	144.8	- 74%	- 87%
1-4	3.7	11.6	3.4	12.3	10.7	25.0	25.0	20.9	51.8	- 82	- 93
5-14	.6	1.3	2.0	3.7	6.7	5.0	5.0	8.0	27.1	- 93	- 98
15-24	4.2	6.8	11.5	25.1	36.6	35.9	35.5	61.8	174.8	- 93	- 98
25-44	23.5	25.8	30.4	49.0	67.2	82.4	80.4	103.9	217.1	- 77	- 89
45-64	51.7	66.6	78.6	102.4	117.1	112.1	115.3	140.5	200.1	- 63	- 74
65-74	86.0	92.5	108.5	126.5	180.4	125.3	140.7	122.9	157.6	- 30	- 45
Nonwhite Females											
1-74*	10.9	13.9	16.0	22.6	31.9	39.3	39.4	56.7	125.6	- 81%	- 91%
1-4	.....	6.7	10.1	5.2	12.6	9.7	9.7	15.2	57.1	-100	-100
5-14	.6	1.3	1.4	3.7	5.8	8.8	8.8	9.9	45.7	- 94	- 99
15-24	9.1	15.9	12.9	27.8	42.4	63.1	59.7	104.0	261.1	- 91	- 97
25-44	10.0	20.9	25.0	34.9	43.1	56.4	57.4	80.4	146.4	- 76	- 87
45-64	17.6	16.0	25.3	24.2	37.3	36.9	37.4	45.8	82.8	- 62	- 79
65-74	22.0	29.0	28.8	41.0	59.2	43.3	46.2	50.1	70.4	- 56	- 69

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

cal fluctuation. The death rate from pneumonia and influenza among Industrial policyholders remained stationary at a level somewhat over 11 per 100,000 from 1950 through 1953, but then dropped to 8.6 in 1955, a decrease of 43 percent from the average for 1946-1950, and of 83 percent from that of 1936-1940. According to Table 16, there was relatively little variation in the rate of improvement with regard to age, sex, or race. Apparently, all segments of Industrial policyholders within the age range 1-74 benefited about equally from the widespread use of the sulfa drugs and the antibiotics in the control of pneumonia during the postwar years. As a result, there has been practically no change in the ratio of male to female mortality or of nonwhite to white mortality. In 1955, the ratio of

TABLE 15  
DEATH RATES FROM TUBERCULOSIS—ALL FORMS  
METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT  
AND GENERAL POPULATION OF UNITED STATES COMPARED  
IN 1951-1953, BY RACE, SEX, AND AGE

AGE PERIOD YEARS	MALES			FEMALES		
	Death Rates per 100,000		Ratio: M.L.I. Co. to U.S.	Death Rates per 100,000		Ratio: M.L.I. Co. to U.S.
	M.L.I. Co.	U.S.		M.L.I. Co.	U.S.	
	White					
1-74* . . . . .	15.2	13.0	1.17	4.9	5.7	.86
1-4 . . . . .	1.8	3.0	.60	2.7	2.7	1.00
5-14 . . . . .	.5	.6	.83	.5	.6	.83
15-24 . . . . .	2.0	2.5	.80	2.9	3.3	.88
25-44 . . . . .	14.0	11.5	1.22	7.4	8.2	.90
45-64 . . . . .	52.0	41.0	1.27	7.9	9.8	.81
65-74 . . . . .	76.3	68.1	1.12	16.1	20.4	.79
	Nonwhite					
1-74* . . . . .	40.5	50.8	.80	23.5	30.5	.77
1-4 . . . . .	8.8	14.1	.62	9.3	13.0	.72
5-14 . . . . .	2.9	2.9	1.00	3.6	4.3	.84
15-24 . . . . .	24.4	25.1	.97	27.7	31.8	.87
25-44 . . . . .	48.9	66.9	.73	34.3	46.1	.74
45-64 . . . . .	99.4	124.3	.80	28.9	41.4	.70
65-74 . . . . .	138.5	137.9	1.00	43.0	52.2	.82

\* Death rates standardized for age.

