Lung Cancer Mortality Trends in Canada, 1931-1960

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ABSTRACT

Trends in mortality due to lung cancer in Canada since 1931 were reviewed and data for 1960 presented. In 1960, 2223 male deaths were due to lung cancer. In each five-year age group over 45, there has been a distinct increase in male lung cancer death rates since 1931. The greatest increase occurred between the ages of 65 and 79. The age group 70-74, where the lung cancer mortality rates increased from 10.7 in the period 1931-33 to 173.5 in 1958-60, indicates the trend. Between 1931 and 1960, the proportion of male lung cancer deaths to all male cancer deaths increased from 3% to 18.8%. Female deaths due to lung cancer numbered 321 in 1960. Between 1931 and 1960 the proportion of female lung cancer deaths to all female cancer deaths increased only from 1.4% to 3.2%.

PHILLIPS[1] and others have previously referred to the great increase in lung cancer mortality in Canada. Because public interest in this problem is growing, this is an opportune time to present the Canadian lung cancer mortality data for 1960 which have just recently become available and to review mortality trends in Canada including this information.

The designation of categories in this report is according to the Seventh International Classification of Diseases, W.H.O., 1955 (I.C.D.). To permit comparison with Phillips' data, the year 1931 is used as a starting point for our tables and figures. "Lung cancer" deaths include malignant neoplasms of bronchus and trachea and of lung specified as primary (I.C.D. 162) and malignant neoplasms of lung, unspecified as primary or secondary (I.C.D. 163). In 1960, the number of deaths in category 163 was 8.4% of the total of categories 162 and 163 combined. Further, to permit comparisons with "all cancer" data during the whole period 1931-1960, this report excludes from "all cancer" deaths those from leukemia and aleukemia (I.C.D. 204), Hodgkin's disease (I.C.D. 201) and benign neoplasms and neoplasms of unspecified nature (I.C.D. 210-239).

Fig. 1, which was prepared from data in Table I, Section A, shows male, age-specific, lung cancer death rates per 100,000 population in the four three-year periods 1931-33, 1941-43, 1951-53, and 1958-60. To obtain these rates, the three-year total number of male cancer deaths in each age group was divided by the three-year totals of males in each of the corresponding age groups and multiplied by 100,000. It is seen that in each five-year age group, 45-49 years and over, there has been a distinct increase in the male lung cancer death rates since the period 1931-33. The greatest increase has occurred in the three age groups 65-69, 70-74 and 75-79, and data for the central group indicate the trends in the three groups. In Table I it is observed that, in the age group 70-74, the male lung cancer mortality rates per 100,000 population increased from 10.7 in the period 1931-33 to 30.6 in 1941-43, 97.8 in 1951-53 and 173.5 in 1958-60.

In the part of Table I, Section A, which shows the male lung cancer death rates by five-year age groups for 1958, 1959 and 1960, the progressive increase in mortality rates noticed in the three-year groups is not seen. Rather the rates show some tendency to stabilize. This is consistent with the hypothesis that the male lung cancer mortality rates are near a peak. However, only time will tell if this is so.

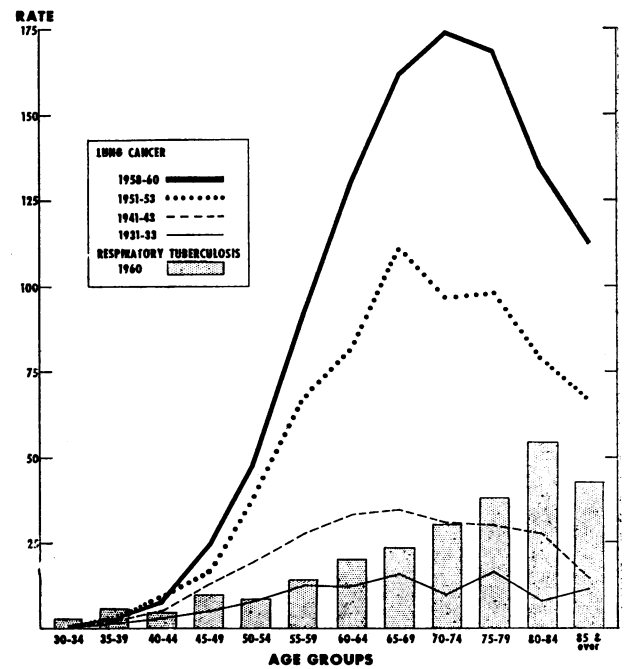

Fig. 1.—Lung cancer mortality in Canadian males. Age-specific death rates per 100,000 population.

