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Mortality Differences Among The Native And Foreign-born Populations In Canada, 1951-1971

Frank Trovato

MORTALITY DIFFERENCES AMONG THE NATIVE AND FOREIGN-BORN POPULATIONS IN CANADA, 1951-1971

-- VOLUME I --

by

Frank Trovato

Department of Sociology

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Faculty of Graduate Studies
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ABSTRACT

There is a scarcity of information concerning ethnic and nativity differences in longevity within Canada. This dissertation provides a comprehensive analysis of mortality variations among the native and foreign-born components of Canada's population encompassing the census periods 1950-52 to 1970-72. The study develops several hypotheses which have been either directly or indirectly implied in the social demographic and epidemiological literature. The life stresses explanation posits that differences in the odds of death are due to social, psychological and structural inequities experienced by a given sector of society such as immigrants or native Indians. Life stresses, it is argued, emanate largely from a group's relative position in the socioeconomic hierarchy of society. In turn, stressors produce variance in longevity through a series of intervening factors such as access to good health care, personal life style habits and under or missutilization of health resources when available. A second explanation, the immigrant selection hypothesis, predicts lower death rates for the foreign-born sector due to the nature of immigration which tends to be inherently selective in that migrants are generally the most healthy and resourceful elements in the

population. The assimilation hypothesis relates to the time factor in mortality differentials with particular reference to native and immigrant subpopulations. It assumes that as time progresses, differences in mortality will converge as a function of assimilation in socioeconomic levels, health and life style patterns of subgroups. A final hypothesis is the compositional explanation which predicts that only age and sex composition account for subgroup differences in human longevity.

This study utilizes vital statistics data from the Mortality Data Base at Statistics Canada in Ottawa to evaluate the efficiency of the specified hypotheses. After a series of data adjustments, due to the incompleteness of information on such variables as nativity and ethnicity, a logit regression analysis revealed that of the four hypotheses, the assimilation hypothesis received the least empirical support. However, all four explanations have relevance in explaining differences in the face of mortality. The analysis in the first section of this thesis focuses on general mortality while in a subseqent section subgroup differences are examined on the basis of four broad categories of causes of death: neoplasms, cardiovascular, accident-violence and all other (residual) causes. In the former aspect, the supremacy of the British native-born and

British foreign-born subpopulations in longevity is established. Relative to the remaining groups in the analysis they have experienced the lowest odds of dying. On the other hand, the most disadvantaged have been Native Indians, French Canadians and "Other" foreign-born, while Other European foreigners have been in an intermediate position in the probability of death. The relative positions are explored further and qualified when causes of death are examined. The thesis concludes that the mortality patterns generally conform to the empirically established rankings of the subpopulations on the socioeconomic structure of Canadian society. Suggestion for future study are given in the concluding sections of the dissertation.

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CHAPTER I

INTRODUCTION

Mortality in Canada is well under control. The current crude death rate is only 7 per 1000--one of the lowest in the world. However, in the emerging discipline of social demography, the scientific investigation of mortality differentials in Canada constitutes terra incognita. Much is known about the other components of population change but somehow demographers--and sociologists in particular--have generallyneglected this important aspect of study. The number of published works which deal specifically with the analysis of social cultural variations in mortality--especially in English Canada--do not exceed ten at best. This may strike the reader as puzzling and one is left wondering why, in a multicultural society such as Canada so little emphasis and attention has been devoted to differentials in longevity with specific reference to ethnic origin and nationality.

This dissertation concerns itself with an analysis of mortality differences among two important sectors of Canadian society: the native and foreign-born populations and their main subgroups. More specifically, the thesis aims to provide an answer to the following questions: (1) are there substantial differences in mortality between the native and foreign-born in Canada; (2) what is the nature of the relationship between subpopulation membership and mortality; (3) how have (1) and (2) changed over the twenty year period 1951-1971; and finally (4) what is the relative importance of nativity and ethnicity in explaining mortality differences in relation to variables such as age, sex and time.

The general plan of the study is to analyze mortality variations among subpopulations within each of the two broad classifications of nativity. The indigenous sector consists of French Canadians, British, Native Indians and a Residual native-born category. Four immigrant populations comprise the foreign-born: British, United States, Other Europe and a Residual foreign-born class (Other foreign-born). The rationale for such a breakdown will be elaborated in Chapter III. It will suffice to mention at this point, that the above system proved to be the most efficacious after laborious attempts at alternative schemes of classifying the study groups.

The data analyzed in this study was obtained from the Vital Statistics and Disease Registry Section of Statistics Canada. The author spent five months in Ottawa executing the necessary tabulations. Due to restrictions and regulations concerning data dissemination and issues of confidentiality, only grouped data could be utilized.

Four main hypotheses pertaining to nativity and mortality are elaborated, synthesized and verified: (1) <u>the migration selectivity hypothesis</u> posits that immigrants (the foreign-born) generally constitute a highly select group of people of superior quality with regard to health and social demographic characteristics; consequently their mortality experience is presumably more favourable than the general population in the host country; (2) the life stresses thesis takes on the opposing view and predicts that in actuality immigrants are expected to show a less favourable mortality pattern due to the social, psychological and structural stresses associated with life in a new society; (3) the mortality assimilation explanation predicts a convergence in mortality levels of foreign and native-born populations, over time; (4) the compositional hypothesis assumes no difference in longevity once the effects of age and sex composition, in addition to other relevant controls, are taken into account. These four hypotheses will be elaborated in greater detail in a subsequent chapter and they will be discussed in relation to an overall general model of the main components of morbidity and mortality. This last feature of the thesis is regarded as considerably important in view of the general disregard for theoretical concerns found in the literature. Most authors tend to restrict themselves to data description and not theorizing about the phenomenon of interest in this study.

1.1 The Relevance of Nativity and Ethnicity to the Study of Canadian Mortality

The history of this country has been and continues to be shaped by immigrants and their descendants. This fact alone could be viewed as sufficient justification for the present study, but there are other important features which provide further importance to this dissertation. The official ideology of this nation, multiculturalism, allows and promotes the continuity of plural cultural traditions. The demography of cultural groups in the social structure will definitely play important functions in determining the extent to which the "multicultural mosaic" will survive. It becomes important, therefore, to investigate mortality differentials in addition to other demographic variables such as fertility, nuptiality, migration and other such factors of population change.

Through the years, the proportionate representation of immigrants to the total population has varied from a low of 13 to a high of 22 percent (1901 and 1911 respectively); and presently it is approximately 15 percent (Kalbach and McVey, 1979:178; George, 1978). A substantial number of immigrants from various parts of the globe have entered Canada over the years. Table 1.1 provides an indication of this trend; it shows the volume of immigration to Canada by calendar year for 1852 to 1979. Table 1.2 shows the relative contribution of immigration to Canada's population growth for the periods 1861-1871 to 1961-71, and the distribution (numerical and percent) of native and foreign-born populations at the end of each decade.

Table 1.1 Immigration by Calendar Year, 1852-1979

1852	29,307	1886	69,152	1920	138,824	1954	154,227
1853	29,464	1887	84,526	1921	91,728	1955	109,946
1854	37,263	1888	88,766	1922	64,224	1956	164,857
1855	25,296	1889	91,600	1923	133,729	1957	282,164
1856	22,544	1890	75,067	1924	124,164	1958	124,851
1857	33,854	1891	82,165	1925	84,907	1959	106,928
1858	12,339	1892	30,996	1926	135,982	1960	104,111
1859	6,300	1893	29,633	1927	158,886	1961	71,689
1860	6,276	1894	20,829	1928	166,783	1962	74,586
1861	13,589	1895	18,790	1929	164,993	1963	93,151
1862	18,294	1896	16,835	1930	104,806	1964	112,606
1863	21,000	1897	21,716	1931	27,530	1965	146,758
1864	24,779	1898	31,900	1932	20,591	1966	194,743
1865	18,958	1899	44,543	1933	14,382	1967	222,876
1866	11,427	1900	41,681	1934	12,476	1968	183,974
1867	10,666	1901	55,747	1935	11,277	1969	161,531
1868	12,765	1902	89,102	1936	11,643	1970	147,713
1869	18,630	1903	138,660	1937	15,101	1971	121,900
1870	24,706	1904	131,252	1938	17,244	1972	122,006
1871	27,773	1905	141,465	1939	16,994	1973	184,200
1872	36,578	1906	211,653	1940	11,324	1974	218,465
1873	50,050	1907	272,409	1941	9,329	1975	187,881
1874	39,373	1908	143,326	1942	7,576	1976	149,429
1875	27,382	1909	173,694	1943	8,504	1977	114,914
1876	25,633	1910	286,839	1944	12,801	1978	86,313
1877	27,082	1911	331,288	1945	22,722	1979	112,096
1878	29,807	1912	375,756	1946	71,719		
1879	40,492	1913	400,870	1947	64,127		
1880	38,505	1914	150,484	1948	125,414		
1881	47,991	1915	36,665	1949	95,217		
1882	112,458	1916	55,914	1950	73,912		
1883	133,624	1917	72,910	1951	194,391		
1884	103,824	1918	41,845	1952	164,498		
1885	79,169	1919	107,698	1953	168,868		

Source: Ministry of Employment and Immigration. Immigration '77. Ottawa, 1977. P. 4.

TABLE 1.2 Summary of Principal Components of Canada's Population, 1861-1971

Period	Births	Deaths	Immigration	End of Period Total	Canadian Born		Foreign Born	
	'000	'000	'000	'000	'000	%	'000	%
1861-1871	1,369	718	183	3,689	3,064	83	625	17
1871-1881	1,477	754	353	4,325	3,722	86	603	14
1881-1891	1,538	824	903	4,833	4,189	87	644	13
1891-1901	1,546	828	326	5,371	4,672	87	699	13
1901-1911	1,931	811	1,759	7,207	5,620	78	1,587	22
1911-1921	2,338	988(1)	1,612	8,788	6,832	78	1,956	22
1921-1931	2,415	1,055	1,203	10,377	8,069	78	2,308	22
1931-1941	2,294	1,072	150	11,507	9,488	82	2,019	18
1941-1951	3,186	1,214	548	14,009(2)	11,949	85	2,060	15
1951-1961	4,468	1,320	1,543	18,238	15,394	84	2,844	16
1961-1971	4,063	1,360	1,429	21,568	18,273	85	3,295	15

(1) Excludes extra mortality associated with World War I, estimated at 120,000

(2) Includes Newfoundland which had a population of 361,416 in 1951.

(3) Emigration not included.

Source: Ministry of Employment and Immigration. Immigration '77. Ottawa, 1977. P. 4

The importance of immigration in the Canadian context is eloquently captured by Kalbach's words as he introduces his monograph on the Impact of Immigration on Canada's Population (1970:1):

> "Few people would question the importance of migration for Canada's relatively short history. The emergence of Canada as a nation, like that of the United States, was a product of the unique conditions and developments in Western Europe which gave rise to the era of exploration and subsequent migration of millions of Europeans to the New World. Those who were among the first to establish themselves, i.e., the French, the British, set the basic character of Canada's population and the criteria by which the desirability of all subsequent immigration was to be judged. Concern over the ethnic composition of the continuing stream of immigrants, its significance for the relative primacy of the two 'founding races', the evolving ethnic mosaic and its effect on the established British and French cultures, are concerns that have dominated discussions of immigration since pre-Confederation times."

1.2 Mortality and Social Demographic Analysis

According to Wilbert Moore, (1959) demography has close affinities to sociology: Population statistics in their own right must reflect social processes and sociology attempts to explain and predict social phenomena. It is in this context that a demographic component such as mortality, (although more obviously fertility), needs to be considered by students of social demography. The merger of social theory with demography predicates that one approach the scientific study of population from what Goldscheider (1971) calls "differential analysis":

> "...[S]ocial processes may be compared at the same point in time, within the same society, among different groups, subcultures, and sub-populations (p.225). ...[A]nalysis of differential populations processes is important sociologically because it reveals significant aspects of group behaviour, social processes and life styles. ... Because births, deaths and movements are fundamental and integral elements of social group life in human society, variations in these phenomena should inform us about the subgroups under investigation. ...[T]o comprehend demographic processes and their variations, we must integrate analyses of subgroup differentials in population processes with other social characteristics, norms, values and life styles of subgroups" (p.235).

The present study takes on the perspective of differential analysis advocated by Goldscheider (1971). The thesis integrates this basic principle to provide the necessary context for the analysis of mortality differentials.

1.3 Mortality in the Context of Canada's Demographic Transition

In order that we may place this study in proper perspective, it is important to first of all provide a brief discussion of Canada's historical trends with reference to mortality and fertility. These, in conjunction with migration, have been the important components of the demographic evolution of this country. More specifically, we want to delineate what has happened to the vital rates over time in Canada. Secondly, we want to determine what the demographic transition theory says about mortality differentials during the stages of a nation's transition.

1.4 The Demographic Transition Theory

According to the classical version of this model there are three principal stages which societies experience as part of the process toward "modernity". (Coale, 1970; 1973; Teitlebaum, 1975; Davis, 1963). The first period is characterized by a stage of "high growth potential". However, because mortality and fertility fluctuate at high levels (crude birth and death rates around 40/1000 to 45/1000), the rate of population growth is low. The second phase may be described as a period of "disequilibrium" which results as a function of the imbalance between high fertility and rapidly decreasing mortality. The decline in mortality is precipitated by the adoption of life-saving technology and improvements in sanitation, agriculture and industry. However, the disequilibrium is responsible for tremendous rates of population growth. The third stage is one of low fertility and low mortality rates; hence it is a "new state of equilibrium" different in nature than that described in the initial stage of demographic transition.

Although scholars have questioned the general applicability and overall utility of this theory in general (Teitlebaum, 1975; Coale, 1973; Davis, 1963) because it lacks specificity and says little about behaviour at the individual motivational level (e.g., Davis, 1963), the general framework of the model serves as a starting point to the study of demographic change on a macro level. Of particular interest to this thesis is the relevance of the theory to what it may say about social demographic differentials in the third and subsequent stages of transition. We ask: what does the general transition theory predict about mortality differences within a country that has reached the third phase of demographic development?

The history of this country is uniquely different from that of most parts of the world. Hence, the pattern of demographic events has varied accordingly. For example, Kalbach and McVey (1979) divide the early part of this nation's background into the French period (ca. 1608 to 1770), and the British period (ca. 1770 to 1860). Kalbach and McVey show that population increased from about 9000 in 1670 to approximately 1,000,000 in 1860. Births and deaths conformed to the classical transition model in that they were both high and fluctuating; although fertility was virtually always at higher levels than deaths. During the pre 1860 era, Canada's population consisted primarily of

Ontario, Quebec and the Atlantic region with a small portion residing west of Ontario. It was not until 1871 that the first official national census was undertaken and national vital statistics began in 1921. Table 1.3, provides a summary view of the demographic patterns concerning births, deaths and natural increase from 1921 to 1976.

Concerning fertility, three distinct periods are noticeable: (1) high fertility around 1921 with crude birth rates in the vicinity of 29 per 1000; (2) a declining trend since 1921, until a subsequent rise in the post World War Two era; (3) a new declining trend, particularly after the mid 1960's. Mortality rates have demonstrated a much smoother progression. The highest rates occurred in the years 1921-1923, with crude levels around 12 per 1000. They have been declining ever since to a low of 7.3 in 1976. The rates of natural increase conform closely to the fertility pattern just mentioned: the highest rates occur in the early 1920's and in the post World War era, culminating to a low of 8.4 in 1976.

Considering all this, the typical transition pattern which is explicated by the classical model; that is mortality declining before a fertility reduction, is not particularly evident in Canadian statistics. Actually, mortality seems to have been consistently lower than fertility.

According to scholars of demographic transition theory, fertility and mortality differentials are assumed to be

TABLE 1.3 Crude Birth and Death Rates and Rate of Natural Increase, Canada 1921-1976

(Rates per 1000 Population)

YEAR	BIRTH RATE	DEATH RATE	NATURAL INCREASE
1921	29.3	11.6	17.7
1922	28.3	11.6	16.7
1923	26.7	11.8	14.9
1924	26.7	10.9	15.8
1925	26.1	10.7	15.4
1926	24.7	11.4	13.3
1927	24.3	11.0	13.3
1928	24.1	11.2	12.9
1929	23.5	11.4	12.1
1930	23.9	10.8	13.1
1931	23.2	10.2	13.0
1932	22.5	10.0	12.5
1933	21.0	9.7	11.3
1934	20.7	9.5	11.2
1935	20.5	9.9	10.6
1936	20.3	9.9	10.4
1937	20.1	10.4	9.7
1938	20.7	9.7	11.0
1939	20.6	9.7	10.9
1940	21.6	9.8	11.8
1941	22.4	10.1	12.3
1942	23.5	9.8	13.7
1943	24.2	10.1	14.1
1944	24.0	9.8	14.2
1945	24.3	9.5	14.8
1946	27.2	9.4	17.8
1947	28.9	9.4	19.5
1948	27.3	9.3	18.0
1949	27.3	9.3	18.0
1950	27.1	9.1	18.0
1951	27.2	9.0	18.2
1952	27.9	8.7	19.2
1953	28.1	8.6	19.5
1954	28.5	8.2	20.3
1955	28.2	8.2	20.0
1956	28.0	8.2	19.8
1957	28.2	8.2	20.0
1958	27.5	7.9	19.6
1959	27.4	8.0	19.4
1960	26.8	7.8	19.0
1961	26.1	7.7	18.4
1962	25.3	7.7	17.6
1963	24.6	7.8	16.8
1964	23.5	7.6	15.9
1965	21.3	7.6	13.7
1966	19.4	7.5	11.9
1967	18.2	7.4	10.8
1968	17.6	7.4	10.2
1969	17.6	7.4	10.3
1970	17.5	7.3	10.1
1971	16.8	7.3	9.5
1972	15.9	7.4	8.5
1973	15.5	7.4	8.1
1974	15.6	7.3	8.2
1975	15.8	7.3	8.4
1976	15.7	7.3	8.4

Sources: Statistics Canada. Vital Statistics, Volume I, Births 1975 and 1976 and Volumes II and III, Deaths 1977. Cols. 84-204 and 84-206.

minimal or not significantly large in the third stage of transition (Abu-Lughod, 1964; Livi-Bacci, 1977; Antonovsky, 1967: 152). Demographic differentials (e.g., mortality and fertility) are assumed to be minor in the initial phase due to the majority of the population being exposed to relatively similar conditions in the environment. In the second stage differentials become apparent as a function of changes in technology, urbanization and concommitant factors which contribute to the accentuation of social gradients (e.g. classes and inequality) concering access to resources. Essentially, differentials are due to differences in social standing and correlated values, norms and lifestyles. In the final stage, the theory implies a diffusion of norms which contribute to the development of values conducive to a homogenization of attitudes about such demographic behavior as family and health planning. With respect to mortality, the extension of this line of reasoning would suggest that in countries such as Canada that are well into the third phase of demographic evolution, the differences in mortality among subgroups in the social structure would be minimal, or non-existent.

Omran (1971) has developed a theory of the epidemiological transition against the backdrop of the classical model of demographic evolution. The central propositions of the theory are summarized by Kitagawa (1977:383):

1) Mortality is a fundamental factor in population dynamics;

2) during the demographic and epidemiologic transition there is a shift from epidemic to degenerative and man-made diseases as causes of morbidity and senescence;

3) during the epidemiologic transition the most dramatic changes in mortality occur among the young (i.e., decline in infant and childhood mortality);

4) the shifts in health and disease patterns that characterize the epidemiological transition are closely associated with demographic and socio-economic change (i.e., modernization and social economic development).

In Omran's view three main models of epidemiological transition are identifiable:

(1) the classical Western Model in which there is a gradual process from high mortality and fertility accompanied by modernization and improvements in sanitation, agriculture and medical technology; (2) the accelerated model which is best exemplified by the case of Japan; it is similar to the European model with the exception that it takes place in a much shorter interval; (3) the contemporary (delayed) model explains the situation which is typical of most developing nations; their demographic and epidemiologic transitions are out of synchronization due to the timing of vital event (imbalances) and the technological improvements from "outside" aid; the effect of this has been a rapid reduction of mortality with fertility lagging behind.

In countries where the level of social and economic developments is relatively high, there has been a concommitant shift in the relative contribution of causes of death. In Omran's words (1971:517):

> "The gradual shift in disease patterns characteristic of the classical transition can be seen in the steady decline of infectious diseases (including tuberculosis and diarrhea) and the moderate increase in cancer and cardiovascular diseases."

Omran's discussion and development of the epidemiological transition does indeed suggest that in the final stage of transition mortality levels are generally low and that the pattern of disease changes from infectious to degenerative. We are not explicitly certain about his position on mortality differentials during the last stage. The evidence seems to indicate that in opposition to the traditional model, there are marked differences in morbidity and mortality among sectors of the population in most countries. In fact, some of the leading scientists in this area of study hold the view that by and large, differentials are far from being removed (Antonovsky, 1967; Stockwell, 1963; Stockwell et al 1978; Kitagawa, 1977; Kitagawa and Hauser, 1973; Preston, 1977; Goldscheider, 1971; Petersen, 1975; United Nations, 1974; Bogue, 1969; Nam, 1968). Kitagawa (1977:387) asserts:

> "As the transition to low mortality is completed, degenerative diseases become the major causes of death and such factors as access to good medical care, preventive medical action, health knowledge and prompt medical treatment become increasingly important in combating mortality. The lower classes are at a disadvantage in these areas."

Later she adds:

> "As countries near the end of their demographic transition from high to low mortality death rates will respond to a variety of environmental, genetic, social, cultural and personal factors that are causally related to the degenerative diseases."

Although most of the literature on the inequality of death has predominantly settled on social class differentials, Kitagawa contends that other social, demographic and environmental factors are also accountable for inequity in longevity among subpopulations. This is essentially the foundation--the premise--of this dissertation: that nativity and ethnicity are two social factors which differentiate subgroups with respect to mortality.

Chapter II provides a review of the literature concerning ethnicity, nativity and mortality. The aim of the review is to build a theoretical framework from which testable hypotheses are derivable. Chapter III will be a discussion of the data, its problems, solutions and applicable methodology. Chapters IV and V assess the results with regard to general and cause-specific mortality, while the last section of the thesis outlines the overall conclusions with some suggestions for further inquiry. Unlike the other substantive areas of demography, the statistical study of death is in principle more straightforward. Death, in most instances assumes no motivation--conscious at least--on the part of the individual. In the parlance of demography senescence is a non-renewable event; once it occurs it can never be reversed. For such reasons death is a less complex phenomenon than fertility or migration.

There are, however, several facts which render mortality a difficult area of study. The most obvious reason pertains to the accessibility and availability of data; official agencies tend to publish summary statistics for the nation as a whole but not for specific subgroups. Secondly, the degree of comprehensiveness that can be extracted from death certificates is quite limited. Provinces do not record variables such as occupation, education, ethnicity (since 1973), and so on. One further source of difficulty is the so-called denominator problem. Meaningful comparisons of mortality patterns across groups require the computation of rates so that dynamic measures of risk or "hazard" may be derived. The problem confronting the investigator is essentially one of insuring maximum correspondence between the population represented in the numerator and the population included in the denominator. Great care needs to be exercised to gain maximum agreement. However, the degree of congruence is subject to the availability of data such as published censuses broken down by the necessary variables. Due to these practical problems, most studies confine themselves to time periods around census years because the census provides a most reasonable account of the denominators of interest. Often, both numerators and denominators require some preliminary adjustment because of errors or discrepancies in the data such as underregistration of deaths, missing information on certain variables, or underenumeration in the census. In the methodology section we will outline the specific problems encountered and their proposed solutions.

CHAPTER II

THEORETICAL FRAMEWORK

2.1 Review of the Literature

This chapter reviews the relevant literature with an emphasis toward providing the necessary background to the hypotheses described earlier in the beginning of Chapter One. The initial sections will focus on research in the context of Canada and the United States.

2.1.1 Canadian Studies

Researchers in Canada have tended to confine their investigating to general mortality with special reference to the overall population. Some important monographs have been made available out of this research tradition (e.g., Wilkins, 1980; Basavarajappa and Lindsey, 1976; Adams and Lafebre, 1980; Adams, 1981). Some demographic texts and vital statistics publications contain further aspects of mortality in Canada (e.g., Kalbach and McVey, 1979; Beaujot and McQuillan, 1982; Statistics Canada Mortality Atlases Volumes I and II, 1980; 1981; Vital Statistics Annual Reports).

Of particular interest to this thesis is the study of Kliewer (1979): It is the only other study in Canada which focuses directly on the problem of this thesis. He utilized published mortality data to investigate factors which influence change in life expectancy at age 40, among immigrants in Canada and Australia. Although he presents data for the years 1921 to 1950, this study concentrates primarily on the year 1941. His results are generally indicative of the notion that the foreign-born actually experience a more favourable level of life expectancy than the indigenous population in Canada.

A comparison of mortality levels of the immigrants' countries of origin with the host country and the immigrants life expectancies, suggests that persons migrating from places where life expectancy was below Canada, actually improved their expectation of life and tended to approximate the levels of the Canadian-born population. In the case where immigrants emigrated from nations which showed a higher life expectancy than Canada, the migrants' levels at age 40 were found to be below the origin country and somewhat similar to Canada's average.

It seems that on one occasion immigrants improve their chances of living, while in the other they suffer a decline in their average length of life in relation to origin and host societies. This is what Kliewer has to say:

> "Generally, the direction of change in life expectancy experienced by the immigrants reflected the relative life expectancy position of the origin population and the destination native-born. Where the origin population's life expectancy was below that of the native-born in the destination country, the immigrants usually experienced an increase in life expectancy (males, 78 percent; females 85 percent). On the other hand, immigrants from those countries where the

> life expectancies were above the native-born level, usually showed decreases in their life expectancies (males 87 percent; females 100 percent). These findings generally support the hypothesis that the life expectancy of the immigrant group will shift towards that of the destination native-born" (p. 98).

One must exercise some caution in interpreting Kliewer's findings. There are several points worth noting. First of all, the author implies that there is an assimlative tendency: the immigrants tend to converge to the mortality level of the host country. This kind of process implies that on some occasion--when the immigrants originate from countries with a lower life expectancy than Canada--the foreign-born actually gain in longevity in relation to their countries of origin. On the other hand--when immigrants come from countries with a higher level of life expectation than Canada--the foreign population appears to lose years in average longevity <u>vis-a-vis</u> the home country.

This "shifting" phenomenon does not necessarily constitute an assimilation of mortality between foreign and native populations. Kliewer did not consider the possibility that migrants form a select group (Lee, 1966; Thomas, 1938; Ritchey, 1976; Shaw, 1975; Ravenstein, 1885). Therefore, the fact that immigrants appear to have average levels of mortality which vary from their origins' population is most likely due to a selection effect. Hence it may be faulty to base one's comparisons on the assumption that immigrants are similar in life expectancy as their origin counterparts. The literature concerning migration suggests that in most cases, people who leave a given locality are often very different in social, economic and personality characteristics in comparison to non-movers.

If one takes this possibility into account, the apparent shift towards a gain in life expectancy in the host country may be a function of positive selection on the part of the immigrants and not due to assimilation. Conversely, the observation that foreigners from countries of relatively high levels of longevity actually appear to decline in converging with the host country--but never decline below the host population--may actually reflect negative selection in the country of origin. By negative, it is meant a process by which persons subject to poorer health are selected out. Let us be clear however, that this latter version of selectivity is perhaps a very rare occurrence. Kliewer himself has suggested that ". . . the majority of immigrant groups in Canada had life expectancies higher than both the population in their origin countries and native-born Canadians" (p.110). This fact may serve as an indication that immigrants tend to be, by and large, positively selected with regards to background and health characteristics. In fact, due to the restrictive nature of immigration laws and policies, in recent years this may have become more the rule than the exception.

A further criticism of Kliewer's research may be raised. The number of immigrant groups which had lower life expectancies than their countries of origin were only three in relation to males and a mere two for females. Thus, males from Denmark, Sweden and Norway showed negative differences of -.073, -1.29 and -1.50, respectively. Only in the latter two cases can one support the notion that a significantly lower life expectancy exists in relation to the home countries. In Denmark's case the difference is hardly astonishing. Females from Norway and Sweden showed differences of -.040 and -2.39, respectively. In comparison with the Canadian population, all three immigrant groups (Sweden, Denmark and Norway) possessed superior life expectancies.

In fact, the data for 1951, presented by Kliewer, showed that ". . . in both males and females, the life expectancies of all the immigrant groups were higher than those of the origin and destination populations" (p. 110). This reinforces the notion that the quality of immigrants entering Canada reflects a higher level of positive selection as time progresses. The ultimate impact of such a process would be to raise the average life expectancy of the foreign-born in relation to the native-born population.

Kliewer introduced a composite measure of time duration (the average length of stay in Canada for all foreign-born immigrants combined). This measure proved to be insignificant in predicting change in life expectancy and this was true for either sex. Such results cannot provide support for the assimilation effect discussed earlier. In connection with this, Kliewer adds:

> "This refuted our hypothesis that the life expectancy of an immigrant would be expected to increase with the longer he resides in a country in which the conditions are conducive to longevity. It also refuted the hypothesis that increased period of residence in the destination would lead to adaptation and reduced stress and thus an increase in life expectancy" (p.199).

Incidentally, Kalbach and McVey (1979:83) posed the same claim as Kliewer had originally implied: that cultural groups in Canada seem to be following an assimilative experience with regard to mortality. Unfortunately this is not borne out by any of the studies reviewed for this thesis. Furthermore, such a claim needs sophisticated methodology and research designs in view of the impossibility of obtaining access to the necessary data to actually test this proposition.

This criticism serves to reinforce the assertion that: (a) migrants may reflect a select group which in turn exemplify a superior mortality experience; (b) there might be an assimilative phenomenon which operates upwardly or downwardly in aligning life expectation of immigrants with the indigenous host population, but this needs further investigation. In the latter case, it seems more feasible to assume that if assimilation does indeed occur among immigrants a convergence towards a host society with a superior life expectancy would seem reasonable as individuals improve their life conditions, but a trend in the opposite direction, from a group of foreigners who upon arrival initiate their experience possessing a more favourable life expectancy than the host population, would seem less credible. Assimilation of mortality levels seems more feasible in the case of a group gaining years of life expectation, not declining, given the universal value of good health and long life (Kitagawa, 1977).

There are other aspects of Kliewer's research which are of further relevance to this study. The substantive relevance of his multivariate analysis may be scrutinized. The equation presented by Kliewer is:

$$e^o_{40} = f\ (a + b_1\text{CONDITIONS} + b_2\text{SUPPORT} + b_3\text{SKILLS} + b_4\text{TIME})$$

where

e^o_{40} = the difference in life expectancy at age 40 between the immigrant group and the population in the origin country;

CONDITIONS = the difference in life expectancy between the origin and destination populations;

SUPPORT = the support structure of an immigrant group;

SKILLS = the brought and acquired skills of an immigrant group;

TIME = the period of residence in the destination country

The variable SKILLS in the equation was assumed to reflect the degree of stress which a group would experience. The rationale for this lies in the relationship between skills and coping mechanisms: the lower the skills, the greater the degree of stress, and vice-versa, presumably. The SKILL variable, along with the remaining three was derived by factor analysis of the following variables (macro level data): (1) percent speaking official languages, English, French or both; (2) percent belonging to Roman Catholic; Anglican, United or Presbyterian denominations; (3) an index of population dispersion; (4) sex ratios; (5) percent children under 15 years of age; (6) size of the immigrant population; (7) percent of immigrants aged 5 years and older with 10 years or more education; (8) percent married; (9) percent urban; (10) mean period of residence in Canada; (11) percent who were Canadian citizen; (12) average annual first admission to mental hospitals per 100,000 population.

The varimax rotated factor matrix for males produced a factor which Kliewer defined as "SKILLS"; it consists of the combination of the variables sex ratio, percent urban, size of population and religion. Now, to what extent the interaction of these variables realistically reflect something which provides an index of "skills" and consequently the ability to cope with stress must be regarded as an academic puzzle to any theoretically minded sociologist. This is not intended to be an acrimonious critique. The author does provide a rationale for the factor; however, the nature and quality of Kliewer's data seem unsuited for what is claimed in his study.

One may continue--in much the same manner--to evaluate the other factors in the equation, but it suffices to say that they are subject to identical problems as the skills (stress) factor.

Taking all things into account, the regression analysis revealed that only conditions and support are of significant relevance to predicting an immigrant's change in life expectancy; and for females, in particular, only support was found to have relevance in studying the dependent variable. An unfortunate feature of the study being discussed lies in the fact that little confidence can be placed on the regression parameters due to the small number of cases (the number of groups varied from 12 to 9).

An overall summary of Kliewer's study may be stated as follows. During the period 1921 to 1950 immigrants in Canada generally exceeded the indigenous population's level of life expectancy at age forty. Four factors were tested for their relevance in explaining this phenomenon, conditions, support, skills and duration in Canada. It was found that only support and skills for males, and support for females best accounted for the changes (upward mostly) in life expectancy among the foreign-born.

The following major criticisms are directed to Kliewer's study: (1) there is an over-emphasis in assuming that migrants from a given country are similar in health and life expectancy to the "stayers"; (2) no measure for the possibility that immigrants form a select group was introduced; (3) the notion of mortality convergence (assimilation) is troublesome in that it makes it difficult to accept the view that immigrants from "high life expectancy origins" actually experience a decline in life expectation and converge to the level of the host country, or possibly fall below it.

On a more positive note, some of the more interesting and relevant features of Kliewer's analysis are as follows: (1) it introduces the relevance of studying mortality differentials in Canada with special reference to a social background factor such as nativity; (2) it emphasizes the possible importance of social psychological variables in immigrant mortality such as stress and social support. One last contribution is worth noting. Kliewer's results suggest that in Canada, during the 1921-1950 period the foreign-born population generally experienced a more favourable mortality pattern than the native host population.

This is at variance with findings in the context of the United States during the same general time frame (e.g., Dublin and Baker, 1920; Lombard and Doering, 1929; Calabresi, 1945; Buechley, 1950; Jacobson, 1963). This contrast is interesting and should stimulate further study to determine the underlying reasons for such a divergence in the pattern of mortality between the native and foreign-born populations in Canada and United States. (If immigrants do in fact possess a longer life expectation as a function of positive selection they should consistently show a more favourable morbidity and mortality level in comparison to native-born persons).

There has been little documentation on the relationship between morbidity and nativity in Canada. The available research however, tends to suggest that morbidity rates are perhaps higher among foreigners. For example, Ashley and his colleagues (1974) studied the influence of immigration and tuberculosis in Ontario. They proposed the thesis that the influence of immigration would be positively related to the incidence of tuberculosis in Ontario between 1961 and 1971. They utilized data from morbidity certificates recorded by the Ontario Ministry of Health. The data base was considered appropriate for the study because variables such as date of entry, country of birth, ethnicity and other demographic background variables were available. It was determined that the ratio of new tuberculosis cases to immigrants as opposed to native-born Ontarions was 2:1. Among immigrants, the rank order (highest to lowest) of the disease's incidence rates was as follows: Asians, Portuguese, South Europeans, Eastern Europeans, Italians, West Europeans, British Isles, other and finally, Canadian-born. Moreover, the study documented that the more recent the immigrants, the greater their relative contribution to the morbidity rate in the province. They concluded:

> "It is clear that the contribution of immigrants to the tuberculosis problem in Ontario is substantial and is of increasing relative importance" (p.144).

The line of causation, according to Ashley and his colleagues, is as follows: origin factors predispose tuberculosis (high incidence areas of origin); the immigration and adaptation process causes outbreaks of tuberculosis which gets transmitted within the communities of the immigrants.

This kind of reasoning is consistent with the notion of negative selection which was briefly mentioned earlier. Although Ashley et al., do not provide a more complete discussion of the phenomenon associated with the process of immigrant adaptation, they also imply that adaptation in the general sense can be linked to morbidity. Presumably, the inherent life stresses that are associated with adaptation have bearing on the incidence of disease.

Assuming that immigrants do in fact experience higher rates of morbidity (there is not enough evidence to claim this with confidence), do they always suffer higher rates of mortality than the native-born? Studies which focus on specific causes of death will prove useful in providing an answer to this question.

Coy et al., (1968) investigate the association between birthplace and lung cancer mortality during the time interval 1931 to 1965. These authors analyzed data collected by the Vital Statistics Division of British Columbia in Victoria. In addition, they also provided a comparative study of lung cancer deaths between British Columbia, Ontario and Saskatchewan for 1950-52 and 1960-62 with special attention to male descendants who were born in Canada, the United Kingdom and all other places.

Their results suggest that over time the intensity of death due to lung cancer has increased. Moreover, it was found that men of United Kingdom origin had much higher age-specific rates than Canadian born men, while men born in other parts of the world had rates which were considered as intermediate. In all three provinces surveyed--British Columbia, Saskatchewan and Ontario--both foreign-born classes showed mortality rates which surpassed those of the native-born. Concerning these differences, they remarked that:

> "... rates for the men born in England and Wales are twice as high as for those born in Canada, while the rates for men born in other countries occupy an intermediate position (p. 480). ...there are at least three main etiological factors in the development of lung cancer:

personal air pollution in the form of tobacco smoking, environmental air pollution and familial factors. Cigarette smoking is generally accepted as the most important of these" (p. 481).

The two most relevant features of the above study are that they demonstrate the greater mortality risk from lung cancer among foreigners and secondly, that they inferred life style differences and habits--what they call familial and personal factors--along with environmental conditions may account for the noted result. It is unfortunate that no substantive discussion of "environmental effects" was offered by the analysts.

The study by Abu-Zeid and his associates (1978) attempted to deal with this issue, among others. They were interested in ascertaining the relationship between mortality from ischemic heart disease (IHD), ethnicity and nationality in Manitoba during 1960-62. They reasoned that the population of this province is ethnically diverse and would therefore provide an opportunity to investigate the extent to which the occurrence of IHD is determined by genetic or environmental factors. To achieve this task the analysts measured mortality differences between ethnic groups of migrant populations and their descendants. It was argued that a lack of significant differentials between a particular nationality group and its ethnic native-born descendants would indicate a genetic predisposition, common to both native and foreign-born affinities to a specific nationality. Conversely, substantial differences in this regard would be interpreted as so-called environmental effect.

Abu-Zeid et al., (1978) sampled 6,029 death certificates and applied the method of standardization to separate away the contaminating influence of age composition on the force of mortality. For this procedure, they utilized the total Canadian age-sex specific composition as a standard. The more salient findings were: (1) when the sample was scrutinized on the basis of ethnic origin alone, the Jewish males had the highest incidence of death due to the mentioned ailment; Native Indian males had the lower standardized mortality ratios. Among females, the Jews had a similar level to that of their male counterparts, while Austrian origin women had the lowest position. (2) Among foreign-born males Irish and Scottish exhibited the most favourable rates, Eastern Europeans showed the opposite level. Among the foreign-born females, Italians and English occupied the highest and lowest rankings, respectively. (4) Analysis of the Canadian-born males indicated that persons of Finnish and Scottish ethnic origins were most susceptible to dying from ischemic heart disease. Norwegians and Native Indian males had the lowest likelihood of dying from such a cause. Among women, Scottish and Norwegian native-born ethnic origins had the highest and lowest rates, respectively.

In their conclusion, Abu-Zeid and colleagues commented that:

> "... both environmental and genetic factors operate in the development of IHD, but the environmental factors seem to have more weight. That genetic susceptibility also had some role is suggested by the marked variation in mortality from IHD among different ethnic groups living in the same place. Furthermore, in some ethnic groups, such as the English and Scottish, the Canadian-born and the English and Scottish-born had a similar high risk of mortality from I.H.D." (p. 145)

Following these researcher's claims, an important feature of mortality analysis among native and foreign-born components in Canada ought to be the separation of genetic from environmental effects. This task is difficult to accomplish--if not impossible. As Kitagawa (1977:382) has said: "Because these factors are often closely interrelated, it is difficult if not impossible to determine their separate influence ... on mortality trends and differentials. A definite assessment ... is also hampered by lack of adequate data." Most authors however, seem to take the position that environmental causes have greater relevance than genetic factors. For example in the case of death from cancer, Choi and colleagues (1971) in their study of Manitoba death certificates asserted that their findings:

> "... suggest the importance of environmental factors and host, habits, e.g., dietary and so on, in the production of cancer of the intestines as well as stomach rather than a genetic factor" (p. 2081).

