On Cohort Mortality in Finland[1]

By RISTO KOLARI

Central Statistical Office of Finland

Defining the approach

There are two main approaches in mortality analyses, the cross-sectional and the longitudinal and correspondingly, one can distinguish period mortality from cohort mortality. However, there is no sharp difference between these two approaches as the cohort model can also be applied to period analysis, as is done for example when life tables are calculated in the traditional way. The probability of survival thus calculated describes the life cycle of a certain hypothetical cohort, but it is based on age-specific death rates of real cohorts born at different times. If one wants to obtain a complete picture of the life cycle of real cohorts, the analysis must cover at least one generation and the calculations must, of course, be performed by cohort.

Calculations by cohort are, indeed, possible also within a short time period, and in some cases such a solution — e.g. with regard to certain applications — can serve its purpose very well.

The purpose of this study was to examine cohort mortality more extensively and above all to compare it with period mortality. Consequently it was important to use several »full-length» cohorts. The analysis is based on 5-year cohorts and periods as well as 5-year age groups. The period analyses concerning the time period 1881—1975 were computed entirely using the data from basic statistics, whereas the cohorts 1851—1910 were made »full-length» by lengthening them from the beginning and from the end using an estimation method. Due to this lengthening other computations were also possible for these cohorts to the same extent as in the period analysis. The computations concerning the truncated cohorts were bound to remain more limited.

The study covers the entire population of the country, and the variables included in the study are date of birth, age and sex. This is why the study is descriptive by nature and only indirectly provides possibilities for explanative conclusions. Bringing explanatory background variables into the analysis

---

[1] This is a summary of a study entitled Cohort Mortality in Finland from 1851 carried out by the author at the Central Statistical Office (Studies 57, 1980).

would undoubtedly have provided interesting findings, but this had to be given up mainly because the available statistical data did not suit this purpose.

Studies on cohort mortality of a longer time period have not been undertaken earlier in our country perhaps due to the problems caused by the vast data the study needs and by making the data available for use. Studies on cohort mortality made by Bolander and Holmberg in Sweden deserve mention.[2] Bolander's study deals with the time period 1861—1966 thus, it can be used as an object of comparison.

Data used

As to the statistical data used in the study, the mortality statistics of our country can be considered sufficiently reliable for this task. As noted earlier, however, the population figures contain some inaccuracies due to inadequate registration of emigration. An effort had been made to eliminate these inaccuracies by correcting the population figures. A preanalysis of the data in the present study, however, indicated that inaccuracies still remained in the age structure of the population figures, inaccuracies which could have had harmful effects on the cohort analysis. Therefore an additional age structure correction was made but the total population figures were left unchanged. The correction was primarily applied to the population figures of earlier decades. The census figures of the years 1950, 1960 and 1970 and the population figure of 1975 were assumed to be correct also regarding the age structure, and as to the years 1955 and 1965 the correction was very slight.

In practice the correction was carried out by transforming the distribution of net emigration so that it corresponded to a certain typical profile. The corrected population figures were then obtained by a simple return calculation. Thus the obtained net emigration figures could be used further as correction factors when calculating probabilities of death.

On methods and reliability

The calculations in this study were performed by employing the technique of life tables. As in the population correction, all the required basic data were classified by age, time of birth and period. Thus it was possible and also quite natural to calculate first the probabilities of death as partial coefficients, of

---

[2] A. M. Bolander: A Study of Cohort Mortality in the Past Hundred Years. Statistiska Meddelanden 1970: 3. Stockholm 1970.

Ingvar Holmberg: A Study of Mortality among Cohorts Born in the 18th and 19th Century. Statistiska Meddelanden 1970: 3. Stockholm 1970.

which the final coefficients by age group were obtained on the one hand by cohort and on the other hand by period. The probabilities of survival and life expectancies by age were then calculated by employing a traditional demographic method as were the probable length of life and the typical length of life as quantities representing total distributions. The calculation procedures have been explained in more detail in the afore-mentioned Studies vol. 57.

The reliability of the results can be considered sufficiently high, but some inaccuracies remain in the population figures, nonetheless. It should be mentioned that deaths due to war operations have been eliminated from the basic data for the First and Second World War. Statistical stochastic fluctuations, on which no attempts at elimination, for instance by smoothing out obtained distributions, were made, have to be taken into account when analyzing the results, however. In order to estimate the size of the fluctuation the relative standard error of the probabilities of death were calculated for the first and last period. In some cases these error values exceed 5 per cent, but a level of 1—2 per cent is the most common.