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TABLE I.—LUNG CANCER* DEATH RATES PER 100,000 POPULATION, CANADA, 1931 - 1960

A—MALES
THREE-YEAR AGE GROUPINGS

Years	*30-34*	*35-39*	*40-44*	*45-49*	*50-54*	*55-59*	*60-64*	*65-69*	*70-74*	*75-79*	*80-84*	*85+*
1931-33.....	0.9	2.0	3.0	5.2	8.2	12.7	12.5	15.1	10.7	15.8	8.2	11.4
1941-43.....	0.9	3.2	5.4	12.5	18.9	27.0	33.7	34.5	30.6	30.0	27.9	14.3
1951-53.....	0.8	3.6	7.1	16.5	38.7	66.2	81.4	110.8	97.8	98.9	80.3	68.9
1958-60.....	0.9	3.1	6.8	23.6	47.4	90.1	130.0	162.5	173.5	165.0	131.0	111.1
1958.....	0.6	2.4	7.7	22.4	44.6	96.0	124.7	165.7	143.2	160.3	129.4	86.8
1959.....	0.5	3.0	7.1	24.0	50.5	80.8	133.4	161.5	181.8	158.5	114.3	119.0
1960.....	1.6	3.8	5.5	24.5	46.9	95.9	131.7	160.3	195.4	175.7	148.7	126.7

B—FEMALES
THREE-YEAR AGE GROUPINGS

Years	*30-34*	*35-39*	*40-44*	*45-49*	*50-54*	*55-59*	*60-64*	*65-69*	*70-74*	*75-79*	*80-84*	*85+*
1931-33.....	0.6	0.9	1.6	2.4	2.6	6.1	8.3	9.8	9.8	7.8	5.2	2.3
1941-43.....	0.8	1.5	2.3	5.0	4.8	8.7	12.4	13.8	15.6	12.8	11.3	14.8
1951-53.....	0.7	1.0	2.7	3.5	5.9	8.5	13.9	22.6	21.4	28.6	32.2	30.7
1958-60.....	0.4	1.3	2.2	4.4	7.2	10.8	13.5	19.6	22.2	31.6	34.2	26.1
1958.....	0.2	0.5	2.6	3.5	9.1	9.3	13.3	20.4	23.5	26.3	28.8	28.9
1959.....	0.8	1.7	2.0	4.9	8.0	10.6	12.9	18.3	19.9	38.6	40.4	18.3
1960.....	0.3	1.6	2.0	4.7	4.7	12.3	14.3	20.2	23.2	29.7	33.3	31.0

*I.C.D. 162 and 163.
Source: Dominion Bureau of Statistics.

For comparative purposes, the shaded bars in Fig. 1 represent the male, age-specific, respiratory tuberculosis death rates per 100,000 population in 1960. It is seen that, in each five-year age group 45-49 and over, the 1958-60 lung cancer mortality rates clearly exceed the 1960 respiratory tuberculosis death rates in the corresponding age groups, reaching the greatest divergence in the age group 70-74 years.

Table II, "male" columns, shows that in 1960 there were 2223 male deaths due to lung cancer and 501 male deaths due to respiratory tuberculosis. In other words, in that year the number of male lung cancer deaths was more than four times the number of male respiratory tuberculosis deaths. The excess of lung cancer over tuberculosis deaths occurs in all five-year age groups starting with the group 40-44 years.

Fig. 2, which was prepared from data in Table I, Section B, shows female, age-specific, lung cancer death rates per 100,000 population in the four three-year periods 1931-33, 1941-43, 1951-53 and 1958-60. It is seen that, in the five-year age groups 65-69 years and over, the lung cancer death rates in the periods 1958-60 and 1951-53 definitely exceed the rates in 1941-43, which in turn exceed the rates in 1931-33. The increase in lung cancer death rates for females is much less dramatic than that for males.