Their study produced the following results with reference to the topic of interest: (1) the foreign-born have higher risks of dying from stomach cancer than the native-born; (2) a general gradient emerged with the immigrants reflecting the greatest risk, followed by their descendants, and finally, the indigenous Manitobans. The issue of genetic versus environmental causes of mortality is an important one. We will come back to it in a later section of this review when some of the literature outside Canada is evaluated. We will now focus on the relevant studies concerning race, ethnicity and mortality in Canada.

Studies that concentrate on ethnicity in particular, have relevance in their own right, but more importantly they contribute towards a better understanding of the role of social cultural background and mortality differences. In Canada, scholars in Quebec seem to have taken a greater interest in this aspect of research than most other researchers. Dufor and Peron (1979) studied general mortality in this part of the country but gave little emphasis on ethnic origin as such. However, Roy (1975) specifically investigated mortality by cause of death among French and other subgroups in Quebec for census periods 1951, 1961 and 1971. Unfortunately, Roy did not separate the French into native and foreign-born components; however, it is safe to say that the latter would comprise not even one percent of the French speaking populace in Quebec.

Coincidentally, Kliewer (1979), whose study was reviewed earlier, corroborated the findings of Davis (1913) who found that the life expectation of French foreign-born females and males were the highest among several other ethnic groups.

Unfortunately the inquiries of Davis (1913) and of Kliewer (1979) focus on a time context which is too remote from the present situation; and it is not possible to generalize the mortality experience of French foreign-born (a very small group), to the French native-born population. Roy (1975) actually provides substantial conclusive evidence that this is in fact an accurate assumption. This is what Roy (1975:73-74) tells us:

> "En resume, meme si les 'francais' etaient deja plus defavorises en 1951, sur le plan de la mortalite que les 'autres' groupes ethniques, ils le sont encore davantage en 1971."

Moreover:

> "L'analyse par age a montre comment etant donne une evolution differente des risques selon les groupes ethniques au cours des vingt ans, les 'francais' sont devenus de plus en plus defavorises face aux principales causes de deces en 1971, et ce surtout aux ages actifs."

In summary, Roy (1975) suggests that no matter what index of relative mortality difference one applies (e.g., mean age at death due to different causes, potential years of life lost as an indication of the intensity of death and age specific death rates), the French in Quebec experience higher levels of death than all other ethnic groups in that province.

Analysts should exercise caution in interpreting the differentials observed by Roy. The "other" classification of ethnicity is quite heterogeneous in Quebec. A complete analysis of this group might reveal marked differentials which may, or may not, surpass the French levels of mortality. Some indication of the heterogeneous nature of the Quebec population and its related experience with pertinence to senescence is provided by Wilkins (1979;1980). He studied mortality differentials by ecological areas--(neighbourhoods) in Montreal. As has been established in numerous other studies, he found that the poorer areas tended to have significantly lower life expectancies in comparison to the more affluent districts.

Other research concerning ethnicity and longevity has tended to focus on highly specific minority populations such as Native Indians and Eskimos or Mormons. For example, Jarvis (1977) examined all Mormon deaths occurring in Alberta during the years 1967 through 1975. Cause-specific mortality rates were calculated and standardized by age and sex on the total Alberta population. His results were: (1) Mormon death rates are lower than either the overall Alberta or Canadian populations; (2) Mormon males have higher death rates than females; (3) Mormons in comparison to the general population have lower mortality rates for causes which are clearly related to the non-use of tobacco, alcohol, coffee or tea. Possibly, there may be two important underlying causes for this sub-group's favourable mortality experience. The Mormons would most likely constitute a genetically select group due to their high degree of endogamy over many generations. In addition, there may be cultural normative factors which predispose this population to a greater level of longevity in relation to the general population. This minority group is known for its strong degree of cohesiveness and integration; and this is something which has been hypothesized as being a contributory cause to positive health (cf. Antonovosky, 1979; 1971; Lynch, 1975; Selye, 1956; Rahe and Ransom, 1978; Cohen and Brody, 1981; Thomas and Duszynski, 1974; Smith, 1967; Rahe et al., 1974; Mirowski and Ross, 1980; Roberts and Askew, 1972; Powels, 1978; Suchman, 1964; Kobrin and Hendershot, 1977; Berkman and Syme, 1979).

Mortimer Spigelman (1949) derived life tables for the Jewish ethnic group in Canada for 1941, based on 1940-2 deaths. The Canadian Census enumerated 170,241 Jews in 1941. A total of 3457 deaths were recorded for this population in the three year period. Two salient features of his study may be cited. The Jew's life expectancy at birth was 67.53 for males and 69.89 for females; these averages represented an excess in longevity of 4.58 and 3.60 years, respectively in relation to men and women in all of Canada. Secondly, Spigelman found early evidence of what has come to be referenced recently as the "crossover effect" (Thornton and Nam, 1968; Nam et al., 1978). In other words, populations such as Jews which have a more favourable age pattern of mortality tend to experience a crossover or convergence at older ages which results in a pattern that is atypical of the overall group; the older ages actually demonstrate higher death rates than the general old age population. This effect has received particular attention among blacks in the United States (e.g. Nam et al., 1978). Spigelman speculated that what may have happened was the Pearsonian "generational effect;" a thesis advanced by the famous statistician. In 1921, Pearson argued that the death rates of younger age cohorts should be inversely related to older cohorts. Actually, this thesis has failed to receive support in recent times (e.g., Vasantkumar, 1979). A second possibility for the Jew's crossover at older ages, according to Spigelman (1949:301) "may perhaps be [due to] the large proportion of foreign-born among [the Jews in Canada]." He thought:

> "Most of these foreign-born are of East European origin and, in their earlier years, were probably living under lower standards than their contemporaries... the effect of these lower standards of living in youth may be reflected in their higher death-rates in later life."

A few studies have focused on Native and Eskimo mortality in Canada. A paper reviewed earlier, that of Abu-Zeid et al., (1978) contains relevant information on Natives. With reference to ischemic heart disease deaths, Native Indians were found to have extremely low standardized mortality ratios in comparison to a host of other ethnic groups. It was found that native females had higher rates than males. This evidence would seem to suggest that Natives have a below average predisposition to dying from heart related diseases. In fact, the available research supports this notion. Native people tend to die from factors which are closely related to states of psychological estrangement and distress rather than degenerative processes.

Jull (1976) in a brief article concerning mortality among the registered Indian population in Alberta, detected that mortality among this group is largely due to motor vehicle accidents, homicide and suicide. Let us view some specific results in tabular form based on 1974 deaths among Natives and the Canadian populations.

(Rates per 100,000)

Cause of Death	Native ASDR	Native Causes Specific D.R.	Canada Cause Specific D.R.
Infective and Parasitic	26.77	28.09	4.98
Endocrine, Nutritional and Metabolic Diseases	49.20	31.21	17.32
Mental, Psychoneurotic and Personality Disorders	68.40	37.45	3.72
Motor Vehicle Accidents	87.74	71.79	27.73
Homicide	42.02	24.97	2.41
Suicide	40.34	40.58	12.92

Jull (1976:5-6) contemplates on the above results:

> "In summary, we conclude that ... mortality is indeed higher among the registered Indian population than among the Canadian population. If mortality differences can be used to reflect and compare the social and economic conditions of various segments of the Canadian population, then the results just presented in the analysis would tend to indicate that the registered Indian population is substantially disadvantaged compared to the Canadian population as a whole. In light of this fact, it would appear that if the mortality of our native peoples is to be reduced, not only will better access to health facilities have to be provided but significant impact in their standard of living will have to occur as well."

Adler and Brusegard (1980) have conveyed the opinion that the more salient factor for the Native Indians mortality levels is simply "inferior conditions." This implies a wide selection of things ranging from poor socioeconomic conditions to reduced life chances. These same authors have assessed the general health conditions of the Natives around the early 1970's. They found that generally some improvement has occurred, but not convergence. For example, although infant mortality has declined, Natives still lag behind the national level.

Native peoples' hospital admission rate has been documented as being two and-a-half times that of the nation as a whole (Adler and Brusegard, 1980:182). Among twelve major disease groups, only in the case of cancer and diseases of the circulatory system, do Canadians surpass Native Indians in terms of hospital admissions. Presumably, these differences accurately reflect the incidence of morbidity for this disadvantaged minority group.

Choi et al., (1971), examined deaths due to gastro-intestinal cancers in Manitoba for the period 1956-65, among various ethnic groups and Native Indians were included. It was found that with reference to particular cancer sites Natives (males and females) had relatively lower death rates (SMR), than twenty-five other groups; this was also true in relation to colon and rectum cancers. It is interesting to note that females showed substantially higher rates in comparison to males of Native Indian ethnicity.

Jarvis and Boldt (1980,a;b), and Millar (1980) provide further evidence about the conditions facing Indian people in Canada. They argue that this population has a unique "death style": they die primarily of accident, violence, suicide and homicide. Jarvis and Boldt (1980a;b) are of the opinion that this is a function of cultural, political, social and economic factors. In short, it may be said that Natives suffer from limited life chances as a consequence of their subordinate minority status in Canada. Some of the national newspapers have captured this facet of Canada's Native population quite eloquently with leading articles such as "Give Back Our Health Cree Asks" (The Gazette, 1980), and "Metis-A Forgotten People" (The Globe and Mail, 1981). Other agencies have reflected these same sentiments in their reports (Department of Indian Affairs and Northern Development, 1980; Siggner, 1979).

The limited literature corresponding to Inuit and Eskimo mortality suggests that these peoples suffer death rates which are even greater than the Native registered Indian population; particularly, the reliable data on infant mortality shows extremely excessive rates (Legare and Normandeau Desjardins, 1975; Musson, 1971; Hobart, 1975; Blot et al., 1975; Piche and George, 1973).

Having reviewed the mortality literature concerning Natives and French minorities, it becomes important to consider the situation pertaining to an important cultural and demographic entity in Canada, the British. Most of the studies which include this group generally conclude that people of British ethnic origin (England-Wales, Scotland, Ireland) have higher risks of death overall and also due to specific diseases in comparison to most, but not all, other cultural entities in Canada.

The study of Choi and his associates (1971), reviewed earlier, included English, Scottish, Irish and Wales as part of the category "British Isles". When they inspected deaths due to gastrointestinal disease by place of birth, the British Isles had standardized death ratios generally below others (Scandinavian, France, Italy, Netherlands, USSR, Poland, Austria, Czechslovakia, Hungary, Rumania, other European and other foreign-born); but when deaths from cancer of the colon or rectum were observed, the pattern generally reversed to the disadvantage of British Isles.

Coy et al., (1968) provide further support for the higher mortality of persons of British background: "United Kingdom born men ... have higher mortality rates than Canadian-born men" (p. 478). "The rates for the men born in England and Wales are twice as high as for those born in Canada, while the rates for men born in other countries occupy an intermediate position" (p.480). Abu-Zeid et al., (1978) found that among different ethnic groups Scottish and English ranked very high in death rates from ischemic heart disease (both males and females). Among the foreign-born male components Ireland, Scotland, and England ranked highest while females from these groups showed an irregular ranking pattern. Among the native-born, Scottish, England and Irish males had the highest risks of dying next to Finnish origin men; the rates for females were relatively low and hence ranked below most other groups. Kliewer (1979) found that the life expectancy at age 40 among males and females was lowest for Irish immigrants (30.79), and (32.89) respectively; however England and Wales men had the highest life expectancies at age 40, with 32.63 years of life remaining, on the average. It must be recognized that Kliewer's study was based on 1941 data and may not be an accurate assessment of the situation today. In fact, there is evidence, although limited, which suggests that among the major ethnic groups in Canada, between 1951 and 1961, British males ranked fourth and third highest in SDR's, respectively; their female counterparts for the same periods, ranked sixth and third, respectively. Table 2.1, taken from Kalbach and McVey (1979:82) delineates these features; also, it demonstrates the relative disadvantaged position of the Native and French populations with regard to the inequality of death.

2.1.2 Studies Outside Canada

A number of comments and criticisms have been identified in connection with the relevant literature in Canada. Before an overall summary of the salient features that are of specific relevance to this study is undertaken, it is important to review some of the key investigations outside the context of this country. Most studies involved the relationship between nativity and/or ethnicity in the United States, but some excellent articles outside North America exist and are worthy of careful consideration. One such work is that of the French demographer Paul Brahimi (1980).

Using statistics from 1974-75, immigrants living in France tend to experience a longer life expectancy than the indigenous French population. This may appear as surprising because most foreign-born groups residing there originate from countries where the overall life expectancy is lower. Brahimi executed further tests to increase his confidence to

Table 2.1

Age Standardized Death Rates[a] by Sex for Selected Ethnic Origins, Canada, 1951 and 1961

Ethnic Origin	Males		Females	
	1951	1961	1951	1961
British Isles	11.3	10.8	9.5	8.2
French	12.6	11.1	11.2	9.2
German	9.5	8.2	8.8	7.0
Netherlands	10.4	9.1	9.2	7.1
Scandinavian	10.5	8.8	9.0	6.7
Hungarian	10.5	9.5	12.2	7.2
Polish	11.5	8.8	10.1	7.0
Russian	12.1	8.4	10.4	5.8
Italian	10.3	8.5	9.8	7.0
Ukrainian	10.2	9.5	8.7	8.1
Native Indian	18.9	14.3	18.9	12.4

Source: Based on unpublished statistics obtained from Vital Statistics Section, Dominion Bureau of Statistics, Ottawa.

[a]Rates for males are standardized on the 1961 male population, and female rates on the 1961 British female population.

This table appears in Kalbach and McVey, 1979, p. 83.

this anomalous finding. Data from Switzerland and the United Kingdom provided further confirmation of his initial findings.

The author entertained two hypotheses about the nature of the data: (1) that there may have been problems of over-registration of foreigners; (2) that the foreign-born are not properly registered at the time of death. The first thesis was discounted on the basis that if anything, foreigners tend to be undernumerated by the census. Concerning the second notion, Brahimi (1980:604) admits that it is difficult to verify; however, he argues that if it is a problem it is not severe enough to alter the general observed relationship. Moreover, he maintains that if the below average mortality "des etrangers" is not due to errors a likely explanation for this fact is migration selectivity. Brahimi tells us in his own words:

> "Le premier facteur auquel on pense est le facteur de selection au depart. Il faut en effet etre valide pour immigrer et echapper a certains etats morbides. Cet effet de selection s'exerce d'ailleurs davantage sur les travailleurs que sur les membres des familles, parce que renforce par un contrale medical a l'entree de la main-d'oeuvre... On peut egalment penser que l'effet de selection s'attenue avec la duree de sejour. Il serat alors plus fort chez les immigres entres receminent ... que chez les immigres de plus longue date ... ce que pourrait mettre en evidence une etude suivant la nationalite" (p.605).

Hence, the notion of migration selectivity as it relates to lower mortality among foreigners can be tested by investigating the age patterns of mortality of recent and earlier immigrant groups against the native-born. The author classified Portuguese, Moroccans and Tunisians as falling into the former category; Italian, Polish and Spanish were assigned to the latter grouping. It was determined that although the native-born generally experiences lower rates of mortality below age 30, at later ages the different nationality groups (except Poland), exhibit lower risks of dying; and furthermore, the more recent immigrants have even lower rates.

This is indeed interesting because under the assumptions of a migration selectivity effect, one would expect to find that the infant, childhood and young adulthood mortality to be at levels below the native-born because generally, there are few immigrants in these age groups, particularly in the infant age category. In fact, it is possible to argue that the superior life expectancy of foreigners may be largely a function of selecting themselves to the degree that they "bring in" the most healthy, and hence "leave behind" the least healthy infants, and youth. In this context, Brahimi's results are very interesting indeed.

Brahimi went on to provide a further test: he compared the life tables of Algerian immigrants in France and of Algeria, the country of origin. Algerians in France possess much lower rates of mortality than Algerians in the origin population.

The research of Brahimi (1980) has further relevance to the topic of this dissertation. Analysis of death by cause often reveals some enlightening findings. Brahimi found that foreign-born males have more favourable mortality experiences than indigenous males due to diseases such as cardiovascular, cancer, alcoholism, suicide, depression, and senility. The more recent immigrants fare even better. However, foreigners in France were observed to have excess deaths due to accidents (including motor vehicle), and violent deaths.

A different situation emerged with regard to females. They die more of cardiovascular heart diseases, cerebro-vascular, respiratory (ages 25-64 only), motor vehicle and other accidents related causes. They have lower death rates than native-born females due to the following causes: cancer of the digestive system, suicide and cirrhosis of the liver. Concerning the sex differential, Brahimi says:

> "Moins sujetes a la selection, ent tant que membres de familles de travailleurs et peut-etre aussi moins surveillees medicalment pour ces memes raisons, les etrangers sont donc moins favorisees que les Francaises pour toutes les maladies autres que le cancer, l'alcoolisme et le suicide. Les societes a haut niveau de vie on favorise le developpement de comportements aggravant la mortalite des hommes surtout (tabac, alcoolisme, suralimentation...). Ainsi l'ecart entre hommes et femmes dans les pays developpes a-t-il eu tendance a s'accroitre. De ce fait, les etrangeres moins selectionnees que leurs compatriotes hommes ayant a s'inserer dans une societe ou les femmes accusent encore une sousmortalite tres forte vis-a-vis des hommes, ne beneficient pas due meme avantage qu'eux par rapport a la population

francoise. Aussi la surmortalite masculine est-elle bien plus importante dans la population francaise que dans la population immigree residente en France" (p.613).

Considering all this in perspective, it is clear that beyond age 30, foreigners in France have a superior mortality experience than the native population. One may question this on the basis that migrants may return to their countries of origin to die and hence contributing to lower immigrant mortality levels in France. Incidentally, this is of minor consequence in Canada, as most immigrants tend to settle here permanently. Brahimi thinks that this possibility is by itself insufficient to mask his results. Essentially, the lower death rates of aliens is a function of selection. Selection is more intense for men, who are more economically active than women.

Brahimi's conclusions in connection with causes of death among immigrants are suggestive of another important phenomenon associated with nativity and mortality. Causes of death which are mostly associated with life stresses (e.g., suicide, accidents, alcoholism, cardiovascular diseases) are less prevalent among aliens. Thus, it is possible to infer, on the basis of this, that immigrants are also better able to cope with life stresses in the host nation. What is surprising, however, are his results in connection with foreign women as discussed earlier.

Migrant studies in Australia have produced results which run counter to some of Brahimi's findings in France. Burvill and colleagues (1973) studied deaths from suicide, motor vehicle accidents and all forms of violent deaths among migrants in Australia during 1962-66. Generally, death rates were higher for immigrants than either country of origin and native-born Australians. However, in a subsequent research by Stenhouse and McCall (1970), involving differential mortality from cardiovascular disease among immigrants from England-Wales, Scotland and Italy, contrasted to native Australians, it was established that: (1) in general, immigrants have lower death rates than their countries of origin and destination; (2) the longer the duration of residence in the host society the closer their death levels to the host country; (3) overall, females had lower rates than males. The implications of a connection between nativity, selection and life stresses (as implied by assimilation of native death rates over time), were stated as follows:

> "It appears that death rates in migrants tend towards those of the country of their adoption... The death rate is lowest for those migrants resident in Australia for short periods of time and rises progressively with increasing length of residence. The effect appears to be more pronounced in persons resident in Australia from an early age than in those who may have come to Australia late in life. The particularly low rates for migrants... resident in Australia for less than 7 years, is probably due either to selection for personal reasons or as a result of medical screening, since these rates are signifi-

> cantly lower than those of their countries of origin. . . . These data provide ... support for ... the proposition that environmental and cultural factors are of major importance in the genesis of coronary heart disease" (p.430).

Essentially, Stenhouse and McCall (1970) support the migration selectivity effect in conjunction with the life stresses-assimilation hypothesis.

Like Brahimi (1980), these authors agree that selection accounts for lower risks of dying from cardiovascular disease; and also, like the previous research, the latter analysts found a gradient in mortality on the basis of recency (duration) in the host country. These facts imply two propositions: (1) migrants are initially positively selected, but (2) the longer they live in the host country the more they assimilate the mortality experience (levels) of the latter population.

This last proposition is troublesome because it contains two possible effects. (1) the influence of life style and health habits, and (2) the influence of life stresses--the sum affects of coping in a foreign environment which range from socioeconomic to social psychological stresses in the process of adaptation. The question is : is the increasing mortality of the foreign-born in relation to increasing duration of stay due to assimilation or life stresses, or both?

As was argued earlier in reference to Kliewer's work, it seems unlikely that immigrants assimilate "negatively" that is, in a destructive manner to lead to a decreasing of life expectancy. In Canada, at least, immigrants generally maintain a high degree of continuity to their origin countries with regards to personal, dietary and even life style habits. Actually, what seems a more likely explanation for the phenomenon in question is the life stresses effect over time.

It is known that "modern" immigrants generally do well economically and that they experience a certain degree of upward mobility (Richmond, 1967; Richmond and Kalbach, 1980; Palmer, 1981). It may be that one of the costs associated with these processes is an increase in mortality due to life stresses. Some indirect evidence for this phenomenon can be extracted from recent studies concerning the adaptation of immigrants in a host environment. For example, a review of the literature on migration, adaptation and illness by Hull (1979) gives support to the life stresses hypothesis, that is, "the migration process itself may indeed be pathogenic (p.27). As Hull puts it:

> "Changes following migration can effect life and health on every level from the physical to the affective environment. Migration affects health directly at the biological level via dietary changes, differences in local pathogens, lack of appropriate immunity and through the risk of accidents in new situations. The social psychological effects may influence health indirectly via the postulated physiological effects of stress and change on immunity to endogenous and exogenous infection, and by hastening systems failure in chronic disease via less well understood chain of events. <u>The effect of migration on chronic</u>

illness might be evident only after an extended period, whereas the effect on infectious illness rates is likely to be more immediate" (p.34). [emphasis mine]

In the United States, early studies generally reported higher levels of mortality among the foreign-born (Davis, 1913, Dublin and Baker, 1920; Dublin, 1922; Lombard and Doering, 1929; Winslow and Wang, 1931; Calabresi, 1945; Buechley, 1950; Jacobson, 1963). As usual, foreign-born males' risk of death generally exceed those of female foreign-born.

In more recent years, the relationship between nativity and mortality seems less uniform. Foreigners experience a higher risk of mortality but often that elevated aspect depends on the cause of death being examined (Kmet, 1970). For example, a study by Mac Mahon (1960) concerning mortality from all common sites of cancer in New York City during 1955, determined that mortality rates for cancer of the stomach and leukemia were about 50 percent higher in the foreign-born than indigenous New Yorkers. However, the death rate from cancer of the breast was approximately 30 percent higher among native-born females.

Newill (1961), studied the distribution of cancer mortality among ethnic subgroups in the white population of New York City during 1953-58. Within this time interval, 84,341 deaths due to malignant neoplasms were reported. After age adjustments, it was established that mortality from cancer was similar in level for both native and foreign-born populations.

Haenszel (1961) concerned himself with an investigation of cancer mortality among nativity groups in the United States in 1950. Among sixteen cancer sites studied, mortality was highest among foreigners. The excess for males was 24 percent; for females it was 6 percent. When the foreign population was partitioned into specific nationality groups, the subsequent results generally--but not consistently--supported Haenszel's earlier conclusions (Haenszel, 1969; Haenszel and Kurihara, 1968). Kmet (1970) attempted to sort out the literature up to 1969 and indicated that in such studies, too many specific categories of diseases generally produces erratic results. Hence, it is not always possible to attain uniform findings to allow one to claim that the foreign population always experiences higher levels of mortality. In fact, scientists such as Sauer (1962), upon evaluating the varied results, have gone as far as to suggest that "...ethnic origin or country of birth of itself cannot be given sole credit for the death rates [observed] in some areas ... and possibly makes only a modest contribution" (p.102). Most researchers in the field do not accept this contention as readily as Sauer does. For instance, Krueger and Moriyama's attitude toward the relevance of nativity in the context of the United States is:

> "Differences between the mortality rates for the foreign-born and those for the native population may reflect a mixture of genetic factors and the residual effect of prior exposure to another environment. Differences between the mortality rates for foreign born and those for the population in the country of birth presumably indicate the effect of environmental factors, holding the genetic factor constant. The influence of health selection for immigration may also appear in both comparisons" (Krueger and Moriyama, 1967:496).

Krueger and Moriyama (1967) provide an important reference towards establishing the scientific relevance of nativity and mortality; but as was pointed out earlier by the present author--Krueger and Moriyama also--a comparison of mortality between migrants and their countries of origin does not necessarily determine the effect of change in environment because the out-migrants may be positively or negatively selected (most likely positively) with regard to health. The possibility of negative selection is less likely--if not impossible--due to the "screening" process associated with entry into a host country such as Canada or the United States. Generally, the "quality" of migrants is better today (Staszewski, 1974).

Staszewski (1974:395) conveys this notion as he discusses his research concerning cancer mortality among Polish immigrants in the United States:

> "The intriguing decrease in mortality...observed between 1950 and 1959-61 in the age groups below 65 may be due to differences between different groups of migrants. Thus, the 'old' migration came predominantly from the poor, rural farming areas. ...In contrast to the 'old' [the] 'new'

migration...originated mainly from a different part of society: namely from higher socioeconomic classes and mostly from large cities..."

Krueger and Moriyama (1967) studied deaths in the United States within the three year period 1959-61 broken down by nativity. The deaths were partitioned on the basis of the following nationality groups: Canada, United Kingdom, Norway, Sweden, Finland and Italy. These were further divided into native and foreign-born components. The analysis was executed in two steps. First, they investigated mortality due to major cardiovascular-renal diseases and all other causes for the broad classification: native, foreign-born, broken down by age and sex. Secondly, for the six nationalities, death rates for immigrants and their places of origin were contrasted to the indigenous American population.

The initial results indicated that age-adjusted death rates were lower for the native-born (males and females); although age-specific death rates were not always consistent in reflecting this trend. Concerning "all other causes" of death, for males, the age-specific death rates were generally lower among native-born Americans; among females however, the indigenous population generally exhibited lower rates only at older age (beyond age 45).

Results from the latter aspect of the study were interpreted as support (more so for males), for the following hypotheses:

> "[C]hanges in the social and physical environments would cause the mortality of migrants (the foreign-born population) to become more like that of the United States native white population than that of the countries of birth; and ... that the similarity will increase with age because of the association between the age of the foreign born and the length of their residence in the United States" (p.499).

The inherent assumptions underlying their acceptance of the two explanations may be reiterated as before: (1) migrants, although a select group of people, assimilate the disease pattern of the host population the longer they reside in the new country; (2) if immigrants in a particular host society had not migrated there, they would have had the same mortality levels as the population in the country of origin. Assumption one is accepted only with the modification that assimilation be defined to include so-called environmental effects or, what I referred to earlier as life stresses and its rationale. The second assumption is refuted on the basis that the mere fact that certain people move out from a given locality sets them apart as being very different than those who remain behind. Hence, the migrants would most likely have superior health and social demographic characteristics, as has been demonstrated in the literature regarding migration differentials (Thomas, 1938; Ravenstein, 1885; Lee, 1966; Ritchey, 1976; Shaw, 1975). In this connection, the finding that migrants at younger ages tend to exhibit lower risks of mortality vis-a-vis the native-born, while older foreigners tend towards the opposite (e.g., Krueger and Moriyama, 1967), may be viewed as support for the life stresses explanation, not necessarily assimilation. Moreover, it does not necessarily refute positive selectivity. The young are better equipped than the older migrants to cope with life stresses; but as they grow older, the sum effect of coping and adapting in the host environment may result in higher average levels of mortality as Hull (1979) suggested earlier. This does not mean to imply that migrants, young or old, are not positively selected, but rather that their advantages in health deteriorate over time due to life stresses. The fact that in Krueger and Moriyama's study, the foreign-born died more of cardiovascular diseases may be suggestive of the notion that life stresses may have been responsible because cardiovascular disease is largely associated with stress, both structural and psychological (Hunt and Cross, 1975).

In one of the most comprehensive studies to date concerning socioeconomic factors related to mortality in the United States, Kitagawa and Hauser (1973) devoted attention to nativity's impact on death rates. Two main conclusions emerged: (1) within the age groups 35 to 64, the mortality of foreign-born white males was significantly below that of native-white males, whereas there was a slight differential between the mortality of foreign females compared to native born counterparts; (2) above age 65, there was very little difference between males by nativity category; however, foreign females actually experienced higher risks of mortality than native American females. An important liability of this research and many others (e.g., Staszewski, 1974; 1976; Mancuso and Kaller, 1957; Jacobson, 1963; Seidman, 1971; Marmot and Syme, 1976; Reid et al., 1966; Rogot, 1978; Roberts and Askew, 1972; and most other studies reviewed here), is the lack of a duration variable in the analysis; so that the only way to examine the effect of length of residence in the host country is through indirect means.

The above review of the literature is quite comprehensive. Several points have been advanced of particular relevance to this dissertation. What follows is a brief synthesis so that the dominant hypotheses dispersed in the literature may be clearly identified and brought to bear directly on the present research.

2.2 Summary of the Literature Review

(1) Most research has not provided the inclusion of a duration control variable thus hampering a more definite analysis of the relationship between length of residence in a host country and immigrant mortality.

(2) In most instances, authors do not test specific hypotheses, but confine themselves to observational type studies. When they do test specific theses, they are mostly interested in answering whether immigrants' mortality experience in a response to environmental conditions is the host country or due to genetic predispositions.

(3) Beyond age and sex, virtually no other control variable is introduced into the analysis. Hence it is not possible to determine whether the relationship between nativity, ethnicity and longevity may be a function of other factors such as social class which are associated with nativity or ethnic origin.

(4) Most studies, if not all, suffer from a general lack of theoretical foundations and do not attempt to progress beyond mere observational research. The linkage of empirical results to a general social demography theory of human action and mortality is missing.

Following these problems, the main features of the literature dealing with mortality can be summarized as follows:

(1) Within the context of North America, the relationship between nativity and mortality has changed. In the pre-war era, foreigners were generally observed as possessing higher risks of dying than the native-born; in recent decades the opposite seems to be occurring.

(2) In either Canada or the United States, ethnic and racial differentials in mortality exist and have been documented over the decades. Generally, Blacks and Native Indians and French Canadians are most disadvantaged.

(3) Outside Canada and the United States, foreigners tend to experience a more favourable mortality experience than natives of the host countries (developed countries), but variations by cause and by sex are often considerable.

(4) The available evidence (mostly indirect), seems to suggest that the longer an immigrant group resides in a host country, the more likely it is to adopt the general morbidity and mortality experience of the host population.

(5) There exists an implicit assumption that by examining the life expectancy of migrants in relation to their countries of origin and destination, one is able to ascertain the relative impact

of genetics versus environment to account for the mortality experience of the foreign-born population.

Concerning specific explanations of the relationship between nativity, ethnic origin and mortality, it is possible to identify the following specific hypotheses found in the literature, but previously not explicitly stated nor elaborated: (1) the migration selectivity hypothesis; (2) the life stresses thesis; (3) the assimilation explanation and (4) the compositional hypothesis. The development of these hypotheses requires that one takes into consideration the problems and features outlined above.

2.3 The Migration Selectivity Hypothesis

Social demographic analysis of migration has established that in general people who migrate from a given country to a host society such as Canada, have select characteristics. That is, they have superior social and demographic characteristics (Lee, 1966). Following on this generalization, it may be assumed that constitutionally, migrants comprise a select entity in the country of origin with respect to health and longevity. Therefore, it is predicted that the immigrants in Canada have lower risks of dying in relation to their countries of origin. This assumes that the immigrants are positively selected from their places of origin. Thus, in a multivariate analysis involving immigrants contrasted to their country of origin the former are expected to demonstrate lower odds of mortality. In this fashion, testing for a selection effect only involves the comparison of a given immigrant subgroup with its "parent" population in the country of origin.

In the context of Canada, it is expected that immigrants will be either positively selected, or that they will show no selectivity in relation to their country of origin. The other possibility is negative selection. But given the nature of immigration laws and the time periods of analysis, the quality of immigrants entering Canada has been increasing due to the implementation of restrictive immigration policies.

A comparison of immigrants to the Canadian born population will probably reveal that the foreigner's mortality position is either equal or higher in longevity. The other possibility is that immigrants actually have lower life expectancies in relation to the indigenous population. This is a possibility but perhaps least likely than the former two propositions. The rationale for this lies in the assumption of the selective nature of immigration itself and furthermore, the added restrictions imposed by immigration policies by Canada.

In any case, evaluation of a migration selection effect involves a contrasting of immigrants to their origin populations. Once this possibility has been established empirically, a further contrast may involve immigrants as opposed to origin and host societies simultaneously. However, such a test goes beyond selectivity <u>per se</u> and serves to determine other mortality effects to be discussed below.

2.4 The Life Stresses Hypothesis

A complementary explanation to the migration selectivity thesis may be defined as the life stresses hypothesis. This prediction assumes that immigrants actually incur greater risks of mortality than the populace of the host country. The augmented risks emanate from a variety of sources, both psychological and sociological in nature. Before proceeding with a full elaboration of psychological and sociological "stressors", it becomes important to discuss the meaning of stress from a technical point of view.

Strehler and Mildvan (1960) develop a mathematical theory of mortality and aging, building on the classical works of several scientists (e.g., Makeham, Gompertz, Maxwell and Boltzman). Essentially, they, like previous students, were concerned with parametrizing the quantitative relationship between aging and dying. According to the law of entropy, the human organism breaks down with advancing age. Hence, humans are subject to a "force of mortality" for which its intensity varies with age. Moreover, they write:

> "An organism consists of a number of subsystems, each of which has a certain maximum ability to restore initial conditions after a challenge (that is, a change in condition due to internal or external energy fluctuations). Death occurs when the rate at which an organism does work to restore the original state is less than that demanded to overcome the effects of a given challenge" (p.14).

Although Strehler and Mildvan are primarily concerned with aging and death, they imply that "... an organism dies when stress magnitude exceeds the organism's maximum ability to compensate thereof" (p.20). Stress, to these authors is purely a biological fact--the declining ability of the organism to function over the aging process.

In social science, stress is a less precise term (Cassell, 1964; 1974), and justifiably so because humans are more than biological beings--they are social, emotional, moral and psychological at the same time. People are affected by "things" around them and by the nature, quantity and quality of their interactions. By necessity, the notion of stress--as applied to humans-- must also include social and psychological dimensions.

Antonovsky (1971; 1979) has argued that illness and mortality encompass people's ability at coping with problem confrontation, tension, tension management and stress. Actually, these four aspects have a state of "incongruity" associated with them--a discrepancy between goals and means to attain them (Dohrenwend, 1967; Cassell, 1967; Smith, 1967). Antonovsky argues that:

> "[Problem confrontation involves] the incongruity, the gap, between one's needs and one's reality, which creates problems. ... the person is confronted with problems when he suffers a loss of self-esteem, feels frustrated, inadequate, relatively deprived, uncertain and so forth (pp. 1779-1780). [Tension] is a state of the organism in which energy and resources are mobilized and invested in the effort to resolve a problem confronted by the organism (p. 1780). [Tension management] is defined as the rapidity and completeness with which problems are resolved (p.1780). [Stress is] a state of the organism in which energy is utilized in continuously dealing with problems over and above the energy that would have been demanded had the problems been resolved" (p.1780).

The notion that migration itself is a problematic (stressful) phenomenon has received much attention from the early developmental stages of sociology to more recent times (e.g. Park, 1928; Oodegard, 1932; Malzberg, 1964; Starr and Roberts, 1980; Locke et al., 1960; Locke and Duvall, 1964; Wan and Tarver, 1972; Abramson, 1966; Kuo, 1976; Jenkins, 1976; Rahe and Arthur, 1978; Rahe et al., 1974). The literature suggests that immigration represents a drastic "life change" with ensuing effects which, "... if severe and/or protracted in time, appear to predispose individuals towards the development of illness" (Rahe and Arthur, 1978:4), and mortality, particularly from coronary heart disease (Rahe et al., 1974; Antonovsky, 1971; Jenkins, 1976 (part I and II); Smith, 1967; Tyroler and Cassell, 1964; Mancuso and Redmond, 1975; Jenkins et al., 1979; Marks, 1967; Cohen and Brody, 1981).

In this study the concept of life stresses encompasses other, more general sociological factors in addition to the above features. It is well known among students in the field that "People in the lower social classes have higher rates of nearly all types of morbidity and mortality" (Cohen and Brody, 1981:453). Although immigrants generally do well economically in Canada (Kalbach, 1975; Richmond and Kalbach, 1980), it may be possible that any observed mortality differential may be a function of low socioeconomic status. It can be argued however, that low socioeconomic status is nothing but a special case of life stress. This implies that there is a positive relationship between economic position and longevity; and that a major part accounting for this is the association of stress inducing effects due to limited life chances and poor social class. The effects of this are often mediated by type of occupation, as we know that certain occupations contain a greater degree of "risk" and health hazards than others (e.g., Beaumont and Weiss, 1980).

Reflecting on the discussion above, the life stresses hypothesis of immigrant mortality posits that: (1) immigrants have lower life expectancies than the native-born and (2) due to the association of nativity and life stress, they are more likely to die of diseases which have been known to be largely precipitated and affected by long term social and psychological stress. Therefore, in addition, it may be hypothesized that the foreign-born will experience higher death rates due to cardiovascular diseases and accidents-violence in relation to the indigenous population.

2.5 The Assimilation Hypothesis

The hypothesis of mortality assimilation posits that over time, an immigrant population will experience the disease and mortality pattern that is typical of the host society. Adequate evaluation of this prediction necessitates a duration variable to allow the construction of a factor reflecting the length of time a decedent had resided in the "new" environment. For most countries,--including Canada--the necessary data are simply non-existant. One may however, resort to some indirect method, or utilize the available data in the most efficacious manner possible.

As noted, Brahimi (1980) and Krueger and Moriyama (1967), used this type of approach. The former compared "recent" as opposed to "early" migrant groups to ascertain the impact of assimilation on longevity. The latter introduced the assumption that immigrants below age 45, in a given year, are mostly comprised of recent "arrivals". On the other hand, older foreigners are assumed to have been resident in the country of destination for a longer, but unknown length of time.

The approach relied upon in the present study is essentially similar to that suggested earlier by Krueger and Moriyama (1967). Instead of partitioning deaths at age 45 to arrive at an approximate measure of "recent" (those younger than 45), and "less recent" (those older than 45) immigrants, it was decided to select decedents at age 65 and above, to denote persons who had lived in Canada for some period of time. Under what grounds is this proposed method a legitimate one?

A careful examination of the age pattern of immigration into Canada from the 1950's through 1972 reveals a distinct age selectivity effect: for either men or women, migration peaks at ages 20-24, 25-29 and 30-34, in that order. Table 2.2 supports this contention. Moreover, immigrants tend to be primarily concentrated in the younger age groups and less represented among ages 65 and above. This means that in any given point in time, the likelihood of an older immigrant being "recent"; that is, just arrived into Canada, is reduced vis-a-vis individuals below the age of 35, especially. This is a reasonable working assumption given the unfortunate lack of a duration variable.