Comments on the results

Period mortality

In our country the development of period mortality is known at least for a hundred years, as life tables have been published since the end of the last century and furthermore, other calculations date from even earlier times. First, attention should be focused on period mortality as the factors influencing the development of cohort mortality are periodical or comparable to them.

The best measure of the level of total mortality is given by life expectancy (e_0) or, actually, its inverse value ($1/e_0$), which is the life table death rate of stationary population. As can be seen in Appendix 1 the quantity e_0 grew quite rapidly in the beginning of the period 1881—1975 with the growth rate at an average of 0.5—0.6 per cent a year, but since the 1950s growth has been only approximately 0.25 per cent for males and 0.30 per cent for females. If one assumes that the increase will continue in the same way the life expectancy for the year 2000 would be about 72 years for males and 83 years for females.

It is, however, probable that growth will not continue in this manner. For instance, according to a projection [3] published by the United Nations the life expectancy in Finland would be 70.5 years for males and 77.9 years for females

[3] Demographic estimates and projections for the world, regions and countries as assessed in 1978, United Nations publication, January 1979 (Provisional report).

during the time period 1995—2000. The respective figures for Sweden were 73.2 and 78.8 years according to the same projection. Evidently it has been assumed in the projection that the growth rate will slow down which no doubt is the most realistic assumption when the development trend is approaching a limit.

The probable length of life (v_0) has increased somewhat slower than e_0 and, at the same time, the difference between these two quantities has diminished. The conclusion is consequently that the (d_x)-distributions have become less skew. This is due, above all, to the decrease in infant mortality but also partly to the fact that the typical length of life ($\hat{x}$) has remained approximately the same for males and for females the change has been relatively small, as Appendix 1 shows. Perhaps the latter fact can be considered as an explanation for male excess mortality which has received attention from various quarters.

Appendix 2 presents the probabilities of death for some typical ages (calculated for single age years). It should be mentioned that as to the development of mortality by age groups the trend is radically decreasing in the youngest age groups. On the other hand, in the oldest age groups the level of mortality has declined only slightly or not at all. The development of mortality in the working age population is an exception to the general trend: beginning at the turn of the century an upward trend can be noticed, which reaches its culmination point during the First World War, after which mortality gradually returns to its former level. The increasing trend is not clearly visible in all age groups and Appendix 2 which only includes a part of the original calculation does not give an exact and comprehensive picture of the matter. It is, however, worthwhile to take note of this phenomenon, as it will come up in the calculations by cohort, too.

Cohort mortality

When studying total mortality one has to limit the calculations by cohort to full-length cohorts. Appendix 3 shows the quantities e_0, v_0, and $\hat{x}$ for the cohorts 1851—1910. The development of these quantities has features similar to those found in period mortality analysis. Both e_0 and v_0 have risen relatively rapidly from cohort to cohort but in the cohorts 1866—80 a lag or a complete stop appears. By comparing the probabilities of death of the original calculations by cohort and by period one observes that this phenomenon can be explained by the previously mentioned increase in period mortality as the cohorts of working age intersect the periods at the turn of the century and in its early years.

A more detailed and a more perspicuous picture of the life cycle of a cohort is obtained by studying the probabilities of survival, which are presented in

Figures 1 and 2 by taking into account every second cohort. There is nothing exceptional in the profiles of the cohorts except for the male cohorts 1861—75 which quite soon begin a sharper decline than expected. This is apparently connected with the increase in period mortality already mentioned. Something similar can also be seen in the corresponding female cohorts but this phenomenon is less considerable than in the male cohorts.

Figure 1. Quantities l_x for some cohorts/males.