In Table I, Section B, little change is observed in the female, age-specific, lung cancer mortality rates in the period 1958-60 over the period 1951-53, and the rates for the individual years 1958, 1959

TABLE II.—LUNG CANCER* AND RESPIRATORY TUBERCULOSIS† DEATHS, CANADA, 1960

Age groups	*Male*		*Female*		*Total*	
	Cancer	*Tuberculosis*	*Cancer*	*Tuberculosis*	*Cancer*	*Tuberculosis*
Under 20	1	7	1	7	2	14
20 - 29	4	8	1	15	5	23
30 - 34	10	19	2	16	12	35
35 - 39	23	37	10	20	33	57
40 - 44	31	25	11	16	42	41
45 - 49	124	51	23	10	147	61
50 - 54	202	39	19	17	221	56
55 - 59	342	51	42	16	384	67
60 - 64	373	58	41	13	414	71
65 - 69	374	52	48	22	422	74
70 - 74	376	56	46	17	422	73
75 - 79	229	50	41	23	270	73
80 - 84	95	35	24	23	119	58
85+	38	13	12	9	50	22
Not stated	1				1	
Total	2223	501	321	224	2544	725

*I.C.D. 162 and 163.
†I.C.D. 001-008.
Source: Dominion Bureau of Statistics.

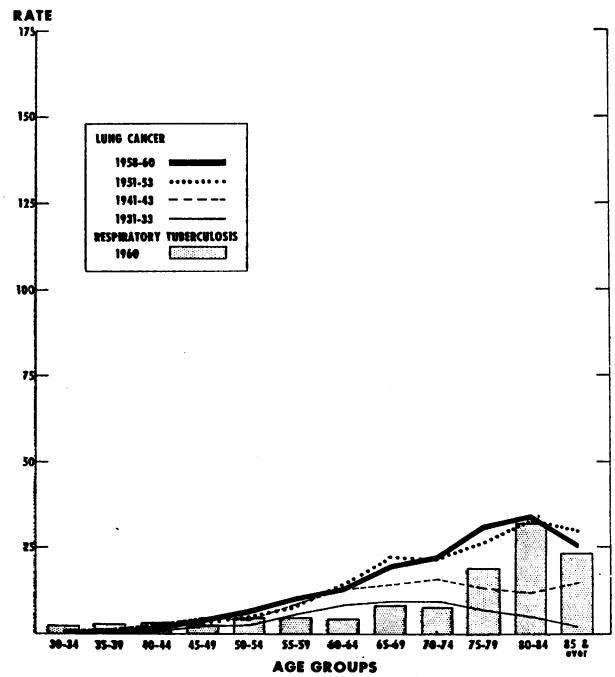

Fig. 2.—Lung cancer mortality in Canadian females. Age-specific death rates per 100,000 population.

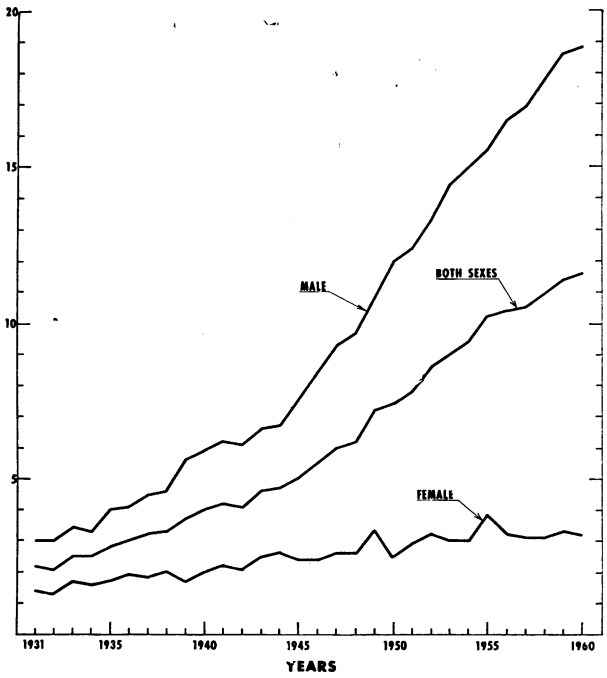

Fig. 3.—Lung cancer deaths expressed as a percentage of all cancer deaths — male, female and both sexes, Canada, 1931-60.