TABLE 16

DEATH RATES FROM PNEUMONIA AND INFLUENZA COMBINED  
BY RACE, SEX, AND AGE  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE PERIOD YEARS	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946-1950†	1936-1940†	1946-1950	1936-1940
						6th Rev.	5th Rev.				
Total Persons											
1-74* . . . . .	8.6	8.9	11.2	11.3	12.0	11.1	11.3	15.0	52.0	-43%	-83%
White Males											
1-74* . . . . .	10.4	11.2	13.5	14.1	14.4	13.2	13.7	17.9	56.7	-42%	-82%
1-4 . . . . .	11.0	11.6	15.6	14.6	12.6	11.4	12.6	16.8	62.3	-35	-82
5-14 . . . . .	1.4	2.4	2.4	2.6	2.3	2.2	2.3	3.3	10.7	-58	-87
15-24 . . . . .	1.8	2.7	2.5	2.3	3.2	2.0	2.3	2.9	12.2	-38	-85
25-44 . . . . .	4.5	5.1	5.4	6.5	5.7	6.6	6.6	9.3	40.6	-52	-89
45-64 . . . . .	27.4	29.9	37.7	41.2	36.5	35.4	36.1	46.9	141.9	-42	-81
65-74 . . . . .	100.1	93.6	116.1	105.7	147.8	124.1	116.9	163.9	400.0	-39	-75
White Females											
1-74* . . . . .	5.3	4.9	7.1	6.7	7.6	7.1	7.1	9.8	38.1	-46%	-86%
1-4 . . . . .	8.2	8.6	12.9	14.6	14.1	11.7	12.2	17.5	59.7	-53	-86
5-14 . . . . .	1.4	1.7	2.3	2.8	2.5	2.3	2.1	2.8	11.2	-50	-88
15-24 . . . . .	1.6	1.7	2.0	1.4	1.4	1.7	2.2	1.9	8.7	-16	-82
25-44 . . . . .	2.9	2.3	2.9	2.5	3.3	3.1	3.3	4.4	22.4	-34	-87
45-64 . . . . .	9.8	8.7	13.2	11.4	14.4	13.6	12.3	18.7	79.6	-48	-88
65-74 . . . . .	50.5	44.9	65.7	76.1	72.8	65.6	65.3	89.3	286.0	-43	-82
Nonwhite Males											
1-74* . . . . .	21.1	24.6	27.7	26.6	29.2	26.4	25.9	34.0	125.7	-38%	-83%
1-4 . . . . .	29.4	36.6	21.9	31.4	35.7	19.2	19.2	35.5	138.8	-17	-79
5-14 . . . . .	1.9	4.0	3.4	2.2	5.2	1.4	1.4	3.4	19.3	-44	-90
15-24 . . . . .	5.6	12.9	5.7	7.5	6.7	2.9	4.2	5.4	27.7	+4	-80
25-44 . . . . .	14.7	17.9	21.5	23.4	17.4	16.1	16.1	22.2	115.4	-34	-87
45-64 . . . . .	48.6	54.7	74.5	57.2	72.6	71.5	67.4	91.0	289.7	-47	-83
65-74 . . . . .	153.3	121.3	180.9	180.4	208.0	230.8	226.4	232.2	646.4	-34	-76
Nonwhite Females											
1-74* . . . . .	13.6	14.1	15.8	19.2	19.6	19.6	19.4	23.9	86.3	-43%	-84%
1-4 . . . . .	18.7	28.5	11.8	27.7	23.4	27.1	27.1	27.5	114.7	-32	-84
5-14 . . . . .	4.5	7	4.7	6.0	5.8	2.0	2.1	3.0	15.8	+50	-72
15-24 . . . . .	4.9	4.3	4.7	4.6	6.2	3.8	4.0	8.1	37.1	-40	-87
25-44 . . . . .	10.1	13.2	8.4	16.4	14.5	13.8	14.5	16.7	64.3	-40	-84
45-64 . . . . .	25.5	21.3	32.9	32.8	40.7	42.1	39.7	54.2	178.8	-53	-86
65-74 . . . . .	90.6	97.0	155.8	136.5	125.5	153.1	148.7	167.8	512.1	-46	-82

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

male to female mortality was nearly 2 to 1 for the whites and over  $1\frac{1}{2}$  to 1 for the nonwhites. The ratio of nonwhite to white mortality was over 2 to 1 for males and  $2\frac{1}{2}$  to 1 for females.