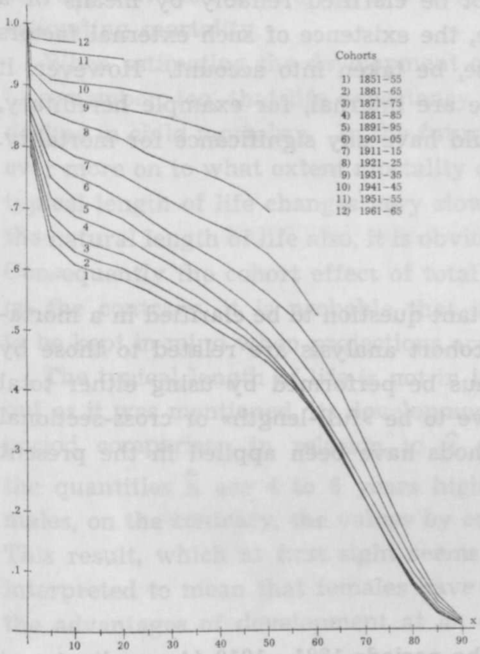
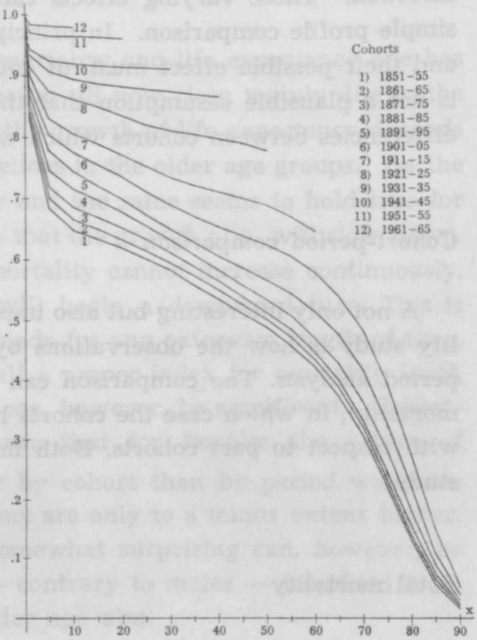


Figure 2. Quantities l_x for some cohorts/females.



If the obtained survival profiles are compared with those presented by Bolander concerning the cohorts 1866—1960, one can notice that the probabilities of survival for the respective cohorts are, as expected, higher in Sweden than in Finland, since the level of total mortality differs. The shapes of the profiles are, however, mainly similar for both countries. In addition, there are variations in the vertical distances between the cohorts. In Finland the distances are rather slight for the earlier cohorts, but become larger for the latter cohorts, whereas in Sweden these distances are almost entirely equal. One explanation could probably be social development and industrialization, which began later in Finland than in Sweden but proceeded very rapidly.

The rise in the survival profiles to a still higher level is the most typical and, in addition, a very clearly observed dissimilarity between successive cohorts. As infant mortality has declined sharply, the survival profiles of later cohorts have, consequently, risen already from the beginning and, owing to this, life expectancies have increased rapidly, although the mortality of older age groups has declined quite slowly.

The other dissimilarities in the structure of the cohorts are minor and partly stochastic. A more detailed analysis was omitted because of difficulties in defining criteria for measuring and analysing small structural differences. It is possible that war, for example, has affected the course of life of some cohorts more than usual, but, on the other hand, there are numerous other factors which have influenced cohorts partly in the same direction and partly in the opposite direction. These varying effects cannot be clarified reliably by means of a simple profile comparison. In principle, the existence of such external factors and their possible effect must, of course, be taken into account. However, it is not a plausible assumption that there are internal, for example hereditary, differencies between cohorts which would have any significance for mortality.

Cohort-period comparison

A not only interesting but also important question to be clarified in a mortality study is how the observations by cohort analysis are related to those by period analysis. The comparison can thus be performed by using either total mortality, in which case the cohorts have to be »full-length» or cross-sectional with respect to part cohorts. Both methods have been applied in the present study.

Total mortality

Comparing the life expectancies of the periods 1881—1910 (Appendix 1 and 3) with the respective cohorts, one notices that especially for females the cohort values are considerably higher than period values. Results like this were expected according to what is known about the development of mortality and although the number of cohorts (periods) included in the comparison is not very big, there are still reasons to assume that the same regularity is valid generally. In other words, calculations by period concerning total mortality give too high a result in probabilities of death and too low a result in probabilities of survival and life expectancies, on the average. This disparity will be called »cohort effect».