Figure 2.1, depicts three hypothetical models of the assimilation hypothesis. Graph (1) is defined as the <u>perfect assimilation (no difference) model</u>; both native and foreign-born show inclining life expectancies over age--as expected--and no significant difference in levels exists. This suggests that assimilation of the mortality pattern characteristic of the host society has occurred or that no difference has ever prevailed in the level of mortality between native and foreign populations at ages 65 and above

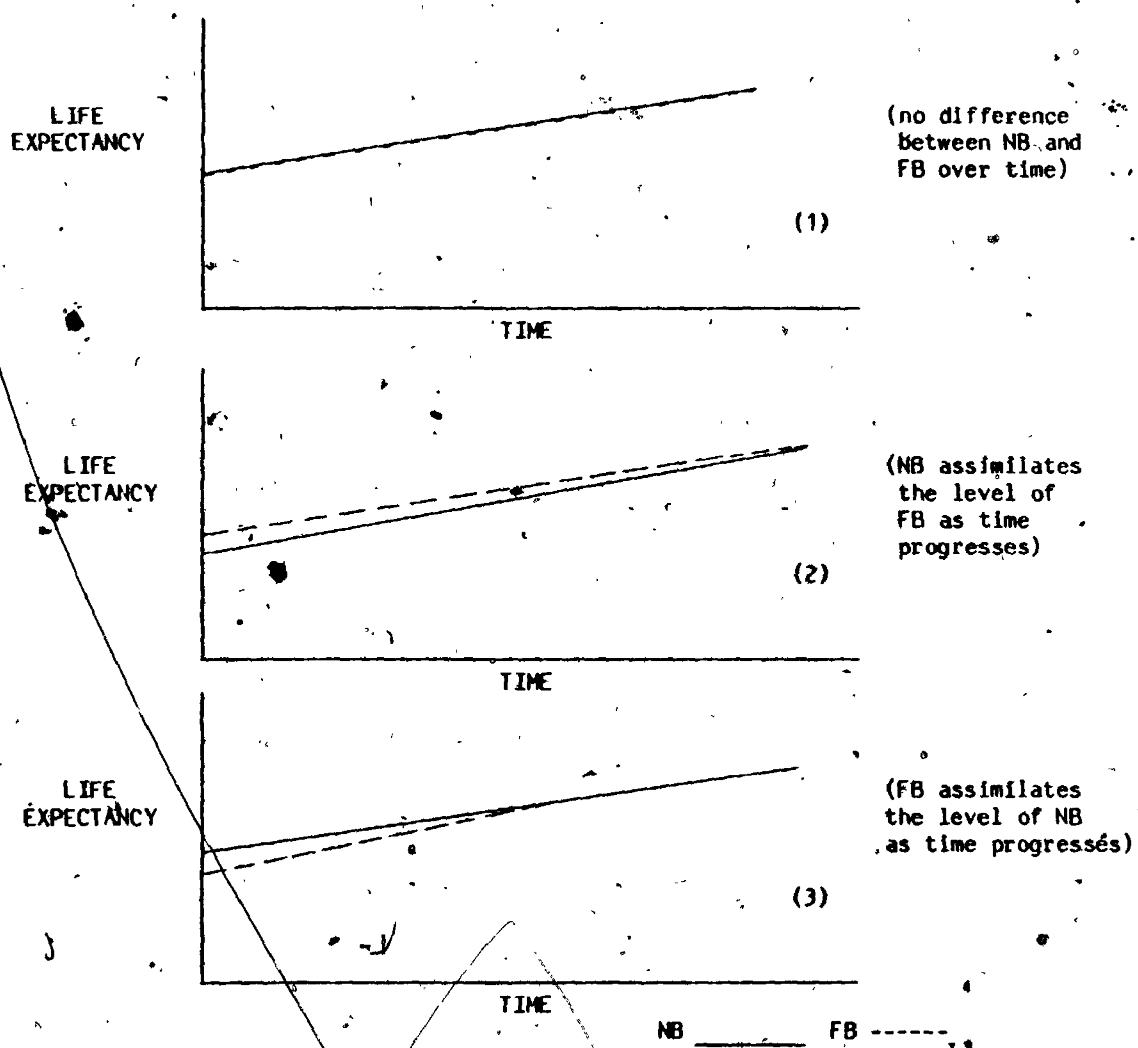
TABLE 2.2 AGE-SEX DISTRIBUTION OF IMMIGRANTS TO CANADA, 1956, 1961, 1964 AND 1971.

AGE	NUMBER BY YEAR AND SEX							
	1956		1961		1964		1971	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
0 - 4	7,396	6,954	3,167	2,942	5,760	5,396	5,238	4,921
5 - 9	7,135	6,418	2,756	2,516	4,716	4,384	4,860	4,601
10 - 14	4,348	3,962	2,221	2,123	3,510	3,382	3,654	3,234
15 - 19	7,270	5,754	2,610	3,393	4,46[illegible]	4,847	3,988	5,212
20 - 24	18,918	14,54[illegible]	5,572	8,763	8,996	10,829	11,517	14,203
25 - 29	17,321	12,737	5,228	6,169	9,977	8,835	12,562	10,768
30 - 34	11,107	8,832	3,369	3,676	6,430	5,521	6,888	5,482
35 - 39	6,344	4,897	2,323	[illegible],555	4,213	3,673	4,099	3,195
40 - 44	3,977	3,269	1,367	1,511	2,688	2,371	2,338	1,943
45 - 49	2,417	2,419	979	1,265	1,378	1,373	1,350	1,475
50 - 54	1,403	1,864	747	1,224	1,064	1,503	847	1,277
55 - 59	773	1,289	504	1,023	868	1,424	772	1,345
60 - 64	400	1,021	418	970	616	1,299	899	1,413
65 - 69	369	664	420	700	587	924	726	1,098
70 +	363	696	425	753	559	1,020	707	1,288
TOTAl	89,541	75,316	32,106	39,583	55,825	56,781	60,445	61,455

AGE	PERCENT BY YEAR AND SEX							
	1956		1961		1964		1971	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
0 - 4	8.26	9.23	9.86	7.43	10.32	9.50	8.66	8.00
5 - 9	7.97	8.52	8.58	6.36	8.45	7.72	8.04	7.49
10 - 14	4.85	5.26	6.92	5.36	6.29	5.96	6.04	5.26
15 - 19	8.12	7.64	8.13	8.57	8.00	8.54	6.60	8.48
20 - 24	21.13	19.30	17.35	22.14	16.1[illegible]	19.07	19.05	23.11
25 - 29	19.34	16.91	16.28	15.58	17.87	15.56	20.78	17.52
30 - 34	12.40	11.73	10.49	9.29	11.52	9.72	11.39	8.92
35 - 39	7.08	6.50	7.23	6.45	7.55	6.47	6.78	5.20
40 - 44	4.44	4.34	4.26	3.82	4.81	4.18	3.87	3.16
45 - 49	2.70	3.21	3.05	3.20	2.47	2.42	2.23	2.40
50 - 54	1.57	2.47	2.33	3.09	1.90	2.65	1.40	2.08
55 - 59	0.86	1.71	1.57	2.58	1.55	2.51	1.28	2.19
60 - 64	0.45	1.35	1.30	2.45	1.10	2.29	1.49	2.30
65 - 69	0.41	0.88	1.31	1.77	1.05	1.63	1.20	1.79
70 +	0.40	0.92	1.32	1.90	1.00	1.80	1.17	2.09
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Manpower and Immigration Statistics

FIGURE 2.1 HYPOTHETICAL MODELS OF MORTALITY ASSIMILATION BETWEEN NATIVE AND FOREIGN-BORN POPULATIONS



(1) PERFECT ASSIMILATION MODEL (MODEL OF NO DIFFERENCE)

(2) INVERTED ASSIMILATION MODEL

(3) POSITIVE ASSIMILATION MODEL

Note that testing for this effect necessitates that one first control for migration selection, life stresses and compositional effects in a multivariate framework.

The second graphic representaion pertains to an inverted assimilation model. Both groups show increasing life expectancies over time, but the immigrants originally enjoy a more favourable mortality experience only to eventually converge with the indigenous population. Incidentally, this pattern is consistent with the selectivity hypothesis because of the better health of immigrants initially (as inferred by their better life expectations).

The final diagram is the positive assimilation model. In this situation, the foreign population initially experiences lower life expectation, but it eventually converges with the level of the native-born due to a more rapid rate of increase in life expectancy among the foreign population.

It is important to keep in mind that we will be using mortality at age 65 and above to test the assimilation thesis. This is a proxy method as it is not possible to use cohort data. Moreover, no difference (as in model (1)), does not necessarily mean that there are no differentials among native and foreign groups at other ages. In fact, the age pattern of life expectancy across all ages will serve to complement a better understanding of the assimilation effects hypothesized here.

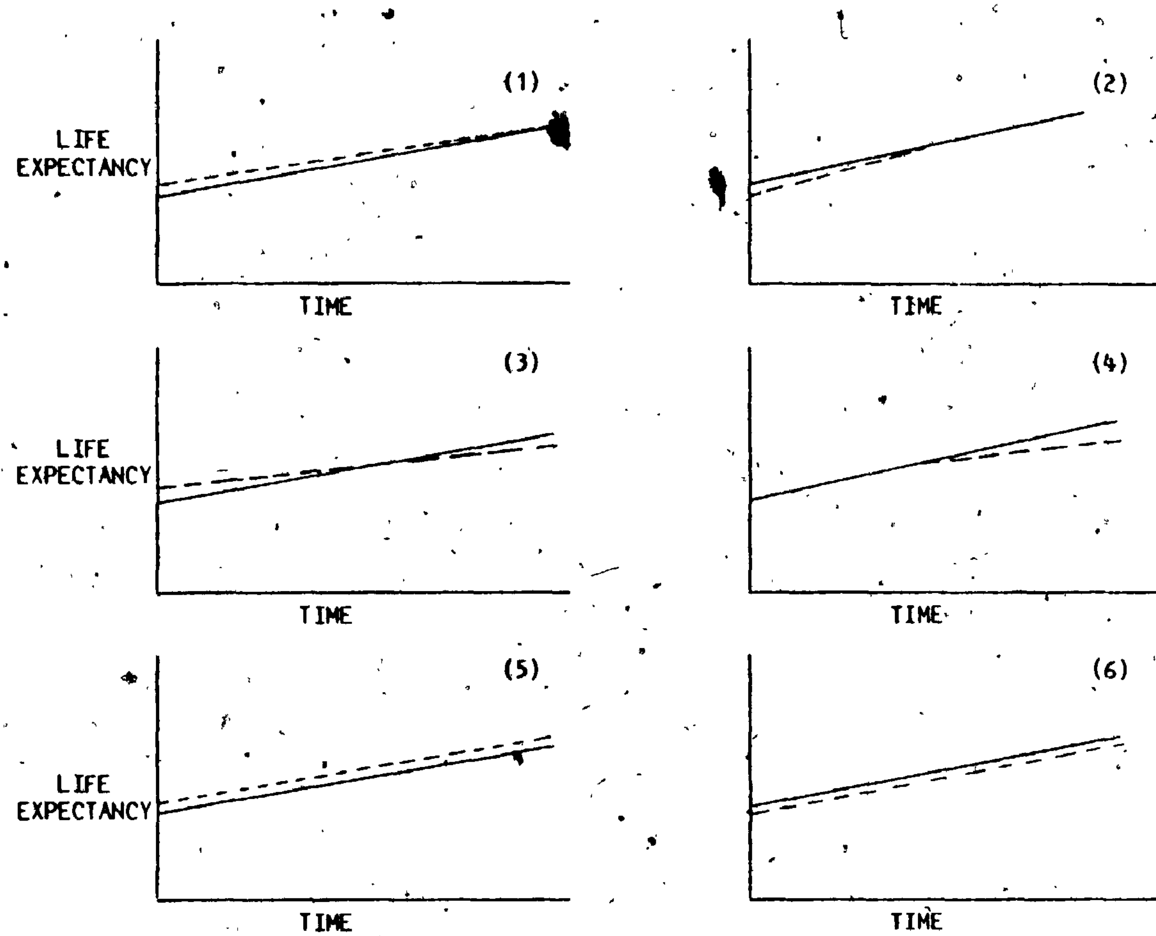
2.6 The Compositional Hypothesis

There is a fourth hypothesis which prevails in the social demographic study of subgroups--the compositional or social characteristics thesis (Goldscheider, 1971; Petersen, 1975). Briefly stated, this explanation suggests that differences in mortality between subgroups are explainable by variations in levels of variables such as age and sex which are known to have independent impacts on the probability of death. This hypothesis has never been referenced in the context of mortality research, but it is nevertheless implied, especially in cases where cultural groups are investigated. For example, when one standardizes for age and sex in order to determine mortality differentials between two populations, the underlying assumption is that age and sex composition alone may be responsible for any observed mortality difference. Extending this line of reasoning to include any other available compositional variables such as education, income and so on, the inherent assumption remains the same: that demographic variables may be responsible for the zero-order difference in longevity. Thus, equalizing the variation on such variables as age and sex, with the use of statistical standardization, should eliminate any observed difference in mortality; this is what the compositional hypothesis predicts.

2.7 Synthesis of Explanations

In actuality, a moment's reflection on what has been discussed thus far will reveal that the hypotheses of assimilation, migration selection and life stresses can all be subsumed under a few general models of nativity and mortality. Figure 2.2 displays six graphic representations to denote likely hypothetical relationships. Models (1) and (2) are called positive and negative selection-assimilation models. The former suggests that over time, the superior life expectancy of foreigners eventually equalizes with the native-born due to the latter's greater rates of increase in life expenctancy. (Thus inverted assimilation). In the second case, the opposite is assumed to occur: the immigrants start out with lower life expectations but eventually catchup and remain at equal par with the indigenous population. (Thus positive assimilation). The third and fourth graphs suggest a positive selection - life stresses and no difference - life stresses models, respectively. In number (3), the originally superior mortality experience of the foreign-born over time, eventually reverts to relatively inferior levels with respect to the host society; hence a complete reversal. Model (4) is another case of the life stresses hypothesis. It is assumed that originally no difference in mortality levels is prevalent between foreign and native populations; however, at some point in time, after some period of residency in the new society, the immi-

FIGURE 2.2 HYPOTHETICAL MODELS SHOWING POSSIBLE RELATIONSHIPS BETWEEN NATIVITY AND MORTALITY



LEGEND:

(1) POSITIVE SELFCTION-NEGATIVE ASSIMILATION MODEL   NB ———
(2) NEGATIVE SELECTION-POSITIVE ASSIMILATION MODEL
(3) POSITIVE SELECTION-LIFE STRESSES MODEL   FB ------
(4) NO DIFFERENCE-LIFE STRESSES MODEL
(5) POSITIVE SELECTION-LOW LIFE STRESSES MODEL
(6) NEGATIVE SELECTION-HIGH LIFE STRESSES MODEL

NOTE: The lines on the graphs are shown as ascending; the assumption is that life expectancy increases over time for all populations unless natural disasters of great magnitude take place.

grants fall below the life expectancy levels of the host population. The last two figures sketch the positive and negative selection models of immigrant mortality. In the former case the foreign-born enjoys superior levels of life expectancy. In the latter situation, the reverse is assumed.

Note that model (1) actually turns out to be a special case of the life stresses model of immigrant mortality in (3) and (4). The loss of superiority in longevity is viewed as a further example of the effects of life stresses among foreigners. The most feasible assimilation models are graphs (1) and (2).

Further elaboration is necessary at this point, to explicate a synthesis of immigrant mortality selection, mortality assimilation and life stresses explanations in the context of this study. Table 2.3 is included for this purpose. It demonstrates synthetic explanations of immigrant, native-born and immigrant descendants' mortality in a host country. There are 81 possible effects in the tabulation. They each represent a particular relationship in mortality. For example (1) through (9) denote that immigrants are positively selected in comparison to their origin societies; and because they possess high life expectancies in relation to the host nation, the most plausible explanation is that first, they are highly select and in addition, they experience low levels of life stresses in the host country.

2

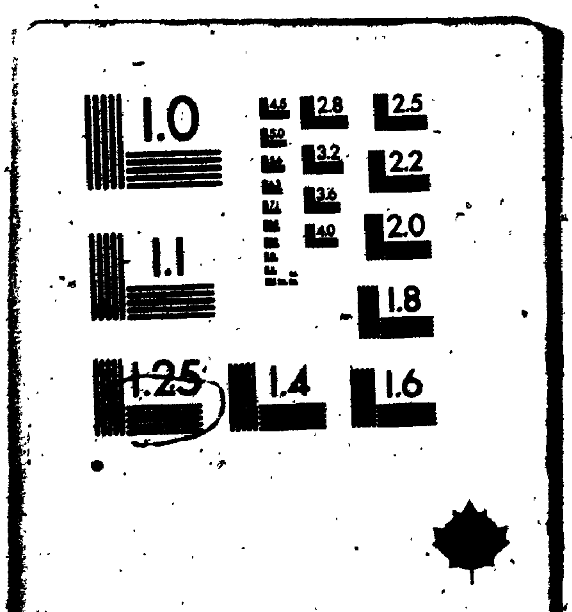


TABLE 2.3 SYNTHESES OF EXPLANATIONS CONCERNING MORTALITY AMONG IMMIGRANTS, THEIR DESCENDANTS AND THE HOST SOCIETY

	Difference in Life Expectancy Between Immigrant Minus Origins	The Life Expectancy Of Immigrants in Comparison to the Host Country is	The Life Expectancy of Immigrant Descendants in Comparison to the Host Society is	The Life Expectancy of Immigrant Descendants in Comparison to Immigrants is	Explanation for Immigrants	Explanation for Immigrant Descendants
(1)	+	Higher	Higher	Higher	+Sel.,Low L.S.	Low L.S.
(2)	+	Higher	Higher	=	+Sel.,Low L.S.	Low L.S.
(3)	+	Higher	Higher	Lower	+Sel.,Low L.S.	Low L.S.
(4)	+	Higher	=	Lower	+Sel.,Low L.S.	Assimilation
(5)	+	Higher	=	Lower	+Sel.,Low L.S.	Assimilation
(6)	+	Higher	=	Lower	+Sel.,Low L.S.	Assimilation
(7)	+	Higher	Lower	Lower	+Sel.,Low L.S.	High L.S.
(8)	+	Higher	Lower	Lower	+Sel.,Low L.S.	High L.S.
(9)	+	Higher	Lower	Lower	+Sel.,Low L.S.	High L.S.
(10)	+	=	Higher	Higher	+Sel.,Assim.	Low L.S.
(11)	+	=	Higher	Higher	+Sel.,Assim.	Low L.S.
(12)	+	=	Higher	Higher	+Sel.,Assim.	Low L.S.
(13)	+	=	=	=	+Sel.,Assim.	Assimilation
(14)	+	=	=	=	+Sel.,Assim.	Assimilation
(15)	+	=	=	=	+Sel.,Assim.	Assimilation
(16)	+	=	Lower	Lower	+Sel.,Assim.	High L.S.
(17)	+	=	Lower	Lower	+Sel.,Assim.	High L.S.
(18)	+	=	Lower	Lower	+Sel.,Assim.	High L.S.
(19)	+	Lower	Higher	Higher	+Sel.,High L.S.	Low L.S.
(20)	+	Lower	Higher	Higher	+Sel.,High L.S.	Low L.S.

Note: +SEL. = POSITIVE SELECTION
LOW L.S.= LOW LIFE STRESSES
HIGH L.S.= HIGH LIFE STRESSES

TABLE 2.3 (continued)

SYNTHESES OF EXPLANATIONS CONCERNING MORTALITY AMONG IMMIGRANTS, THEIR DESCENDANTS AND THE HOST SOCIETY

	Difference in Life Expectancy Between Immigrant Minus Origins	The Life Expectancy Of Immigrants in Comparison to the Host Country is	The Life Expectancy of Immigrant Descendants in Comparison to the Host Society is	The Life Expectancy of Immigrant Descendants in Comparison to Immigrants is	Explanation for Immigrants	Explanation for Immigrant Descendants
(21)	+	Lower	Higher	Higher	+Sel.,High L.S.	Low L.S.
(22)	+	Lower	=	Higher	+Sel.,High L.S.	Assimilation
(23)	+	Lower	=	Higher	+Sel.,High L.S.	Assimilation
(24)	+	Lower	=	Higher	+Sel.,High L.S.	Assimilation
(25)	+	Lower	Lower	Higher	+Sel.,High L.S.	High L.S.
(26)	+	Lower	Lower	=	+Sel.,High L.S.	High L.S.
(27)	+	Lower	Lower	Lower	+Sel.,High L.S.	High L.S.
(28)	=	Higher	Higher	Higher	No Sel.,Low L.S.	Low L.S.
(29)	=	Higher	Higher	=	No Sel.,Low L.S.	Low L.S.
(30)	=	Higher	Higher	Lower	No Sel.,Low L.S.	Low L.S.
(31)	=	Higher	=	Lower	No Sel.,Low L.S.	Assimilation
(32)	=	Higher	=	Lower	No Sel.,Low L.S.	Assimilation
(33)	=	Higher	=	Lower	No Sel.,Low L.S.	Assimilation
(34)	=	Higher	Lower	Lower	No Sel.,Low L.S.	High L.S.
(35)	=	Higher	Lower	Lower	No Sel.,Low L.S.	High L.S.
(36)	=	Higher	Lower	Lower	No Sel.,Low L.S.	High L.S.
(37)	=	=	Higher	Higher	No Sel.,Assim.	Low L.S.
(38)	=	=	Higher	Higher	No Sel.,Assim.	Low L.S.
(39)	=	=	Higher	Higher	No Sel.,Assim.	Low L.S.
(40)	=	=	=	=	No Sel.,Assim.	Assimilation
(41)	=	=	=	=	No Sel.,Assim.	Low L.S.
(42)	=	=	=	=	No Sel.,Assim.	Low L.S.
(43)	=	=	Lower	Lower	No Sel.,Assim.	High L.S.
(44)	=	=	Lower	Lower	No Sel.,Assim.	High L.S.
(45)	=	=	Lower	Lower	No Sel.,Assim.	High L.S.

TABLE 2.3 (continued) SYNTHESES OF EXPLANATIONS CONCERNING MORTALITY AMONG IMMIGRANTS, THEIR DESCENDANTS AND THE HOST SOCIETY

	Difference in Life Expectancy Between Immigrant Minus Origins	The Life Expectancy Of Immigrants in Comparison to the Host Country is	The Life Expectancy of Immigrant Descendants in Comparison to the Host Society is	The Life Expectancy of Immigrant Descendants in Comparison to Immigrants is	Explanation for Immigrants	Explanation for Immigrant Descendants
(46)	=	Lower	Higher	Higher	No Sel.,High L.S.	Low L.S.
(47)	=	Lower	Higher	Higher	No Sel.,High L.S.	Low L.S.
(48)	=	Lower	Higher	Higher	No Sel.,High L.S.	Low L.S.
(49)	=	Lower	=	Higher	No Sel.,High L.S.	Assimilation
(50)	=	Lower	=	Higher	No Sel.,High L.S.	Assimilation
(51)	=	Lower	=	Higher	No Sel.,High L.S.	Assimilation
(52)	=	Lower	Lower	Higher	No Sel.,High L.S.	High L.S.
(53)	=	Lower	Lower	=	No Sel.,High L.S.	High L.S.
(54)	=	Lower	Lower	Lower	No Sel.,High L.S.	High L.S.
(55)	=	Higher	Higher	Higher	-Sel.,Low L.S.	Low L.S.
(56)	=	Higher	Higher	=	-Sel.,Low L.S.	Low L.S.
(57)	=	Higher	Higher	Lower	-Sel.,Low L.S.	Low L.S.
(58)	=	Higher	=	Lower	-Sel.,Low L.S.	Assimilation
(59)	=	Higher	=	Lower	-Sel.,Low L.S.	Assimilation
(60)	=	Higher	=	Lower	-Sel.,Low L.S.	Assimilation
(61)	=	Higher	Lower	Lower	-Sel.,Low L.S.	High L.S.
(62)	=	Higher	Lower	Lower	-Sel.,Low L.S.	High L.S.
(63)	=	Higher	Lower	Lower	-Sel.,Low L.S.	High L.S.
(64)	=	=	Higher	Higher	-Sel.,+Assim.	Low L.S.
(65)	=	=	Higher	Higher	-Sel.,+Assim.	Low L.S.
(66)	=	=	Higher	Higher	-Sel.,+Assim.	Low L.S.
(67)	=	=	=	= r	-Sel.,+Assim.	Assimilation
(68)	=	=	=	= r	-Sel.,+Assim.	Assimilation
(69)	=	=	=	= r	-Sel.,+Assim.	Assimilation

TABLE 2.3 (continued)

SYNTHESES OF EXPLANATIONS CONCERNING MORTALITY AMONG IMMIGRANTS, THEIR DESCENDANTS AND THE HOST SOCIETY

	Difference in Life Expectancy Between Immigrant Minus Origins	The Life Expectancy Of Immigrants in Comparison to the Host Country is	The Life Expectancy of Immigrant Descendants in Comparison to the Host Society is	The Life Expectancy of Immigrant Descendants in Comparison to Immigrants is	Explanation for Immigrants	Explanation for Immigrant Descendants
(70)	=	=	Lower	Lower	-Sel.,+Assim.	High L.S.
(71)	=	=	Lower	Lower	-Sel.,+Assim.	High L.S.
(72)	=	=	Lower	Lower	-Sel.,+Assim.	High L.S.
(73)	=	Lower	Higher	Higher	-Sel.,High L.S.	Low L.S.
(74)	=	Lower	Higher	Higher	-Sel.,High L.S.	Low L.S.
(75)	=	Lower	Higher	Higher	-Sel.,High L.S.	Low L.S.
(76)	=	Lower	=	Higher	-Sel.,High L.S.	Assimilation
(77)	=	Lower	=	Higher	-Sel.,High L.S.	Assimilation
(78)	=	Lower	=	Higher	-Sel.,High L.S.	Assimilation
(79)	=	Lower	Lower	Higher	-Sel.,High L.S.	High L.S.
(80)	=	Lower	Lower	=	-Sel.,High L.S.	High L.S.
(81)	=	Lower	Lower	Lower	-Sel.,High L.S.	High L.S.

Notes: -SEL. = NEGATIVE SELECTION
+ASSIM. = POSITIVE ASSIMILATION

Although the explanations in the first 9 rows are stated to be the same, it must be emphasized that they actually represent variations on the main explanation. For example, we claimed that (1) is indicative of an effect which derives from the interaction of positive selection and low life stresses. The same is posited to prevail in (4). The difference here is that the most likely future outcome will be assimilation. This is so because the descendants of immigrants have equal levels of longevity as the host population. Contrast these to (7). In this case, the immigrants enjoy lower mortality vis-a-vis the host, but judging from the experience of their descendants, the future will witness an eventual lower life expectancy in relation to the host population.

A further contingency is introduced by examining the differences between immigrants and their descendants. The possibilities included under this heading in Table 2.3 may be used to clarify further the kinds of explanations in the last two columns of the table. For instance, in (1) the superior longevity of the foreign-born's decendants vis-a-vis their first generation immigrants, in connection with the positive selection and low life stresses inherent in being a foreigner suggests that with increasing time immigrants will tend to benefit even more with regards to longevity in comparison to the indigenous population.

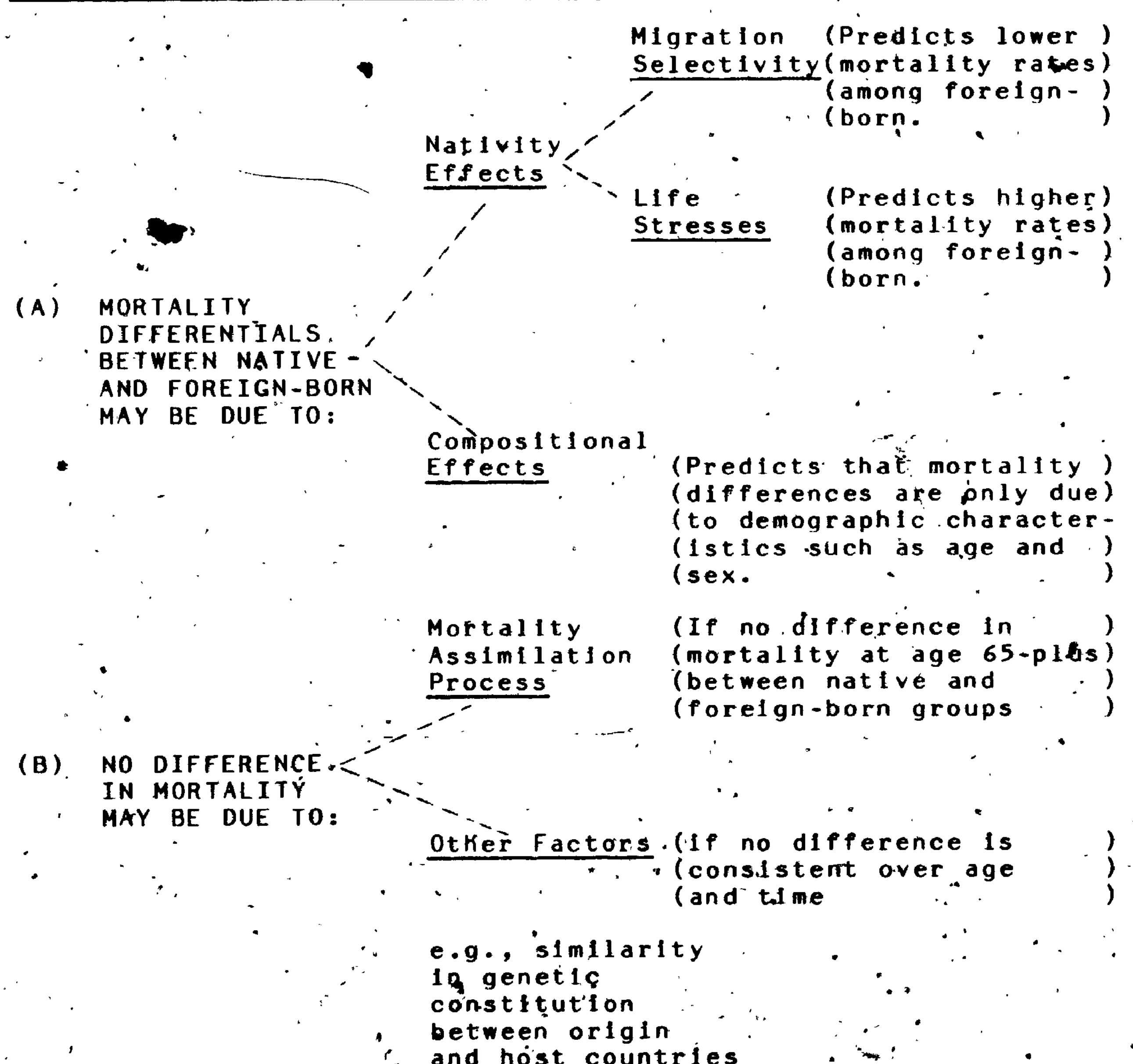
There are numerous possibilities in the typology and it is not fruitful to explicate each one in great detail. The reader will be able to comprehend the various possibilities. However, one more contingency needs to be introduced. A complete analysis of immigrant mortality (second last column) is greatly enhanced by knowing the difference in life expectancy between the origin and host populations. For example in (10), we have noted that immigrants are positively selected and that they have equal mortality levels to the host country. Our conclusion is stated within the framework of positive selection-assimilation model. However, this is not necessarily so. Assuming that the mortality levels are the same in both origin and destination, the fact that immigrants are equal to the host would imply that immigrants assimilated negatively. This is so because, in relation to origin and destination, their positive selection implies further that initially they had higher levels of longevity than both origin and host nations. In an empirical analysis this contingency needs to be considered very carefully for it determines what type of assimilation process is experienced by the foreign-born.

The situation in (13), (14) and (15) is suggestive of a genetic selection process. That is, immigrants are positively selected, they are equal in relation to their destination, their descendants are also equal to the host society and furthermore, first generation foreign-born are equal to their descendants. Perhaps this may be a function of a genetic or biological selection factor which ensures no change in mortality between immigrants and their descendants and also, the host society.

Table 2.3 provides three initial conditions. We have briefly examined the first -- when foreigners are positively selected (1) through (27). Rows (28) through (57) provide contingencies which emanate from the initial condition where no immigrant selection occurs. That is, immigrants are no different than their origin in longevity. Items (55) through (81) delineate possible relationships that derive from the starting point where the immigrants are negatively selected in relation to their place of origin.

It is believed that the table, although lengthy, is valuable in that it includes a series of likely outcomes concerning the empirical relationship between nativity and mortality. Probably, in the final analysis only a few of all the possibilities will actualize from the data. In any event, it will be a relatively simple matter to relate findings to the hypothesized conditions and explanations in Table 2.3

For most purposes, direct evaluation of hypotheses is not possible. The main reason for this is that we lack cohort data and a duration variable. Such variables are crucial in any investigation of assimilation processes in particular. Moreover, when we say "life stresses" we actually subsume a host of interrelated effects as will be explained shortly. Thus, indirect means will be relied on for the empirical tests in this thesis. The following diagram is a conceptual representation of the hypotheses to be evaluated.



Essentially, part (A) of the diagram says that any differential in mortality between native and foreign-born populations is a function of two possible causes--a nativity effect or a compositional effect. The nativity effect however, may reflect: (a) a migration selectivity influence or (b) a life stresses influence. These two possible sources of variation were discussed previously along with the compositional effect.

The second part of the diagram needs some clarification. If no differences in mortality (an unlikely event) are discerned, two explanations may be posited. The first, which received some degree of attention in the discussion above, is the assimilation hypothesis. It was stated that several possible hypothetical outcomes may emerge. However, for the thesis to hold true, there must be significant mortality differentials among some age groups in both native and foreign populations so that one may provide the claim that over time the differential disappears due to assimilation.

Suppose over periods of observation, 1951, 1964 and 1971, the level of mortality between native and foreign-born populations appear identical. The explanation may be that the native and foreign populations have similar genetic constitutions such that their mortality experience is the same. Also, it may be that the two populations have had similar or equal SES levels with equal life chances and hence equal risks of dying. This seems unlikely however.

Finally, it is important to explicitly state the underlying assumptions embodying the migration selectivity and life stresses hypotheses. For the former:

(1) immigrants constitute a select group of people;

(2) they are biologically and constitutionally healthier than others;

(3) they are socially and psychologically able to cope with adaptation and change in a new environment (society).

The life stresses contains the following assumptions:

(1) life stresses are largely a function of one's socioeconomic status and individual ability to cope with the social environment;

(2) immigrants enter a new environment and cope with the necessary adjustments over time;

(3) adjustment is a life long process;

(4) adjustment is socially and psychologically stressful;

(5) stress is deleterious to health and longevity;

(6) immigrants, although they may be successful economically are not necessarily healthier than the native-born population

Before proceeding with the final section of this chapter it is essential to discuss the relevance of the selectivity, life stresses, assimilation and compositional hypotheses to the four native-born groups in this study. It is not necessary to do so with regards to the particular foreign-born populations because what has been suggested with reference to foreigners in the general sense, applies to each immigrant category as well. Actually, the problem is to achieve correspondence between the four explanations above and their applicability to the four indigenous sub-populations.

Essentially, it can be argued that although the rationale changes, the same theses apply equally as well to the given subgroups originating in Canada. For the sake of clarity and brevity consider Table 2.4 below. It outlines the research hypotheses, rationale and degree of congruence of the hypotheses to the life stresses and mortality assimilation explanations of subgroup mortality differentials. It is not necessary to consider the migration selection thesis at this point since we are specifically concerning ourselves with the native-born population (non-migrants).

Concerning Native Indians, it has been documented by other researchers that this group suffers a lower life expectancy than the general population in this country. Hence the hypothesis to be evaluated is that they do indeed suffer a lower life expectation as a group. The reasoning behind this underlines the following causal chain: Native Indians have always been subject to social and economic discrimination and prejudice; this has had the effect of lowering the group's life chances (opportunities) and as a consequence members of this ethnic minority have experienced excess levels of life stresses (as the term has been defined); the final outcome is higher rates of mortality in relation to the general population. This proposition is compatible with the life stresses hypothesis of mortality.

TABLE 2.4 RESEARCH HYPOTHESES, RATIONALE FOR THE PREDICTIONS AND CORRESPONDENCE OF PREDICTIONS TO GENERAL EXPLANATIONS OF MORTALITY DIFFERENTIALS AMONG NATIVE-BORN GROUPS IN CANADA.

CROSS-SECTIONAL ANALYSIS

GROUP	RESEARCH HYPOTHESIS	RATIONALE	CORRESPONDENCE TO A GENERAL EXPLANATION OF MORTALITY DIFFERENTIALS
NATIVE INDIANS	RELATIVELY LOW LIFE EXPECTANCY	SES DISCRIMINATION ↓ LOW LIFE CHANCES ↓ GREATER LEVELS OF LIFE STRESSES ↓ GREATER LEVELS OF MORBIDITY AND RISK OF DYING ↓ GREATER LEVELS OF MORTALITY	THE LIFE STRESSES HYPOTHESIS: TO PREDICT HIGHER* MORTALITY
FRENCH CANADIANS	RELATIVELY LOW LIFE LIFE EXPECTANCY	SES DISCRIMINATION ↓ LOW LIFE CHANCES ↓ GREATER LEVELS OF LIFE STRESSES ↓ GREATER LEVELS OF MORBIDITY AND RISK OF DYING ↓ GREATER LEVELS OF MORTALITY	THE LIFE STRESSES HYPOTHESIS: TO PREDICT HIGHER* MORTALITY
BRITISH NB	RELATIVELY HIGH LIFE EXPECTANCY	DOMINANT SOCIAL AND CULTURAL GROUP IN CANADA ↓ GREATER LIFE CHANCES ↓ LOWER LEVELS OF LIFE STRESSES ↓ LOWER LEVELS OF MORBIDITY AND RISK OF DYING	THE LIFE STRESSES HYPOTHESIS: TO PREDICT LOWER* MORTALITY
RESIDUAL NB	(NOT CERTAIN)	(NOT CERTAIN)	(NOT CERTAIN)

* Higher or lower than expected under some specified probability model

TABLE 2.4 (continued) RESEARCH HYPOTHESES, RATIONALE FOR THE PREDICTIONS AND CORRE[...] OF PREDICTIONS TO GENERAL EXPLANATIONS OF MORTALITY DIFFEREN[...] AMONG NATIVE-BORN GROUPS IN CANADA.

LONGITUDINAL ANALYSIS (OVER TIME)

GROUP	RESEARCH HYPOTHESIS	RATIONALE	CORRESPONDENCE[...] GENERAL EXPLAN[...] MORTALITY DIFF[...]
NATIVE INDIANS	INCREASING LIFE EXPECTANCY OVER TIME	TIME ↓ INCREASE IN LIFE CHANCES ↓ DECREASE IN LIFE STRESSES ↓ DECREASE IN MORBIDITY AND RISK OF DYING ↓ DECREASE IN MORTALITY LEVELS	THE MORTALITY[...] TION (POSITIVE[...]
FRENCH CANADIANS	INCREASING LIFE EXPECTANCY OVER TIME	TIME ↓ INCREASE IN LIFE CHANCES ↓ DECREASE IN LIFE STRESSES ↓ DECREASE IN MORBIDITY AND RISK OF DYING ↓ DECREASE IN MORTALITY LEVELS	THE MORTALITY[...] TION (POSITIV[...]
BRITISH NB	INCREASING LIFE EXPECTANCY OVER TIME	TIME ↓ INCREASE IN LIFE CHANCES ↓ DECREASE IN LIFE STRESSES ↓ DECREASE IN MORBIDITY AND RISK OF DYING ↓ DECREASE IN MORTALITY LEVELS	THE MORTALIT[...] TION (POSITI[...]
RESIDUAL NB	(NOT CERTAIN)	(NOT CERTAIN)	(NOT CERTAI[...]

The same prediction and rationale can be applied to French Canadians. However, it may be that this group's level of mortality is slightly more favourable than Native Indians. The French in Canada have been known to be disadvantaged in comparison to most other ethnic groups but their relative position is better than that of Native Peoples. Hence, the causal mechanisms outlined in connection with Native Indians is assumed to follow a similar course for the French, only that it is less severe in its final outcome.

The British group represents the dominant culture of Canada; moreover it has enjoyed a higher level of social and economic status in relation to most other ethnic groups (Porter, 1965). It is expected, therefore, that their mortality levels will reflect their superior position in the ethnic mosaic. By way of a rationale, it can be argued--as is shown in Table 2.4 -- that unlike Indians and French Canadians, the British possess better life chances and therefore experience lower degrees of life stresses. The outcome of all this should be a lower level of mortality in comparison to other ethnic groups.

It is not known what to predict for the Residual native-born category. It is a very heterogeneous group comprising approximately 20 percent of the native-born population throughout 1951 to 1971. Possibly, it will show a pattern similar to the British. This is a largely unknown aspect of the study and we will treat it as such until results are analyzed.