Further progress in the reduction of mortality from pneumonia and influenza, particularly among nonwhites, may be expected. For influenza, the search for effective vaccines is continuing. Although pneumonia is largely under control as a cause of death, the disease is still an important contributory cause where cardiovascular disease or other degenerative conditions may be present, especially at the older ages. Also, many fatal cases of pneumonia are due to organisms which do not respond to antibiotics.

#### COMPLICATIONS OF PREGNANCY AND CHILDBIRTH

In the postwar period, the birth rate for the general population of the United States was at a high of 26.6 per 1,000 in 1947, and has remained at a level greater than 24 since then. In contrast, the birth rate in the decade before World War II was under 20 per 1,000 population for most years. Notwithstanding the recent high birth rates, mortality from complications of the puerperal state has been decreasing rapidly. For white female policyholders at ages 15-44, the death rate from complications of childbirth and pregnancy fell almost two-thirds from the average for 1946-1950 to 1955; for nonwhite females at the same ages, the decline was only two-fifths. In 1955, the rate for white female policyholders at ages 15-44 was 2.7 per 100,000; this is just one-fourth of the corresponding rate for nonwhite females, as may be seen in Table 17. The maternal mortality record for the general population, in which deaths from complications of pregnancy and childbirth are related to live births of the same year, also showed an appreciable decline for the period under review. Starting from a level of 15.7 deaths per 10,000 live births in 1946, the maternal mortality rate declined steadily to only 4.7 in 1955.

The improved mortality picture from these conditions reflects many influences.<sup>25</sup> An important factor has been the great rise in the proportion of live births in hospitals, reaching 93.6 percent in 1954, compared with 88.0 percent in 1950 and 55.8 percent in 1940.<sup>26</sup> At the same time, more women have been educated to seek adequate prenatal care early in pregnancy, thereby benefiting from guidance in diet and from treatment of abnormal conditions. Of particular importance have been notable advances in the

<sup>25</sup> S. B. Kirkwood, "Twenty Years of Maternal Care," *Children*, vol. 2, p. 133, July-August, 1955.

<sup>26</sup> National Office of Vital Statistics, "Nativity," *Vital Statistics—Special Reports*, vol. 44, p. 56, May 31, 1956.

control of infection through chemotherapy and the antibiotics, in the methods of blood replacement, and in obstetrical techniques generally.<sup>27</sup>

## THE DISEASES OF CHILDHOOD

During the period 1950-1955, the death rates from measles, scarlet fever, whooping cough, and diphtheria among insured children remained

TABLE 17  
DEATH RATES FROM COMPLICATIONS OF PREGNANCY,  
CHILDBIRTH AND PUERPERIUM  
BY RACE AND AGE  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE PERIOD YEARS	DEATH RATES PER 100,000								PERCENT CHANGE 1955 SINCE		
	1955	1954	1953	1952	1951	1950		1946- 1950†	1936- 1940†	1946- 1950	1936- 1940
						6th Rev.	5th Rev.				
White Females											
15-44*.....	2.7	3.0	3.5	4.6	4.3	5.1	5.1	7.6	22.7	-65%	-88%
15-19.....	.5	.7	.9	2.0	.8	2.2	2.0	2.9	7.6	-83	-93
20-24.....	2.9	2.4	3.3	5.0	5.4	4.9	5.5	7.5	21.5	-61	-87
25-29.....	4.8	4.2	4.5	7.9	6.4	7.7	7.4	12.1	32.6	-60	-85
30-34.....	3.9	4.6	4.7	6.6	5.8	6.7	6.6	10.3	34.1	-62	-89
35-39.....	3.0	4.4	6.1	4.0	4.6	6.4	6.5	9.2	28.4	-67	-89
40-44.....	.9	2.9	2.0	1.9	3.4	2.8	2.7	4.8	14.3	-81	-94
Nonwhite Females											
15-44*.....	10.7	11.6	14.6	12.3	13.1	16.1	17.2	18.3	39.3	-42%	-73%
15-19.....	7.9	8.4	14.5	9.9	15.7	15.6	15.6	19.5	44.8	-59	-82
20-24.....	11.2	15.3	18.9	19.6	12.7	25.2	27.2	23.1	52.0	-52	-78
25-29.....	7.8	16.1	20.9	10.5	11.0	14.9	17.5	19.0	40.6	-59	-81
30-34.....	15.2	11.4	18.1	15.0	23.9	19.1	20.0	20.4	39.8	-25	-62
35-39.....	16.7	12.1	7.4	12.0	7.3	10.0	10.0	19.4	30.8	-14	-46
40-44.....	6.3	3.5	1.7	3.5	5.3	7.0	7.0	5.9	17.8	+7	-65