For instance, life expectancy calculated for the time period 1881—85 for males is 41,01 years by cohort and 39,49 years by period and the corresponding values for females are 45,87 and 42,46. This means a cohort effect of almost 4 per cent for males and about 8 per cent for females. For the years 1906—10 the effect is almost 7 per cent for males and above 13 per cent for females.

Provided that development would continue in the same direction, the effect in the 1970s would be about 10 per cent for males and over 15 per cent for females, even if the rate of growth declined somewhat.

As the life expectancy for Finnish men was 68,5 in 1978 according to period calculation, the »real» life expectancy for live-born boys in the year mentioned would be about 75 years presuming that the previous estimates for the cohort effect are correct.

According to the same presumption the life expectancy for girls, which according to period calculation was 77,1 years, would in reality be nearly 90 years. Although this kind of estimation is probably too optimistic, one can still say that the cohort effect is a fact which has to be taken into account when estimating mortality.

When estimating the development of mortality and life expectancy one has to remember, too, that life expectancy has up till now risen mainly due to the decline in child mortality. In the future, the growth of life expectancy depends ever more on to what extent mortality declines in the older age groups. As the typical length of life changes very slowly and the same seems to hold true for the natural length of life also, it is obvious that the growth of e_0 will slow down. Consequently the cohort effect of total mortality cannot increase continuously, on the contrary, it is probable that it will begin a downward turn. This is to be kept in mind when projections are made for any extensive length of time.

The typical length of life is not in itself a proper index for mortality level, but as it was mentioned, its development can, however, be significant. Cohort-period comparison in relation to $\hat{x}$ shows that for females the values of the quantities $\hat{x}$ are 4 to 6 years higher by cohort than by period while for males, on the contrary, the values by cohort are only to a minor extent higher. This result, which at first sight seems somewhat surprising can, however, be interpreted to mean that females have — contrary to males — benefited from the advantages of development at an older age also.

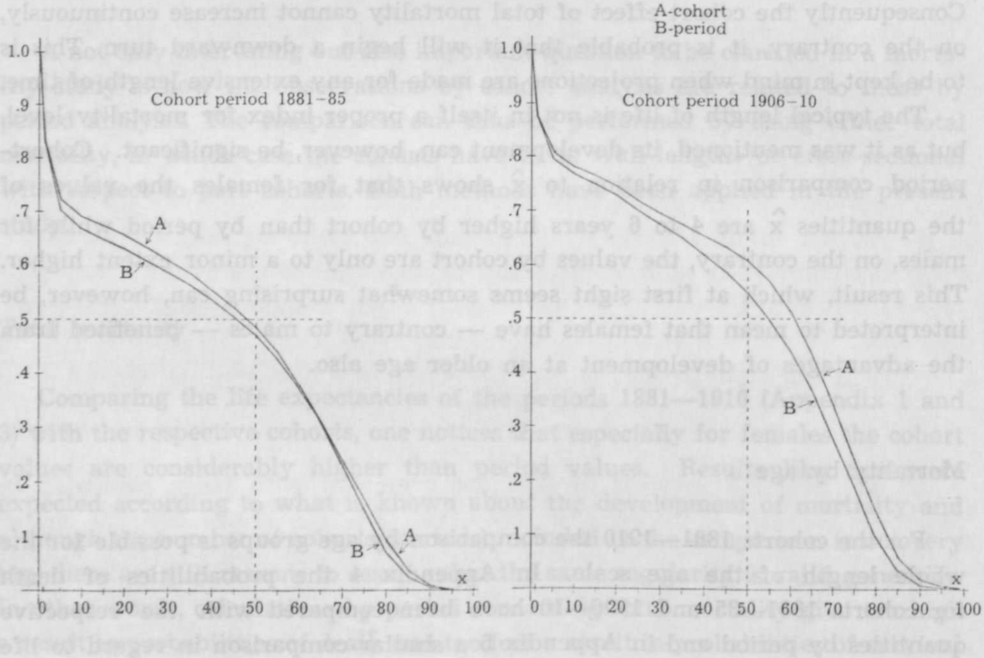
Mortality by age

For the cohorts 1881—1910 the comparison by age groups is possible for the whole length of the age scale. In Appendix 4 the probabilities of death for cohorts 1881—85 and 1906—10 have been compared with the respective quantities by period and in Appendix 5 a similar comparison in regard to life expectancies is given. It should be mentioned that the differences between the probabilities of death by cohort and period cannot, of course, be great in the beginning of the age scale where the cohorts have not yet reached far from their periodic starting point. Neither can, on the other hand, the differences be very great in the higher age groups as the probability of death approaches rapidly and finally asymptotically the value of one. Thus, the relatively largest differences are expected to be elsewhere in the age scale.