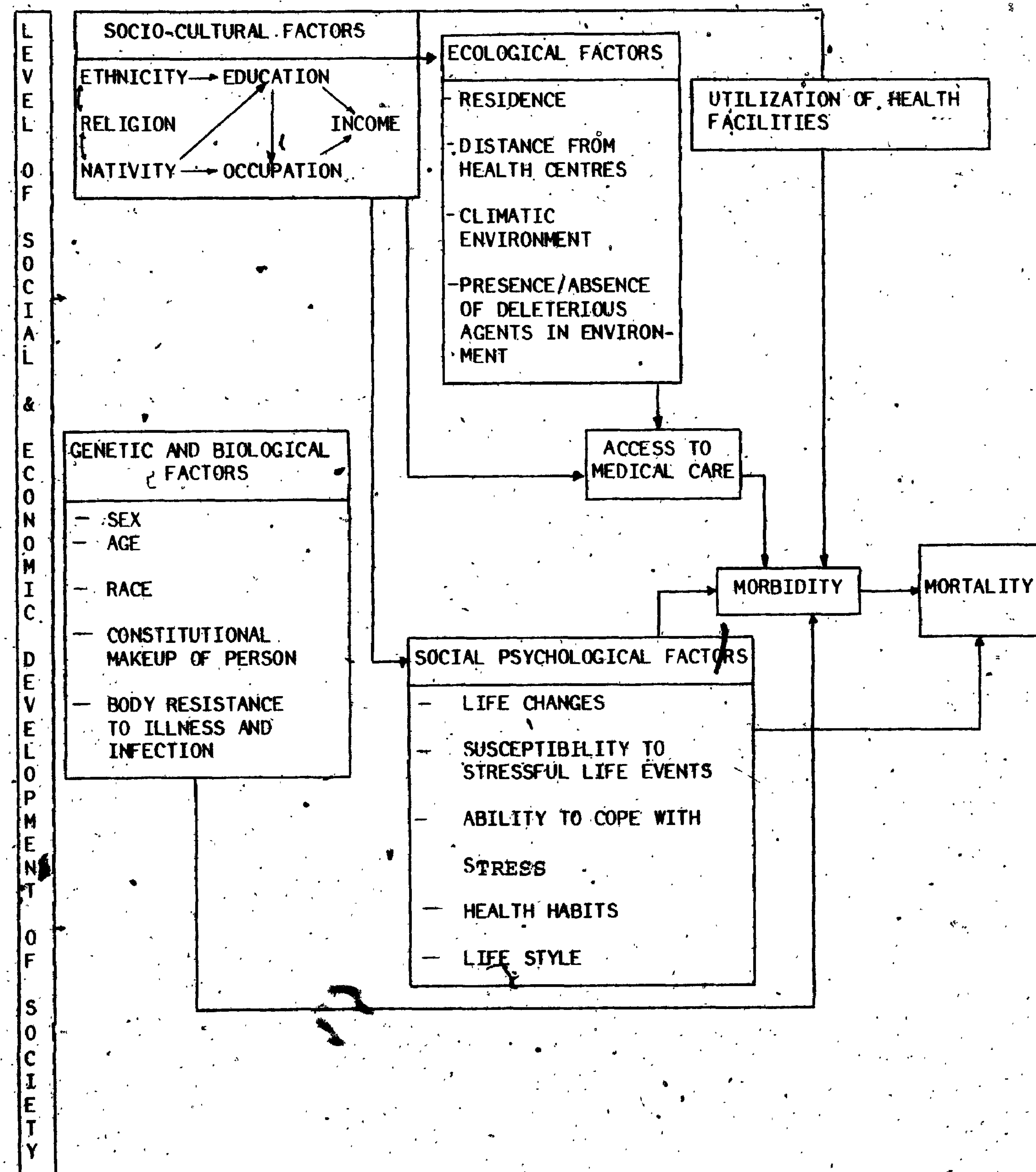
Table 2.4 also considers the time factor and reflects the variable assimilation or non-assimilation in mortality levels. It is predicted that the effect of time is to improve the general condition of Native Indians and French Canadians so that a convergence occurs with the general population. This is an assimilative type of explanation. Assimilation in this context must encompass several implied causal linkages such as a lowering of discrimination and subsequent improvement of life chances and a consequential diminuition of life stresses. Contrastingly, non-assimilation is assumed to reflect the opposite to all of these things.

In the above section, we have argued that the life stresses and assimilation hypotheses (compositional can also be included) may be viewed as general explanations of mortality differentials among subgroups in Canada.

2.8 Theoretical Model: Components of Morbidity and Mortality

The hypothesized effects--compositional, nativity, assimilation and life stresses--operate through a series of interrelated components. This can be demonstrated by Figure 2.3; it shows the main components of morbidity and mortality. The diagram provides a general framework for more

FIGURE 2.3 MAIN COMPONENTS OF MORBIDITY AND MORTALITY



detailed investigations in the areas of illness and senescence. It can be argued that there are seven most important components which interconnect in a complex causal fashion: (1) socio-cultural; (2) genetic-biological; (3) ecological; (4) social psychological; (5) degree of access to medical care; (6) degree of utilization of health care facilities and (7) morbidity.

The final outcome is reflected by the mortality component. Exogenous to these seven factors is the level of social and economic development of society. Recall that in Chapter One, it was argued that concomitant with the demographic transition of a given nation, changes in the economy and social structure may also take place. The level of development is an important factor in mortality levels and variations in any given societal context (Preston, 1977; Cutright and Kelly, 1978; Eyer, 1977; Eyer and Sterling, 1977; Coale, 1973; El-Badry, 1975; McKeown and Record, 1962; Nam and Gustavus, 1976; Omran, 1971; Cowgill, 1950). As a causal factor, this exogenous component is best viewed as operating through all the others; it does not have a direct effect on morbidity nor mortality.

The socio-cultural and genetic factors are antecedent to all other endogenous causal "blocks". Nativity and ethnic origin fall within the former set of factors. Their causal interconnections assume differentials in income and SES, on the basis of such background variables as ethnicity, religion and nativity (Tumin, 1967). The SES variable is known to be indirectly related to morbidity and mortality (Stockwell, 1963; Stockwell et al., 1978; Fein, 1977; Williams and Horn, 1977; Fordyce, 1977; Antonovsky, 1967) through access to medical care and health facilities (Penchansky and Thomas, 1981), and utilization of health resources (Zola, 1966; Suchman, 1964). Although authors have consistently argued that genetic, biological and socio-cultural factors are correlated, it is uncertain in what causal direction (Jencks, 1981; Ostenfeld, 1967; Roberts and Askew, 1972; Damon, 1977; Freeman et al., 1972).

Much empirical research has established that ecological variables are of particular relevance to mortality differentials (Hamilton, 1955; Barret, 1980; Knox, 1979; McCarroll and Bradley, 1966; Winkelstein et al., 1967; Hinkle and Loring, 1977; Train, 1977; El-Shaarawi et al., 1976; Smith, 1976; Fabitz and Feinlib, 1980; Morris and Heady, 1955; Bashlur et al., 1971; Sauer, 1962). It is also known that they are interrelated with social, economic and cultural variables. For example analysts have frequently documented ecological disparities with regards to income (Waggle and Mao, 1980; Newacheck et al., 1980; Ernster et al., 1978), occupation (Beaumont and Weiss, 1980; Powels, 1978), and education (Williams and Horn, 1977; Maeye, 1979; Benjamin, 1965). These have causal bearing on morbidity and mortality through the factor of limited life chances (Syme and Berkman, 1976; Roche, 1978).

Two of the components mentioned previously are known to affect social psychological variables. For example, researchers have established that race, culture and minority status have important causal relevance to social psychological distress and morbidity (Antunes et al., 1974; Mirowski and Ross, 1980), insecurity (Goldscheider, 1971; Goldscheider and Uhlenberg, 1969) and health habits (Zola, 1966; Suchman, 1964). Antonovsky (1979) has also posed the notion that there are biological and social differences in one's ability to cope with stressful life events, which are assumed to be related to morbidity and possibly mortality (Rahe, 1979; Cohen and Brody, 1981; Kobrin and Hendershot, 1977; Berkman and Syme, 1979).

The extent to which sectors of society enjoy total access to medical care and facilities is largely dependent on one's station in life and hence life chances. Both social and ecological causes are important in this regard (Tumin, 1967; Dutton, 1978; Anderson, 1979; Powels, 1978; Freeman et al., 1972).

Some classic studies in medical sociology have documented that social and cultural background have bearing on the degree of utilization of available health care facilities and resources (Suchman, 1964; Zola, 1966); it seems that some groups under-utilize such resources. Variation in the adequate use of health technology affects mortality through morbidity (Pollard, 1979).

The social psychological component has direct and indirect effects on mortality. In the former case, it has been shown that social psychological processes such as life changes, stressful life events and so on, often lead to chronic illnesses (Rahe 1979). Stresses in life can lead directly to mortality through unconscious and/or conscious motivations such as accidents and suicide (Phillips, 1979; 1974). However, the impact of deleterious life events and stress are often dampened by social support systems (Thomas and Duszynski; 1974; Antonovsky, 1979; Cohen and Brody, 1981; Kobrin and Hendershot, 1977; Berkman and Syme, 1979; Dohrenwend, 1967, Cobb, 1976).

Morbidity is directly affected by all of the causal "blocks" with the exception of the socio-cultural one, which has indirect influences. The impact of morbidity on mortality is an obvious one and does not require further elaboration.

When all things are considered in perspective, it becomes clearly evident that the hypotheses of life stresses, assimilation, compositional and migration selectivity can only affect the risk of dying through one or more, singly or in combination, of the components in Figure 2.3. The purpose of the causal diagram is not to serve as an empirical model but only as a general theoretical framework, so that the specific hypothesized predictions could be placed in proper theoretical context. It is virtually impossible to empirically test all of the causal linkages in any one research endeavour.

CHAPTER III

MATERIALS AND METHODS OF ANALYSIS

3.1 The Mortality Data Base

The data for this study are taken from the Mortality Data Base which is located in Ottawa, at the Vital Statistics and Disease Registry Section of Statistics Canada. The author spent five months there executing the necessary tabulations for the analysis. Due to issues of confidentiality, Statistics Canada does not release micro data to customers. Thus, it was necessary to carry out much of the data processing work in residence.

The Mortality Data Base includes deaths in Canada back to the year 1950. According to Smith and Newcombe (1980:1262), the accumulated total in death registrations included in this Data Base (1950-1977), is approximately 4,000,000 cases. Each province in Canada submits all its yearly death registrations to Statistics Canada, who subsequently adds them to the Mortality Data Base. Each case in the data set contains personal identifying information (e.g., surname, given name(s), name(s) of immediate relatives of the decedents, address, place of birth of decedent and of parents, place of death, (and residence), cause of death, and a host of other relevant information (Smith and Newcombe, 1981a;b). Table 3.1, provided by Smith and Newcombe (1980:1263), gives a detailed list of the variables contained in the data base.

TABLE 3.1 - MORTALITY DATA BASE RECORDS

	Information	Number of Characters
Personal Identification		
Deceased's:	surname	10
	given names	9
	birth date (year, month, day)	7
	birth province or country (coded)	2
	sex, marital status, racial origin	4
Father's:	surname (maiden surname of deceased woman)	10
	initials	2
	birth province or country	2
Mother's:	maiden surname	10
	initials	2
	birth province or country	2
Spouse's:	birth surname (maiden surname where spouse is wife)	10
	initials	2
Death Details		
Death:	cause (ICDA code)	4
	date (year, month, day)	6
	province	2
	place of occurrence	10
	age	4
	home or institution	1
Accident:	nature of injury (ICDA code)	4
	place of occurrence	1
	county	2
	locality	3
Miscellaneous:	pregnancy death	1
	operation	1
	autopsy and findings	2
	attendant	1
Other personal		
Residence:	province or country	2
	county or census division	2
	locality	3
Occupation:	kind of work done (coded)*	4
	kind of industry (coded)*	4
Housekeeping information		
	control codes	2
	death registration number	7
	Social Ins. No. (in case available)*	9
	surname codes (for 5 surnames, including alternate)	30
	date of update	2

* Not all of the items for which spaces are provided are keyed to tape. For example, occupation is rarely coded and Social Insurance Numbers are rarely keypunched. However, availability of the various personal identifiers in records of the Mortality Data Base has tended to improve over the years. For 1973 deaths, the full birth date is given in 96 percent of the records, and the province or country of birth in 98 percent; parental initials and the provinces or countries of birth of the two parents are given in 82 per cent of the records, and their mother's maiden surname is given in 68 per cent.

For the purposes of this study, the relevant variables utilized are: age, sex, ethnic origin, place of birth, cause of death and year of death of the decedent. No other relevant background variables, such as education, income and occupation, are available.

3.2 Populations

The populations studied are native and foreign, subdivided into four respective major components, by age and sex. The following classification system is adopted for the major part of the analysis.

(1) Age: 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+;

(2) Sex: Male, Female;

(3) Native-Born: French Canadian, British, Native Indian (includes registered and non-registered, plus Eskimos Innuit and Metis), Residual Native-Born;

(4) Foreign-Born: British, United States, Other Europe, Other Foreign-Born.

The native-born groups were classified on the basis of nativity and ethnic origin. By simple cross-classification, it was possible to select those decedents who were born in Canada falling under the denoted ethnic origins. Concerning the foreign-born, it was simply a matter of determining the country of birth, and subsequently assigning cases to one of the appropriate categories delineated above. (Refer to Appendix B to see the breakdown of the ethnic and place of birth codes in the data set used to derive the groups in this study).

The nativity-ethnicity classification system above is based on the fact that more refined categories proved inefficient due to generating excessive zero-cells. Moreover, for some of the years of interest to this study, the number of missing observations on either nativity or/and ethnicity proved excessively large. It became necessary, therefore, to utilize the most parsimonious method possible.

Unfortunately, even after collapsing on ethnicity and nationality, culminating in the system adopted, the problem of "missing" observations was not fully eliminated. This problem will be taken up in a subsequent section because it deserves detailed attention.

3.3 Age-Sex Structures

An adequate investigation of mortality differentials requires the calculation of age-sex-specific death rates. For the rates, a denominator calculation is required. The only available data source for the latter requirement are the decennial published census reports. The task is to provide age-sex distributions to complement the classification system decided upon in relation to deaths. To fulfill this objective, the published census tabulations provided by Statistics Canada for the 1951, 1961 and 1971 censuses are used (refer to Appendix A for a more detailed description of these data).

The task of "extracting" the appropriate age-sex distributions is somewhat problematic. Statistics Canada publishes separate tables for nativity (country of birth), and ethnic origin. Given this exclusiveness, it is not possible to derive direct figures for the specific native-born ethnic groups (i.e., French Canadians, British Native-born and Residual native-born); however, it is not a problem to obtain the age-sex compositions for the foreign-born groups because the data are explicitly available.

The major difficulties lie in deriving estimates for French Canadians, British native-born and Residual native-born. The problem is to separate the native from the foreign-born in the census tables which contain ethnic origin. For the British native-born it was simply a minor exercize: the age-sex specific British foreign-born figures are subtracted from the British ethnic age-sex specific data. The differences are assumed to be fairly accurate assessments of the British population born in Canada. (Refer to Appendix A for a more detailed discussion of this).

Extracting the French indigenous (French Canadian) population structure was somewhat more involved. The census publications only provide total figures by sex for the French foreign population in Canada; and before the French native-born age-sex structure could be obtained, it was necessary to have either an actual age-sex distribution of French foreigners, or if not available, an estimate of this. Hence, the estimated figures were produced by apportioning the sex totals of French immigrants on the basis of the "Other Europe" foreign-born age-sex structure provided by published tabulations. Having thus derived the French foreign-born, it was simply a matter of utilizing the same approach as that explained in connection with the British above.

The Native Indian population structure was directly derived from published census tabulations. No attempt was made to separate native from foreign populations as there are few foreign-born Natives. In fact, foreign Natives must originate from one other place, the United States. If this is accepted as true, one may consider that for most practical purposes Indians born in the United States are generally no different from Native people in Canada.

The Residual native-born component was estimated by indirect means. First, from the summation of the foreign populations, an overall age-sex foreign-born population distribution was attained. These age-sex specific figures were then subtracted from the overall age-sex composition of Canada. The difference produced the overall native-born age-sex composition. Hence by subtraction of the native-born French, British and Native populations from the indigenous age-sex composition, the difference gives the Residual native-born.

3.4 The Definition of Ethnicity and Nativity in the Census and Death Registration

The accuracy of the denominators is largely dependent on the degree of precision which is reflected in the definitions of ethnicity and nativity. Generally, place of birth statistics causes few concerns. In the censuses of Canada, place of birth is ascertained by a direct question: "what is your place of birth?" The only problems that could be associated with this question are mistatement (giving the wrong place or nationality), and missing information (failure to state a country of origin). Concerning the first issue, there is no control possible; it is assumed that most people do not lie about where they were born.

About the latter aspect, people at Statistics Canada have developed means to distribute the missing observations to the most likely categories of nativity on the basis of similarity of characteristics (Brackstone and Gosselin, 1973; Benyon et al., 1970) between the individual who failed to respond to the place of birth question and others who share similar background characteristics (e.g., age, sex, marital status, mother tongue, ethnicity etc.)

Place of birth on the death certificate is determined by the coroner questioning a close relative of the decedent, or an acquaintance, who is presumably knowledgeable about the background of the dead person. Generally, the "informant" is also a witness who signs the death certificate. The number of potential problems in this case increase in magnitude because a second person is responsible for the provision of information. A most crucial problem arises when the witness does not know the place of origin of the individual who is dead. No indirect means are applied in this case to attempt classifying the deceased into a "most likely" category of nativity; the variable is left blank. This poses enormous problems for analysts because they must make a decision as to what to do about missing observations on a variable which is of central importance to their study.

Ethnic origin in the Canadian censuses has been ascertained by the following question: "To what ethnic group did you or your ancestors (on the male side) belong on coming to this continent?" The most obvious limitation of this item is the fact that it excludes what could be a significant proportion of people from some ethnic categories. For example, a person born to an ethnically mixed couple in which, say the husband is British and the wife is Italian, would be constrained by the definition, to give British as their ethnicity. This is a problem inherent in the census; one has no control in this matter. Responses to this question are handled in the same fashion as described in connection with birthplace.

One could convincingly argue that if the degree of ethnic endogamy is high (marriage within one's ethnic group), the degree of error in the census figures would be minimal. Concerning the French and British groups, Kalbach (1976:38) affirms that "since the French and British are numerically dominant and geographically segregated, the statistical probabilities are also weighted in favour of ethnic endogamy."

Kalbach and McVey (1979:320-323) have shown elsewhere that in 1961 and 1971, British and French family heads (husbands) had the following proportion of wives of same ethnic origin:

Ethnicity	1961	1971
British	81.2	80.9
French	88.3	86.2
Native Indian and Inuit	91.8	76.8

The Natives have declined in their degree of endogamy over the ten year period, but are still considered as a group who still experiences high levels of "in-marriage".

All things considered, the degree of error in the four native-born populations is assumed to be small. The figures on ethnic endogamy reinforce this assessment. Thus for the most part the population structures to be used as denominators are adequate given the constraints.

Ethnicity, as an item on the death records, presents an altogether different scenario. Essentially, the same intricacies and complexities as discussed with reference to place of birth exist. The degree of error involved in the registration of French, British and Natives ethnicity is probably not large, however.

Assuming that ethnicity is a variable that is routinely coded on death certificates, the coroner and/or witness responsible for signing the document should have minor difficulties in identifying the descendent's ethnicity. But this is a safe assumption only for groups like Native Indians (who are generally physically distinct in appearance and hence recognizable as Native), and of course French Canadians (due to their identifiable surnames and the high probability that the "informant" is also of French ethnicity). Similarly, British decedents are probably correctly identified by the person responsible for providing the background information. Thus, identification may not be a serious problem per se.

It is felt that a high degree of correspondence has been achieved between the numerators (deaths) and denominators (age-sex structures) for the reasons outlined above. The fact that the degree of completeness in census enumerations and death registration in Canada has been consistently high (98 percent for census; virtually complete for death registration), raises our confidence in our figures (Brockstone and Gosselin, 1973; Nagnur et al., 1981). Perhaps the greatest hindrance lies in the fact that on the death records, the degree of recording (coding) varies depending on which variable is under consideration (Nagnur et al., 1981).

3.5 Data Evaluation, Problems and Adjustments

Table 3.2, displays the pattern of the degree of comprehensiveness according to key variables in the Mortality Data Base, from 1951 to 1973. Overall, it seems clear that the availability of information is good. However, variables such as month and day of birth do not exceed 60 per cent availability until 1964, at which point they became 94 to 97 per cent available. Sex and ICDA cause of death have been consistently high, close to 100 per cent available. Concerning place of birth of the decedent and of his/her parents, the situation is variable. It seems that these pieces of information were coded with almost total completeness in 1950-52, but from 1953 to 1962, they were

TABLE 3.2 PER CENT AVAILABILITY OF INFORMATION ON KEY VARIABLES, MORTALITY DATA BASE, 1951-1973

DATA ITEM	PER CENT AVAILABILITY OF INFORMATION ON KEY VARIABLES, MORTALITY DATA BASE, 1951-1973																						
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
BIRTH DATE																							
YEAR	99.8	99.8	99.8	99.8	99.9	99.9	100.	99.9	99.9	100.	99.9	99.9	99.9	99.8	100.	99.8	99.8	99.8	99.8	99.9	99.9	99.9	100.
MONTH	56.7	88.1	57.0	57.1	57.3	57.0	56.0	57.3	57.7	57.3	58.2	58.5	59.1	94.1	95.3	95.4	96.0	96.1	96.2	96.2	96.5	96.6	96.7
DAY	55.5	86.4	55.9	56.1	56.3	56.1	56.1	56.5	57.0	56.5	57.5	57.8	58.5	93.1	94.4	94.5	94.3	95.3	95.6	95.6	96.0	96.1	96.2
SEX	99.7	99.8	99.8	99.8	99.8	99.8	100.	99.8	99.8	99.8	99.8	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9
BIRTH PLACE	100.	99.9	1.2	1.1	1.0	1.1	1.1	0.9	1.1	0.6	0.7	0.7	63.6	98.8	98.7	98.7	99.7	98.6	98.4	98.0	98.0	98.0	97.5
PARENT'S BIRTH PLACE																							
MOTHER	99.0	96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	8.7	53.6	87.0	86.5	86.3	86.1	86.0	84.0	83.1	82.8	82.5	82.2
FATHER	99.0	96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	9.1	56.7	90.0	90.0	89.4	89.0	88.7	86.6	86.0	86.1	86.0	85.4
ETHNIC ORIGIN	96.2	96.2	96.3	96.5	96.4	96.5	96.4	96.2	94.8	89.8	58.5	57.0	52.3	52.1	49.8	50.1	50.1	48.6	45.0	40.6	38.4	38.5	34.0
ICDA CAUSE OF DEATH	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.1	99.0	99.4	99.3	90.0	99.3	99.3	99.3	99.3	100.	100.	99.6	99.4	99.3	99.8	100.

Note: Figures for 1950 were obtained after this table was typed. The data do not differ from those reflecting 1951, for the variables listed above.

virtually neglected. Analysts in the Health Division of Statistics Canada indicate that this is due to most provinces' discontinuation of recording birth place during the 1953-1962 interval. From 1963 onwards (to the present even), birth place of descendents has become virtually fully complete. Birth place of the parents however, ranges from 82 to 90 per cent (1964-1973) in their degree of comprehensiveness. Ethnic origin was almost 100 per cent complete in the 1950-53 period. As time progresses however, a continuing decline in reporting of this variable is evident. By 1973, almost all of Canada's provinces had discontinued ethnicity as an identifying characteristic of decedents. Table 3.3 provides an account of the situation concerning provincial coding of ethnicity.

3.6 The Problem of Missing Observations on Ethnicity and Nativity and Solutions

An ideal approach to studying mortality differentials is to examine deaths which occur around census years because the denominators are most accurate; they reflect the most recent accounts of the age-sex structure of different populations enumerated by the census. It has become standard practice to calculate average death rates for a three year period centering on the census year; for example, utilizing deaths in 1950-53 divided by the mid-period population given by the 1951 census.

TABLE 3.3 PROVINCIAL CODING OF ETHNIC ORIGIN ON DEATH RECORDS

Province	Final Year Coded	
	Natives & Eskimos	All Other
Prince Edward Island	Upto 1972	1972
Nova Scotia	Upto 1973	1973
New Brunswick	Upto 1972	1972
Quebec	Upto 1973	1973
Ontario	Upto 1960	1960
Manitoba	Upto 1968	1968
Saskatchewan	Upto 1973	1973
Alberta	Upto 1970	1970
British Columbia* (B.C.)	Upto 1974	1964
Yukon**	To present	1973
Northwest Territories***	To present	1973
Newfoundland	Never coded	Never coded

* BC has used a partial list from 1965 onwards in coding ethnicity:

(a) registered Indian
(b) non registered Indian (white status)
(c) East Indian
(d) Chinese
(e) Japanese
(f) Negro
(g) all other ethnicities

** Since 1972, has been recording only Natives and Eskimos
*** Since 1972, has been recording only Natives and Eskimos

A major difficulty emerges when attempting to follow this method for the period 1960-1962. The proportion of missing observations on either ethnicity or place of birth was exceedingly high (over 90 percent).

It was felt that a suitable alternative would be the utilization of numerators (deaths) which were most complete in reporting but would be as close as possible to the 1961 point in time. As it turned out, the most suitable three year period is 1963-1965, with 1964 as the mid-point (See Table 3.4 for a breakdown of missing cases by year).

The task is to provide an estimate of the age-sex structures of the different populations for 1964. Initially it was considered using the 1961 census figures, but it was felt that this would cause inaccuracies due to the fact that during the 1960-1965 period considerable immigration into Canada took place. Although not a problem for the native-born sector, it most certainly would have affected the foreign-born populations.

3.6.1 The Problem of Missing Cases

Missing observations, when data are grouped, introduce unique problems not otherwise encountered by analysts working with micro data. In the latter instance one has the option of executing multivariate analyses employing either pairwise or listwise deletion of missing data and the statistical results would not be altered significantly, in

TABLE 3.4 DISTRIBUTION OF MISSING CASES BROKEN DOWN BY NATIVITY, CAUSE OF DEATH, YEAR AND SEX, CANADA, 1950-52, 1963-65 AND 1970-72

YEAR AND SEX	MISSING OBSERVATIONS (%)*								TOTAL
	NATIVE BORN				FOREIGN BORN				
	NEOPLASMS	CARDIO-VASCULAR	ACCIDENT-VIOLENCE	OTHER	NEOPLASMS	CARDIO-VASCULAR	ACCIDENT-VIOLENCE	OTHER	
1950									
MALE	159 (2.9)	600 (3.0)	149 (3.8)	357 (1.7)	100 (2.7)	303 (2.8)	101 (8.0)	261 (6.0)	2030
FEMALE	153 (2.6)	588 (3.6)	73 (4.7)	260 (1.6)	76 (3.0)	144 (2.0)	25 (6.0)	180 (6.6)	1499
1951									
MALE	161 (2.8)	631 (3.1)	158 (3.9)	388 (1.9)	72 (2.0)	301 (2.7)	127(11.0)	272 (5.8)	2110
FEMALE	163 (2.7)	543 (3.2)	76 (4.9)	285 (1.7)	42 (1.6)	164 (2.2)	19 (4.8)	181 (6.7)	1473
1952									
MALE	140 (2.6)	619 (2.9)	140 (3.2)	351 (1.8)	103 (2.7)	372 (2.8)	134(10.4)	578(13.6)	2437
FEMALE	144 (2.4)	530 (3.1)	59 (4.0)	246 (1.6)	72 (2.7)	177 (2.3)	22 (5.2)	352(14.7)	1602
1963									
MALE	4627(44.7)	15508(48.5)	2019(37.2)	7642(37.0)	400(11.4)	950 (9.7)	224(24.8)	468(12.0)	31838
FEMALE	4098(43.9)	12079(50.0)	932(44.9)	5374(36.4)	163 (7.4)	502 (7.6)	56(16.5)	259(10.0)	23463
1964									
MALE	1158(13.2)	5774(21.3)	1139(22.0)	2812(16.2)	192 (3.7)	757 (4.9)	240(17.5)	455 (7.7)	12527
FEMALE	1294(16.0)	5530(27.8)	604(31.4)	2241(18.0)	143 (3.9)	479 (4.5)	49 (9.5)	257 (7.6)	10597
1965									
MALE	1702(19.1)	8866(31.3)	1500(28.4)	3677(21.6)	213 (3.9)	779 (5.0)	250(18.3)	432 (7.4)	17419
FEMALE	1494(18.0)	7322(35.0)	594(29.0)	2197(18.0)	126 (3.5)	496 (4.6)	51 (8.4)	264 (7.6)	12544
1970									
MALE	4048(36.4)	9543(33.0)	1485(29.3)	4035(22.1)	302 (5.0)	876 (6.1)	190(13.6)	533 (8.9)	21012
FEMALE	3246(34.2)	6735(31.8)	864(39.0)	2779(22.3)	206 (5.0)	587 (5.2)	71(11.1)	326 (8.2)	14814
1971									
MALE	4118(36.0)	9637(33.0)	1797(33.0)	5866(32.2)	320 (5.2)	956 (6.4)	184(13.1)	541 (8.8)	23419
FEMALE	3371(35.0)	6907(32.1)	835(37.4)	3827(31.0)	222 (5.4)	578 (5.0)	56 (8.5)	321 (8.3)	16117
1972									
MALE	4319(36.3)	9999(33.4)	1626(29.4)	6084 (5.6)	349 (5.6)	1137(7.5)	274(18.3)	660(10.8)	24448
FEMALE	3469(33.0)	7175(32.3)	931(39.5)	4135(33.0)	243 (5.6)	682(5.8)	73(10.0)	356 (8.7)	17064

* Percent missing in parentheses based on cause-specific totals within each nativity classification.

most instances. Unfortunately, the task is less straightforward when information is grouped. The solution requires the introduction of key assumptions about the underlying nature of the data classified as missing.

3.6.2 Methods commonly used in distributing missing cases

Several well known methods are available to accomplish the objective of distributing missing cases.

1. Apportionment on the basis of the distribution of known cases (deaths)

   This is perhaps the most common methods of dealing with the problem being discussed. This procedure assumes that the missing cases are randomly distributed and that the known distribution of deaths is a valid approximation to the underlying distribution of the missing observations. The main limitations associated with this kind of solution are: (1) if the cases are not randomly distributed some groups would tend to receive a larger number of cases while others would tend to be underrepresented; (2) the greater the number of missing cases, the greater the likelihood that a high degree of error or bias is introduced.

2. Apportionment of the basis of the age-sex composition of the study populations

   If one assumes no difference in mortality between subgroups and that mortality is solely determined by the age-sex composition, the latter may be applied to assign missing observations on the basis of age-sex specific proportions associated with the specific study groups of interest. The main obstacle of this approach, in view of this thesis' orientation, is that it assumes no mortality differences among subgroups, as far as the missing cases are concerned. Thus, in the event that the proportion of missing cases is high, this solution would tend to obfuscate any "real" subgroup differentials in mortality which may be attributable to factors other than age and sex (e.g., nativity or ethnicity).

3. <u>Adjustment on the basis of a predetermined structure</u>

As early as 1940, demographers (e.g., Deming) have been using this method to adjust cross-classified data; however, most applications have dealt primarily with population estimation. The typical case is to impose the known structure of a two-way table of an earlier period on the marginals of a current period to estimate a new crosstabulation. The most important assumption underlying this method is that no significant change in the internal structure (relationship) of the two factors juxtaposed has occurred over time. Shryoch and Seigel call this the "method of iterative proportions". It may be applied to distribute missing cases. For example, if the structure (proportions reflecting cell frequencies) of the relationship between age, sex, nativity, ethnicity and mortality is completely recorded for an earlier year it can be imposed on the missing cases associated with a later point in time. It is unfortunate that the crucial assumption of no difference over time renders this solution unfeasible for the purposes of this thesis because change in mortality over time is hypothesized as an important factor.

4. A Synthetic approach

All of the previous methods have merit in themselves, but cannot be applied to solve the problem associated with this thesis: they each imposed crucial assumptions which are incompatible with the basic features of the study. It was therefore decided to combine two methods which pose assumptions that counteract each other. First, the provincial distribution of missing cases in Canada was scrutinized to ascertain which province(s) generated the missing cases (due to non coding of the necessary variables). In a subsequent step, the missing cases belonging to a particular province were divided in half. The first half of the cases were then distributed on the basis of the study populations' provincial age-sex distributions. The final step involved the apportionment of the remaining half of the missing cases on the basis of the "new" distribution of deaths. It is clear that this proppsed method is a combination of solutions 1 and 2 discussed earlier.

The assumptions involved in the synthetic approach may be stated as follows: (1) one half of the overall distribution of missing cases (deaths) have the same distribution as the age-sex composition of a given group in a particular province; (2) the other half of the missing cases conform to the distribution of known deaths. The effect of the former assumption is to minimize group differentials in mortality among the missing cases while the latter assumption works to maximize differences due to factors other than age and sex.

As specified earlier, ideally one would apply the age distribution of a specific nativity/ethnic group to half of the missing cases, by first obtaining the age composition by province and then, depending on which province is primarily "responsible" for missing observations, apply the corresponding age distribution to apportion the missing cases. Unfortunately, it is not possible to obtain provincial age-sex distributions for the various group of interest to this thesis. The census publications do not consistently provide the necessary figures for all groups.

As a solution to this problem, it was decided to utilize the nation's group specific age-sex distributions for the purposes of assigning the missing cases. This

TABLE 3.5 CONCEPTUAL OUTLINE OF METHODS OF DATA ADJUSTMENT FOR MISSING CASES, ASSOCIATED ASSUMPTIONS, WEAKNESSES, ADVANTAGES AND FEASIBILITY OF EACH METHOD.

METHOD	ASSUMPTIONS	WEAKNESS	ADVANTAGES	WHEN MOST FEASIBLE TO APPLY
1. Knowledge of under-registration of death.	None	None	Ideal method.	Any time.
2. Apportionment on the basis of known cases.	Random distribution of missing cases.	Danger of over or under representation among groups with large and small frequencies, respectively.	Easy and quick method to apply.	When the nummber of missing cases is small.
3. Apportionment on the basis of population age-sex structure.	No difference in mortality among subgroups as far as missing cases are concerned.	It is insensitive to substantive subgroup differences in mortality along the missing cases.	Relatively easy and quick to apply.	When the number of missing cases is small, or when subgroup differences are assumed irrelevant or negligible.
4. Adjustment to a known previous structure and current marginal totals.	No change in the relationship between the factors of interest over time.	Insensitive to changes over time.	Produces good results; it is a powerful method.	When no change over time is assumed and when proper prior information is available.
5. Synthetic method.	Missing case derive from provincial subgroup population age-sex distribution in conjunction with the known distribution of deaths; age sex and ethnicity/nativity are assumed to affect mortality	It may produce biased results if the "true" distribution of missing cases does not conform to populations structure and are not randomly distributed.	Captures change over time; allows for differentials in mortality among subgroups; allows for population composition to partially determine the distribution of missing cases.	Any time there are many missing cases and no other one method seems feasible or suitable to apply.

assumes that the national distributions do not significantly deviate from the provincial age-sex compositions of the ethnic/nativity classifications.

The rationale for partitioning missing observations in half and then applying the two approaches lies in the assumption that the bias introduced by the first would generally counteract the bias which would be imposed by the second method alone. In view of the serious limitations associated with each of the methods surveyed, it was decided to utilize the synthetic approach to solve the problem of missing cases in this dissertation. A brief conceptual overview of the methods and associated strengths and weaknesses is presented in Table 3.5.

3.7 Provincial Completeness in the Reporting of Ethnicity and Nativity on Death Certificates

Proper execution of the synthetic method requires that the provincial distribution of the degree of completeness in reporting nativity and ethnic origin be known. Tables 3.6 and 3.7 show this information, respectively. The first table concerns itself with nativity. It suggests that while most years are suitable for a complete study of mortality difference with special emphasis on nativity, the period 1960-62 is of no practical value to such an objective. The degree of reporting of this variable during this period does not exceed 12 per cent, and in most provinces it is less

TABLE 3.6 DEGREE OF PROVINCIAL COMPLETENESS IN CODING NATIVITY ON DEATH CERTIFICATES, CANADA 1950-52; 1960-65 AND 1970-72.

PROVINCE	YEAR (%)											
	1950	1951	1952	1960	1961	1962	1963	1964	1965	1970	1971	1972
NEWFOUNDLAND	88	88	85	1	0.2	0.6	82	84	81	71	76	75
P. E. I.	100	99	99	0.6	0.6	2	100	100	100	100	100	100
NOVA SCOTIA	100	100	99	0.1	0.4	0.4	100	100	100	100	100	100
NEW BRUNSWICK	100	100	100	0.6	2	2	100	100	100	100	100	100
QUEBEC	99	99	99	2	0.6	0.5	99	99	99	97	97	96
ONTARIO	99	99	100	0.3	0.7	0.7	0.8	99	99	99	99	99
MANITOBA	99	100	99	1	0.6	0.5	99	99	99	99	99	99
SASKATCHEWAN	99	99	99	0.4	0.4	0.7	99	99	99	99	99	99
ALBERTA	99	98	99	0.6	0.6	0.4	0.3	99	99	99	98	98
BRITISH COLUMBIA	100	99	99	0.4	0.6	0.5	99	99	100	100	100	100
YUKON	88	93	89	10	11	12	98	91	94	92	93	94
NORTHWEST TERR.	96	99	80	7	10	11	95	96	96	92	97	92

TABLE 3.7 DEGREE OF PROVINCIAL COMPLETENESS IN CODING ETHNICITY ON DEATH CERTIFICATES, CANADA 1950-52; 1960-65 AND 1970-72.

PROVINCE	YEAR (%)											
	1950	1951	1952	1960	1961	1962	1963	1964	1965	1970	1971	1972
NEWFOUNDLAND	0	5	0	0	0	0	0	0	0	0	0	0
P. E. I.	99	98	99	100	99	98	100	99	99	100	100	99
NOVA SCOTIA	99	99	99	99	99	99	99	99	99	99	98	97
NEW BRUNSWICK	98	98	98	98	98	98	98	98	98	97	98	97
QUEBEC	98	99	99	97	99	99	99	98	97	99	98	99
ONTARIO	99	98	99	86	2	0.6	0	0	0	0	0	0
MANITOBA	99	99	99	99	99	99	99	99	99	0	0	0
SASKATCHEWAN	98	98	98	98	98	98	97	98	98	96	95	93
ALBERTA	99	98	98	98	98	98	98	98	97	0	0	0
BRITISH COLUMBIA	99	99	98	82	70	63	21	21	6	6	6	6
YUKON	88	94	98	85	80	85	86	76	85	73	71	75
NORTHWEST TERR.	96	92	92	95	91	94	92	90	89	76	86	84

than 2 per cent. The number of missing cases on this factor during all other years is relatively small and therefore poses no major problem.

The situation with the ethnic variable is quite problematic. Two salient features emerge from Table 3.7: (1) Newfoundland has practically never coded ethnicity; (2) most provinces--except Ontario since 1961, Alberta since 1970, and British Columbia since 1963--have virtually complete reporting of ethnic origin over time. Overall, the 1950-52 period is the most complete as the number of missing cases on both variables is relatively small.

Table 3.6 displays the distribution of missing cases broken down by nativity, cause of death, year and sex for 1950-52, 1963-65 and 1970-72. Both native and foreign-born have relatively few missing observations in the earliest period. For subsequent years, the foreigners show a relatively small proportion of "unknown cases" while the indigenous population presents an alarming number of such cases. The most serious aspect of the problem occurs in the 1963 series; and although the number missing tends to diminish in later years, a substantial proportion remains classified as missing.

The spectacular increase in missing cases among the native-born component in 1963 is mostly due to Ontario's discontinuation in coding the ethnic variable. In 1964 and

1965, things improved because Ontario reinstituted the ethnicity question on the death certificate. Unfortunately, this same province again discontinued recording such information in 1970 and has not coded ethnic origin ever since. To complicate the matter further, Manitoba, British Columbia and Alberta followed Ontario's example in 1970. The resultant effects of these provinces' reporting practices has been a significant increase in missing observations over time in connection with the ethnic variable. All things considered, the task is to introduce a reasonable method to somehow assign the missing cases to the known distribution of deaths without severely distorting the results that would obtain under the condition of no missing cases. This will be done by applying the synethic method proposed above. A practical alternative would be to drop all the cases from the provinces which contributed to the generation of missing cases and carry out the analysis on the basis of the remaining deaths. This is not feasiblebecause the denominators derived from published census tabulations cannot be disaggregated accordingly.

3.8 <u>Linear Interpolation of Age-Sex Structures</u>

The solution adopted was to calculate linear interpolations as estimates of the age-sex population structures for 1964, based on 1961 and 1971 age-sex specific census figures for the groups studied.