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

at a very low level, as shown in Table 18. Except for measles, there were fewer than 10 deaths from each of these causes in most of the years under

<sup>27</sup> J. E. Fitzgerald and A. Webster, "Nineteen Year Survey of Maternal Mortality at the Cook County Hospital," *American Journal of Obstetrics and Gynecology*, vol. 65, p. 528, March, 1953.

F. L. Adair, "Mortality Associated With Maternity," *American Journal of Obstetrics and Gynecology*, vol. 68, p. 20, July, 1954.



review; no deaths were reported from scarlet fever in 1953-1955. The death rates for measles, although low, continue to fluctuate from year to year. For the four diseases jointly, the death rate at ages 1-14 declined by 72 percent from 1946-1950 to 1955. Immunization played a major role in the virtual elimination of mortality from whooping cough and diphtheria. The rarity of deaths from diphtheria reflects not only increased resistance to it but also apparently a decreasing severity of the disease.

TABLE 18  
DEATH RATES FROM CERTAIN COMMUNICABLE DISEASES OF CHILDHOOD  
BY RACE, SEX, AND AGE  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE, RACE, SEX, CAUSE OF DEATH	DEATH RATES PER 100,000								PERCENT CHANGE 1955 SINCE		
	1955	1954	1953	1952	1951	1950		1946- 1950†	1936- 1940†	1946- 1950	1936- 1940
						6th Rev.	5th Rev.				
1-14* Total Persons...	.8	.9	.6	1.0	1.2	1.2	1.3	2.9	13.1	- 72%	- 94%
Measles.....	.5	.7	.5	.8	.7	.4	.5	1.0	2.1	- 50	- 76
Scarlet Fever.....				†	†	†	.1	.2	3.4	-100	-100
Whooping Cough.....	.1	.1	†	.1	.2	.4	.4	.6	3.0	- 83	- 97
Diphtheria.....	.2	.1	.1	.1	.3	.3	.3	1.1	4.6	- 82	- 96
1-24*											
Acute Poliomyelitis...											
Total Persons.....	1.0	1.1	1.5	2.4	1.5	1.6	1.6	2.0	1.0	- 50%	0%
White Males.....	1.1	1.4	2.2	2.9	1.8	2.1	2.2	2.5	1.1	- 56	0
White Females.....	1.1	.8	1.0	2.1	1.3	1.3	1.3	1.5	.8	- 27	+ 38
Nonwhite Males.....	.5	.6	.9	2.6	.3	.5	.5	1.4	1.3	- 64	- 62
Nonwhite Females...	.5	1.1	.3	1.2	.9	.4	.4	.9	.8	- 44	- 38

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

‡ Less than 0.05 per 100,000.

NOTE.—Rates in italics are based on fewer than 10 deaths.

The reduced level of mortality from measles has been brought about, in part, by the temporary immunity established by gamma globulin in very young or sickly children for whom an attack might be fatal or result in serious complications.

Acute poliomyelitis retained its earlier importance as a cause of death during childhood and adolescence for most of the period 1950-1955. The highest death rate occurred in 1952, when it was 2.4 per 100,000 at ages 1-24. The rate declined to only 1.0 per 100,000 in 1955, the level prevailing in 1936-1940. A total of 15,400 cases of poliomyelitis was reported for the general population of the United States in 1956, compared with 29,270 for the year before and a median of 36,000 for 1950-1954. The re-

cently improved situation may reflect, in part, the immunization program against poliomyelitis introduced during the spring of 1955.<sup>28</sup> Although the postwar period saw a reduction in mortality from poliomyelitis in childhood and adolescence, the death rates changed little in early maturity.<sup>29</sup> As a result of this differential in trend, the death rates for white persons in 1953-1955 show relatively little variation with age up to about age 35; in 1948-1952, there was a marked peak in mortality at ages 5-14 for white males and at ages 5-9 for white females.