There are no differences in the values of probability of death for males for the time 1881—85 worth mentioning. In most age groups, however, it can be noted that the cohort effect takes the expected direction. For females the effect is considerably more distinct, especially between the age of 40 and 90. On the other hand, in the figures for 1906—10 the effect can already be seen very clearly also for males, and for females the differences are really significant as the value by period is in many cases over twice that of the cohorts. No doubt, differences like this strongly influence the probabilities of survival and life expectancies. Just like the comparison of life expectancies shows (Appendix 5) the cohort effect appears in all age groups except in the time period 1881—85, where the differences are slight for males and in some cases even negative.

In Figures 3 and 4 the cohort-period comparison is presented in relation to survival profiles concerning the same previously mentioned time periods. The

Figure 3. Quantities l_x, cohort-period comparison/males.

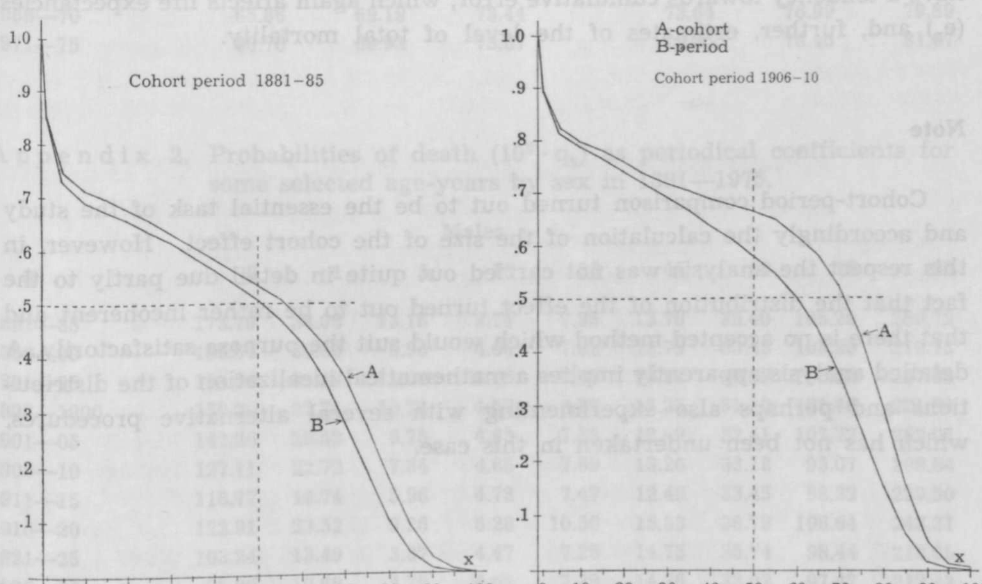


result for the time period 1881—85 is unusual in that the figures by cohort first rise, according to the presumption, above those by period but decline at the age of 60 to the same level and after this again rise above them. The other comparisons are normal in the sense that the cohort effect in them is positive i.e. the distribution by cohort is above the period distribution, except for the starting point. In the profiles for the period 1906—10 the effect appears very clear-cut both for males and for females. In this case, also, the typical difference between the sexes is apparent, meaning that the cohort effect is considerably higher for females than for males.

Cohort-period comparison by age can also be performed more extensively by choosing several age scale values in addition to that of zero. In the present study such a comparison was performed and the age groups (or exact ages) 0, 15, 30, 45, 60, and 75 were chosen as starting points. The comparison periods chosen were 1881—85, 1906—10, 1931—35, and 1956—60, i.e. periods which are successively 25 years distant from each other. The comparison was performed on the other hand in relation to survival figures (probability of survival). The survival figures by cohort were then transformed so that they would be equal to those by period at each starting point.

In this case it was possible to perform the comparison of the probabilities of death directly and the results were, in general, similar to those in the total

Figure 4. Quantities l_x, cohort-period comparison/females.



comparison. In the comparison of survival figures the relative size of the deviation was estimated at 15 years distance calculated per one year of age. As a result, the effect obtained can be interpreted as the relative error of probability of death.