Below is the formula pertaining to linear interpolation.

$$I^{t+s} = I^{t} + \frac{s}{n} \cdot (I^{t+n} - I^{t})$$

where: I^{t+s} is a given 5 year age group to be interpolated for year $t+s$ from year t to t + n

I^{t} = Age group at year t

$\frac{s}{n}$ = a fraction reflecting the point to be interpolated

$(I^{t+n} - I^{t})$ = the difference in the age group between t and t + n

The sums of the 1964 interpolated population structures were compared to Statistics Canada's official post-censal 1964 estimate for the whole country (Dominion Bureau of Statistics, 1964), the differences are negligible -- less than one per cent. (See Table 3.8).

Appendix C provides age pyramids according to ethnic-nativity grouping for 1951, 1961, 1964 and 1971; the total native and foreign-born pyramids for various periods are included as well. The corresponding population figures by age and sex, for the eight groups, are displayed in Appendix D.

Generally, the population pyramids conform to expectation; that is, the native-born groups display structures which are typical of young populations; the immigrant age-sex distributions on the other hand, deviate from the general shape of a pyramid, which is understandable because migration is age selective. There is a problem however in connection with the Native figures. For each point in time, the female population beyond age 30 is consistently smaller than the male statistics. Given the sex differential in mortality in favour of women and our general knowledge of Indian mortality, the expectation is that fewer males than females would fall into ages 30 and above. There is an obvious problem with the figures. Perhaps the discrepancy is due to the higher exogamy rate of native females. (See Table G.2, Appendix G). By law native females loose their Indian status when they marry a male who is not an Indian. It is believed that this is the underlying cause of the problem. Some ~~adjustment is~~ necessary. The method of adjustment is included in Appendix E.

3.9 Causes Of Death

Four major causes of death are studied: (1) deaths due to neoplasms; (2) deaths due to cardiovascular disease; (3) deaths due to accidents and violence and (4) deaths due to all other causes.

Originally, the 12-cause system developed by Preston and his associates (1972) was considered. It proved ineffi-

TABLE 3.8 COMPARISON OF LINEAR AND EXPONENTIAL INTERPOLATED POPULATION FOR 1964 WITH OFFICIAL 1964 STATISTICS CANADA ESTIMATE OF THE CANADIAN POPULATION BY SEX

	SEX		
	MALES	FEMALES	TOTAL
OFFICIAL (1) ESTIMATE FOR 1964	9,699,200	9,537,800	19,237,000
LINEAR INTERPOLATION (2)	9,708,841	9,535,311*	19,244,151
EXPONENTIAL INTERPOLATION (3)	9,709,960	9,540,329	19,250,289
DIFFERENCE (2)-(1)	+ 9,641	-2,489	+ 7,151
DIFFERENCE (3)-(1)	+10,760	+2,529	+13,289

* This figure does not take into account the adjustment to Native Indian females in the ages 30 and above. Actually, the adjusted total is 9,539,367, once the inflation of Native female figures is considered.

cient for our purposes because of numerous zero cells. This was a problem particularly in connection with the foreign-born population groups whose distribution of deaths tends to be relatively small; especially when considering that several variables were cross-classified.

The four cause classification system proved to be a most efficient way of analyzing mortality by major causes of death. In Canada, the percent distribution of deaths (in 1976 as reported by Statistics Canada), due to major diseases was approximately:

CAUSE OF DEATH	%
Heart Disease	35
Cancer	21
Stroke	10
Respiratory	7
Accidents	7
Arterial Disease	4
Diabetes	2
Cirrhosis of the liver	2
Diseases of the nervous system	1
Congenital anomalies	1
Other	8

Hence, it conforms quite well to the four causes employed in this thesis: heart and arterial disease (35 + 4 per cent) fall under cardiovascular; cancer (neoplasms) take up 21 per cent of all deaths; accidents 7 per cent. In total these three categories of disease accumulate to 67 per cent of all decedents in Canada.

Further justification lies in the fact that several scientists have adopted a similar system. For example, Hansluwka (1973) used (1) neoplasms; (2) cardiovascular; (3) accidents and (4) all other causes, as his method of analyzing mortality levels among modern nations. Crimmins (1981), applied a similar approach to investigate the changing pattern of American mortality decline since 1940: (1) cancers; (2) cardiovascular; (3) violence-accidents; (4) diseases of infancy and (5) all other causes. Elandt-Johnson and Johnson (1980:301) also used the same classes of cause of death as adopted in this thesis.

3.10 Statistical Methods

3.10.1 Life Table Analysis

The first part of the data analysis will be confined to the analytical study of life table functions as they apply to the specific populations in this thesis. A brief description of the life table is in order. It is known that the level of mortality in any given population is dependent on its age-sex composition. Therefore, age-sex specific mortality rates are necessary in order to derive the necessary life table functions. It can be shown that age-specific death rates are simple extensions of the most basic measure of mortality, the crude death rate:

$$CDR = \frac{\text{DEATHS IN A GIVEN YEAR}}{\text{MID YEAR POPULATION}} \times 1000 \qquad \ldots\ldots(1)$$

The age-specific death rate for a five year age group may be defined as:

$${}_5M_x = \frac{{}_5D_{x_i}}{{}_5P_{x_i}} \times 1000 \qquad \ldots\ldots(2)$$

Therefore, the crude death rate in (1) can be thought of as being the weighted sum of the age specific death rates in a given population:

$$CDR = \frac{\sum_{i=0-4}^{85+} {}_5M_{x_i} \cdot {}_5P_{x_i}}{\sum_{i=0-4}^{85+} {}_5P_{x_i}} \times 1000 \qquad \ldots\ldots(3)$$

where in both (2) and (3), ${}_5D_{x_i}$ and ${}_5P_{x_i}$ refer to the deaths in a given five year age group, and the corresponding population for the same group respectively.

A period life table may be constructed from the age-specific death rates. Discrete transformations are necessary however, because the life table requires the probability of dying between age x and x+n (the probability of dying within a given age interval before a person reaches his/her next birthday). Thus age-specific death rates must be transformed into probabilities. In a five year age group the probability of dying before reaching the next birthday is:

$$_5q_x = \frac{5 \cdot {}_5M_x}{1 + \frac{5}{2} \cdot {}_5M_x} \qquad \ldots.(4)$$

where: $_5q_x$ = the probability of dying before reaching the next birthday for an individual in a five year age group;

$_5M_x$ = the age-specific death rate expressed as a ratio of deaths over population in a given age interval.

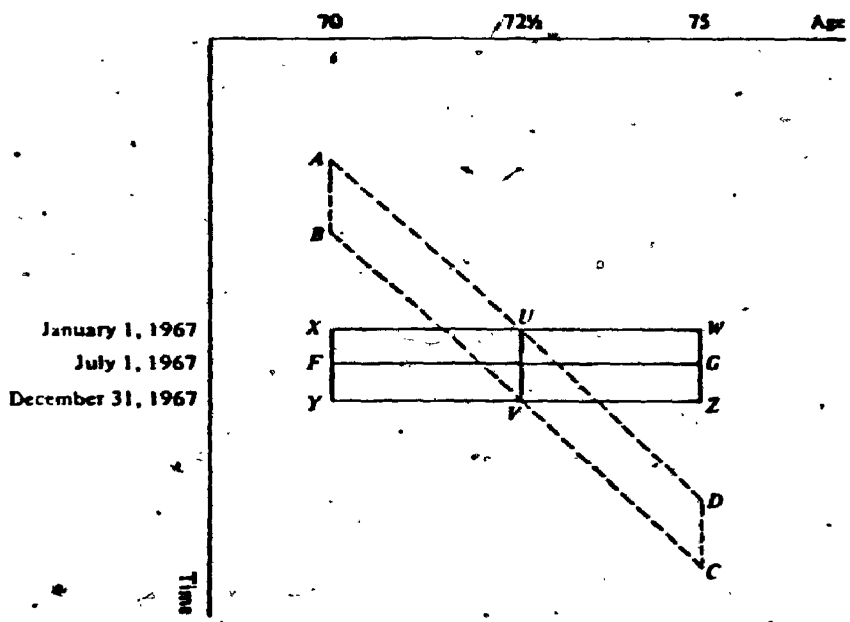
Equation (4) assumes that the risk of dying is uniform over the five year age interval. Preston (1972:10) and his colleagues have shown the following Lexis diagram to explain the above principles. (See next page). For ages below 5, the probability of dying cannot be assumed as being uniform. Appropriate modifications are usually introduced to equation (4) to take this fact into account (e.g., separation factors; see Shryock & Seigel, 1975: 430-35). In this study, mortality to ages zero and 1-4 is combined into one category, 0-4. Single years data would have been preferable, but this was not possible as the denominators (census tabulations) are usually published in five year age groups. The probability of death at age zero is usually computed on the basis of cohort data on births and deaths over two calendar years:

$$q^o = \frac{D^o_y + D^o_{y+1}}{B_y}$$

where: q^o = the probability of dying in the first year of life;

D_y^o = infant deaths in year y to infants born in year y;

D_{y+1}^o = infant deaths to infants in year y+1 to infants born in year y.



Lexis Diagram from Preston et al., (1972:10)

The dotted lines in the parallelogram represent the mid point for the intersection of age and time corresponding to the five year age group 70-75, in this case. This is why $_5q_x$ is based on what is called central death rates.

A given life table represents the life time mortality experience of a single cohort of newborn babies who are subjected to the age-specific mortality rates on which the life table is based; it is therefore the mortality experience of a hypothetical cohort as it ages to eventual extinction due to the force of mortality (Shryock and Seigel, 1975: 431). Below are the functions of the life table as described by Shryock and Seigel,(1975:431):

$_nq_x$ = the proportion of persons in the cohort alive at the beginning of an indicated age interval (x) who will die before reaching the end of that age interval (x+n);

l_x = the number of persons living at the beginning of an age interval (x) out of the total number of births assumed as the radix (the initial size of the cohort at its beginning), usually set at 100,000;

ndx = the number of persons who would die within the indicated age interval (x to x+n) out of the total number of births assumed in the table;

$_nL_x$ = the number of person-years that would be lived within the indicated age interval (x to x+n) by the cohort of 100,000 births assumed;

T_x = the total number of person-years that would be lived after the beginning of a given age interval by the cohort of 100,000 assumed;

e^o_x = the average remaining lifetime (in years) for a person who survives to the beginning of an age interval; this function is also referred to as the life expectancy at age X.

3.10.2 Calculation of Infant Mortality

For the most part (at least in the developed world), the life table consists of three main sections: infant mortality, mortality beyond age 85+, and of course mortality at other ages. To calculate the infant mortality rate one needs cohort data so that deaths occurring to specific birth cohorts of interest around a given time point may be separated. Unfortunately this poses a problem in the context of this research. The published census figures are not broken down to the point of allowing a separate age group for those aged zero; in actuality, the initial age group given is 0-4. What is needed is the number of persons aged zero enumerated by the census to serve as the denominator for the infant mortality rate. For example, if we had the necessary information, a crude approximation to the infant mortality rate could be derived by:

$$IMR = \frac{D_0^{y-1} + D_0^{y} + D_0^{y+1}}{P_0^{y}} \quad \ldots.(5)$$

where:

D_0^{y-1} = deaths to infants dying in a current year, who were born in the previous year;

D_0^{y} = deaths to infants who were born and dead in a current year;

D_0^{y+1} = deaths to infants who were born in a current year but died in the subsequent year;

P_0^{y} = the census population aged zero in a census year.

Formula (5) would derive a three year annual average infant probability of dying assuming that the number of births remain constant over the three years. Actually a more exact measure would be obtained if the denominator could be disaggregated into birth cohorts corresponding to the deaths in each year. Unfortunately, the data available (census data) does not allow for such a refined method of calculating infant mortality. This is why P_0^y is used as a denominator in equation (5). In any case, direct calculation of infant mortality as by formula (5) is not possible.

The basic problem is: the death statistics are broken down accordingly to allow us to identify infant deaths for a given year, but because our denominator relies on census data, we are left with the problem of disagregating the population aged zero from the 0-4 age group given in the census.

What complicates the matter further is that there is lack of sufficient information to systematically allow for such a disaggregation. Several technical approaches were attempted such as applying Beer's fifth difference multipliers but the results were unsatisfactory. On some occasions the derived estimates for the population age zero were negative (especially the foreign-born). As a solution, to be explained below, it was decided to apply the series of model regional life tables provided by Coale and Demeny (1966), in such a manner as to allow estimates of infant mortality.

3.10.3 <u>The 0-4 Age Group Problem</u>

Initially, life tables were computed for the dichotomy native and foreign-born, with 0-4 as the first entry in the life table. Of course, the problem with this is that it assumes linearity in the probability of death from age zero to ages 1-4. This is a highly unrealistic assumption, therefore some adjustment is necessary.

It was decided to apply the Coale-Demeny Regional Model life tables to provide an approximate solution. But first this required that some decision be made about which "region" would be most appropriate for the two populations being investigated. It was felt that the "West" model would be suitable; it assumes a residual category of family life tables, not fitting under South, East nor North regions. Essentially, West regional life tables do not show a consistent pattern as is characteristic of the other regions. Working with no <u>a priori</u> knowledge of what a native or foreign-born pattern is appropriate for the Canadian context, the West model life tables would seem applicable. Thus the following steps were executed to deal with the problem at hand:

(1) calculate life tables with 0-4 as the starting age;

(2) use the life expectancy at age 10 from the derived life tables to determine the appropriate level in the West model tables;

(3) once the level was found (for either sex), the probabilities of death at age 0 and 1-4 were added together, and the age zero probability was expressed as a proportion of the 0-4 total;

(4) the derived proportions were applied to the original 0-4 probabilities in the two study populations to obtain an estimate for the probabilities for age zero and ages 1-4, separately;

(5) new life tables were computed for the study populations.

Using this method, it was found that the suitable levels in the West regions which correspond closest to 1951, 1964 and 1971 life tables, for the native male population, are levels 21, 22 and 23, consecutively. The native female population was best approximized by levels 21, 22 and 23 as well. The corresponding levels for foreign males were found to be 21, 22 and 23; for females: 22, 23 and 23, as no significant change in life expectancy at age 10 emerged between 1964 and 1971. Below are the proportions corresponding to age zero broken down by region, sex and level:

	West Region	
	(q_0/q_0+q_{1-4})	
Level	Male	Female
21	.7796	.7608
22	.8345	.8305
23	.8760	.8633

The proposed procedure assumes that there is a one-to-one correspondence between the levels and the years (periods) of study; and that changes in proportions in the regional model levels accurately reflect changes in proportion age zero (in the probability of dying) relative to ages 1-4. Thus, level 21 is assumed to reflect 1951; level 22 corresponds to 1964 and finally, level 23 to 1971.

One other important assumption is that the derived probabilities, using the proposed technique, are accurate accounts of the true probability of dying at age zero and 1-4 respectively, in the foreign and native populations.

Other methods could have been used to achieve disaggregation of the infant mortality rates; for example, graduation and extrapolation, least squares methods to solve simultaneous equations predicting q^0, or application of multipliers to disaggregate the 0-4 denominators (age composition). All such adjustments involve crucial assumptions along with their weaknesses and strengths. Some of these methods were actually attempted and were proven to be inefficient in the present context. Hence, it was decided that the present application is as valid as any other and it has the advantage of simplicity and intuitive appeal.

One last note of caution is in order: the Coale-Demeny model life tables assume that one has a parameter to match the region and level most appropriate to one's study population. The parameter could be life expectancy at age 10. Given this, one could find a corresponding model life table. In the present context it was not possible to provide the above parameter initially, as no information was available to fill this task for the total foreign-born and native-born populations in Canada over the time points of interest.

3.11 Multivariate Analysis

The questions set forth in the previous chapters require that answers be derived on the basis of some multivariate statistical framework. Given the nature of the data at hand an appropriate methodology is loglinear modeling.

There are several considerations which must be entertained when data are categorical and crossclassified -- as is the case here -- and a multivariate analysis is desired. According to experts in the field of log-linear analysis (e.g., Swafford, 1980; Hanuschek and Jackson, 1977; Knoke and Burke, 1980; Goodman, 1970; 1972a; b; Feinberg, 1977; Grizzle et al., 1969), three of the most widely adopted statistical models for the multivariate analysis of contingency tables are: (1) linear probability models (e.g., Grizzle et al., 1969); (2) log-linear models (e.g., Goodman, 1970) and (3) logit regression modeling (a combination of (1) and (2)). The method which is deemed appropriate to answering the questions set forth in this thesis is logit regression. Parameters reflecting the odds of the logit on a criterion variable can be computed via log-linear analysis with appropriate logit specifications. Thus, with the aid of logit regression one is able to say how changes in the independent variables multiply or increase the odds of falling into state A of a dichotomous dependent variable versus category B of the same variable, holding everything else constant (Swafford, 1980).

Log-linear models on the other hand predict the logrithm of a certain quantity using a linear or multiplicative combination of predictor variables. (Swafford, 1980; Knoke and Burk, 1980). Hence, it is possible to work in either additive or multiplicative form. the logit coefficients for a specified hypothesis using log-linear modeling are derived by doubling "those terms in the log-linear equation which involve the (substantive) dependent variable, and disregard the others" (Swafford, 1980:674). This is a principle which has been mathematically proven to hold true and has been discussed extensively in the literature, particularly by Goodman. (See Swafford's discussion of this, 1980:672).

To illustrate how logit and log-linear equations are related, the following example is set forth. Assume that we want to study the impact of Age (A), Sex (S), and nativity (N) on the odds of being dead, versus being alive (D), logit analysis treats (D) as the dependent variable, A,S,N as independent attributes. Thus, (D) is dependent on the linear combination of (A), (S), (N) and their interactions.

Further, suppose that we wish to test the hypothesis that Age (A), Sex (S) and Nativity (N) affect (D) independently, and the interaction (AS) also influences the odds of being dead as against being alive.

In the convention of logit analysis via log-linear modeling, the following marginals (model) must be fitted to the data (specified):

[DN] [DAS] [ASN] ....(1)

Because log-linear models are based on the principle of hierarchy (nested models), all the lower order terms in (1) are implied:

[D][A][S][N][DA][DS][DN][AS][AN][SN][DAS][ASN] ...(2)

However, since we are particularly interested in a logit model (versus a log-linear model in which no distinction is made between dependent and independent variables) all the terms which do not involve the dependent variable D, have no substantive relevance. Hence, the logit model of interest reduces to:

[D][DA][DS][DN][DAS][ASN] ...(3)

which is the same as the short form representation in (1) above. Note that the term [ASN] is included even though it does not contain D, the dependent variable; it represents the second-order interaction among the three independent variables in the logit model. The reason for its inclusion pertains to the fact that, as in ordinary regression, the correlations (interrelationships) among all the independent variables must be taken into account even though they do not explicitly appear in the equation. Thus [ASN], because it implies all its lower terms [AS], [AN] and [NS] -- which are analogous to zero-order correlations -- must always be included into the process of fitting logit models involving the dependent variable D and independent factors A, S and N.

As is the case with log-linear models, logit analysis is based on analyzing the log of the odds, thus called logit. Conventionally, the odds are analogous to the traditional cross-product ratio in contingency table analysis. Parameters in both log-linear and logit models are estimated by the log odds of the expected frequencies generated by models fitted to the observed data. it is not practical to provide a detailed technical discussion of the estimation process, it suffices to say that the parameters are estimated by maximum-likelihood techniques. Substantivelly this means the best possible, most efficient, statistical solution that can be obtained by a hypothesized model, which when applied to the data, provides the least error in predicting the observed frequencies in a multiway contingency table. In the technical sense maximum-likelihood involves estimating the cell frequencies on the basis of specified fitted marginals through an iterative process so that the cell frequencies eventually conform (add up) as far as possible, to the specified fitted marginals. Tests of significance can be carried out to ascertain whether the expected frequencies generated by this approach deviate significantly from the observed counts.

In order to calculate the odds of being dead as opposed to alive with the model in (1), the conditional odds of the two classes of the dependent variable are determined by the multiplicative model:

$$\frac{F_{1_{ijk}}}{F_{2_{ijk}}} = \frac{\eta\,\tau A_i\,\tau S_j\,\tau N_k\,\tau D_1A_i\,\tau D_1S_j\,\tau D_1N_k\,\tau AS_{ij}\,\tau AN_{ik}\,\tau SN_{jk}\,\tau D_1AS_{ij}\,\tau ASN_{ijk}}{\eta\,\tau A_i\,\tau S_j\,\tau N_k\,\tau D_2A_i\,\tau D_2S_j\,\tau D_2N_k\,\tau AS_{ij}\,\tau AN_{ik}\,\tau SN_{jk}\,\tau D_2AS_{ij}\,\tau ASN_{ijk}} \quad \ldots (4)$$

where:

F_{1ijk}/F_{2ijk} = the odds (based on the expected frequencies) of being dead as opposed to alive; where 1 corresponds to alive, and 2 to dead;

τ = the grand mean (theta);

η = symbol for parameter (tau);

D_1 = the first category of the dependent variable;

D^2 = the second category of the dependent variable;

A_i = the categories of age;

S_j = the categories of sex;

N_k = the categories of nativity

In agreement with logit analysis, if the terms which do not involve D the dependent variable, are cancelled out, equation (4) reduces to:-

$$\frac{F_{1_{ijk}}}{F_{2_{ijk}}} = \frac{\tau_{D_1}\,\tau_{D_1A_i}\,\tau_{D_1S_k}\,\tau_{D_1N_k}\,\tau_{D_1AS_{ij}}}{\tau_{D_2}\,\tau_{D_2A_i}\,\tau_{D_2S_k}\,\tau_{D_2N_k}\,\tau_{D_2AS_{ij}}} \quad \ldots.(5)$$

Note the omission of ASN_{ijk} from equation (5): it is not necessary to show it in the equation; however, when fitting the appropriate marginals, as in (1), this term must be fitted.

Equations (4) and (5) are shown in multiplicative terms. They can be restated in additive logit form by taking the logrithims of the parameters involving D_1 only and multiply by 2. For example, (5) would become:

$$\mathrm{Ln}\,\frac{F_{1ijk}}{F_{2ijk}}=2\mathrm{Ln}^{\tau}D_1+2\mathrm{Ln}^{\tau}D_1A+2\mathrm{Ln}^{\tau}D_1S+2\mathrm{Ln}^{\tau}D_1N+2\mathrm{Ln}^{\tau}D_1AS+2\mathrm{Ln}^{\tau}D_1AN+2\mathrm{Ln}^{\tau}D_1SN \quad \ldots(6)$$

Due to the restriction of identifiability (the arithmetic sum of parameters for any variable equal zero), this reduces to (using only lambda parameters: $\lambda=\mathrm{Ln}^{\tau}$):

$$\mathrm{Ln}(^{F}1ijk)-\mathrm{Ln}(^{F}2ijk)=(^{\lambda}D_1-{}^{\lambda}D_2)+(^{\lambda}D_1A-{}^{\lambda}D_2A)+(^{\lambda}D_1S-{}^{\lambda}D_2S)+(^{\lambda}D_1AS-{}^{\lambda}D_2AS)+$$
$$(^{\lambda}D_1AN-{}^{\lambda}D_2AN)+(^{\lambda}D_1SN-{}^{\lambda}D_2SN)$$

Once the au parameters have been transformed to Lambda parameters the algebraic quantity of any effect parameter when transformed to its logrithim reflects the difference between the categories of the independent variables in the expected odds (e.g. Native = -.09; Foreign = +.09; the algebraic difference is .18 and the arithmetic difference is zero).

Equation (6) can be expressed in more familiar regression notation, as suggested by Goodman (1972):

$$\Phi_{ijk} = B^{D}+B_i^{DA}+B_j^{DS}+B_k^{DN}+B^{DAS} \quad \ldots(7)$$

where:

Φ_{ijk} = the log of the expected odds on the dependent variable (dead vs. alive);

B^D = a constant term;

B_i^{DA} = the arithmetic average of logits for being dead, across all categories of age (A_i);

B_j^{DS} = the arithmetic average of logits for being dead, across all categories of sex (S_j);

B_k^{DN} = the arithmetic average of logits for being dead, across all categories of nativity (N_k);

B_{jk}^{DAS} = the arithmetic average of logits for being dead, across all categories of the interaction of age and sex (AS_{jk}).

In substantive terms equation (7) says: the odds of being dead as opposed to being alive depends on the linear combination of age, sex, nativity and the interaction of [illegible] and sex.

Usually, specific hypothesized models are tested against a baseline model which assumes the effects of the relevant factors to be nil. In logit analysis an appropriate baseline model is [D] [ASN]. This implies that the following terms are set to zero; that is, no effect (if working in multiplicative form, they would be set to 1.00):

$$DA=DS=DN=DAS=DSN=DAN=DASN=0$$

In other words, all the relationships between D, the dependent variable, and the independent variables, in addition [illegible] the interactions, are fixed as being absent. A series of alternative hypotheses (models) involving the relevant te[illegible] can be tested against the baseline model to ascertain the impact of adding any relevant term(s) in reducing the er[illegible] in prediction. Either the Pearson Chi-square statistic [illegible] or the likelihood-ratio statistic (L^2), may be applied. [illegible] most purposes L2 is preferred.

$$L^2 = 2\Sigma\ f_{ij}\ L_n\ (f_{ij}/F_{ij})$$

where:

L^2 = likelihood-ratio statistic;
f_{ij} = observed conditional frequency;
F_{ij} = expected conditional frequency;
L_n = logrithim.

A large L^2 implies that, given its degrees of freedom, the expected frequencies depart from the observed cell counts significantly. Hence, one would conclude that the hypothesized model does not fit the data and must be rejected in favour of an alternative one. Thus, the smaller the L^2, the greater the fit between a hypothesized model and the actual cell frequencies.

The difference between L^2 due to a base model and L^2 due to alternative models may be tested with the following formula when large samples (over 2000 cases) are analyzed:

$$\frac{L^2\ \text{BASELINE MODEL} - L^2\ \text{ALTERNATIVE MODEL}}{L^2\ \text{BASELINE MODEL}}$$

L^2 is chi-square distributed with degrees of freedom equal to the number of parameters set to zero (those terms fixed as not having any impact on the depedent variable).

The sum (not the algebraic difference) of the B coefficients pertaining to the categories of a given independent variable is always zero. For example, assuming that nativity, which acts on D, has two categories: native-born and foreign-born and the corresponding odds are 1.257 and .795 respectively. The Beta effects, when transformed are: $2L_n$ 1.257=.458, and $2L_n$.795 = -.458. Thus, the sumation of the two logits equals zero. This principle holds true for polytomous independent variables as well. (See Goodman, 1970; 1972 and Davis, 1974). The substantive interpretation of the above effects would be: being native-born raises the odds of dying by .458 as opposed to lowering the odds of dying by -.458 for the foreign-born.

Several computer programs exist to facilitate logit analysis (e.g., ECTA by Goodman, C-TAB by Haberman, 1974; GSK by Grizzle et al., MULTIQUAL by Bock, 1973). For the purposes of this study it was decided to apply the log-linear models subroutine available in the BMDP package. The following models have been included as examples to clarify further the discussion above:

MODEL (MARGINALS FITTED)	HYPOTHESIS IMPLIED
1. [ASNT] [D]	All categories of the independent variables possess some risk of dying [BASELINE MODEL];
2. [ASNT] [DA]	Only age directly affects the odds of dying;
3. [ASNT] [DS]	Only sex directly affects the odds of dying;
4. [ASNT] [DT]	Only time directly affects the odds of dying;
5. [ASNT] [DN]	Only nativity directly affects the odds of dying;
6. [ASNT] [DA] [DS]	Age and sex affect the odds of dying independently;

7. [ASNT][DA][DS][DN] Age, sex and nativity affect the odds of dying independently;

8. [ASNT][DA][DS][DT] Age, sex and time affect the odds of dying independently;

9. [ASNT][DA][DS][DT][DN] Age, sex, time and nativity affect the odds of dying independently;

10. [ASNT][DTN][A][S] The interaction of time and nativity affect the odds of dying independently of age and sex;

11. [ASNT][DAT][DN][DS] The interaction of time and age affect the odds of dying independently of nativity and sex;

12. [ASNT][DST][DA][DN] The interaction of sex and time affect the odds of dying independently of age and nativity;

13. [ASNT][DAST][DN] The interaction of age, sex and time affect the odds of dying independently of nativity;

14. [ASNT][DASN][DT] The interaction of age, sex and nativity affect the odds of dying independent of time;

15. [ASNT][DATN][DS] The interaction of age, time and nativity affect the odds of dying independenly of sex;

16. [ASNT][DAS][DT][DN] The interaction of age and sex affect the odds of dying independently of time and nativity;

3.12 Operationalization of Hypotheses

In the case when one is fitting logit models to a sample, it becomes important to test for the efficacy of alternative models as was discussed above. Test of significance for the parameters may be employed as well. In our case, we are dealing with complete populations and these aspects of statistical analysis are less crucial. Instead of selecting best fitting models, it was decided to fit the model specifying main effects only. That is, a model containing the odds of dying as the dependent variable with age, sex, time and subpopulation membership (ethnicity/nativity) as the independent variables. Such a model is analogous to a multiple regression equation containing all main effects.

For the most part, such a model is sufficient to test the hypotheses. The magnitude and direction of parameters may be observed and interpreted in the light of the hypothesized relationships specified in Chapter Two. However, interaction terms will be included whenever necessary, such as in the case of the assimilation thesis which posits that there is an independent interaction of ethnicity/nativity with time affecting the odds of dying.

A main effect model is theoretically justified. It is a well established fact that age and sex have independent influences on mortality. Similarly, it can be argued that time <u>per se</u> exerts an independent influence on survivorship. The real unknown is the variable reflecting ethnic/nativity subpopulation membership. In this thesis it is expected that this variable too, has independent effects on mortality.

CHAPTER IV

MORTALITY DIFFERENTIALS: GENERAL MORTALITY

One of the unknowns in Canadian demography pertains to mortality variations between native and foreign-born populations. Table 4.1 suggests that as far as crude rates are concerned, foreigners in Canada have consistently experienced greater risks in the face of death.

The native-born crude rates were 8.48 and 6.82 for males and females respectively in 1951. They declined to 7.66 and 5.60 in 1964, and by 1971, indigenous males had a crude death rate of 7.06 while the females of Canadian birth showed 5.04 deaths per 1000 population. In all three periods of observation the immigrants experienced rates which were more than twice of the native-born. Further comparisons are possible by contrasting the period-sex specific totals for Canada as a whole. For example, indigenous males and females have always had lower rates than the period-sex specific totals, while foreigners have followed a pattern of excess mortality as expressed by crude rates.

However, crude rates are affected by age and sex composition and we know that immigrants have unusual distributions in these variables due to the selective nature of

TABLE 4.1 CRUDE DEATH RATES FOR THE NATIVE AND FOREIGN-BORN, 1951, 1964 AND 1971

Year	Native-Born		Foreign-Born	
	Male	Female	Male	Female
1951	8.48	6.82	19.74	13.88
1964	7.66	5.60	16.45	11.02
1971	7.06	5.04	17.37	12.46

TOTALS

Year	Male	Female	TOTAL
1951	10.21	7.81	9.00
1964	8.94	6.43	7.68
1971	8.64	6.17	7.40

immigration. The rates in Table 4.1 are no doubt partly a reflection of this fact. In order to evaluate further the relationship between nativity and longevity, a series of life tables were computed and they are exhibited in Appendix I. For the present task, it was decided to inspect the life expectancies associated with the two populations of interest by age, sex and period. These figures are displayed in Table 4.2.

Foreigners, in relation to the native-born, have experienced slightly higher life expectations at age zero with the exception that in 1971, women of either nativity showed no significant difference in this measure of longevity. For example, in 1950-52, immigrant men had a life expectancy of 66.41; in 1964 this increased to 69.09, and in 1971 it rose to 69.64. By comparison, the Canadian born males showed figures of 66.03, 68.06 and 69.22 in 1951, 1964 and 1971 respectively.

Concerning females' life expectancies over time the same type of pattern prevailed in 1951 and 1964 only, with the foreigners having higher levels of longevity at age zero. A contrast between indigenous and immigrant women reveals that the latter enjoyed 1.5 and 0.37 years longer life expectancies at age zero during 1951 and 1964 respectively.

In terms of the age patterns of mortality derived from the previous table and corresponding life tables in Appendix I, it may be concluded (1) females have lower probabilities

TABLE 4.2 LIFE EXPECTANCIES AMONG THE NATIVE AND FOREIGN-BORN POPULATIONS, CANADA, 1951, 1964 AND 1971

	1951*				1964*				1971*			
	NB		FB		NB		FB		NB		FB	
AGE	M	F	M	F	M	F	M	F	M	F	M	F
0	66.03	70.37	66.41	71.89	68.06	76.16	69.09	76.53	69.22	76.54	69.64	76.45
1	67.95	71.89	67.49	72.63	69.08	76.84	69.90	76.99	69.70	76.77	69.81	76.39
5	64.75	68.66	64.06	68.97	65.46	73.17	66.25	73.21	65.90	72.96	65.97	72.47
10	60.06	63.90	59.43	64.25	60.67	68.29	61.54	68.42	61.08	68.09	61.26	67.65
15	55.30	59.07	54.81	59.45	55.78	63.39	56.70	63.53	56.23	63.20	56.54	62.81
20	50.67	54.29	50.40	54.78	51.07	58.54	52.10	58.70	51.63	58.38	52.02	58.03
25	46.12	49.55	46.01	50.03	46.49	53.67	47.49	53.84	47.10	53.54	47.48	53.19
30	41.50	44.82	41.46	45.25	41.80	48.80	42.73	48.95	42.45	48.72	42.79	48.32
35	36.90	40.14	36.86	40.52	37.15	44.00	37.97	44.06	37.81	43.95	38.08	43.49
40	32.36	35.53	32.33	35.90	32.57	39.27	33.28	39.26	33.23	39.24	33.40	38.70
45	27.97	31.03	27.92	31.40	28.15	34.48	28.74	34.58	28.82	34.65	28.87	34.02
50	23.82	26.72	23.74	27.01	23.94	29.84	24.21	29.92	24.61	30.17	24.54	29.46
55	19.98	22.55	19.84	22.78	20.03	25.50	20.21	25.44	20.71	25.87	20.45	24.10
60	16.56	18.62	16.30	18.75	16.52	21.30	16.47	21.24	17.13	21.77	16.75	20.95
65	13.40	14.99	13.12	15.04	13.37	17.31	13.24	17.29	13.98	17.91	13.46	16.94
70	10.47	11.69	10.27	11.63	10.[illegible]9	13.87	10.20	13.58	11.22	14.34	10.63	13.31
75	7.94	8.84	7.74	8.69	8.26	10.40	7.74	10.27	8.85	11.18	8.22	10.01
80	5.89	6.54	5.69	6.35	6.46	7.70	5.95	7.56	6.85	8.55	6.26	7.58
85	4.32	4.82	4.02	4.56	4.90	5.67	4.63	5.55	5.40	6.55	4.68	5.92

* Three year averages

of dying in relation to men; (2) with the exception of 1971, foreign women possessed the most advantaged position with respect to life expectancy across all ages; (3) in 1971, indigenous women were most superior in longevity over all; (4) among males in 1951, the foreigners had consistently lower life expectancies over all classes of age except at age zero; in 1964, this actually reversed with foreigners actually showing higher levels of longevity up to age 60; in 1971, the same pattern prevailed but the immigrants' superiority over the indigenous men was evident only up to age 50; these same contrasts among females suggest that in 1951, the foreign-born component enjoyed greater life expectations at every age except at ages 70 and above; the same pattern was evident in 1964, with the exception that by age 60, the native-born had surpassed the immigrants in longevity; in 1971, the indigenous women had higher life expectancies at every age.

The most consistent trend in these data is the fact that immigrants generally enjoy a higher or virtually equal life expectancy at age zero regardless of year or sex. Beyond this, it is not possible to make consistent generalizations without perhaps risking overstating the facts. For example, life expectancy at age 40 -- a measure which has been used to compare native and foreign-born mortality (e.g. Kliewer, 1979) -- is not always a consistent indicator because in some cases it provides evidence for greater longevity among immigrants while in other cases it suggests greater life expectancy among the indigenous Canadian born population.

From the perspective of this thesis it is important to focus our attention to the various subpopulations within the native and foreign-born components in Canada. It is quite possible that the dichotomy based on nativity may actually mask more pronounced differentials which may exist among the various groups that are contained within the foreign-native classification.

4.1 Subgroup Differences in General Mortality

Table 4.3 shows crude death rates for the eight subpopulations in this study. Among males, Native Indians clearly standout as having the highest rates in 1951 and 1964. In 1971, French native-born men had the highest crude rate among native-born males. This would seem to suggest that significant improvements among Native Indians have taken place. But in the case of French Canadians, their relative position over the three periods of study implies a less optimistic evaluation. The British male rates fall at intermediate positions between French and Residual native-born who have the lowest crude rates among the indigenous males.

Among foreign males, the overall pattern is less systematic. In 1951 "Other" foreigners had a very high crude rate of mortality (38.91); however, it declined significantly in 1964, and by 1971, they were lowest in this regard. The British and American males have shown very

TABLE 4.3 CRUDE DEATH RATES AMONG EIGHT SUBPOPULATIONS BY SEX AND YEAR (RATES PER 1000)

SUBPOPULATION	1951*		1964*		1971*	
NATIVE-BORN	M	F	M	F	M	F
FRENCH	9.00	6.97	9.15	6.63	9.34	6.58
BRITISH	8.67	6.91	7.08	5.12	6.30	4.29
INDIAN	20.71	16.98	13.02	9.97	7.24	5.40
RESIDUAL	6.48	5.21	5.19	4.40	4.85	4.11
FOREIGN-BORN						
BRITISH	23.65	16.31	23.63	15.89	25.47	17.89
U.S.A.	18.54	12.43	23.34	15.19	25.24	17.14
OTHER EUROPE	15.04	10.58	11.29	6.92	13.45	8.64
OTHER	38.91	36.14	17.09	8.30	10.04	8.83

* Three year averages around the year shown.

similar rates over time; their rates converged in 1964. The other European men have had relatively low crude rates of mortality.

The crude rates corresponding to women tend to follow a similar general pattern as their male counterparts. For example, the Native Indians show extremely high rates in 1951 and 1964; and although they experienced accentuated declines in mortality, in 1971 they ranked second highest behind the French.

Immigrant women reflect a similar pattern to that noted earlier corresponding to male foreigners. In the first two points of observation the "Other" foreign-born had very high rates; as time progressed they declined to a level which is almot coterminous with other Europeans, who evidently demonstrate consistency in their relatively low rates over time.

The crude death rates associated with the subgroups in this study suggest that mortality variations are more prevalent in Canada than it is commonly believed. Not only are there important inequalities based on sex, but substantial variation among different subpopulations exist as well. The crude rates belonging to the foreign components are generally greater in magnitude in relation to the four native-born categories. This confirms our earlier observation in Table 4.1. In fact, foreign-born such as British and United States in particular surpass the Native Indians. This is surprising. It remains to be seen however, to what extent these differentials can be attributed to age-sex composition and the independent influence of belonging to the subgroups *per se*.

4.2 Male Differences in Mortality

Tables 4.4 to 4.11 display age-sex specific death rates among the eight categories of ethnicity/nativity over three points in time. Some of the main generalizations from these tables will be highlighted below.

4.2.1 1951 Period

During 1951 the Native Indians suffered the highest incidence of infant and childhood mortality combined (age 0-4), with 56.50 deaths per 1000. This was followed by United States immigrants, French Canadians and "Other" foreign-born. Their corresponding rates were 18.60, 15.38 and 14.52 respectively. The lowest likelihood of mortality at ages 0-4 were associated with Other Europe foreigners, British foreign-born and British native-born groups respectively.