#### MISCELLANEOUS DISEASES

Table 19 sets forth age-adjusted death rates in the range 1-74 years for certain causes of death.

*Syphilis.* The decline in mortality from syphilis was particularly rapid in the postwar period, the rate for 1955 having dropped by more than three-fifths from the average for 1946-1950. The relative decrease was somewhat greater for females than for males, and greater for nonwhites than for whites. The earlier reductions in syphilis death rates were effected by chemotherapy. In recent years, a major factor in the control of the disease has been the use of penicillin, which is highly effective in its prevention and treatment.

*Ulcers of the stomach and duodenum.* The death rates for this category of diseases show little change in level during 1950-1955 for whites and nonwhites of each sex. For each race, the rates for males are several times those for females. Although the level of mortality from ulcers of the stomach and duodenum is not very high, these conditions rank among the important chronic diseases. The treatment of peptic ulcers has been advanced by medical progress and by new surgical procedures which have materially reduced operative mortality.

*Diseases of the gallbladder and biliary ducts.* There was practically no change in the level of the death rates from these conditions at ages 1-74 during the period 1950-1955. However, compared with the early postwar period, 1946-1950, the rates for females, among whom mortality is well above that for males, have shown some reduction. This favorable trend may reflect several influences. Thus, the large proportion of cases with these conditions that come to operation have the advantages of advances in operative technique, the control of infection by antibiotics and chemotherapy, and the prevention of surgical shock and pulmonary embolism.

*Appendicitis.* The death rates from appendicitis among Industrial

<sup>28</sup> J. E. Salk, "Poliomyelitis Vaccination in the Fall of 1956," *American Journal of Public Health*, vol. 47, p. 1, January, 1957.

<sup>29</sup> Metropolitan Life Insurance Company, *Statistical Bulletin*, July, 1956.

policyholders at ages 1-74 in 1955 were reduced by more than half from the annual average for 1946-1950 and by nine-tenths since 1936-1940. Major factors contributing to this decline have been the popular educational campaigns on the need to avoid laxatives in the presence of abdominal pain, the necessity for early diagnosis and treatment, skilled surgery, and the measures for control of infection and shock in surgery.

TABLE 19

DEATH RATES FROM MISCELLANEOUS DISEASES  
BY RACE AND SEX, AGES 1-74 YEARS\*  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE PERIOD, RACE, SEX	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946- 1950†	1936- 1940†	1946- 1950	1936- 1940
						6th Rev.	5th Rev.				
Syphilis											
Total Persons . . . . .	1.4	1.5	1.6	1.8	2.5	2.8	3.5	3.6	7.8	-61%	-82%
White Males . . . . .	1.8	1.8	2.0	2.3	3.1	3.4	4.3	4.3	8.8	-58	-80
White Females . . . . .	.4	.4	.5	.5	.9	.9	1.3	1.1	2.4	-64	-83
Nonwhite Males . . . . .	7.1	8.3	7.9	9.3	12.5	13.6	16.4	20.2	44.0	-65	-84
Nonwhite Females . . . . .	2.3	3.9	3.0	4.3	4.9	6.7	7.2	9.6	22.1	-76	-90
Ulcers of Stomach and Duodenum											
Total Persons . . . . .	3.7	3.8	4.1	4.1	3.9	3.8	4.4	3.7	4.9	0%	-24%
White Males . . . . .	6.5	6.8	7.4	7.5	6.7	6.7	7.8	6.6	8.7	- 2	-25
White Females . . . . .	1.1	1.1	1.1	1.2	1.2	1.1	1.2	1.1	1.4	0	-21
Nonwhite Males . . . . .	5.1	4.3	6.4	4.7	6.4	5.5	6.4	4.6	7.4	+11	-31
Nonwhite Females . . . . .	1.6	2.1	1.5	1.2	2.0	1.3	1.8	1.3	2.3	+23	-30
Diseases of the Gallbladder and Biliary Ducts											
Total Persons . . . . .	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.3	5.1	-13%	-61%
White Males . . . . .	1.6	1.9	1.8	1.6	1.8	1.5	1.5	1.7	3.3	- 6	-52
White Females . . . . .	2.6	2.4	2.8	3.0	2.8	2.8	2.7	3.3	7.5	-21	-65
Nonwhite Males . . . . .	.7	.3	.7	1.0	.7	.4	.5	.5	1.4	+40	-50
Nonwhite Females . . . . .	1.3	1.5	1.8	1.7	1.0	1.3	1.3	1.7	3.3	-24	-61
Appendicitis											
Total Persons . . . . .	1.0	1.0	1.2	1.4	1.3	1.6	1.7	2.3	9.9	-57%	-90%
White Males . . . . .	1.4	1.2	1.7	1.8	1.6	1.9	2.0	2.7	11.8	-48	-88
White Females . . . . .	.5	.6	.7	.8	.9	1.0	1.2	1.5	7.2	-67	-93
Nonwhite Males . . . . .	1.8	2.6	1.9	2.8	1.9	4.0	4.1	3.8	12.9	-53	-86
Nonwhite Females . . . . .	.8	1.6	1.3	1.4	2.7	2.0	1.9	3.1	10.2	-74	-92