Thus it could be noted that calculation by period exaggerates the relative decrease of survival figures and consequently also quite significantly exaggerates the size of probability of death in some cases. For instance, in the period 1956—60 the effect for females is over 5 per cent at each point and for age intervals 15—30 and 30—45 over 30 per cent in each. In the last mentioned age intervals values for females also exceed 20 per cent during the period 1931—35. When moving from one period to another females seem to have an upward trend. The greatest deviations for males are about 10 per cent and are found in the period 1931—35 and in the period 1881—83 for age intervals 0—15 and 30—45; no upward trend can be observed, however. In the period 1906—10 the effect for both males and females is negative almost throughout, which is due most likely to the high mortality in the beginning of the century.

The cohort effect by age groups varies greatly and since the stochastic error also influences the distributions mentioned, it is difficult to see distinctly what kind of quantitative regularities the phenomenon follows. Nevertheless, one can conclude that the effect is highest in the younger age groups. The fact that the probability of death is low in these age groups reduces to some extent the significance of the effect, but, on the other hand, one has to take into account that the effect is generally systematic i.e. affects in the same direction and does not eliminate itself like a stochastic error. This is why period survival figures have a tendency towards cumulative error, which again affects life expectancies (e_x) and, further, estimates of the level of total mortality.

Note

Cohort-period comparison turned out to be the essential task of the study and accordingly the calculation of the size of the cohort effect. However, in this respect the analysis was not carried out quite in detail due partly to the fact that the distribution of the effect turned out to be rather incoherent and that there is no accepted method which would suit the purpose satisfactorily. A detailed analysis apparently implies a mathematical idealization of the distributions and perhaps also experimenting with several alternative procedures, which has not been undertaken in this case.

Appendix 1. Quantities e_o, V_o and $\hat{X}$ by sex and period in 1881—1975.

Period	Males			Females		
	e_o	V_o	$\hat{X}$	e_o	V_o	$\hat{X}$
1881—85	39.49	45.69	71.52	42.46	50.59	73.01
1886—90	42.69	51.01	72.42	45.41	55.17	73.93
1891—95	41.48	49.61	72.25	44.53	54.47	74.34
1896—1900	43.94	53.33	73.00	46.69	57.66	75.25
1901—05	44.23	53.42	72.96	47.09	57.90	75.53
1906—10	45.81	54.84	72.38	48.98	60.18	75.51
1911—15	47.34	56.24	72.87	50.75	62.03	75.88
1916—20	43.41	50.28	70.12	47.60	57.39	75.33
1921—25	49.41	57.75	71.95	54.37	65.28	76.32
1926—30	50.22	57.86	69.32	55.42	65.79	76.84
1931—35	52.98	60.32	71.88	58.36	68.13	76.71
1936—40	53.34	60.86	68.65	59.03	68.38	76.71
1941—45	54.34	61.78	71.07	61.05	70.35	77.21
1946—50	57.58	64.08	71.94	65.63	72.86	77.30
1951—55	63.38	68.14	73.20	69.86	74.75	78.26
1956—60	64.91	69.11	73.31	71.58	75.77	78.70
1961—65	65.41	69.06	74.21	72.58	76.18	78.80
1966—70	65.86	69.19	73.44	73.64	76.99	79.89
1971—75	66.76	69.93	73.67	75.35	78.45	81.07

Appendix 2. Probabilities of death ($10^3 \cdot q_x$) as periodical coefficients for some selected age-years by sex in 1881—1975.