The differentials at subsequent ages tend to be less pronounced. But Native Indians, "Other" foreign-born and Residual native-born stand out by virtue of their higher rates in relation to most of the other subpopulations. Age-specific rates beyond age 65 are generally highest among Residual native-born, "Other" foreigners and Native Indians. The remaining groups fall intermediate to the

TABLE 4.4 AGE-SPECIFIC DEATH RATES AMONG FRENCH NATIVE-BORN, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	15.38	11.55	7.85	5.94	5.67	[illegible]
5-9	1.14	.77	.95	.56	.79	[illegible]
10-14	.91	.56	.65	.38	.67	[illegible]
15-19	1.43	.86	1.46	.60	1.81	[illegible]
20-24	1.95	1.08	2.01	.63	2.46	[illegible]
25-29	2.09	1.43	1.66	.73	1.92	[illegible]
30-34	2.32	1.83	2.04	1.14	2.23	[illegible]
35-39	2.97	2.46	2.99	1.62	2.78	[illegible]
40-44	4.48	3.47	4.54	2.83	4.92	[illegible]
45-49	7.18	5.31	7.52	3.93	7.68	[illegible]
50-54	11.60	7.49	13.35	[illegible]	13.10	[illegible]
55-59	17.15	11.44	20.86	10.00	20.94	[illegible]
60-64	25.61	17.36	31.30	16.82	32.90	[illegible]
65-69	35.76	27.86	44.88	27.20	49.69	[illegible]
70-74	55.45	46.04	68.72	45.53	72.32	[illegible]
75-79	86.89	74.29	109.91	82.51	106.74	[illegible]
80-84	137.35	124.92	159.99	136.59	157.59	[illegible]
85+	228.83	211.21	275.96	271.50	273.40	[illegible]

TABLE 4.5 AGE-SPECIFIC DEATH RATES AMONG BRITISH NATIVE-BORN, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	6.30	6.13	5.72	3.93	3.28	2.36
5-9	.77	.49	.44	.28	.34	.28
10-14	.68	.40	.37	.18	.32	.21
15-19	1.22	.58	.92	.37	1.03	.38
20-24	1.61	.67	1.35	.40	1.33	.38
25-29	1.38	.80	1.13	.39	1.07	.44
30-34	1.73	1.10	1.36	.58	1.16	.61
35-39	2.19	1.68	1.84	.92	1.67	.90
40-44	3.63	2.50	2.91	1.55	2.72	1.48
45-49	5.90	3.97	4.54	2.47	4.23	2.13
50-54	9.61	5.61	7.22	4.02	7.15	3.40
55-59	14.83	8.51	12.23	5.34	10.95	5.02
60-64	22.19	14.15	18.65	8.25	16.77	8.18
65-69	31.05	21.79	29.29	13.93	29.34	13.24
70-74	48.18	36.74	46.04	24.97	42.64	21.78
75-79	77.14	62.82	71.09	44.95	61.91	33.29
80-84	121.67	104.44	106.80	76.30	90.76	54.60
85+	216.42	193.16	181.10	153.80	143.59	101.37

TABLE 4.6 AGE-SPECIFIC DEATH RATES AMONG NATIVE INDIANS

1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951		1964		1971	
	M	F	M	F	M	F
0-4	56.50	42.58	34.02	26.94	11.70	9.31
5-9	5.40	4.61	2.11	1.12	1.00	.61
10-14	4.60	3.60	1.22	.65	.99	.62
15-19	7.67	5.98	2.92	1.70	3.09	1.32
20-24	9.77	7.47	5.09	1.97	4.88	1.98
25-29	9.65	7.27	4.66	2.52	4.91	3.05
30-34	9.25	7.48	5.49	4.55	4.14	3.49
35-39	9.27	8.32	5.85	6.60	4.94	5.66
40-44	11.08	10.49	8.01	5.67	6.59	6.08
45-49	13.78	12.27	9.01	7.54	8.38	6.63
50-54	13.90	12.80	12.93	8.15	10.42	6.95
55-59	15.51	17.80	17.39	11.55	12.64	8.19
60-64	32.05	19.47	24.60	18.69	17.40	11.30
65-69	44.62	31.19	34.59	25.08	26.91	17.14
70-74	74.71	48.78	50.14	27.12	39.07	23.29
75-79	97.86	68.56	84.78	59.06	61.26	37.54
80-84	153.87	96.46	118.68	91.13	80.21	47.91
85+	270.46	193.46	210.55	220.00	104.30	103.31

TABLE 4.7 AGE-SPECIFIC DEATH RATES AMONG RESIDUAL NATIVE-BORN, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	12.26	9.93	4.43	3.96	3.72	3.35
5-9	.93	.69	.41	.35	.38	.22
10-14	.72	.61	.37	.29	.39	.26
15-19	1.26	.75	.92	.54	1.29	.51
20-24	1.80	1.14	1.41	.63	1.72	.47
25-29	1.77	1.26	1.16	.67	1.33	.63
30-34	2.21	1.44	1.49	.96	1.56	.99
35-39	2.92	2.10	2.06	1.58	2.11	1.40
40-44	4.54	3.46	3.41	2.40	3.44	2.42
45-49	7.44	6.35	5.84	3.95	5.41	3.94
50-54	15.27	14.17	11.05	7.67	9.07	5.82
55-59	37.83	39.43	18.34	12.57	14.24	9.90
60-64	88.67	67.47	36.60	32.56	24.41	15.90
65-69	143.54	100.12	75.46	72.40	39.93	23.68
70-74	181.47	121.22	156.08	197.58	75.47	72.72
75-79	350.80	226.68	300.98	342.51	160.60	190.31
80-84	454.52	288.15	349.66	312.20	426.97	441.80
85+	551.03	454.36	422.42	434.34	434.64	463.38

TABLE 4.8 AGE-SPECIFIC DEATH RATES AMONG BRITISH FOREIGN-BORN, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	6.10	4.30	6.56	3.85	2.86	1.66
5-9	1.10	.80	.52	.39	.84	[illegible]
10-14	1.66	.83	.45	.33	.69	.31
15-19	2.89	.64	1.50	.66	1.63	.62
20-24	1.87	.93	1.72	.48	1.47	.40
25-29	1.89	.86	.63	.32	1.34	.50
30-34	1.87	1.32	.84	.37	1.08	.60
35-39	2.57	1.90	1.73	.79	1.33	.92
40-44	3.45	3.07	2.89	1.81	2.78	1.71
45-49	6.15	4.40	3.46	2.53	5.17	2.94
50-54	10.42	5.82	7.36	3.57	8.47	4.76
55-59	16.03	8.94	13.64	6.60	15.04	7.03
60-64	24.28	14.40	23.43	10.48	24.01	10.38
65-69	35.17	22.45	29.76	16.15	37.33	16.46
70-74	53.59	38.51	45.19	25.70	54.93	26.27
75-79	86.89	68.98	81.38	47.81	85.04	44.27
80-84	135.22	115.88	126.07	87.64	120.62	76.39
85+	243.54	207.64	188.89	161.34	199.22	169.88

TABLE 4.9 AGE-SPECIFIC DEATH RATES AMONG UNITED STATES IMMIGRANTS, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	18.60	13.49	9.26	7.96	7.82	7.34
5-9	1.09	.99	2.32	1.08	1.55	.87
10-14	1.00	.53	1.35	.95	1.76	1.08
15-19	2.79	2.14	3.35	.92	4.53	1.59
20-24	2.94	1.06	4.22	1.14	4.76	1.06
25-29	2.68	1.16	2.89	.97	3.33	1.00
30-34	2.11	1.08	2.47	.98	3.91	1.47
35-39	3.58	2.41	4.72	1.76	4.04	1.60
40-44	4.94	3.36	4.51	2.28	5.74	3.26
45-49	7.38	4.24	6.97	3.05	9.56	4.20
50-54	9.81	7.08	11.31	5.04	14.90	6.07
55-59	16.37	9.49	18.15	8.62	21.78	10.70
60-64	24.32	15.17	24.87	13.86	26.34	10.87
65-69	39.10	25.84	33.74	19.84	39.46	20.88
70-74	56.08	43.02	55.08	33.73	56.93	30.78
75-79	88.75	73.24	86.97	53.33	86.06	42.62
80-84	147.01	127.08	124.04	101.07	115.28	90.81
85+	278.87	259.23	199.37	162.76	212.04	180.08

TABLE 4.10 AGE-SPECIFIC DEATH RATES AMONG OTHER EUROPEAN FOREIGN-BORN

1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	5.64	4.09	4.55	3.01	3.04	1.83
5-9	1.37	.89	.82	.45	.68	.46
10-14	1.31	.64	.45	.25	.85	.35
15-19	2.07	.82	1.25	.50	1.44	.60
20-24	2.33	.89	1.32	.42	1.77	.52
25-29	1.85	.79	1.10	.43	1.24	.47
30-34	2.04	1.16	1.07	.42	1.35	.59
35-39	2.42	1.77	1.49	.92	1.79	.82
40-44	3.70	2.64	2.73	1.52	2.79	1.26
45-49	5.88	3.64	2.93	1.62	4.46	2.10
50-54	9.49	5.82	5.74	3.37	6.67	3.70
55-59	15.09	9.42	10.53	5.98	11.57	5.72
60-64	23.04	15.42	20.82	10.10	19.88	9.24
65-69	35.01	24.14	28.16	15.71	33.15	16.61
70-74	52.48	40.59	45.18	28.32	52.99	30.05
75-79	83.30	67.60	79.11	54.52	79.09	59.01
80-84	127.11	107.12	121.28	90.82	127.12	99.63
85+	234.87	211.72	180.83	150.40	232.07	190.80

TABLE 4.11 AGE-SPECIFIC DEATH RATES AMONG OTHER FOREIGN-BORN, 1950-52; 1963-65 AND 1970-72

(RATES PER 1000)

AGE	1951 M	1951 F	1964 M	1964 F	1971 M	1971 F
0-4	14.52	12.52	7.88	5.47	2.43	2.11
5-9	2.07	1.13	.62	1.16	.92	.55
10-14	.88	0.00	.50	.40	.82	.56
15-19	1.40	2.37	1.26	.14	1.50	.66
20-24	6.60	3.47	1.70	.52	1.30	.74
25-29	5.90	3.60	1.08	.42	1.21	.50
30-34	8.10	4.00	1.70	1.00	1.40	1.36
35-39	8.70	4.90	1.98	1.15	2.03	2.62
40-44	9.20	6.19	3.62	2.38	2.82	4.35
45-49	14.17	13.77	6.28	3.94	5.54	9.49
50-54	18.70	15.75	11.22	5.90	9.92	9.73
55-59	30.24	25.61	24.26	13.89	18.64	13.97
60-64	44.14	56.99	38.37	15.06	30.53	20.83
65-69	66.26	98.29	52.53	22.65	52.48	36.90
70-74	92.55	210.83	81.80	51.93	77.72	56.61
75-79	154.28	323.70	127.05	111.91	110.30	94.23
80-84	299.14	707.62	172.78	168.98	176.42	174.60
85+	540.00	934.74	299.06	304.21	302.21	328.70

above and the British Native-born, who occupy the lower end of the mortality range.

4.2.2 1964 Period

In 1964, Native Indians maintained the highest rates at ages 0-4. The "Other" foreign-born followed but with a considerably lower incidence of mortality at age 0-4. United States and French Canadians displayed relatively high rates as well. The lowest mortality rates at the youngest age class was associated with Other Europeans and Residual native-born.

Over the remainder of the age distribution of mortality "Other" foreigners, Residual native-born, and the French had relatively greater incidences of age-specific mortality. As age advances, the differentials among groups tend to widen considerably. In the case of Native Indians, rates at older ages are lower than all other groups. This will be discussed later in greater detail as it demands separate attention.

4.2.3 1971 Period

The rates in 1971 are substantially lower overall than the previous two points of analysis. Nevertheless, significant differentials are noticeable. Among the younger age classes, Native Indians had a greater incidence of death than any other group. United States immigrants and French

Canadians had similarly high rates of mortality. On the other hand, British foreigners and their native-born counterparts generally enjoyed a more favourable mortality experience than the other groups in this study.

4.3 Female Differences in Mortality

4.3.1 1951 Period

The rates among women are much lower than those observed in connection with males. In 1951, women of Native Indian ancestry generally had greater risks of dying in comparison to other subpopulations. What is clearly evident is the relative distance between the Native Indian rates and the other subgroups who experienced relatively high age-specific mortality: "Other" foreign-born and United States immigrants. Another important highlight is that the indigenous British had very low rates beyond age 0-4. As is true for males, female immigrant mortality at older ages is generally higher than the native-born subpopulations.

4.3.2 1964 Period

As in the previous year, Native Indian females continued to show the highest incidences of mortality within the age classes 0-4 through 40-44. Beyond age 60, it was the Residual Native-born that displayed the greatest disadvantages in the face of mortality. French Canadians were generally third highest in their rates while the British indigenous population actually enjoyed the most advantaged position.

4.3.3 1971 Period

The pattern in the first three age classes does not differ greatly from the previous accounts of Native Indian female mortality. Beyond age 60, "Other" foreigners and Residual native-born exhibited a greater likelihood of dying than any of the remaining subgroups. In general, French Canadian women had relatively high rates. The British, however, occupied the opposite position in 1971.

Concerning the Native Indians it was observed that in the periods following 1951, their age-pattern of mortality is such that beyond age 50 for men, and age 55 for females, their age-specific rates are generally lower than the other subpopulations studied in Tables 4.4 through 4.11. This situation is analogous to that reported by Thornton and Nam (1968) for blacks and whites in the United States (see also Nam et al., 1978 for an analysis of other countries). It seems that some high mortality populations, which have characteristically high death rates at infancy and middle life, actually display lower probabilities of dying at older ages thus accounting for a "crossover" effect. Although much study is needed to untangle the causal sources of this phenomenon, Nam et al., (1978:306) suggest that it "is probably a result of some type of selection in survival patterns". Perhaps in the case of Native Indians, those persons who are able to combat the relatively high risks of dying at young and midle ages, are selected out by virtue of their ability to stay alive in their stages of the life cycle when the chance of death is most forceful. This assumes also that such individuals may be constitutionally stronger than most other persons in the general population. This aspect of Native Indian mortality will be analyzed further in Chapter V when we investigate causes of death and their relevance to the crossover effect noted here.

The United States foreigners have demonstrated unusually high death rates at ages 0-4. This was an unexpected result given what we know about United States society in general and the selective nature of immigrants. This may reflect problems of underenumeration. If this is actually the case, the rates would be inflated. There are many other possible explanations, but it is not certain what the relevant factor(s) may be given the limited information at our disposal. A further speculation may be that the numerators have been inflated due to the possibility of USA visitors aged 0-4 dying while visiting Canada.

The data pertaining to the age pattern of mortality suggests that differences in longevity have been prevalent in Canada. Although the crude rates may not be a "net" reflection of the propensity to die, the age-specific figures lend support to wide differences in the risk of dying among subpopulations in Canada. (See Appendix J for

TABLE 4.12 LIFE EXPECTANCIES AT AGE ZERO AMONG EIGHT SUBPOPULATIONS, CANADA, 1951, 1964 AND 1971*

SUBPOPULATION AND SEX	PERIOD 1951	1964	1971
MALES			
FRENCH NB	64.26	67.80	68.50
BRITISH NB	69.14	71.84	73.55
NATIVE INDIANS	47.52	59.26	66.17
RESIDUAL NB	66.41	68.22	69.23
BRITISH FB	67.28	70.32	70.52
USA	65.04	66.18	67.03
OTHER EUROPE FB	67.90	71.84	71.91
OTHER FB	64.37	66.09	68.43
TOTAL**	66.30	68.40***	69.30
FEMALES			
FRENCH NB	69.69	72.55	75.86
BRITISH NB	72.92	75.13	77.09
NATIVE INDIAN	50.72	64.89	71.44
RESIDUAL NB	71.20	73.96	75.98
BRITISH FB	72.91	76.26	76.96
USA	70.38	73.04	74.22
OTHER EUROPE FB	73.03	75.22	76.67
OTHER FB	66.72	73.10	75.00
TOTAL**	70.80	74.20***	76.40

* See Appendix J for the complete life tables.

** R. Beaujot and K. McQuillan Growth and Dualism: The Demographic Development of Canadian Society , p. 40.

*** Figure is for 1961.

further confirmation with life tables). Table 4.12 is included here to demonstrate that there have been wide disparities in the expectation of life at age zero on the basis of nativity and ethnicity. This is a further confirmation that age-sex composition differences are not solely responsible for the wide variations observed.

4.4 Multivariate Analysis

The extent to which age and sex, ethnicity, and year of observation exert independent effects on the odds of dying can be evaluated by a logit model. An appropriate specification is: [ASEY] [DA] [DS] [DE] [DY]. This is analogous to a multiple regression equation with the odds of dying as the dependent variable and age, sex, ethnicity/nativity and year as independent variables.

Table 4.13, displays the results associated with the above logit equation. The effect of year on mortality is non-trivial. In 1951, it added to the logit of the odds of dying by .116; in the subsequent two periods this was -.046 and -.120, respectively. Hence, there is an inverse relationship between time and mortality which acts independently of age, sex and subpopulation membership.

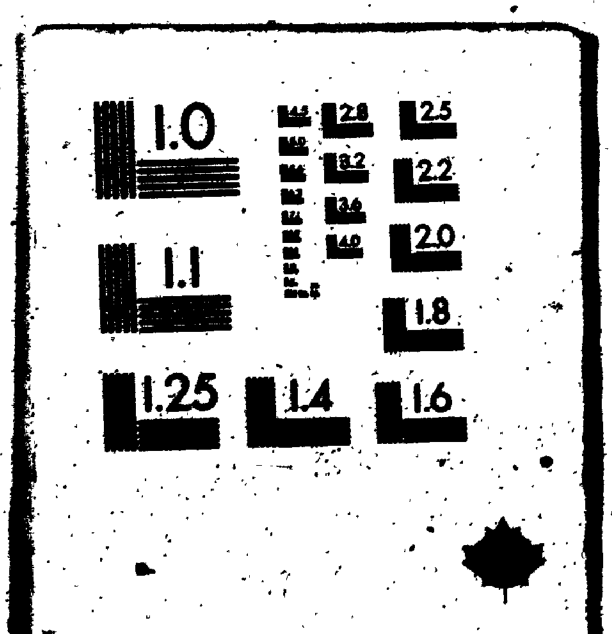
Given this effect, time is best treated as a conditioning factor. Each period will be analyzed separately with the effects of age, sex and subpopulation to be determined for their independent effect on mortality.

As expected, age and sex have strong main effects on the logit for the odds of dying, although the former

TABLE 4.13 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	α	B	η	τ
AGE				
	-4.934		.085	
0-4		-.056		.972
5-9		-2.456		.293
10-14		-2.674		.263
15-19		-1.926		.382
20-24		-1.678		.432
25-29		-1.760		.415
30-34		-1.568		.457
35-39		-1.238		.538
40-44		-.770		.680
45-49		-.326		.850
50-54		.174		1.091
55-59		.630		1.370
60-64		1.108		1.740
65-69		1.536		2.156
70-74		2.000		2.719
75-79		2.498		3.488
80-84		2.966		4.406
85+		3.540		5.870
SEX				
MALE		.212		1.112
FEMALE		-.212		.900
ETHNICITY				
FRENCH NB		.084		1.043
BRITISH NB		-.414		.813
NATIVE INDIANS		.524		1.300
RESIDUAL NB		.198		1.104
BRITISH FB		-.266		.876
USA		-.126		.939
OTHER EUROPE FB		-.276		.871
OTHER FB		.274		1.147
YEAR				
1951		.166		1.087
1964		-.046		.977
1971		-.120		.941

3



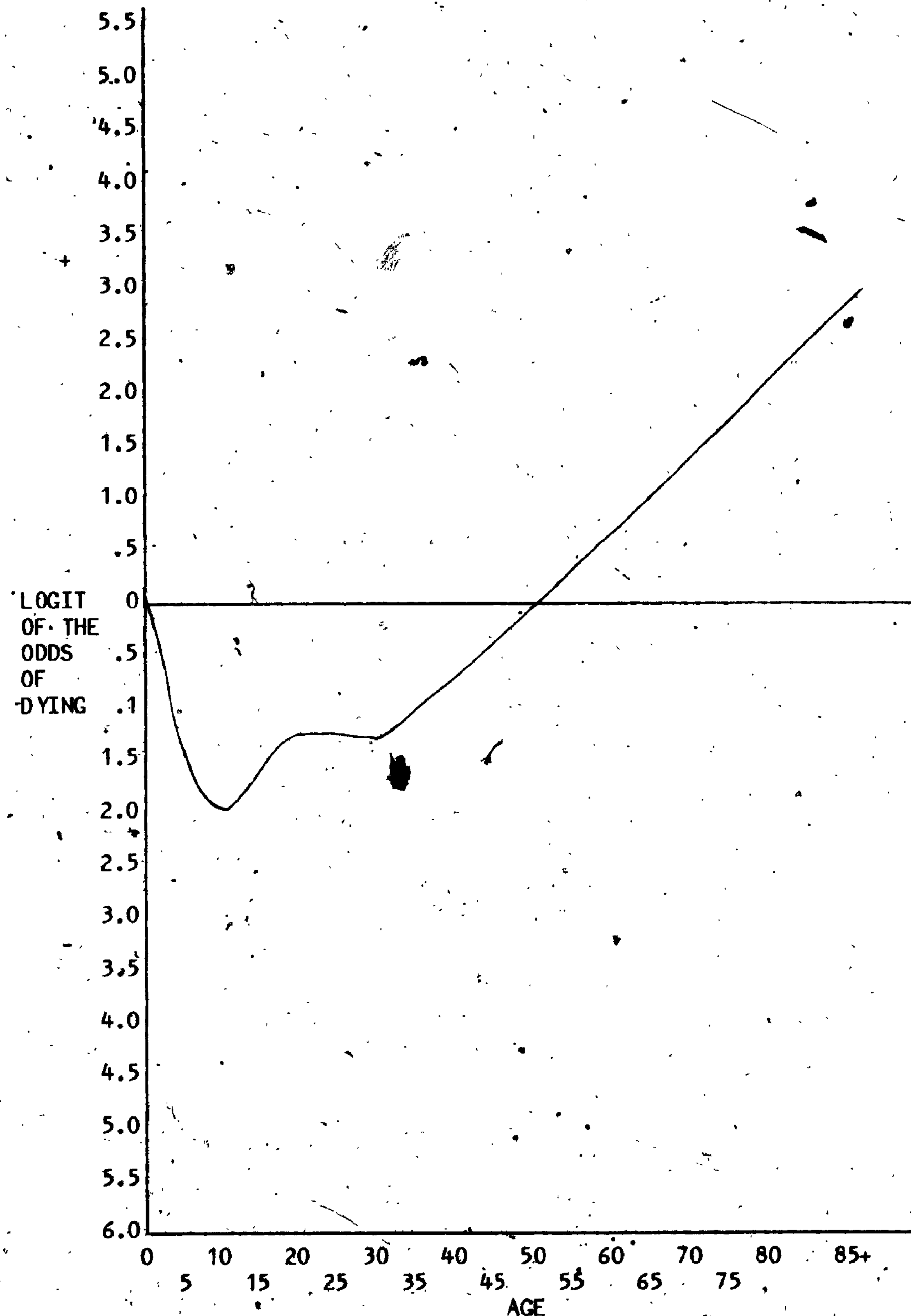


FIGURE 4.1 AGE PATTERN OF MORTALITY IN CANADA BASED ON THE LOGIT MODEL CONTAINING AGE, SEX, TIME AND ETHNICITY/NATIVITY MAIN EFFECTS

variable is definitely of greater importance than is sex. The pattern of mortality over age conforms to the theoretical curve of mortality. This is verified in Figure 4.1.

Table 4.13 shows that the British native-born, Other European immigrants and British foreigners benefit more from lower levels of mortality than the remaining groups. The extreme position is occupied by Native Indians. They experience the greatest likelihood of death in relation to others in Canada. The remaining subpopulations fall somewhere intermediate to the British Native-born and Native Indians.

Tables 4.14, 4.15 and 4.16 are included to examine the effect of sex, age and subpopulation membership on the logit of the odds of dying within the three separate points in time. The logit equations are based on the main effects model.

In general, the effects are virtually the same as was explicated earlier; what changes is the magnitude of the coefficients. In 1951, the subpopulation effects are quite strong: Indians, "Other" foreign-born and Residual native-born experienced positive increments in the likelihood of death, while being of British or of Other European origin implied a relatively lower likelihood of mortality.

The logit effects associated with ethnic/nativity subpopulation membership indicate that mortality convergence

TABLE 4.14. LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS, 1951

VARIABLES	EFFECTS: ADDITIVE α	ADDITIVE B	MULTIPLICATIVE η	MULTIPLICATIVE τ
AGE				
	-4.652		.098	
0-4		.228		1.120
5-9		-2.250		.325
10-14		-2.460		.292
15-19		-2.010		.366
20-24		-1.726		.422
25-29		-1.692		.429
30-34		-1.508		.470
35-39		-1.212		.546
40-44		-.782		.677
45-49		-.310		.856
50-54		.134		1.069
55-59		.582		1.337
60-64		1.022		1.667
65-69		1.424		2.037
70-74		1.882		2.562
75-79		2.380		3.288
80-84		2.860		4.178
85+		3.442		5.590
SEX				
MALE		.142		1.074
FEMALE		-.142		.931
ETHNICITY				
FRENCH NB		-.128		.938
BRITISH NB		-.428		.807
NATIVE INDIANS		.738		1.447
RESIDUAL NB		.190		1.100
BRITISH FB		-.308		.858
USA		-.216		.898
OTHER EUROPE FB		-.324		.850
OTHER FB		.476		1.268

TABLE 4.15 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS, 1964

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	α	B	η	τ
AGE				
	-5.048		.080	
0-4		-.118		.943
5-9		-2.500		.286
10-14		-2.800		.247
15-19		-2.016		.365
20-24		-1.744		.418
25-29		-1.874		.392
30-34		-1.626		.443
35-39		-1.248		.536
40-44		-.772		.680
45-49		.352		.839
50-54		.208		1.109
55-59		.678		1.404
60-64		1.176		1.801
65-69		1.594		2.218
70-74		2.082		2.831
75-79		2.616		3.698
80-84		3.064		4.626
85+		3.634		6.156
SEX				
MALE		.222		1.117
FEMALE		-.222		.895
ETHNICITY				
FRENCH NB		.130		1.068
BRITISH NB		-.378		.828
NATIVE INDIANS		.654		1.387
RESIDUAL NB		.256		1.136
BRITISH FB		-.324		.850
USA		-.152		.927
OTHER EUROPE FB		-.364		.834
OTHER FB		.178		1.093

TABLE 4.16 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS, 1971

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	[illegible]	B	η	τ
AGE				
	-5.108		.078	
0-4		-.444		.801
5-9		2.582		.275
10-14		-2.700		.259
15-19		-1.790		.409
20-24		-1.576		.455
25-29		-1.722		.423
30-34		-1.558		.459
35-39		-1.242		.538
40-44		-.742		.690
45-49		-.298		.862
50-54		.198		1.104
55-59		.654		1.386
60-64		1.136		1.765
65-69		1.598		2.224
70-74		2.046		2.781
75-79		2.506		3.500
80-84		2.972		4.421
85+		3.544		5.880
SEX				
MALE		.260		1.139
FEMALE		-.260		.878
ETHNICITY				
FRENCH NB		.200		1.105
BRITISH NB		-.438		.803
NATIVE INDIANS		.160		1.083
RESIDUAL NB		.176		1.092
BRITISH FB		-.164		.922
USA		-.034		.983
OTHER EUROPE FB		-.166		.920
OTHER FB		.268		1.143

has failed to occur in the census periods 1951 to 1971. Although improvements in mortality have been noted, a stratification of mortality levels has persisted in Canada. The mortality assimilation hypothesis predicts full convergence over time. The empirical indication seems to refute the applicability of this hypothesis. The subsequent section will elaborate on this in greater detail.

Interestingly, the effect of sex has increased over the years. In 1951 it was .142, a decade or so later it increased to .222, and in 1971 it changed to .260. Thus, it appears that both sex and ethnic/nativity membership have been increasingly important factors in mortality within this country. The age curve of mortality net of the other variables included in the analysis has also changed but in a less surprising manner. The most evident trend in the age patterns is the decline in infant and childhood mortality over time.

4.5 Evaluation of Hypotheses

4.5.1 Assimilation

It was argued at the onset of this study that the assimilation hypothesis would predict a convergence in mortality levels among subgroups. However, assessment of this thesis must be done differently for the native-born than the immigrant groups. Among the former groups, assimilation occurs if over time the logit effects of subpopulation membership approach zero (no difference). As we saw in connection with the analysis of life expectancy, full convergence has not materialized. The logit effects demonstrated that the Native Indian population has maintained higher levels of mortality than the British and the French; and up to 1971, the Residual native born as well. In 1971 the latter category of ethnicity was slightly above the Native Indians. The British native-born have consistently enjoyed lower levels of mortality. The French have actually encountered net losses in longevity over the twenty year study period. Overall, the results do not seem to support the mortality assimilation hypothesis among the indigenous population. This contention is evident in Table 4.13 discussed earlier. Also, substantial differences in the ethnic logits remain in the subsequent Tables 4.14 to 4.16.

This hypothesis cannot be tested in a straightforward manner among foreigners because they constitute "open" populations affected by immigration. An adequate test of assimilation requires cohort analysis, which is not possible here. As a proxy, it was decided to examine differences in mortality among ages 65 and above. The rationale for this was based on the fact that few immigrants enter Canada at ages beyond 65. Thus, persons who die within this age range are assumed to have resided in Canada for some length of time (which unfortunately cannot be controlled).

The hypothesis calls for the control of all main effects and the time-nativity interaction. Table 4.17 contains the necessary results to evaluate the assimilation hypothesis. Note that in the top panel the data have been collapsed into the dichotomy native-foreign for the purposes of this test. In the lower panel the effects are broken down by age and ethnicity/nativity.

No support for complete assimilation has emerged in these data. In 1951 and 1964, the total immigrant population suffered higher risks of dying than the native-born. However, in 1971, the pattern reversed favouring foreigners. Perhaps this reversal is a function of the changing "quality" of immigrants that have been entering Canada in recent decades. Persons who have been entering this nation since the late 50s and early 60s are more educated and occupationally skilled. In short, their characteristics are of a higher quality in comparison to the post-war immigrants (Richmond, 1967; Richmond and Kalbach, 1980). The bottom panel of Table 4.16 confirms the above notion that no claim for complete assimilation is possible. That is, if our assumption is correct that older immigrants beyond age 65 have actually resided in Canada for a long period of time, the differences in the logits should be zero if assimilation to the native-born groups in Canada occurred. This is clearly not the case in the bottom panel of Table 4.17.

TABLE 4.17 LOGIT EFFECTS FOR THE ASSIMILATION HYPOTHESIS BETWEEN NATIVE AND FOREIGN-BORN POPULATIONS IN CANADA, AGE 65+

(PANEL 1)

MODEL: [ASNY][DA][DS][DNY]

VARIABLES	α	B	Algebraic Difference NB-FB
NATIVITY-TIME INTERACTION	-3.818		
NB			
1951		.024	.048
1964		.034	.068
1971		-.058	.116
FB			
1951		-.024	
1964		-.034	
1971		.058	

(PANEL 2)

(SATURATED MODEL) B EFFECTS, AGE-SUBPOPULATION INTERACTION

LOGITS

Age	FNB	BNB	N.I.	RNB	BFB	USA	OEFB	OFB
65-69	.024	.064	-.606	.528	.038	-.244	.044	.154
70-74	-.006	.060	-.742	.696	.004	-.286	.070	.204
75-79	-.040	.012	-.788	.878	.024	-.366	.094	.186
80-84	-.044	.016	-.900	.816	.048	-.308	.104	.268
85+	-.016	.066	-.808	.490	.098	-.240	.148	.266

ABBREVIATIONS:
FNB = FRENCH NATIVE-BORN
BNB = BRITISH NATIVE-BORN
N.I. = NATIVE INDIANS
RNB = RESIDUAL NATIVE-BORN
BFB = BRITISH FOREIGN-BORN
USA = UNITED STATES
OEFB = OTHER EUROPE FOREIGN-BORN
OFB = OTHER FOREIGN-BORN

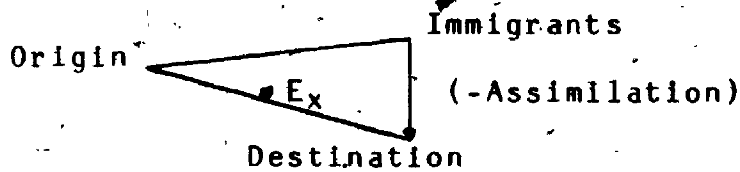
One other way to test for assimilation is to compare immigrants and their descendents in Canada to their "parent" country's mortality levels. Fortunately, Preston and his colleagues (1972), have compiled 1951 and 1964 mortality and population data for the British Isles (England, Wales, Scotland and Ireland were added together to conform to our coding). The 1971 data was obtained from the Demographic Yearbook (1979). It was therefore possible to compute logit regression equations to test for the effect of population membership net of age, sex and time, on the likelihood of dying among the parent population, its immigrants, and their native-born descendents in Canada.

In Chapter II, we developed a typology of explanations concerning native and foreign-born mortality (see Table 2.3 in Chapter II). In that formulation there are 18 possible conditions [(10) to (18); (37) to (45), and (64) to (77)] which are consistent with an immigrant mortality assimilation process. Our objective is to scrutinize the logit effects and to determine which of the above possible conditions are congruent with the British immigrants, and subsequently, the United States foreigners' death experience in Canada. Is there a mortality assimilation? If so, is it a positive assimilation or a negative assimilation process?

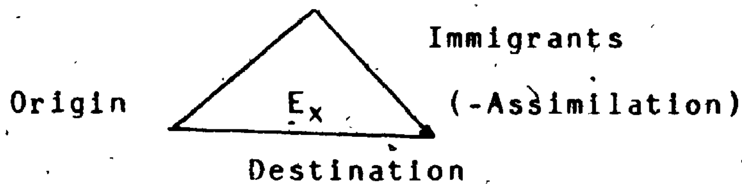
A negative assimilation model may be invoked if any of the following four processes prevail.

Condition

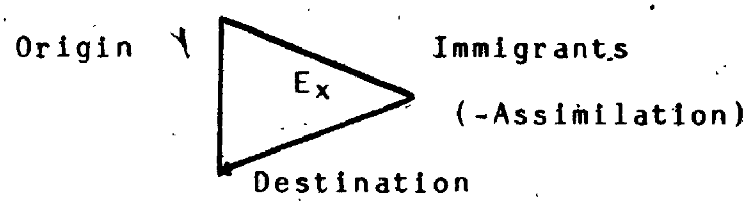
(A): (1)



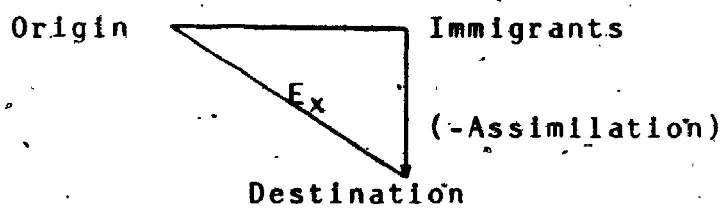
(2)



(3)



(4)

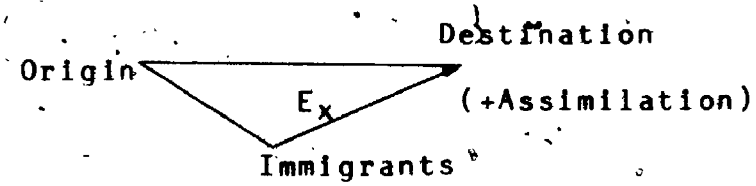


In (1) and (2) immigrants are positively selected vis-a-vis their origin population, but in comparison to the host country immigrants take on the same mortality level which is either higher or equal to the foreigners' origin. In (3), the foreign-born are negatively selected and in addition, suffer losses in longevity as they assimilate the mortality level of the host society which is higher than the origin country Number 4 is yet another variation in which immigrants start with an equal level to their origin and subsequently decline to the level of the host country.

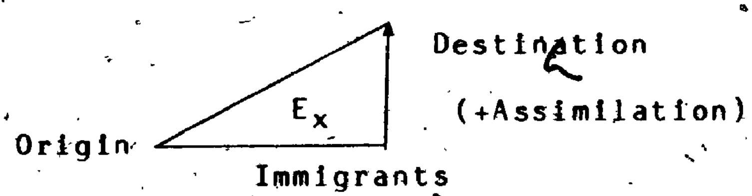
A <u>positive assimilation</u> effect is supported under the following situations.

Condition

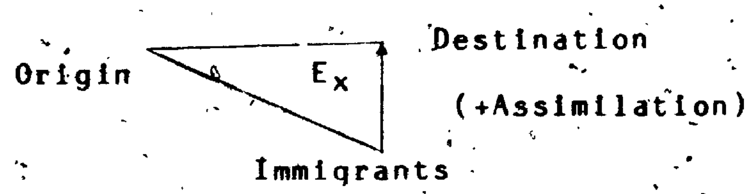
(B): (1)



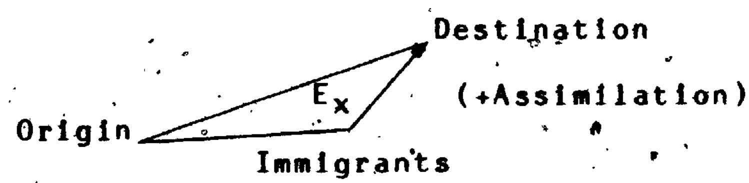
(2)



(3)



(4)



The first and third models represent assimilation in a positive sense. That is, immigrants are initially negatively selected but, in relation to their adoptive society they are equal. Equality involves an upward movement in longevity. Numbers (2) and (4) are further variations on the positive assimilation model of immigrant mortality.

In the above conceptualizations, comparisons are explicated on the basis of life expectancy at a given age. In this study, we will use the logit effects to represent the same relationships as denoted by life expectancy. Thus, the logits of the expected odds of dying based on population membership controlling for age, sex and year, will be used to make comparisons between origin and destination (Canada). This approach will allow us to determine which of the eight models above fit the experience of British immigrants, and then, United States foreigners.

Table 4.18 shows crude death rates corresponding to the British Isles, British immigrants and British native-born descendants in Canada for the periods 1951 to 1971. In all cases, the foreign-born appear to suffer the highest incidences of death relative to the other two groups in the table. The rates belonging to the immigrants are substantially higher than either their origin or their Canadian-born counterparts. The latter seem to be at a more advantaged position than the British Isles and its immigrant populations. Most of these differences however is due to age composition and this needs to be considered in the subsequent analysis.

Tables 4.19 and 4.20, contain logit regression equations which contrast British immigrants and their origin population. Our interest is primarily with the net effects of population membership. In 1951 the foreign-born migrants had lower odds of mortality than the parent population. In

TABLE 4.18 CRUDE DEATH RATES AMONG BRITISH NATIVE-BORN, BRITISH FOREIGN-BORN AND BRITISH ISLES, 1951, 1964 AND 1971

	1951		1964		1971**	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
BRITISH ISLES*	13.50	11.91	12.06	10.72	13.14	11.59
BRITISH FB	23.65	16.31	23.63	15.89	25.47	17.89
BRITISH NB	8.67	6.91	7.08	5.12	6.30	4.29

* BRITISH ISLES: ENGLAND, WALES, IRELAND (ALL) AND SCOTLAND. FOR IRELAND, 1961 DATA ARE INCLUDED AS 1964 WERE NOT AVAILABLE. DATA TAKEN FROM PRESTON ET AL., 1972, CAUSES OF DEATH: LIFE TABLES FOR NATIONAL POPULATIONS.

** 1971 FIGURES WERE OBTAINED FROM THE UNITED NATIONS DEMOGRAPHIC YEARBOOK, 1978, ISSUE ON MORTALITY STATISTICS.

TABLE 4.19 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS; BRITISH FOREIGN BORN AND BRITISH ISLES, 1951, 1964, AND 1971

	EFFECTS											
	ADDITIVE						MULTIPLICATIVE					
	1951		1964		1971		1951		1964		1971	
VARIABLES	α	B	α	B	α	B	η	τ	η	τ	η	τ
AGE	-5.008		-5.376		-5.356		.082		.068		.069	
0-4		-.082		-.194		-.444		.960		.908		.801
5-9		-2.536		-2.764		-.2672		.281		.251		.263
10-14		-2.740		-2.914		-2.830		.254		.233		.243
15-19		-2.212		-2.212		-2.086		.331		.331		.352
20-24		-1.844		-2.068		-2.012		.398		.356		.366
25-29		-1.678		-2.044		-1.980		.432		.360		.372
30-34		-1.486		-1.806		-1.734		.475		.405		.420
35-39		-1.220		-1.348		-1.326		.544		.509		.516
40-44		-.836		-.832		-.744		.659		.660		.689
45-49		-.324		-.334		-.168		.850		.847		.919
50-54		.180		.176		.316		1.094		1.092		1.171
55-59		1.244		[illegible]688		.790		1.380		1.411		1.485
60-64		1.130		1.856		1.278		1.760		2.533		1.894
65-69		1.596		1.662		1.756		2.220		2.296		2.407
70-74		2.074		2.656		2.226		2.821		3.773		3.043
75-79		2.596		2.630		2.700		3.662		3.724		3.858
80-84		3.094		3.142		3.156		4.697		4.812		4.845
85+		3.644		3.700		3.776		6.185		6.360		6.603
SEX												
MALE		.186		.396		.256		1.098		1.219		1.136
FEMALE		-.186		-.396		-.256		.911		.821		.880
POPULATION												
BRITISH IMMIGRANTS		-.118(-.086)		-.230(-.128)		-.094 (-.018)		.943(.995)		.891(.938)		.954(.991)
B.I.POPULATION		.118(.086)		.230(.128)		.094 (.018)		1.061(1.005)		1.122(1.066)		1.049(1.009

( ) = EFFECTS IN SATURATED MODEL.