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

## ACCIDENTS, SUICIDE, AND HOMICIDE

Deaths due to violence rank high in the total mortality picture of Industrial policyholders. According to Table 6, accidents alone accounted for 9 percent of all deaths among white males at ages 1-74 and for 7 percent of nonwhite male deaths. They are a leading cause of death throughout life, and as already indicated are first among the causes of death at ages under 25. Suicide is a significant factor in the mortality of white males, particularly at ages 15-24 where it ranks fourth and at ages 25-44 where it is fifth. Homicide ranks second as a cause of death among nonwhite males at ages 15-24 and fourth at ages 25-44.

*Accidents, total.* For both white and nonwhite persons of each sex at ages 1-74, the death rate for total accidents within the period 1950-1955 rose to a peak in 1952 and then declined, as seen in Table 20. The rates for white persons in 1955 were below the annual average for 1946-1950, but nonwhites experienced practically no change. However, for both races, the recent record is substantially better than the prewar average covering 1936-1940.

As indicated in Table 21, the accident death rate among Industrial policyholders was much lower than that for the general population in each age-sex-race category. In the general population of the United States, over two-fifths of the fatal accidents involved motor vehicles, one-fifth were due to falls, and lesser proportions to fire and explosion, drowning, firearms and machinery.

*Motor vehicle accidents.* The death toll from motor vehicle accidents among Industrial policyholders during the period 1950-1955 had its high point in 1952. Although the rates for the period from 1950 through 1955 were above the annual average for 1946-1950, particularly for nonwhite persons, they were well under the average for 1936-1940. In the postwar period, there has been a considerable reduction in the motor vehicle death rate based upon miles traveled. In 1945 in the general population, there were 11.3 such fatalities per 100,000,000 vehicle miles traveled; this rate declined to 7.6 in 1950 and 6.4 in 1955.<sup>30</sup> Among white males, the motor vehicle death rate per 100,000 Industrial policyholders was at its peak at age 21; the peak for white females in the adolescent and young adult ages came at age 18, but its level was only one-fourth that at age 18 for white males. The highest rates for females were at ages 65-74.

*Occupational accidents.* Despite the high level of economic activity during the postwar period, the rate for fatal occupational accidents declined rapidly. At ages 15-64, the rate for white males in 1955 was one-third under the annual average for 1946-1950; for nonwhite males, the rate was halved.

<sup>30</sup> "Accident Facts," 1956 edition, National Safety Council, Chicago.

TABLE 20

DEATH RATES FROM EXTERNAL VIOLENCE  
BY RACE, SEX, AND SPECIFIED AGE GROUPS  
METROPOLITAN LIFE INSURANCE COMPANY  
INDUSTRIAL DEPARTMENT, 1936 TO 1955