x	Males								
	0	1	5	15	30	45	60	75	90
1881—85	173.79	38.08	13.16	3.74	7.35	13.70	35.40	105.29	250.72
1886—90	155.57	30.60	8.96	4.06	7.32	13.79	33.43	105.20	210.73
1891—95	158.56	33.89	11.00	4.45	7.36	13.97	32.39	106.52	257.36
1896—1900	150.20	27.71	10.26	4.57	6.37	12.35	31.12	101.46	221.80
1901—05	142.26	26.52	8.75	4.93	7.88	12.69	32.41	102.72	262.07
1906—10	127.11	22.72	7.84	4.65	7.69	13.26	33.18	95.07	209.84
1911—15	118.77	18.74	5.96	4.78	7.47	12.40	33.45	98.32	229.50
1916—20	122.91	23.52	9.26	6.28	10.50	15.83	36.79	106.64	243.31
1921—25	103.24	13.49	3.87	4.47	7.25	14.75	35.74	98.44	210.05
1926—30	95.80	10.68	3.75	4.68	7.39	14.36	33.02	97.47	212.43
1931—35	77.98	8.59	3.45	3.24	6.32	13.45	35.89	93.98	205.77
1936—40	78.86	8.36	3.19	3.42	5.92	12.53	36.89	105.68	240.21
1941—45	68.48	6.98	3.77	4.12	6.16	11.90	34.69	90.67	220.67
1946—50	57.48	4.10	1.52	1.96	5.18	10.07	33.39	95.46	206.21
1951—55	35.90	2.09	0.94	1.06	2.67	7.70	28.76	90.40	208.43
1956—60	27.39	1.70	0.72	0.97	2.60	7.73	28.10	84.29	185.74
1961—65	21.19	1.20	0.75	0.90	2.27	8.00	29.06	87.82	205.77
1966—70	15.89	1.03	0.75	1.01	2.22	8.17	28.48	85.75	212.99
1971—75	12.81	0.70	0.57	1.11	1.91	7.73	27.53	77.49	198.92

(cont.)

(cont.)				Females					
x	0	1	5	15	30	45	60	75	90
1881—85	148.43	35.78	12.59	4.51	8.05	9.91	27.18	96.28	207.38
1886—90	130.93	28.86	8.78	4.76	7.97	10.63	26.85	94.88	192.32
1891—95	132.71	32.28	10.45	5.46	7.14	10.10	26.01	95.43	229.39
1896—1900	127.26	26.71	10.41	5.24	6.94	9.80	24.08	91.96	210.31
1901—05	119.45	24.95	9.00	6.19	7.63	9.62	23.69	89.34	209.44
1906—10	107.02	21.82	8.22	5.88	7.37	9.19	22.47	81.57	212.99
1911—15	98.75	18.15	6.12	5.91	7.45	8.65	22.13	82.45	221.50
1916—20	104.28	23.02	9.07	6.29	8.90	10.45	23.36	88.55	212.70
1921—25	86.25	12.58	3.84	5.04	6.38	9.09	21.53	79.91	196.23
1926—30	78.85	9.92	3.23	5.45	6.72	8.68	20.46	79.98	196.53
1931—35	65.23	8.00	3.17	3.56	5.16	7.77	20.55	77.25	210.05
1936—40	63.47	7.54	2.89	3.46	4.54	7.18	21.40	85.34	222.27
1941—45	56.50	6.51	3.28	3.50	4.47	6.45	18.82	71.17	202.91
1946—50	45.96	3.53	1.03	1.52	2.70	4.63	16.93	75.02	192.95
1951—55	28.28	1.54	0.58	0.58	1.59	3.70	14.80	76.44	205.97
1956—60	21.55	1.41	0.43	0.44	1.09	3.45	13.12	68.51	180.53
1961—65	16.40	0.87	0.49	0.43	0.93	3.19	12.80	71.94	213.42
1966—70	12.57	0.83	0.41	0.41	0.83	3.03	11.84	63.95	200.95
1971—75	9.42	0.52	0.38	0.47	0.64	2.47	10.29	53.44	164.88

Appendix 3. Quantities e_0, V_0 and $\hat{X}$ by sex and cohort.

Cohort	Males			Females		
	e_0	V_0	$\hat{X}$	e_0	V_0	$\hat{X}$
1851—55	37.12	37.46	69.22	41.26	46.00	76.70
1856—60	37.56	40.86	70.63	41.75	46.56	76.85
1861—65	37.99	41.61	71.46	42.43	47.47	76.33
1866—70	38.64	42.35	70.90	43.03	50.39	76.13
1871—75	39.06	45.09	68.56	43.72	50.95	77.47
1876—80	39.19	42.46	69.38	43.66	50.56	77.83
1881—85	41.01	46.39	70.66	45.87	55.30	78.63
1886—90	41.81	46.93	74.38	47.10	56.68	78.18
1891—95	43.47	50.79	72.96	48.66	60.83	80.21
1896—1900	43.87	51.21	73.19	49.83	62.28	80.17
1901—05	46.45	56.09	73.56	52.83	66.65	80.54
1906—10	48.94	60.20	73.67	55.54	70.55	80.73

Appendix 4. Probability of death ($10^3 \cdot Q_x$) by age and sex/cohort-period-comparison.