NOTE: A contrast between the British Native-Born and British Isles shows (main effect model):

	1951	1964	1971
BNB	-.130	-.160	-.214
B.I.	.130	.160	.214

B.I. = BRITISH ISLES PARENT POPULATION

TABLE 4.20 LOGIT EFFECTS OF POPULATION MEMBERSHIP ON MORTALITY FOR BRITISH NATIVE AND FOREIGN-BORN POPULATIONS, NET OF AGE, SEX AND YEAR; AND ALGEBRAIC DIFFERENCES.

	B EFFECTS 1951	1964	1971
BRITISH NB*	-.428	-.378	-.438
BRITISH FB*	-.308	-.329	-.164
DIFFERENCES**			
(1) BNB - BFB	.120	.049	.274
(2) BFB - BRITISH ISLES	.236	.460	.188
(3) BNB - BRITISH ISLES	.260	.320	.428

* EFFECTS FROM TABLES 4.14 TO 4.16

** ALGEBRAIC DIFFERENCES

the subsequent decade, the same relationship emerged, but the differential widened from -.118 in 1951 to -.230 in 1964. The superiority favouring immigrants continued in 1971, but the logit effect was reduced to -.094 in favour of the foreign-born.

Controlling for age, sex and period derives a very different conclusion than a comparison of crude death rates. In fact, our conclusion must be opposite than that suggested by the data in Table 4.18. British immigrants are in actuality positively selected in relation to their country of origin, and this fact has remained true over the periods 1951 to 1971.

The footnote in Table 4.19 shows the logit main effects of the expected odds of dying for the contrast between British native-born in Canada and the British Isles population for 1951, 1964 and 1971. The British of Canadian origin have always maintained a superior level of longevity <u>vis-a-vis</u> their "parent" population. In fact, the differential favouring the former group has increased from -.130 in 1951 to -.160 in 1964, and to -.214 in 1971.

Table 4.20 shows algebraic differences among the British native-born, British Isles and British foreign-born. The differences between British indigenous and British immigrant groups (1) suggest that although the former have always enjoyed greater chances of survival, the trend over time is not indicative of a narrowing of the differentials. The contrast involving the British immigrants to the British Isles is indicative of a narrowing of the difference between the mortality levels of these two groups, but also substantial disparities in favour of the former group. The immigrants have shown lower odds of death, but over time, their relative superiority increased, peaking in 1964, but in 1971, the difference was reduced below the 1951 variation. The third contrast (3), shows an increasing superiority in longevity on the part of the British native-born relative to the British Isles.

The question arises as to whether these trends and patterns are congruent with an immigrant assimilation model, and if so, which one? In order to answer this question, we need to provide one more contrast in the odds of death: that between Canada as a whole (the host population) against the British Isles (the origin population). Logit equations were fitted to a main effect model which includes the independent effects of age, sex, and population membership controlling for time. The full equation is not of crucial importance and it will not be shown. The logit effects involving the effect of population membership are shown below. It is important to point out that Canada does not include British foreigners, they were excluded for the purpose of this analysis.

POPULATION	LOGITS 1951	1964	1971
Canada	-.412	-.318	-.642
British Isles	.412	.318	.642

The above figures support the conclusion that Canada has had lower odds of mortality in comparison to the British Isles population.

Given our results, it is now possible to identify an appropriate assimilation model corresponding to the British immigrants in Canada. We saw that: (1) immigrants have lower odds than those in the country of origin; (2) immigrants have higher odds of dying in relation to their native-born descendants and that their difference is not narrowing; (3) the native-born British have lower odd of mortality than the British Isles origin population; (4) Canada has lower likelihood of death vis-a-vis the British Isles; and finally, the British foreigners have relatively lower odds of dying in relation to all other subgroups in Canada except their native-born counterparts and to a much lesser extent, the other Europeans (see Table 4.14 to 4.16).

These results are not consistent with any of the models explicated at the opening of this section, the main reason being that assimilation has not occurred at all. The immigrants are intermediate in their mortality experience between origin and their native-born counterparts, but also, foreigners are superior to the majority of the host population. This implies that if we were to establish a ranking based on survival, the British native-born is first, immigrants second, the host population third and the origin last. Given this course of events, we cannot accept the hypothesis of immigrant mortality assimilation. However, this must be qualified in that although mortality convergence has not occurred, the British immigrants nevertheless have in the overall a more favourable mortality experience than most other groups in Canada. Other explanations for this will be introduced later.

Unfortunately, the available data does not permit a similar analysis, to be applied to the remaining groups in this study. However, we have data for the United States population and a somewhat analogous approach may be executed. In other words, we can compare the United States immigrants in Canada to their origin population and also to the population of Canada. Information for the United States population was derived from Preston et al., (1972) and from the United Nations Demographic Yearbook (1978). The comparison is restricted to immigrants versus origin, immigrants to other subgroups in Canada, and origin to Canada excluding United States immigrants. Note that we have no native-born category of United States ethnicity in Canada.

Table 4.21 displays the appropriate logit equations for 1951, 1964 and 1971. In accordance with the main effects model, the results suggest that in the first two points of observation the immigrants had slightly lower chance of dying relative to their origin population. In 1971, however, this effect reversed in the opposite direction

TABLE 4.21 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING, MULTIPLICATIVE AND ADDITIVE EQUATIONS; UNITED STATES IMMIGRANTS AND UNITED STATES POPULATION, 1951*, 1964 AND 1971

	EFFECTS											
	ADDITIVE						MULTIPLICATIVE					
	1951		1964		1971		1951		1964		1971	
VARIABLES	α	B	α	B	α	B	η	τ	η	τ	η	τ
AGE	-4.876		-5.042		-5.024		.087		.080		.081	
0-4		-.136		-.198		-.388		.935		.905		.824
5-9		-2.552		-2.726		-2.816		.279		.256		.246
10-14		-2.614		-2.788		-2.816		.271		.248		.245
15-19		-1.984		-1.980		-1.782		.371		.371		.410
20-24		-1.684		-1.674		-1.462		.431		.433		.481
25-29		-1.596		-1.628		-1.508		.450		.443		.471
30-34		-1.374		-1.380		-1.348		.503		.501		.510
35-39		-1.022		-1.034		-1.026		.600		.596		.599
40-44		-.582		-.608		-.616		.748		.738		.735
45-49		-.148		-.162		-.166		.928		.922		.920
50-54		.274		.298		.274		1.147		1.161		1.147
55-59		.678		.714		.692		1.404		1.429		1.413
60-64		1.078		1.120		1.102		1.714		1.750		1.735
65-69		1.442		1.550		1.496		2.057		2.170		2.107
70-74		1.882		1.922		1.896		2.562		2.614		2.582
75-79		2.314		2.332		2.352		3.179		3.209		3.240
80-84		2.748		2.804		2.788		3.951		4.063		4.032
85+		3.278		3.443		3.322		5.151		5.592		5.265
SEX												
MALE		.180		.238		.262		1.094		1.126		1.139
FEMALE		.180		-.238		-.262		.914		.888		.878
POPULATION												
USA IMMIGRANTS		-.014(.064)		-.026(.102)		.004 (.152)		.993(1.033)		.988(1.053)		1.002(1.079)
USA POPULATION		.014(-.064)		.026(-.102)		-.004 (-.152)		1.007(.968)		1.011(.950)		.998 (.927)

* 1950 DATA FOR USA POPULATION

( ) = EFFECTS IN SATURATED MODEL.

- the effect of subpopulation membership in a saturated model containing age, sex, time, subpopulation and the dependent variable is: USA immigrants B = .106; USA population B = -.106

Footnote to Table 4.21

The following are crude death rates corresponding to USA immigrants in Canada and USA population, 1951, 1964 and 1971.

	PERIOD					
	1951*		1964*		1971	
POPULATION	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
U.S.A. IMMIGRANTS	18.54	12.43	23.34	15.19	25.24	17.14
U.S.A. POPULATION	10.99	8.17	10.84	8.01	10.89*	8.15*

* FIGURES FROM PRESTON ET AL., 1972

** FIGURES WERE COMPUTED WITH DATA FAROM THE U.N. DEMOGRAPHIC YEARBOOK, 1978, SPECIAL EDITION ON MORTALITY STATISTICS.

implying, this time, a slight immigrant disadvantage in the mortality equation. It is interesting that the subpopulation effects derived from the saturated model run counter to the above results. In 1951 and 1964, the immigrant population actually experienced a greater likelihood of death than their United States origin population. Thus, it appears that if we control for all possible main effects and interactions among all variables, the results show the immigrants to be at a mortality disadvantage. This is confirmed further in the footnote to Table 4.21.

Perhaps the following results may help in the clarification of the previous findings above: the interaction of population membership with year in affecting the odds of dying in the saturated model containing age, sex, year and membership, is as follows:

1951	Tau Effects
USA FB	.979
USA POPULATION	1.021
1964	
USA FB	1.014
USA POPULATION	.987
1971	
USA FB	1.024
USA POPULATION	.978

This confirms the conclusion that beyond 1951, immigrants from the United States have been negatively selected due to their relatively higher mortality in comparison to their "parent" population.

In relation to the native-born subgroups, the United States immigrants have experienced lower risks of death and this is consistent over time. In 1951, 1964 and 1971, they had lower odds than the French, the Native Indians and the Residual Native-born. Table 4.22 has been included to facilitate this comparison. It shows the B logits effects and rank with regards to relative position in the odds of dying. Evidently, United States immigrants are second lowest next to the British Native-born; and among foreigners in general, the immigrants from the United States rank below British and Other European foreign-born (see Table 4.13).

Logit equations were computed to reflect the differences in the odds of dying between Canada (excluding USA immigrants) and the United States. The population effects are listed below:

POPULATION	LOGITS 1951	1964	1971
Canada	-.448	-.412	-.394
United States Population	.448	.412	.394

The data are supportive of the conclusion that Canada in comparison to the United States has a more advantageous

TABLE 4.22 LOGIT EFFECTS BASED ON THE MAIN EFFECTS MODEL OF POPULATION MEMBERSHIP ON MORTALITY FOR UNITED STATES IMMIGRANTS AND FOUR NATIVE-BORN SUBPOPULATIONS;

	B EFFECTS					
SUBPOPULATION	1951	(RANK)	1964	(RANK)	1971	(RANK)
USA FB	-.216	(2)	-.152	(2)	-.034	(2)
FRENCH NB	-.128	(3)	.130	(3)	.200	(5)
BRITISH NB	-.428	(1)	-.378	(1)	-.438	(1)
NATIVE INDIAN	.738	(5)	.654	(5)	.160	(3)
RESIDUAL NB	.190	(4)	.256	(4)	.176	(4)
ALGEBRAIC DIFFERENCE: BNB BRITISH USA FB	.212		.226		.404	

mortality experience. However, the difference has been declining over time.

The immigrants have been negatively selected in 1964 and 1971, but positively selected in 1951. Therefore, the model of assimilation which may fit 1951, will not apply in the subsequent periods. For 1951, no particular assimilation model specified earlier is applicable. On the overall, the United States immigrants experienced intermediate mortality levels in relation to the other subpopulations studied. A logit main effect reflecting United States immigrants against the rest of Canada revealed that in all three points in time, the foreigners had higher odds of dying (.122 in 1951; .118 in 1964 and .096 in 1971). Thus, in 1951, although they were positively selected, in relation to the general Canadian population their mortality was higher. This fails to support an assimilation explanation. Similarly in 1964 and 1971, the data do not support assimilation. The immigrants were negatively selected to begin with and furthermore, they generally had greater likelihood of mortality than the Canadian population.

Our development of the assimilation hypothesis suggests that mortality differentials are still prevalent in Canada. In no case were we able to accept a full assimilation explanation. The investigation of British and United States immigrants determined that assimilation in mortality has not taken place, and the trend is not suggestive of a narrowing of differences; if this continues the future may not witness a levelling of mortality differentials among such groups.

4.5.2 The Nativity Effect Hypothesis

4.5.2.1 The Immigrant Selection Effect

This hypothesis proposed lower immigrant mortality in relation to their origin populations. Qualified support for this hypothesis was developed earlier in connection with the analysis of British and United States origin and resident populations. In 1951 the immigrants from the United States were positively selected, but negatively selected in 1964 and 1971. Relative to their country of/origin British immigrants have actually experienced a pattern that is consistent with the positive selection hypothesis. Unfortunately, it is not possible to compare the other subgroups to their origin populations due to lack of the necessary data. However, it may be speculated that immigrants from Europe probably follow an experience which is similar to that noted in connection with British immigrants. This view is based on the fact that both the Other Europe foreign-born and British foreigners tend to have relatively low odds of dying in Canada. Perhaps there is much similarity in these two subpopulations mortality and immigration experiences. Unfortunately, we lack the necessary data to execute a similar analysis for the remaining immigrant populations as was actualized for the British immigrants.

4.5.2.2 The Life Stresses Effect

This hypothesis predicts that ethnicity or nativity exerts an effect on mortality independent of age, sex, time and all other higher order interactions among these factors. We have seen already in the presentation of logit equations in Tables 4.13 to 4.16, that ethnicity/nativity does indeed have an important main effect on the odds of dying. It was further stated that a positive effect reflects the influence of life stresses while a negative net effect would imply the opposite. Table 4.23 demonstrates that in fact the ethnicity/ nativity term has substantial net effects on the dependent variable. Among the indigenous groups, the coefficient for Native Indians, French Canadians, Residual native-born and other foreign born is positive, suggesting a life stresses explanation as the underlying causal mechanism. On the other hand, the British native-born have enjoyed lower life stresses as their relationship to mortality is negative.

The relatively more favourable position of the British in Canada has been documented by the late John Porter during the early part of the 1960s decade. He made no direct reference to inequality in the face of mortality but he provided convincing evidence that Canada consists of a "vertical mosaic" pertaining to class, status and power. Some of the consequences of the Canadian stratification system are differences in life chances among the various

TABLE 4.23 MAIN EFFECT OF SUBPOPULATION MEMBERSHIP ON THE ODDS OF DYING BASED ON THE SATURATED MODEL [DASYN]: ADDITIVE EFFECTS:

SUBPOPULATION	EFFECTS α	B
	-4.896	
FRENCH NB		.034
BRITISH NB		-.458
NATIVE INDIAN		.488
RESIDUAL NB		.168
BRITISH FB		-.302
U.S.A.		.126
OTHER EUROPE FB		-.330
OTHER FB		.274

sectors of the populations (Forcese, 1982; Curtis and Scott, 1979).

In general, Canadian scholars have failed to make this association in an explicit manner. Our results suggest that, as Porter argued, there is a vertical mosaic pertaining to inequality in the quantity of life and by implication, quality of life as well. A major assumption in this relationship is that differences in longevity are the final consequences associated with differences in the quality of life.

Although Canadian scholars have not paid much attention to this phenomenon, there is some documentation that French Canadians (Roy, 1975) and Native Indians have occupied disadvantaged social positions in Canada with a related consequence being relatively lower survival rates. What has lacked however, is the analysis which has been introduced in this dissertation.

Among the indigenous groups, the pattern of mortality follows the stratification suggested by Porter in connection with social status. The British are relatively advantaged both socially and in the likelihood of survival; the French follow, but with a significant difference from the British. The Residual component is still farther behind, and Native Indians are last: there seems to be a close correspondence between social position and group mortality levels in Canada.

The impact of nativity among foreigners suggests that in Canada, the Other Europeans and British effects lower the expected logits of the odds of dying by .330 and .302 respectively, while being "Other" foreign-born or United States immigrant raises the logit of the expected odds by .274 and .126 respectively. Thus among two subpopulations, the effects actually reflect low life stresses which translate into lower incidences of mortality, but perhaps not morbidity. This cannot be known at this point in time. Certainly there is an important causal link between morbidity and mortality. Unless we introduce knowledge of health seeking and response to illness we can not be certain that lower incidences of mortality imply lower incidences or prevalence of morbidity among such subpopulations. Moreover, morbidity does not have an immediate effect on death. For the most part, morbidity has a lagged influence on senescence.

It is not certain why the United States origin's effect is positive. In accordance with the life stresses hypothesis, we suggest that perhaps USA immigrants to Canada are generally "low quality" in selection and hence suffer high degrees of life stresses culminating in high rates of death. Cause of death is an important aspect of mortality analysis which will complement and further the interpretations of our results above. The next chapter concerns itself with this aspect of the thesis.

CHAPTER V

MORTALITY DIFFERENTIALS: CAUSE OF DEATH ANALYSIS

This chapter examines four major causes of death corresponding to the eight subpopulations of interest. Table 5.1 shows crude death rates due to neoplasms, cardio-vascular, accidents-violence and all other causes among native and foreign-born populations in Canada during 1951, 1964 and 1971. What is immediately apparent is the wide range of variations within and between classes of nativity.

In all cases, the foreign-born have greater crude rates of mortality regardless of sex, cause and year. Direct standardization was applied to determine the extent to which age composition affects these rates. The standard population is the total 1964 male and female Canadian population. Table 5.2 provides the results after standardization.

A much different picture emerges from these comparisons. For example, among males, the foreigners had higher incidences of neoplasm mortality in 1951 and 1971. Cardio-vascular related deaths have been consistently lower for immigrants. In the case of accidents-violence the rates were higher among the foreign-born in 1951 and 1964, but in 1971 they enjoyed lower odds of dying from this category of death. In comparison to the indigenous males, the rates

TABLE 5.1 CRUDE DEATH RATES DUE TO FOUR MAJOR CAUSES OF DEATH AMONG NATIVE AND FOREIGN-BORN POPULATIONS, CANADA, 1951, 1964 AND 1971 (Rates per 10,000 population)

SEX AND YEAR	CAUSE OF DEATH AND NATIVITY							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
	N-B	F-B	N-B	F-B	N-B	F-B	N-B	F-B
MALES								
1951	9.60	34.52	34.22	105.36	6.10	12.00	32.72	44.16
1964	11.22	31.74	35.52	90.30	6.45	8.04	22.56	34.40
1971	12.55	37.05	32.05	91.50	5.82	8.72	20.14	36.48
FEMALES								
1951	10.02	27.43	28.00	78.50	2.60	4.47	27.25	28.40
1964	10.55	21.74	26.72	64.06	2.20	3.37	16.21	21.06
1971	10.78	25.48	23.67	70.48	2.49	4.30	13.62	24.30

TABLE 5.2 STANDARDIZED DEATH RATES* DUE TO FOUR MAJOR CAUSES OF DEATH AMONG NATIVE AND FOREIGN-BORN POPULATIONS, CANADA, 1951, 1964 AND 1971. (Rates per 10,000 population)

SEX AND YEAR	CAUSE OF DEATH AND NATIVITY							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
	N-B	F-B	N-B	F-B	N-B	F-B	N-B	F-B
MALES								
1951	12.48	14.58	46.45	45.58	7.20	10.48	33.91	29.31
1964	14.60	14.47	47.12	37.93	6.80	6.95	24.98	21.46
1971	15.40	17.62	40.30	39.52	8.72	6.99	23.25	21.10
FEMALES								
1951	13.20	13.37	39.96	40.84	2.90	3.60	28.69	22.10
1964	12.94	10.87	34.51	28.14	2.40	2.48	17.60	14.51
1971	11.91	12.52	26.64	27.55	2.63	3.18	14.98	13.70

* 1964 Age-sex population of Canada used as the standard; directly standardized rates.

corresponding to "all other" causes suggest that the immigrant males in Canada have experienced lower likelihood of senescence relative to the Canadian born. The situation for females is generally similar in that, the foreigners have tended to die less from "all other" causes, more from accidents-violence complications and with the exception of the 1964 period, they had lower odds of senescence related to neoplasms. The main difference lies in connection with cardiovascular mortality. In contrast to native-born women, the immigrant females suffered higher rates in 1951 and 1971 whereas their male counterparts enjoyed lower death rates in relation to the indigenous men, for the same years.

In general, the cause-specific death rate differences are greatly reduced in magnitude once direct standardization is applied. This indicates that sole reliance on crude rates would provide an erroneous picture of mortality variation between native and immigrant populations in Canada.

Table 5.3 gives an indication of cause-specific mortality variation among the eight subpopulations in this study by displaying crude rates per 10,000 population. There are some overall consistencies in the table worth noting. Among the native-born, the French die more of neoplasms, the British have greater risks associated with cardiovascular mortality and the Indians have higher rates due to accidents-violence and "all other" causes of death. These relationships are consistent over time.

TABLE 5.3 CRUDE DEATH RATES DUE TO FOUR MAJOR CAUSES OF DEATH AMONG EIGHT SUBPOPULATIONS IN CANADA, 1951, 1964 AND 1971
(Rates per 10,000 population)

SUBPOPULATION AND YEAR	NEOPLASMS MALE	NEOPLASMS FEMALE	CARDIOVASCULAR MALE	CARDIOVASCULAR FEMALE	ACCIDENTS-VIOLENCE MALE	ACCIDENTS-VIOLENCE FEMALE	ALL OTHER CAUSES MALE	ALL OTHER CAUSES FEMALE
1951								
FRENCH NB	10.70	10.17	30.22	23.54	6.51	1.92	42.56	34.02
BRITISH NB	10.70	11.28	43.05	35.78	6.90	2.89	23.16	19.23
NATIVE INDIAN	8.10	7.90	26.07	20.44	25.12	9.46	147.93	131.97
RESIDUAL NB	6.22	6.30	19.10	15.47	7.07	1.27	32.42	27.92
BRITISH FB	44.12	33.20	133.88	95.57	10.43	5.02	48.05	29.30
USA	23.78	23.78	96.52	64.16	12.06	3.66	53.06	32.67
OTHER EUROPE FB	15.52	10.32	76.22	57.81	13.19	3.99	33.67	23.79
OTHER FB	4.00	2.10	201.38	210.52	21.48	11.63	106.77	74.73
1964								
FRENCH NB	14.39	12.59	43.78	32.58	7.14	2.17	26.24	19.01
BRITISH NB	10.16	8.99	37.00	28.42	5.41	1.91	18.21	11.92
NATIVE INDIAN	7.13	8.46	22.93	18.55	22.69	11.15	77.47	64.87
RESIDUAL NB	8.29	10.59	20.37	15.50	5.30	2.20	17.94	15.71
BRITISH FB	45.62	29.80	136.88	97.47	7.72	4.03	46.07	27.64
USA	34.53	29.53	123.59	82.59	9.92	4.82	65.37	35.00
OTHER EUROPE FB	23.68	14.82	59.30	38.24	7.80	2.51	22.13	13.64
OTHER FB	30.84	16.52	88.51	44.36	9.30	4.20	42.28	17.97
1971								
FRENCH NB	18.86	14.86	42.70	30.66	6.46	2.71	25.40	17.62
BRITISH NB	12.12	9.19	31.27	21.59	4.11	1.79	15.50	10.34
NATIVE INDIAN	6.46	6.10	16.49	12.08	17.00	8.46	32.42	27.57
RESIDUAL NB	6.93	9.10	19.20	16.24	5.53	2.71	16.88	12.91
BRITISH FB	54.51	36.56	138.70	114.31	8.33	5.84	53.14	22.14
USA	43.19	37.86	136.40	35.07	16.30	9.41	56.54	11.98
OTHER EUROPE	3.06	13.45	68.74	44.69	8.00	2.96	27.23	25.17
OTHER FB	20.15	41.06	48.95	30.33	7.28	3.40	24.02	13.53

Among foreigners, British immigrants show the highest crude rates associated with neoplasms, and also, during 1964 and 1971, they had the highest odds of dying from cardiovascular diseases. Concerning accidents and violence, in 1951 the Residual category of foreign-born had the highest rates, but in the subsequent periods the United States group has had higher rates due to this cause of death. After 1951, the latter subpopulation has had higher rates of "all other" causes as well.

Direct standardization was also applied to this aspect of the analysis to gain a more complete understanding of the differences once the effect of age is taken into account. Table 5.4 shows the results of this adjustment to the data.

There are 192 cells in Table 5.4 and thus detailed tabular analysis of all the contrasts is not practical. However, there are some general overall tendencies worth noting. Among males born in Canada, the Residual native-born tends to demonstrate the highest risks of dying from two of the four causes: neoplasms and cardiovascular. In connection with accidents-violence and "Other" causes the Native Indians (both male and female), surpass all other groups in the risk of death. The British, on the other hand, show a lower likelihood of mortality in relation to all four causes of death. Among foreign males, Other Europeans are generally the lowest in the odds of death, while "Other" foreigners tend to occupy the other extreme in

TABLE 5.4 STANDARDIZED* DEATH RATES AMONG NATIVE AND FOREIGN-BORN SUBGROUPS DUE TO FOUR MAJOR CAUSES OF DEATH, CANADA, 1951, 1964 AND 1971
(Rates per 10,000 population)

SEX AND SUBPOPULATION	NEOPLASMS			CARDIOVASCULAR			ACCIDENTS-VIOLENCE			ALL OTHER CAUSES		
	1951	1964	1971	1951	1964	1971	1951	1964	1971	1951	1964	1971
MALES												
NATIVE-BORN												
FRENCH	14.37	18.70	23.41	42.48	59.10	55.25	6.68	7.51	4.12	44.46	30.10	30.20
BRITISH	10.53	10.77	12.70	45.33	39.11	32.31	6.85	5.50	2.45	22.66	18.62	16.20
NATIVE INDIANS	10.80	10.47	10.04	33.17	36.04	26.12	22.99	25.19	18.46	117.55	67.62	35.13
RESIDUAL	37.78	34.45	19.00	136.13	91.21	65.58	11.80	8.65	8.43	78.25	45.68	40.87
FOREIGN-BORN												
BRITISH	15.23	14.71	18.34	46.15	38.74	39.55	9.33	5.93	5.60	25.51	20.45	19.89
USA	11.39	12.81	16.78	47.45	42.92	48.40	9.39	7.59	15.72	48.91	41.87	32.05
OTHER EUROPE	13.94	14.05	17.07	41.46	34.65	37.26	11.51	7.13	6.25	25.31	17.14	18.92
OTHER	25.28	22.61	22.73	86.93	58.57	52.98	20.96	9.81	7.40	63.18	32.71	25.78
FEMALES												
NATIVE-BORN												
FRENCH	14.31	15.93	16.85	38.08	47.13	37.59	2.31	2.49	1.70	38.40	22.65	20.63
BRITISH	11.82	8.90	8.59	38.19	26.82	18.57	2.95	1.84	1.10	18.65	11.54	9.96
NATIVE INDIAN	10.24	12.54	8.77	28.05	29.35	18.06	8.93	11.19	9.50	118.06	57.05	30.57
RESIDUAL	33.60	50.53	25.50	109.09	102.53	82.96	5.81	6.13	6.37	66.36	48.76	31.19
FOREIGN-BORN												
BRITISH	13.91	10.79	12.81	40.13	27.36	27.17	3.39	2.05	2.92	18.09	13.10	8.28
USA	12.81	12.01	13.37	42.19	30.45	28.99	3.04	3.60	6.17	37.00	23.63	20.76
OTHER EUROPE	11.92	10.19	8.47	38.80	27.38	27.29	3.84	2.31	2.47	20.51	12.53	17.74
OTHER	47.21	17.39	48.67	191.27	51.62	38.18	11.56	5.14	3.75	77.80	23.36	16.94

* Standardized for age, by the direct method, using the 1964 total male and female Canadian population as the standard.

their position in the likelihood of mortality due to the specified causes.

The standardized rates pertaining to women suggest that as far as the indigenous segment is concerned, the highest cause-specific death rates are associated with being Native Indian or Residual native-born. The lowest rates tend to be correlated with the British native-born women. Among the foreign subpopulations, the highest standardized rates have been experienced by "Other", while the British origin immigrants have generally had a more favourable position. Other Europeans have tended to have intermediate to low rates; the United States group has had intermediate risks but generally higher than Other Europeans.

These figures discussed in the above paragraphs suggest that simplistic generalizations about subgroup mortality variations in Canada cannot be readily advanced. However, as a means to summarizing the previous discussion the following breakdown is included to aid our synthesis of results presented thus far:

RELATIVE STANDINGS: CAUSE OF DEATH

(Highest SDR's)

	NEOPLASMS	CARDIO-VASCULAR	ACCIDENTS-VIOLENCE	OTHER
M A	Residual NB	Residual NB	Native Indians	Native Indians
L E.	Other FB	French NB	Residual NB	Residual NB
S		Other FB	USA Other FB	USA Other FB

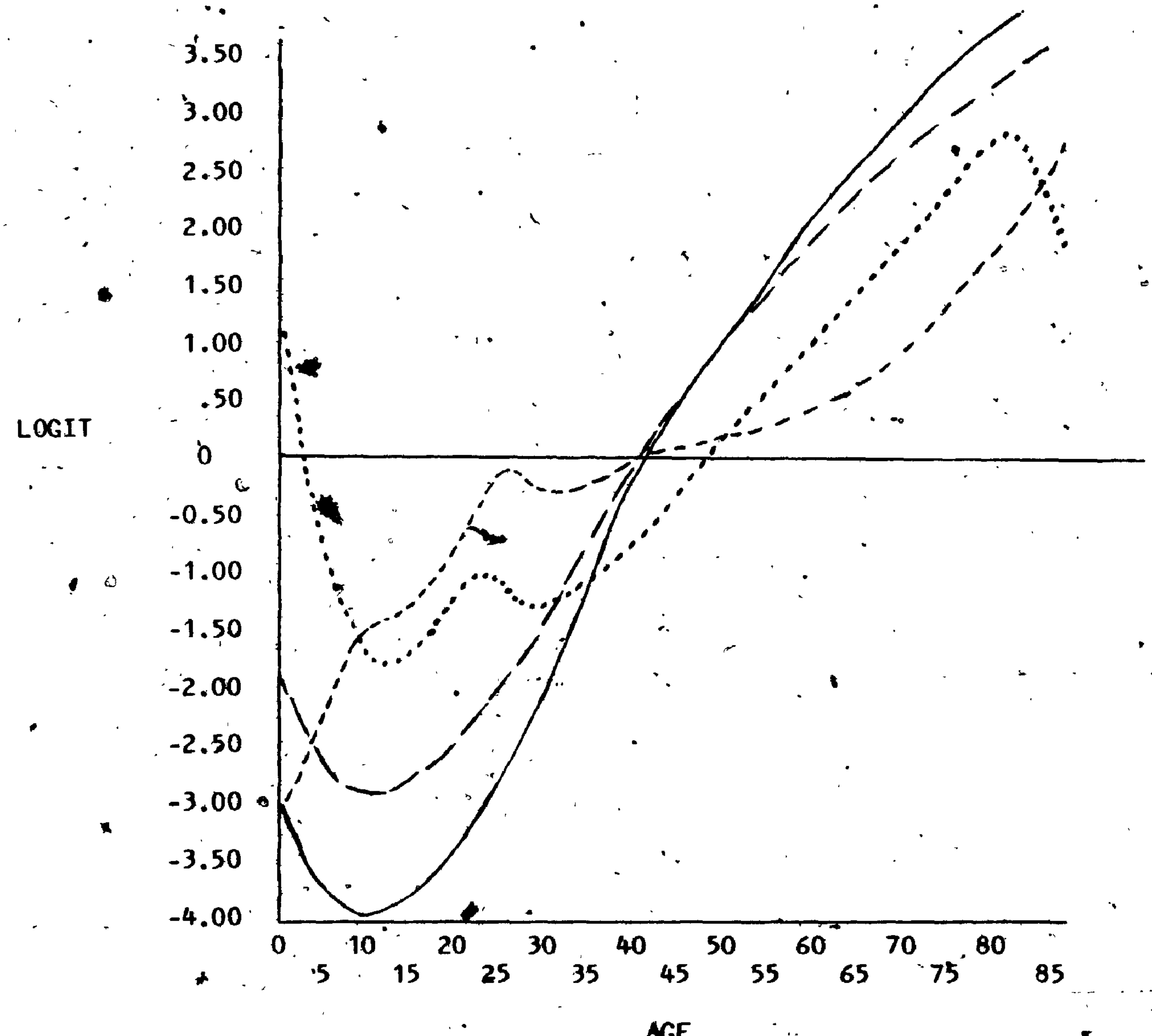
RELATIVE STANDINGS: CAUSE OF DEATH (Continued)

FEMALES	Residual NB Other FB	Residual NB Other FB	Native Indians Residual NB Other FB USA (1971)	Native Indians USA Residual NB

(Lowest SDR's)

	NEOPLASMS	CARDIO-VASCULAR	ACCIDENTS-VIOLENCE	OTHER
MALES	Native Indians USA	Native Indians Other European FB	British NB	British NB
FEMALES	Native Indians British NB Other Europe FB	British NB Native Indians French NB)1964 Other) and Europe FB)1971	British NB	British NB

It is important to emphasize that the above generalities are based on standardized death rates. The relative positions of the subpopulations may change once we introduce a multivariate framework to compute logit equations to ascertain the effect of subpopulation membership on mortality while controlling for the simultaneous influences of age, sex and year.



_____ Neoplasms

__ __ Cardiovascular

\- - - Accident-Violence

..... All other causes

FIGURE 5.1 AGE PATTERNS OF MORTALITY IN CANADA ASSOCIATED WITH FOUR MAIN CAUSES OF DEATH, BASED ON THE LOGIT MODEL CONTAINING AGE, SEX, TIME AND SUBPOPULATION MAIN EFFECTS

Having determined that age compositional differences do not eliminate mortality differentials due to four major causes of death, the next procedure involves the multivariate analysis of cause-specific mortality. This will facilitate the evaluation of the relative importance of subpopulation membership in accounting for the variations in the odds of dying among the eight subgroups being investigated. Figure 5.1 shows the derived age pattern of cause-specific mortality based on the main effects logit model. As one would expect, the age pattern differs by cause of death. For example, neoplasms have the lowest likelihood of occurrence prior to age 40. Beyond this age category, this cause of death has very similar odds to cardiovascular deaths until approximately age 60 at which point, the former cause produces increasing probabilities of dying. The age pattern of death due to accident-violence is characterized by gradually increasing odds, but the age groups 10-14 and 20-24 show increasing deviations from the general trend. Beyond age 40 the odds associated with this cause of death are generally the lowest in comparison to the remaining causes. The residual group "all other causes" corresponds closely to the general pattern most commonly defined as the "age curve of mortality."

Tables 5.5 to 5.8 have been included to show the importance of year in relation to the other determinants of mortality in this study. Therefore, these tabulations are preliminary in importance. Table 5.5 shows the logit effects on the odds of dying from neoplasms. Time has an important interaction on this cause of death. The effect of time on the odds of dying from this cause has been increasing: In 1951 its likelihood on neoplasm mortality was -.014; it changed to -.034 in 1964, and it increased to .044 in 1971. The logits for this variable in Table 5.6 indicate that time has had a declining influence on the odds of cardiovascular related death. In Table 5.7, the effect of time on deaths due to violence and accidents combined was .148 in 1951, -.044 in 1964 and -.104 in 1971. Thus, a general decline is also evident in this case as well. The evidence in Table 5.8, which corresponds to "all other" causes, is suggestive of a similar conclusion. An examination of the intercepts indicates that in the overall, "all other" causes and cardiovascular complications reflect the highest incidences in Canada independent of time, age, sex and subpopulation. The four tables also demonstrate that age exerts the strongest effect on all of the four causes and that males have suffered greater risks in comparison to women. The magnitudes of these effects varies with the specific cause analysed.

Concerning subpopulation membership, there are substantial differentials associated with cause specific mortality. For example, in deaths due to neoplasms, Other foreign-born, Residual native-born and French Canadians all demonstrate positive logit effects, whereas British native-born and Native Indians in particular, followed by Other

TABLE 5.5 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO NEOPLASMS, ADDITIVE AND MULTIPLICATIVE MODELS

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	α	B	η	τ
AGE	-6.962		.031	
0-4		-2.232		.328
5-9		-2.522		.283
10-14		-2.812		.245
15-19		-2.554		.279
20-24		-2.390		.303
25-29		-2.034		.362
30-34		-1.504		.472
35-39		-.864		.649
40-44		-.262		.878
45-49		.300		1.162
50-54		.822		1.509
55-59		1.264		1.882
60-64		1.698		2.337
65-69		2.046		2.782
70-74		2.372		3.273
75-79		2.682		3.822
80-84		2.914		4.293
85+		3.074		4.650
SEX				
MALE		.132		1.068
FEMALE		-.132		.936
TIME				
1951		-.014		.993
1964		-.030		.985
1971		.044		1.022
SUBPOPULATION				
FRENCH NB		.164		1.085
BRITISH NB		-.370		.831
NATIVE INDIANS		-.332		.847
RESIDUAL NB		.354		1.194
BRITISH FB		-.072		.964
USA		-.160		.923
OTHER EUROPE FB		-.174		.917
OTHER FB		.590		1.343

TABLE 5.6 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO CARDIOVASCULAR DISEASES

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	α	B	η	τ
AGE	-6.760		.034	
0-4		-3.320		.190
5-9		-4.346		.114
10-14		-4.024		.134
15-19		-3.340		.188
20-24		-2.988		.224
25-29		-2.506		.286
30-34		-1.826		.401
35-39		-1.092		.579
40-44		-.258		.879
45-49		.360		1.197
50-54		1.012		1.659
55-59		1.572		2.195
60-64		2.138		2.912
65-69		2.646		3.753
70-74		3.172		4.883
75-79		3.726		6.444
80-84		4.238		8.322
85+		4.836		11.223
SEX				
MALE		.222		1.117
FEMALE		-.222		.895
TIME				
1951		.132		1.069
1964		.008		1.003
1971		-.140		.933
SUBPOPULATION				
FRENCH NB		.156		1.082
BRITISH NB		-.246		.885
NATIVE INDIANS		-.336		.846
RESIDUAL NB		.522		1.298
BRITISH FB		-.142		.931
USA		-.066		.968
OTHER EUROPE FB		-.196		.907
OTHER FB		.304		1.164

TABLE 5.7 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO ACCIDENTS-VIOLENCE CAUSES OF DEATH

	EFFECTS			
	ADDITIVE		MULTIPLICATIVE	
VARIABLES	α	B	η	τ
AGE	-7.312		.026	
0-4		-.276		.871
5-9		-1.434		.488
10-14		-1.412		.494
15-19		-.568		.752
20-24		-.234		.890
25-29		-.396		.820
30-34		-.380		.827
35-39		-.318		.853
40-44		-.190		.910
45-49		-.130		.937
50-54		-.022		.989
55-59		.012		1.006
60-64		.099		1.050
65-69		.124		1.064
70-74		.350		1.191
75-79		.858		1.536
80-84		1.480		2.096
85+		2.436		3.381
SEX				
MALE		.496		1.273
FEMALE		-.496		.785
TIME				
1951		.148		1.077
1964		-.044		.978
1971		-.104		.949
SUBPOPULATION				
FRENCH NB		-.180		.914
BRITISH NB		-.456		.796
NATIVE INDIANS		1.092		1.725
RESIDUAL NB		-.110		.947
BRITISH FB		-.332		.847
USA		.058		1.030
OTHER EUROPE FB		-.170		.919
OTHER FB		.098		1.050

TABLE 5.8 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO ALL OTHER CAUSES OF DEATH

VARIABLES	ADDITIVE α	ADDITIVE B	MULTIPLICATIVE η	MULTIPLICATIVE τ
AGE	-6.020		.049	
0-4		.984		1.635
5-9		-1.822		.402
10-14		-2.176		.337
15-19		-1.394		.498
20-24		-1.210		.546
25-29		-1.402		.496
30-34		-1.306		.520
35-39		-1.134		.567
40-44		-.854		.652
45-49		-.550		.760
50-54		-.174		.916
55-59		.214		1.113
60-64		.640		1.377
65-69		1.032		1.675
70-74		1.498		2.116
75-79		2.000		2.719
80-84		2.492		3.475
85+		1.162		4.861
SEX				
MALE		.190		1.100
FEMALE		-.190		.909
TIME				
1951		.322		1.174
1964		-.128		.938
1971		-.194		.908
SUBPOPULATION				
FRENCH NB		.102		1.052
BRITISH NB		-.566		.754
NATIVE INDIANS		1.026		1.671
RESIDUAL NB		.024		1.012
BRITISH FB		-.454		.797
USA		-.030		.985
OTHER EUROPE FB		-.312		.855
OTHER FB		.208		1.110

Europe, United States and British immigrants, are less likely to die from cancer related disease.