and 1960 are variable. In contrast to Section A of the same table, there is no established pattern of regularly increasing female, age-specific, mortality rates over successive three-year periods, even for those groups age 65-69 and over.

The shaded bars in Fig. 2 represent the female, age-specific, respiratory tuberculosis death rates per 100,000 population in 1960. It is seen that, in each five-year age group 45-59 and over, the 1958-60 lung cancer death rates are slightly greater than the respiratory tuberculosis death rates in the corresponding age groups.

Table II, "female" columns, shows that in 1960 there were 321 female deaths due to lung cancer and 224 female deaths due to respiratory tuberculosis. In other words, in 1960 the number of female lung cancer deaths was about one and one-half times more than the number of female respiratory tuberculosis deaths. The totals for both sexes combined were, for lung cancer, 2544 and for respiratory tuberculosis, 725.

TABLE III.—LUNG CANCER* DEATHS EXPRESSED AS A PERCENTAGE OF ALL CANCER† DEATHS, CANADA, 1931-1960, BY SELECTED YEARS: MALE, FEMALE AND BOTH SEXES

Year‡	*Male*	*Female*	*Total*
1931	3.0	1.4	2.2
1935	4.0	1.7	2.8
1940	5.9	2.0	4.0
1945	7.5	2.4	5.0
1950	12.0	2.5	7.4
1955	15.5	3.8	10.2
1960	18.8	3.2	11.6

*I.C.D. 162 and 163.

†I.C.D. 140-200, 202, 203 and 205.

‡Includes Newfoundland since 1950.

Source: Epidemiology Division, Department of National Health and Welfare.

Fig. 3, which was prepared, in part, from data in Table III, shows, for selected years 1931-60, the percentage of male lung cancer deaths to total male cancer deaths, the percentages of female lung cancer deaths to total female cancer deaths, and the percentage of male and female lung cancer deaths combined to total cancer deaths for both sexes. It is seen that since 1931 there has been a marked increase in the proportion of male lung cancer deaths to all male cancer deaths, from 3% to 18.8%. For females, the proportion of lung cancer deaths to all female cancer deaths has shown a gradual increase, from 1.4% to 3.2%.

DISCUSSION

In this report an attempt has been made to maintain comparability of data over a period of time when four different revisions of the International Classification of Diseases were in use in Canada, i.e., the Fourth, 1931-1940; the Fifth, 1941-1949; the Sixth, 1950-1957; and the Seventh, 1958 to date. Another factor to be considered is the possibility of the existence of changing criteria for ascribing deaths to lung cancer. In 1961, Phillips[2] stated that "if 5% of the deaths attributed to respiratory diseases were actually due to lung cancer, the recorded increase in males since 1931 would be reduced by over 50% and the increase in females would completely disappear". However, even with the application of this 5% error factor, the increase in male lung cancer mortality is substantial. In the same report, Phillips presented the results of a recent one-year study of the criteria used in diagnosis of primary lung cancer in Canada. "The analysis shows that of 2235 deaths, 72.1% were based on pathological evidence, 23.1% on radiological evidence and 4.8% on clinical evidence." This indicates a high degree of precision in ascribing deaths to primary lung cancer during the survey period.

SUMMARY

Male, age-specific, lung cancer mortality rates have increased regularly and dramatically over the period 1931-1960; however, there is some indication that these rates are near a peak.

In the same period, the increase in female, age-specific, lung cancer mortality rates is much less dramatic than that for males.

REFERENCES

1. PHILLIPS, A. J.: *Canad. Med. Ass. J.*, 71: 242, 1954.
2. *Idem*: *Ibid.*, 84: 795, 1961.