AGE PERIOD, RACE, SEX	DEATH RATES PER 100,000									PERCENT CHANGE 1955 SINCE	
	1955	1954	1953	1952	1951	1950		1946- 1950†	1936- 1940†	1946- 1950	1936- 1940
						6th Rev.	5th Rev.				
Suicide											
1-74*											
White Males.....	10.0	9.1	10.1	9.4	10.6	11.0	11.0	11.6	16.0	-14%	-38%
White Females....	3.0	2.8	3.0	3.0	3.1	3.5	3.5	3.9	5.2	-23	-42
Nonwhite Males..	5.4	6.4	6.5	5.6	6.3	5.6	5.6	6.2	7.9	-13	-32
Nonwhite Females	1.5	1.9	1.5	1.5	2.1	2.2	2.2	2.0	3.4	-25	-56
Homicide											
1-74*											
White Males.....	2.1	1.9	2.1	2.1	1.9	2.2	2.1	2.9	3.8	-28%	-45%
White Females....	.7	1.0	.7	.7	.7	.8	.8	.9	1.2	-22	-42
Nonwhite Males..	18.1	19.0	23.9	26.8	22.2	22.4	22.4	25.4	36.3	-29	-50
Nonwhite Females	4.9	5.4	5.1	6.7	7.0	7.6	7.6	7.2	9.4	-32	-48
Accidents—Total											
1-74*											
White Males.....	57.4	56.2	60.8	64.4	60.4	57.5	58.0	63.6	80.3	-10%	-29%
White Females....	14.3	14.6	15.9	17.0	14.7	14.7	15.6	16.0	22.9	-11	-38
Nonwhite Males..	62.2	60.8	68.3	73.5	65.3	62.1	62.4	63.8	85.8	-3	-28
Nonwhite Females	20.0	23.1	21.3	22.6	21.8	20.7	21.4	20.2	29.0	-1	-31
Motor Vehicle Accidents											
1-74*											
White Males.....	26.4	24.8	26.8	27.5	26.9	25.6	25.7	25.4	33.5	+ 4%	-21%
White Females....	7.5	7.0	8.1	8.2	7.1	7.4	7.4	6.9	9.5	+ 9	-21
Nonwhite Males..	27.2	25.2	25.6	30.9	24.3	25.6	25.6	22.6	31.6	+20	-14
Nonwhite Females	8.2	9.1	8.3	10.3	8.9	9.1	9.2	6.8	10.4	+21	-21
Occupational Accidents											
15-64*											
White Males.....	10.2	10.2	12.6	13.6	14.1	14.9	15.2	15.4	21.6	-34%	-53%
White Females....	.1	.1	.2	.1	.2	.2	.2	.2	.3	-50	-67
Nonwhite Males..	6.1	7.3	11.0	11.3	12.2	10.8	10.8	12.5	20.3	-51	-70
Nonwhite Females	.1	.5	.1	.....	.....	.....	.....	.2	.6	-50	-83
Home Accidents											
1-74*											
White Males.....	5.7	6.4	6.7	6.8	6.5	6.8	7.9	7.7	10.0	-26%	-43%
White Females....	3.3	4.0	4.1	4.5	4.3	4.1	5.1	4.9	7.9	-33	-58
Nonwhite Males..	11.2	10.9	9.5	9.9	11.3	11.2	12.2	11.9	14.2	-6	-21
Nonwhite Females	7.7	9.4	7.9	7.4	8.7	7.7	8.3	9.2	12.3	-16	-37

\* Death rates standardized for age.

† Fifth Revision death rates adjusted to be comparable to the Sixth Revision.

NOTE.—Rates in italics are based on fewer than 10 deaths.

*Home accidents.* The death rate from fatal home accidents at ages 1-74 fluctuated within a relatively narrow range in the period 1950-1955. However, the rates for 1955 showed an appreciable reduction from the annual average for 1946-1950 and a still greater reduction from 1936-1940. It is noteworthy that the rate for fatal home accidents at ages 1-74 is appreciably greater for males than for females.

*Suicide.* The suicide rate at ages 1-74 showed relatively little change during the six years 1950-1955. However, there was some improvement from the annual average for 1946-1950.