Age	Males				Females			
	1881—85		1906—10		1881—85		1906—10	
	Period	Cohort	Period	Cohort	Period	Cohort	Period	Cohort
0	173.79	171.68	127.11	127.25	148.43	146.16	107.02	106.95
1— 4	152.32	131.64	90.89	81.31	143.12	125.96	87.28	78.18
5— 9	56.72	43.97	36.35	29.96	54.54	43.24	37.79	30.61
10—14	24.22	20.72	20.38	19.61	24.38	22.65	26.02	22.17
15—19	23.44	26.08	27.19	26.17	25.35	28.17	29.67	26.30
20—24	35.41	37.27	38.26	38.78	30.45	31.40	31.62	30.08
25—29	34.79	36.79	37.07	29.61	33.98	36.05	35.76	25.31
30—34	39.40	42.35	39.70	29.58	41.56	40.48	37.68	23.27
35—39	47.35	51.05	46.36	32.51	45.21	41.86	44.68	20.09
40—44	58.93	56.18	52.58	32.67	51.86	41.49	42.95	16.27
45—49	70.66	74.68	67.37	41.42	54.72	44.46	47.45	20.03
50—54	91.87	97.47	87.29	65.02	68.97	54.26	58.01	27.04
55—59	123.99	135.91	118.20	102.79	96.65	70.80	81.20	40.86
60—64	177.03	180.68	170.78	147.09	145.33	96.80	120.92	62.27
65—69	259.06	236.21	240.47	213.99	227.66	149.86	186.31	103.00
70—74	374.56	311.73	333.10	298.97	336.10	228.62	289.83	178.20
75—79	507.95	429.32	472.26	412.63	464.93	359.54	417.08	308.90
80—84	668.38	583.57	626.36	560.73	620.19	524.16	578.41	469.10
85—89	779.78	730.04	790.26	717.20	765.43	663.29	733.24	639.00
90—94	935.65	843.10	871.64	839.25	846.92	825.95	852.58	819.10

Appendix 5. Mean expectation of life/cohort-period-comparison.

Age	Males				Females			
	1881—85		1906—10		1881—85		1906—10	
	Period	Cohort	Period	Cohort	Period	Cohort	Period	Cohort
0	39.49	41.01	45.81	48.94	42.46	45.87	48.98	55.54
1	46.73	48.44	51.43	55.03	48.80	52.66	53.81	61.15
5	50.86	51.56	52.43	55.77	52.70	56.03	54.81	62.21
10	48.78	48.41	49.32	52.42	50.60	53.45	51.88	59.09
15	44.93	44.79	45.29	48.42	46.80	49.63	48.19	55.38
20	40.94	40.92	41.48	44.65	42.95	46.00	44.59	51.81
25	37.35	37.41	38.03	41.35	39.22	42.41	40.96	48.34
30	33.61	33.75	34.40	37.54	35.51	38.90	37.39	44.53
35	29.88	30.13	30.71	33.60	31.94	35.43	33.75	40.53
40	26.24	26.61	27.08	29.65	28.33	31.87	30.21	36.31
45	22.72	23.05	23.44	25.57	24.74	28.14	26.45	31.87
50	19.25	19.71	19.96	21.56	21.02	24.34	22.64	27.47
55	15.94	16.57	16.62	17.89	17.39	20.59	18.88	23.16
60	12.85	13.78	13.51	14.65	13.98	16.97	15.32	19.04
65	10.07	11.26	10.77	11.74	10.92	13.52	12.07	15.14
70	7.72	8.98	8.36	9.26	8.39	10.46	9.24	11.59
75	5.84	6.91	6.27	7.14	6.36	7.82	6.96	8.56
80	4.33	5.22	4.64	5.41	4.75	5.81	5.12	6.27
85	3.34	4.04	3.45	4.12	3.64	4.45	3.82	4.60
90	2.37	3.20	2.83	3.22	2.94	3.29	2.88	3.31