*Homicide.* The homicide rate for white persons at ages 1-74 was stable during the period from 1950 to 1955, but for nonwhites there has been

TABLE 21

DEATH RATES FROM ACCIDENTS—TOTAL  
METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT  
AND GENERAL POPULATION OF UNITED STATES COM-  
PARED IN 1951-1953, BY RACE, SEX, AND AGE

AGE PERIOD YEARS	MALES			FEMALES		
	Death Rates per 100,000		Ratio M.L.I. Co. to U.S.	Death Rates per 100,000		Ratio M.L.I. Co. to U.S.
	M.L.I. Co.	U.S.		M.L.I. Co.	U.S.	
	White					
1-74* . . . . .	61.9	72.1	.86	15.9	20.6	.77
1-4 . . . . .	32.4	38.0	.85	21.6	27.0	.80
5-14 . . . . .	26.2	30.0	.87	9.4	12.8	.73
15-24 . . . . .	78.2	100.2	.78	13.5	20.0	.68
25-44 . . . . .	64.5	75.2	.86	10.7	15.1	.71
45-64 . . . . .	84.2	91.3	.92	22.2	26.5	.84
65-74 . . . . .	147.0	151.7	.97	75.0	76.2	.98
	Nonwhite					
1-74* . . . . .	69.0	103.4	.67	21.9	33.1	.66
1-4 . . . . .	40.3	67.6	.60	28.4	57.9	.49
5-14 . . . . .	33.6	41.0	.82	11.6	19.0	.61
15-24 . . . . .	86.3	108.8	.79	20.7	25.1	.82
25-44 . . . . .	75.0	126.7	.59	17.2	29.1	.59
45-64 . . . . .	89.0	145.9	.61	28.2	43.5	.65
65-74 . . . . .	135.2	173.2	.78	87.1	90.2	.97

\* Death rates standardized for age.

some improvement in recent years. For each race-sex category, there has been a considerable reduction in the homicide rate from the annual average for 1946-1950.

#### WAR DEATHS

This survey of mortality of Industrial policyholders from 1946 to 1955 excludes deaths from enemy action during the Korean War among military personnel who were insured. Since the number of policyholders in military service was not known, death rates among such personnel could not be computed. From the opening of the Korean conflict on June 6, 1950, to the end of 1955, there were reported about 5,450 deaths of military personnel among Metropolitan Industrial policyholders.<sup>31</sup>

Of all deaths among military personnel with Industrial insurance, 60 percent were due to enemy action, 8 percent to aviation accidents, 22 percent to other nonbattle injuries, and 10 percent to disease. Among the deaths due to enemy action, 29 percent were at ages under 20, 57 percent at ages 20-24, and 14 percent at ages 25 and over.

#### CONCLUSION

Although the mortality of Industrial policyholders decreased generally from 1950 to 1955, the magnitude of the declines in mortality rates differed considerably by age, race, and sex. On the whole, the relative reductions in death rates were proportionately much smaller at the older than the younger ages. The rates of decline in mortality were greater for non-white than for white policyholders, but the margin between the mortality rates by race still remains appreciable. Among white policyholders, the reductions in mortality for females were considerably greater than for males, among whom the decreases were relatively small. In the absence of major advances in the control of the cardiovascular diseases and cancer, it is likely that in the near future the mortality among white male policyholders will at best continue to decline very slowly but the prospect for white female policyholders appears much better.

The new form of death certificate and classification procedures introduced with the adoption of the Sixth Revision of the International List for Industrial death records have complicated the analyses of mortality trends by cause of death for the postwar period. In this paper the difficulty was met by adjusting the death rates for specific causes prior to 1950 to approximate, by means of comparability ratios for 1949, what they would have been on the basis of the Sixth Revision of the Interna-

<sup>31</sup> This includes premium-paying and paid-up policyholders, the latter being a small proportion of the total. The reported deaths include missing cases legally declared dead.

tional List. The insight into mortality trends provided by this experience of Industrial policyholders may assist in an understanding of trends by cause of death in Ordinary insurance, where intercompany data prior to 1950 are not available.

The increasing predominance of deaths from cardiovascular-renal diseases, cancer, and other chronic diseases raises new issues regarding the interpretation of mortality trends from these causes. The crux of the difficulty lies in the practice of recording only a single specific cause of death for classification purposes when, as a matter of fact, these diseases are frequently associated with other significant morbid conditions, usually but not always mentioned on the death certificate. Moreover, the selection of the single cause of death for classification is subject to changing concepts and rules of procedure. A better insight into the characteristics and trends of mortality from the chronic diseases is needed, in view of their present importance. These new developments may be clarified by a re-examination of current practices in certifying, classifying, and tabulating causes of death and by analysis of mortality with respect to multiple causes of death.