The data for cardiovascular related deaths suggest a similar pattern. Among the eight subgroups Native Indians are least likely to die from this cause of death, whereas the Residual native-born population has suffered disproportionately high chances in this regard. For Natives, cardiovascular diseases have a minor role in their mortality experience because accidents-violence and "other causes" are relatively more important in accounting for this group's death levels. This has been supported by other research (Jull, 1976; Jarvis and Boldt, 1980).

Accidents-violence mortality has a radically different relationship to ethnic/nativity group membership. In this case, Native Indians have had the most disadvantaged position in the odds of dying. "Other" foreigners and United States immigrants show increasing odds, but they are very small with respect to Native Indians. The British Native-born on the other hand have had a relatively more favourable condition pertaining to the chances of dying from accidents and violence combined.

Native Indians are also more predisposed to die from "all other" causes. The French follow in this respect but the magnitude of their logit coefficient is much smaller. With the exception of "Other" immigrants, the foreign-born have enjoyed relatively lower chances of dying from "all other" causes. But, it is the British indigenous group which has enjoyed the greatest immunity to the risk of death.

Since time was found to have an important interaction with mortality, it becomes necessary to compute separate logit equations for each cause within the three periods of study. Tables 5.9 to 5.11 display the gross effects of age, sex and subpopulation membership on the expected odds of dying for the four causes of death, over the three points of observation. Of particular relevance is the following: age has the strongest effect, followed by ethnicity/nativity and sex, regardless of cause of death. In the case of neoplasms and cardiovascular related mortality the indigenous groups have had declining probabilities whereas the immigrant sub-populations have shown positive increases in the analysisof the expected death rates. The gross effects of subpopulation membership on the likelihood of dying from accidents-violence and "other" causes tend to be strongest in raising Native Indians mortality, but of even greater magnitude in lowering the British native born's chances of dying.

The logit equations containing the net effects of age, sex and subpopulation membership, based on the main effects model, are presented in Tables 5.12 to 5.15. Judging from the magnitude of the constants, there has been a general decline in mortality from all four causes over the twenty year interval 1951 to 1971; however, most of the decline has taken place between 1951 and 1964.

TABLE 5.9. GROSS EFFECTS OF AGE, SEX AND SUBPOPULATION MEMBERSHIP ON THE ODDS OF DYING FROM FOUR MAJOR CAUSES OF DEATH, 1951

	ADDITIVE EFFECTS							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
VARIABLES	α	B	α	B	α	B	α	B
AGE	-6.980		-6.454		-7.296		-5.932	
0-4		-2.044		-3.544		-.076		1.288
5-9		-2.486		-3.778		-1.222		-1.556
10-14		-2.646		-3.340		-1.180		-1.938
15-19		-2.510		-3.014		.660		-1.462
20-24		-2.286		-2.724		-.282		-1.274
25-29		-1.940		-2.280		-.580		-1.254
30-34		-1.322		-1.694		-.536		-1.164
35-39		-.762		-1.076		-.472		-1.018
40-44		-.200		-.318		-.378		-.812
45-49		.364		.324		-.272		-.524
50-54		.794		.892		-.140		-.232
55-59		1.210		1.436		-.090		.096
60-64		1.596		1.944		.038		.478
65-69		1.908		2.396		.188		.850
70-74		2.212		2.906		.422		1.306
75-79		2.532		3.432		.970		1.818
80-84		2.702		3.936		1.644		2.352
85+		2.830		4.502		2.558		3.054
SEX	-6.640		-5.516		-7.658		-5.778	
MALE		.040		.130		.506		.120
FEMALE		-.040		-.130		-.506		-.120
SUBPOPULATION	-6.368		-5.260		-7.126		-5.410	
FRENCH NB		-.498		-.658		-.644		-.154
BRITISH NB		-.468		-.276		-.494		-.746
NATIVE INDIANS		-.784		-.824		.756		1.120
RESIDUAL NB		-1.006		-1.098		-.516		.290
BRITISH FB		.812		.790		-.044		-.146
USA		.328		.424		-.054		-.056
OTHER EUROPE FB		.350		.274		.142		-.416
OTHER FB		1.268		1.368		.854		.788

TABLE 5.10 GROSS EFFECTS OF AGE, SEX AND SUBPOPULATION MEMBERSHIP ON THE ODDS OF DYING FROM FOUR MAJOR CAUSES OF DEATH, 1964

	ADDITIVE EFFECTS							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS - VIOLENCE		ALL OTHER CAUSES	
VARIABLES	α	B	α	B	α	B	α	B
AGE	-7.018		-6.884		-7.494		-6.394	
0-4		-2.102		-3.798		-.222		1.156
5-9		-2.356		-4.694		-1.346		-1.740
10-14		-2.792		-4.198		-1.400		-2.228
15-19		-2.376		-3.506		-.446		-1.486
20-24		-2.354		-2.928		-.088		-1.328
25-29		-2.004		-2.498		-.346		-1.540
30-34		-1.496		-1.748		-.328		-1.974
35-39		-.844		-.962		-.248		-1.170
40-44		-.246		-.118		-.190		-.848
45-49		.246		.484		-.228		-.578
50-54		.796		1.156		-.044		-.150
55-59		1.228		1.690		.010		.272
60-64		1.654		2.232		.084		.706
65-69		1.960		2.700		.062		1.070
70-74		2.270		3.232		.238		1.542
75-79		2.604		3.810		.792		2.046
80-84		2.838		4.278		1.444		2.510
85+		2.970		4.864		2.256		3.142
SEX	-6.622		-5.562		-7.840		-6.218	
MALE		.084		.150		.506		.180
FEMALE		-.084		-.150		-.506		-.180
SUBPOPULATION	-6.410		-5.392		-7.418		-5.866	
FRENCH NB		-.198		-.176		-.254		-.224
BRITISH NB		-.538		-.330		-.492		-.630
NATIVE INDIANS		-.762		-.802		1.024		.908
RESIDUAL NB		-.558		-.928		-.460		-.518
BRITISH FB		.822		.938		-.036		.252
USA		.662		.802		.178		.548
OTHER EUROPE FB		.176		.084		-.114		-.442
OTHER FB		.396		.412		.156		.104

TABLE 5.11 GROSS EFFECTS OF AGE, SEX AND SUBPOPULATION MEMBERSHIP ON THE ODDS OF DYING FROM FOUR MAJOR CAUSES OF DEATH, 1971

ADDITIVE EFFECTS

	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS - VIOLENCE		ALL OTHER CAUSES	
VARIABLES	α	B	α	B	α	B	α	B
AGE	-7.022		-6.930		-7.564		-6.324	
0-4		-2.386		-2.522		-.456		.632
5-9		-2.530		-4.442		-1.590		-1.900
10-14		-2.762		-4.368		-1.484		-2.110
15-19		-2.580		-3.240		-.534		-1.126
20-24		-2.366		-3.120		-.264		-.960
25-29		-2.042		-2.620		-.278		-1.308
30-34		-1.552		-1.900		-.226		-1.266
35-39		-.880		-1.084		-.194		-1.114
40-44		-.262		-.216		.004		-.824
45-49		.330		.352		.072		-.520
50-54		.858		1.018		.108		-.146
55-59		1.300		1.578		.010		.236
60-64		1.736		2.140		.172		.668
65-69		2.110		2.676		.116		1.072
70-74		2.420		3.156		.312		1.486
75-79		2.668		3.662		.698		1.908
80-84		2.898		4.178		1.196		2.328
85+		3.048		4.752		2.250		2.944
SEX	-6.504		-5.634		-7.830		-6.306	
MALE		.124		.154		.392		.186
FEMALE		-.124		-.154		-.392		-.186
SUBPOPULATION	-6.330		-5.494		-7.416		-6.038	
FRENCH NB		-.056		-.114		-.272		-.104
BRITISH NB		-.514		-.442		-.714		-.614
NATIVE INDIANS		-1.058		-1.058		.746		.228
RESIDUAL NB		-.800		-.838		-.358		-.468
BRITISH FB		.926		1.118		.154		.430
USA		.754		1.018		.606		.650
OTHER EUROPE FB		.232		.334		-.070		.096
OTHER FB		.516		.018		-.092		-.218

Focussing on these tables, it is noted that age has the most powerful effect and the ethnicity/nativity variable has greater independent importance than sex. That is, the B values corresponding to the subpopulations are often greater than those associated with sex. The only notable exception to this lies in connection with accidents-violence mortality. It seems clear, based on these data, that sex is a very important factor in the explanation of deaths due to this particular cause, but less so for the other sources of mortality.

5.1 Mortality Due to Neoplasms

In 1951, the Residual native-born and "Other" foreigners had the highest risks of dying from cancers. On the other hand, the remaining groups had lower probabilities in this regard. The British native-born, Native Indians and USA, respectively, enjoyed the lowest incidences of mortality related to neoplasms as the underlying cause of senescence. The most notable change to this pattern in the subsequent periods is that the French have tended to suffer increasing odds of death (Table 5.12)

5.2 Cardiovascular Mortality

The pattern of mortality displayed in Table 5.13 is similar to that of the neoplasms data. Among the indigenous populations, the odds have been increasing over time for the

TABLE 5.12 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO NEOPLASMS 1951, 1964 AND 1971

VARIABLES	ADDITIVE EFFECTS 1951 α	1951 B	1964 α	1964 B	1974 α	1974 B	MULTIPLICATIVE EFFECTS 1951 η	1951 T	1964 η	1964 T	1971 η	1971 T
AGE	-6.896		-7.008		-6.994		.032		.030		.030	
0-4		-2.106		-2.440		-2.408		.349		.326		.300
5-9		2.552		-2.466		-2.562		.279		.291		.278
10-14		-2.720		-2.878		-2.796		.257		.237		.247
15-19		-2.590		-2.460		-2.608		.274		.292		.271
20-24		-2.346		-2.422		-2.394		.309		.298		.302
25-29		-1.938		-2.074		-2.098		.379		.355		.350
30-34		-1.370		-1.546		-1.612		.504		.462		.447
35-39		-.794		-.880		-.924		.672		.644		.630
40-44		-.202		-.284		-.286		.904		.868		.867
45-49		.380		.226		.326		1.209		1.120		1.178
50-54		.832		.806		.862		1.515		1.497		1.539
55-59		1.262		1.254		1.312		1.880		1.873		1.928
60-64		1.648		1.718		1.746		2.280		2.360		2.395
65-69		1.962		2.050		2.128		2.666		2.786		2.899
70-74		2.268		2.382		2.460		3.107		3.291		3.422
75-79		2.598		2.730		2.730		3.665		3.916		3.914
80-84		2.770		2.970		2.972		3.996		4.416		4.419
85+		2.898		3.116		3.152		4.260		4.749		4.834
SEX												
MALES		.030		.120		.200		1.015		1.062		1.105
FEMALES		-.030		-.120		-.200		.985		.941		.905
SUBPOPULATION												
FRENCH NB		-.044		.186		.264		.979		1.097		1.141
BRITISH NB		-.302		-.394		-.386		.860		.821		.825
NATIVE INDIAN		-.304		-.184		-.464		.859		.912		.793
RESIDUAL NB		.512		.612		.118		1.292		1.358		1.060
BRITISH FB		-.044		-.152		.022		.978		.926		.990
USA		-.226		-.182		-.102		.893		.913		.950
OTHER EUROPE FB		-.140		-.182		-.178		.932		.913		.915
OTHER FB		.273		.298		.770		1.314		1.161		1.469

TABLE 5.13 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO CARDIOVASULAR DISEASE 1951, 1964 AND 1971

	ADDITIVE EFFECTS						MULTIPLICATIVE EFFECTS					
	1951		1964		1971		1951		1964		1971	
VARIABLES	α	B	α	B	α	B	η	T	η	T	η	T
AGE	-6.398		-6.942		-6.972		.041		.031		.031	
0-4		-3.640		-3.950		-2.60		.162		.139		.273
5-9		-3.872		-4.820		-4.516		.144		.090		.105
10-14		-3.448		-4.300		-4.438		.178		.117		.109
15-19		-3.130		-3.604		-3.294		.209		.165		.193
20-24		-2.814		-3.002		-3.152		.245		.223		.207
25-29		-2.346		-2.568		-2.666		.310		.277		.264
30-34		-1.770		1.798		-1.944		.413		.407		.378
35-39		-1.136		-.996		-1.130		.566		.608		.568
40-44		-.324		-.158		-.248		.850		.924		.884
45-49		.356		.460		.340		1.195		1.258		1.185
50-54		.956		1.158		1.008		1.613		1.784		1.656
55-59		1.516		1.718		1.578		2.134		2.360		2.201
60-64		2.028		2.300		2.156		2.755		3.160		2.940
65-69		2.480		2.798		2.714		3.454		4.050		3.884
70-74		2.990		3.356		3.224		4.458		5.354		5.014
75-79		3.524		3.948		3.762		5.823		7.200		6.559
80-84		4.030		4.426		4.300		7.500		9.146		8.583
85+		4.604		5.032		4.906		9.991		12.379		11.620
SEX												
MALES		.148		.226		.270		1.077		1.119		1.145
FEMALES		-.148		-.226		-.270		.929		.893		.873
SUBPOPULATION												
FRENCH NB		-.200		.256		.284		.905		1.137		1.153
BRITISH NB		-.182		-.224		-.338		.913		.894		.844
NATIVE INDIAN		-.180		-.210		-.438		.827		.900		.803
RESIDUAL NB		.700		.600		.410		1.420		1.349		1.228
BRITISH FB		-.170		-.228		-.056		.919		.892		.972
USA		-.134		-.130		.022		.935		.937		1.012
OTHER EUROPE FB		[illegible]		[illegible]		[illegible]		.892		.863		.952

TABLE 5.14 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO ACCIDENTS-VIOLENCE 1951, 1964 AND 1971

	ADDITIVE EFFECTS						MULTIPLICATIVE EFFECTS					
	1951		1964		1971		1951		1964		1971	
VARIABLES	α	B	α	B	α	B	η	T	η	T	η	T
AGE	-7.120		-7.414		-7.384		.028		.050		.025	
0-4		.052		-.294		-.522		.974		.863		.770
5-9		-1.202		-1.408		-1.648		.548		.495		.439
10-14		-1.164		-1.452		-1.528		.559		.484		.466
15-19		-.640		-.496		-.562		.726		.780		.755
20-24		-.256		-.124		-.278		.880		.940		.870
25-29		-.480		-.386		-.310		.786		.824		.856
30-34		-.506		-.356		-.260		.777		.837		.878
35-39		-.456		-.260		-.230		.796		.878		.891
40-44		-.394		-.198		-.020		.821		.906		.990
45-49		-.320		-.222		.074		.852		.895		1.037
50-54		-.188		-.052		.118		.910		.974		1.061
55-59		-.136		.010		.114		.934		1.005		1.059
60-64		-.016		.094		.176		.992		1.048		1.091
65-69		.138		.088		.122		1.071		1.045		1.063
70-74		.398		.286		.346		1.220		1.154		1.189
75-79		.968		.858		.756		1.622		1.535		1.460
80-84		1.674		1.534		1.278		2.309		2.153		1.894
85+		2.634		2.380		2.372		3.730		3.287		3.275
SEX												
MALES		.510		.526		.422		1.291		1.301		1.235
FEMALES		-.510		-.526		-.422		.775		.769		.810
SUBPOPULATION												
FRENCH NB		-.462		-.078		-.104		.794		.962		.950
BRITISH NB		-.400		-.390		-.616		.819		.823		.735
NATIVE INDIAN		.944		1.252		1.026		1.603		1.871		1.671
RESIDUAL NB		-.196		-.162		-.042		.906		.922		.980
BRITISH FB		-.300		-.418		-.280		.861		.812		.810
USA		-.126		-.060		.332		.939		.971		1.180
OTHER EUROPE FB		.008		-.234		.252		1.004		.889		.882
OTHER FB		.534		.088		-.068		1.306		1.045		.967

French from -.200 in 1951 to .284 in 1971. However, for the subsequent three subgroups, the pattern is the opposite. For example, the British reduced their chances of death from -.182 in 1951, to -.338 in 1971. Among the Canadian born the Residual population has tended to experience relatively high probabilities of senescence from cardiovascular complication.

The indication among the immigrants suggests that with the exception of Other foreign-born, mortality due to cardiovascular complications has been on the increase over the 1951 to 1971 decades. The group which has displayed the most favourable experience is the Other European foreign-born.

5.3 Mortality due to Accidents-Violence

The chances of dying from accidents and violence have always been greater for Native Indians in comparison to any other group (Table 5.14). In each year studied, Indians ranked first in death rates. Furthermore, their likelihood of dying has actually increased over time and the magnitude of difference is among the highest in the whole study.

Among the indigenous groups, there has been a general but gradual increase in mortality from this cause over time. For example, among the French, the B effect in 1951 was -.462; in 1964 it increased to -.073, and in 1971 it was -.104, which was considerably higher than in 1951. A similar trend is apparent among the British and the Residual native-born subpopulations.

Of the immigrant groups, the British have consistently displayed negative effects over the years. They experienced their lowest incidence of death in 1964. The United States foreigners possessed lower effects in 1951 and 1964, but suffered higher increments in 1971. The case for Other European foreigners suggests an irregular pattern witnessing a small increment in the odds in 1951, a declining logit value in 1964, and again an increasing coefficient for mortality due to accidents-violence in 1971. The "Other" foreign-born have improved their condition progressively over the twenty year period.

5.4 All Other Causes of Death

The residual class of mortality contains many causes of death and for this reason, the results must be viewed with some degree of caution. Considering the findings in Table 5.15, all groups have experienced declines in the odds of dying from "all other" causes over the 1951-71 decades. However, Native Indians and French Canadians had positive rates in 1971 while the British groups had negative chances of dying, and the remainder were very close to convergence. As we have seen however, substantial differentials remain when particular causes of death are analyzed separately.

TABLE 5.15 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO ALL OTHER CAUSES 1951, 1964 AND 1971

VARIABLES	ADDITIVE EFFECTS 1951 α	B	1964 α	B	1971 α	B	MULTIPLICATIVE EFFECTS 1951 η	T	1964 η	T	1971 η	T
AGE	-5.654		-6.202		-6.234		.059		.045		.044	
0-4		1.118		1.050		.570		1.810		1.699		1.329
5-9		-1.664		-1.820		-1.962		.435		.403		.375
10-14		-2.05		-2.294		-2.168		.359		.317		.338
15-19		-1.570		-1.552		-1.172		.456		.460		.557
20-24		-1.350		-1.378		-.994		.509		.502		.609
25-29		-1.292		-1.586		-1.356		.524		.452		.508
30-34		-1.194		-1.402		-1.314		.550		.496		.518
35-39		-1.036		-1.180		-1.162		.596		.554		.560
40-44		-.818		-.856		-.858		.664		.652		.651
45-49		-.516		-.576		-.534		.773		.750		.766
50-54		-.202		-.142		-.146		.904		.932		.929
55-59		.142		.288		.242		1.074		1.155		1.129
60-64		.536		.736		.680		1.308		1.440		1.405
65-69		.924		1.114		1.096		1.587		1.745		1.729
70-74		1.386		1.606		1.540		2.000		2.231		2.160
75-79		1.904		2.126		1.994		2.591		2.896		2.711
80-84		2.448		2.602		2.442		3.402		3.673		3.391
85+		3.160		3.254		3.098		4.856		5.091		4.706
SEX												
MALES		.124		.212		.248		1.064		1.112		1.132
FEMALES		-.124		-.212		-.248		.940		.899		.883
SUBPOPULATION												
FRENCH NB		.024		.054		.200		1.012		1.028		1.105
BRITISH NB		-.694		-.508		-.492		.707		.776		.782
NATIVE INDIAN		1.250		1.138		.546		1.868		1.766		1.314
RESIDUAL NB		.016		-.048		.060		1.008		.976		1.056
BRITISH FB		-.542		-.430		-.354		.762		.806		.838
USA		-.136		.044		.008		.934		1.023		1.004
OTHER EUROPE FB		-.468		-.468		-.086		.791		.792		.958
OTHER FB		.552		.216		.068		1.318		1.115		1.035

5.5 Determining the Net Effect of Cause of Death on Subgroup Mortality

Another type of procedure that may be used to examine the mortality experience of any given group is to determine the relative importance of a given cause of death in accounting for the population's odds of death holding constant all other remaining causes. This approach has been developed by demographers in connection with the construction of "net" life tables (e.g., Elandt- Johnson and Johnson, 1980).

In the present context, it was decided to apply logit modelling to ascertain the independent effect of each cause for each subpopulation controlling for age, sex and time. Although this is not strictly comparable to the usual demographic net life table methodology, in principle we are attempting to determine the same thing. Instead of providing net probabilities of death due to a given cause by age group, we will show a "net" logit coefficient reflecting the effect of a given cause on the odds of death for a particular subpopulation.

One major advantage of this methodology, from the point of view of this thesis, is that age patterns of mortality specific to each population studied may be provided. This is facilitated by the fact that the age-specific odds represent main effects once the influence of cause of death, age, sex and time have been controlled.

Figure 5.2 shows the age patterns of mortality for the overall native and foreign-born populations of Canada during 1951, 1964 and 1971. The figures show a high degree of regularity in the patterns. For example: (1) Foreigners have always experienced lower odds of mortality at infancy; (2) foreign-born persons have always had greater chances of death between the ages 5 through 20 (and 25 in 1951); (3) immigrants have had lower probabilities of dying in the prime working ages, 20 to 55. A few divergent trend may be mentioned as well. In 1951, the foreign component had a higher likelihood of death beyond age 55. In 1964 this pattern did not materialize until age 75, and in 1971 this occurred at age 80. Thus, it seems that a comparison of indigenous and immigrant mortality in Canada would have to take into account all of these particularities in the age patterns of death. No single summary index is able to capture all the intricacies noted above.

Figure 5.3 displays age patterns of mortality among the eight subpopulations in this analysis. In all cases, the odds of dying associated with 1971 are lowest among ages zero and 5. Beyond these ages however, some unexpected reversals are evident. For example, in the case of French native-born, in 1971 the logits of the expected odds are highest in the age range 15 to 25. The same situation is also apparent among the British native-born (to a lesser extent), the Residual native-born and the United States

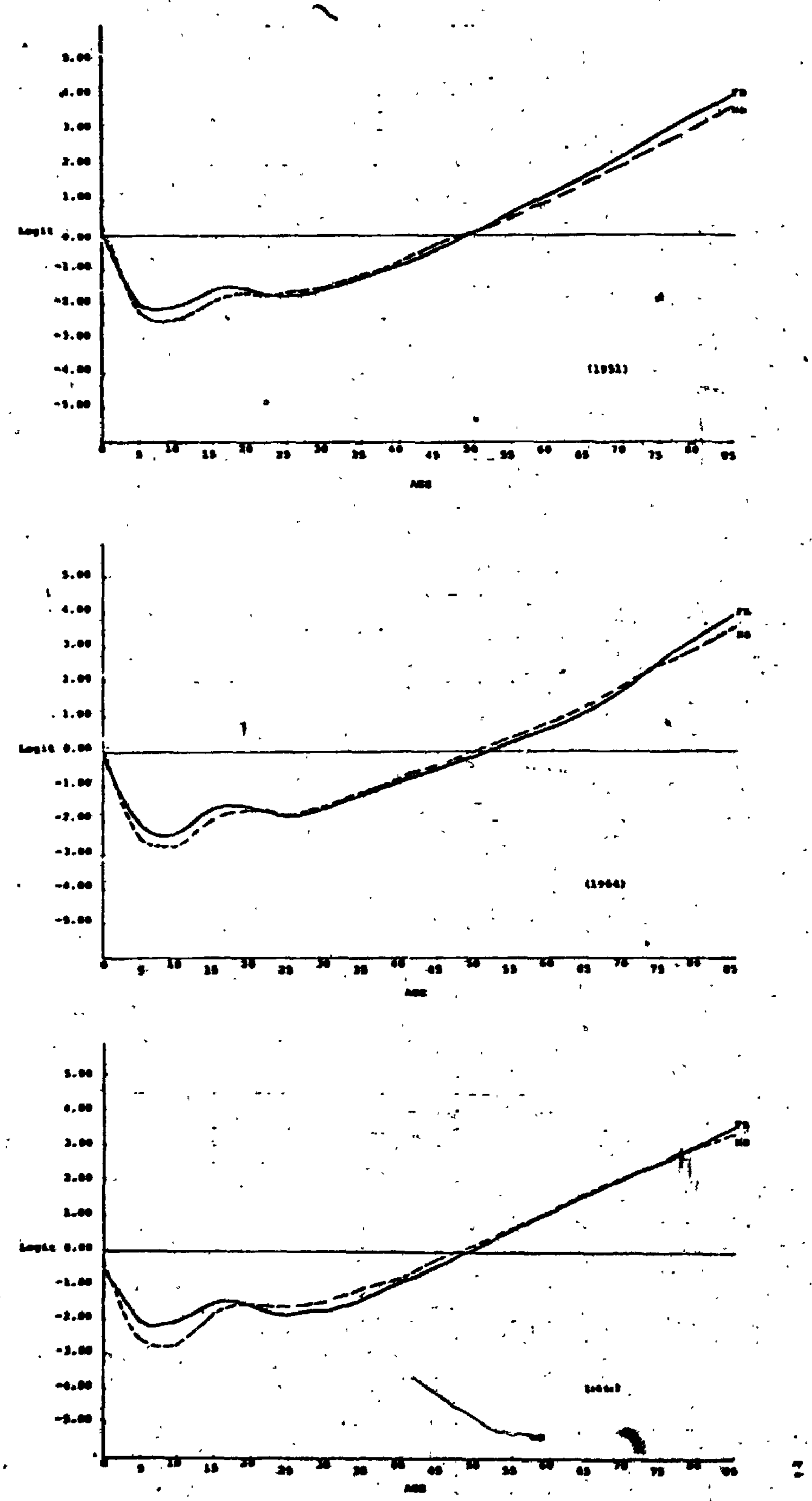


Figure 5.2 Age Patterns of Mortality for the Native and Foreign-Born Populations, 1951,1964 and 1971, Derived from the Logit Model : ASC DA DS DC .

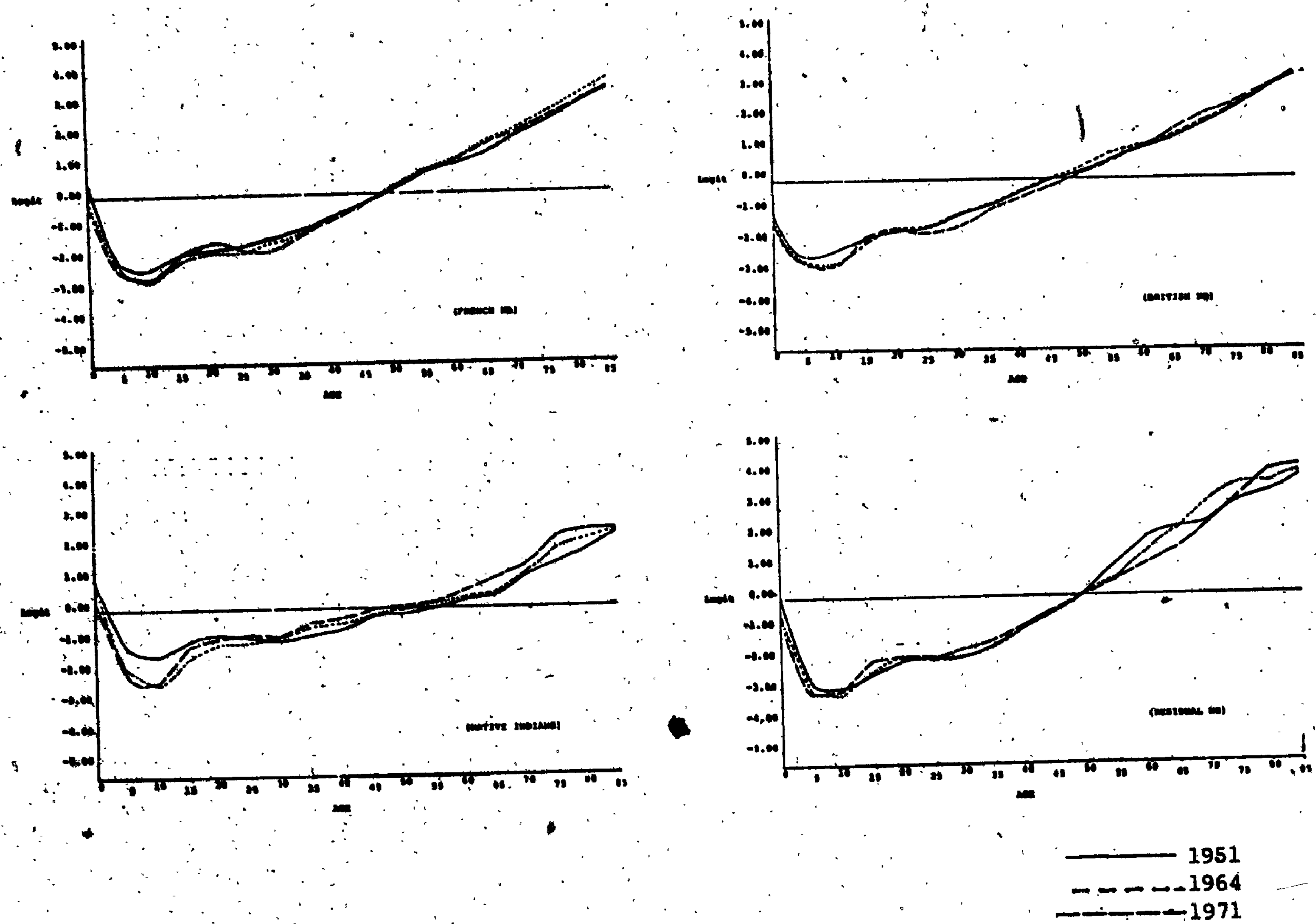
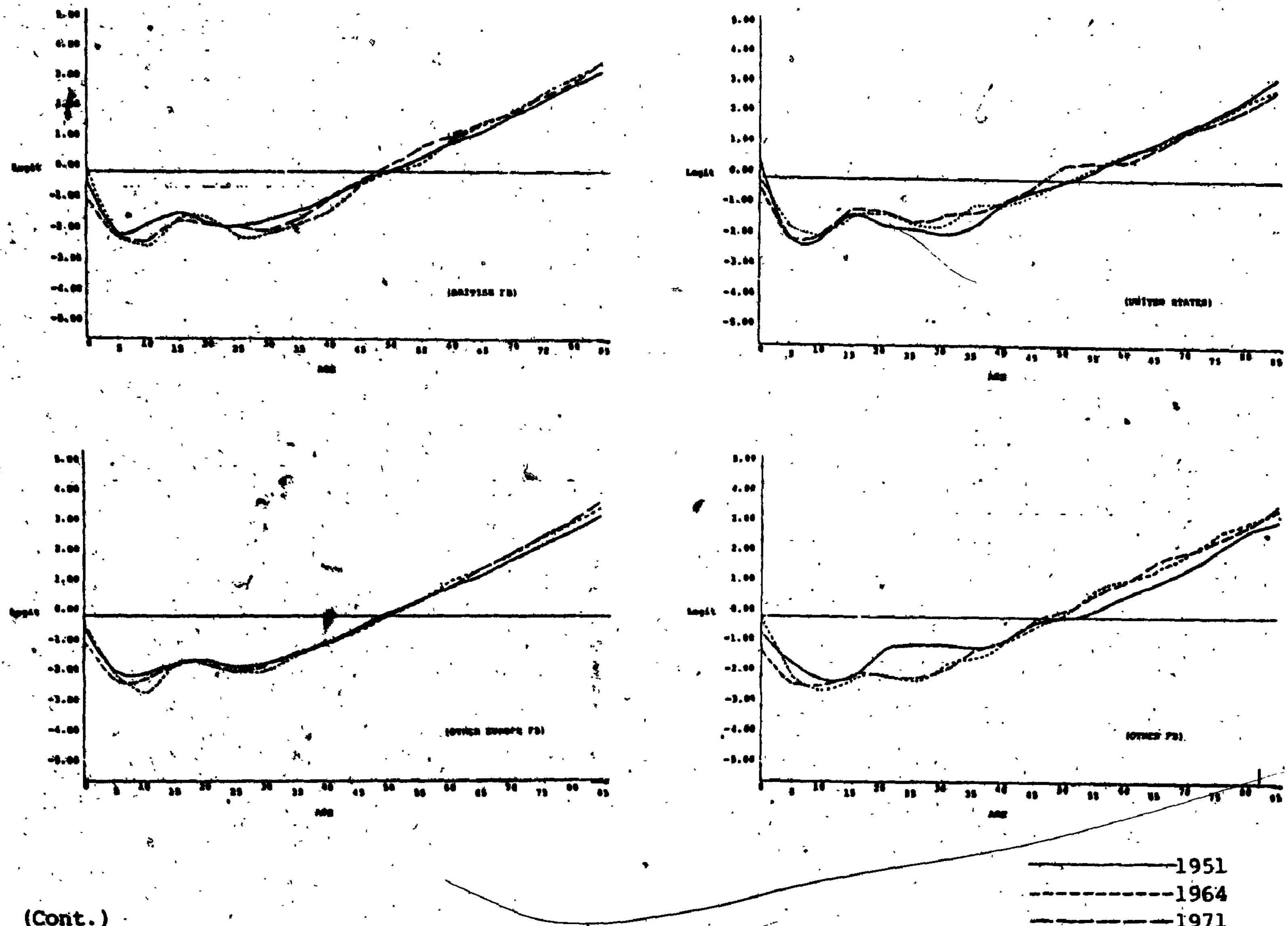


Figure 5.3 Age Patterns of Mortality Among Native and Foreign-Born Subpopulations, 1951, 1964 and 1971, Derived from the Logit Model: ASC DA DS DC



(Cont.)
Figure 5.3, Age Patterns of Mortality Among the Native and Foreign-Born Subpopulations, 1951,1964 and 1971, Derived from the Logit Model: ASC DA DS DC .

immigrants. Beyond age 25, the trends on the graph corresponding to the three time periods often reverse making an overall generalization impossible. The expectation was for a time gradient to emerge. That is, 1951 to be highest, 1964 intermediate and 1971 having the lowest odds of senescence over age. This does not occur consistently. Perhaps the main reason for this is that the logits are net effects independent of the other variables, including cause of death, in the derivation of the equations. The complete equations are included in Tables K.2 to K.4, in Appendix K.

An especially important feature of the graphs in Figure 5.3 is the mortality crossover at older ages for Native Indians. This phenomenon was first discussed in the opening sections of Chapter IV. To highlight this effect, Figure 5.4 is provided below. It shows a comparison of age patterns of mortality among Native Indians, French Native-born and British native-born in 1964. The other two years could have been included along with the remaining groups but a series of preliminary graphs for the three periods of interest confirmed the general pattern delineated in Figure 5.4. For the sake of clarity it was decided to present data for one point in time including only three subpopulations to demonstrate the Native Indians' crossover pheonomenon. The data are clearly consistent with a mortality reversal evident around age 45.

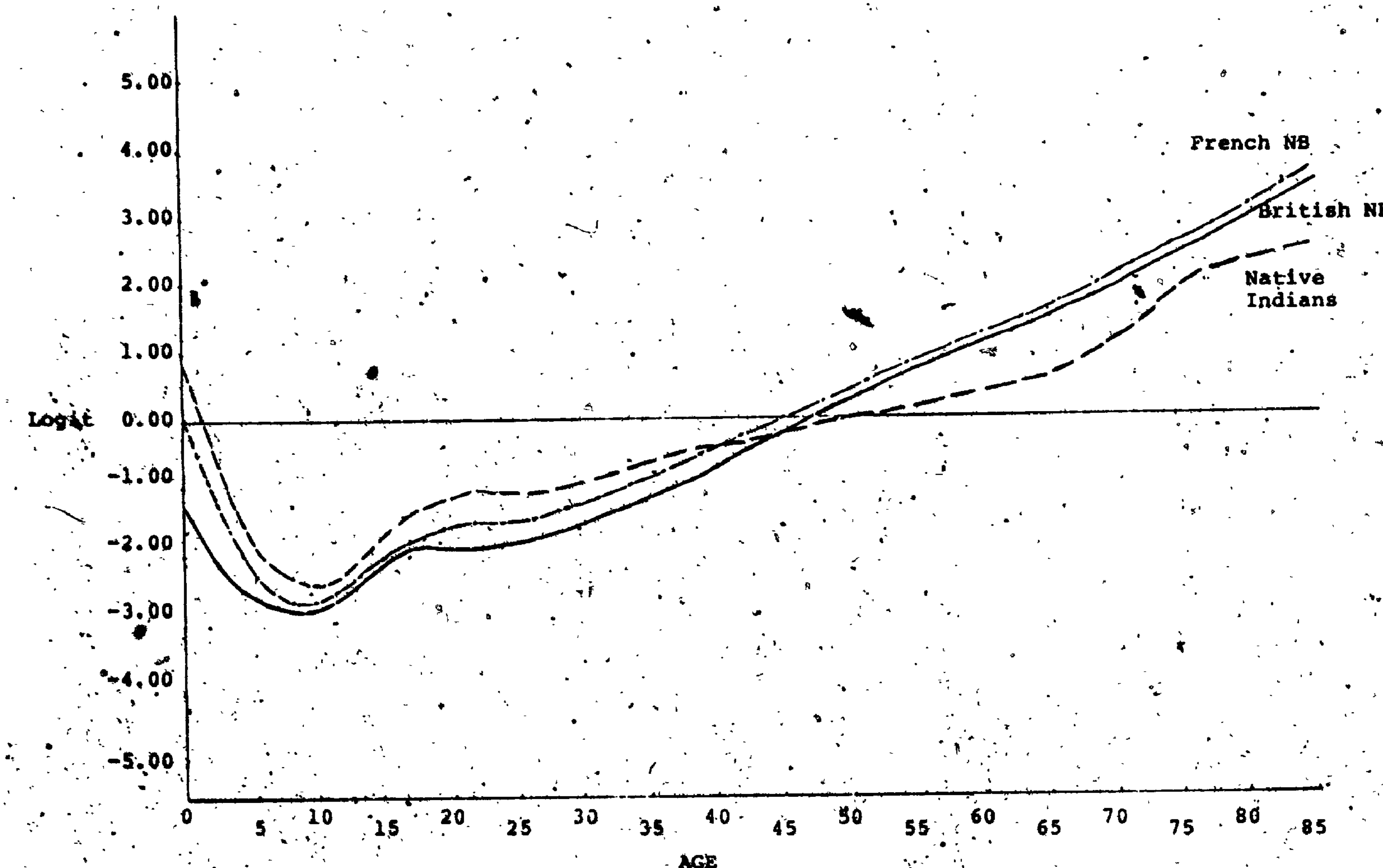


Figure 5.4 Age Patterns of Mortality Among Native Indians, British Native-Born and French Native-Born and Crossover Effect 1964

Figure 5.5 exhibits the logits associated with the relative importance of cause of death among the eight subpopulations in this thesis. The graphic display generally confirms the observation made earlier that neoplasms and cardiovascular are of lesser importance than accidents-violence and "other" causes among the Native Indians.

The relative importance of neoplasms seems to have declined by 1964, but in 1971, a few groups such as Other foreign-born, British native-born and French native-born actually showed gains in their odds of death due to this disease. For the most part, the remaining groups seem to have had a slight increase in this cause over time.

The logits for cardiovascular related deaths are substantial in magnitude. From the appropriate graph, it seems evident that this has remained an important cause of senescence over the recent decades since 1951. Other Europe immigrants, United States and Other foreign-born have been more susceptible to death from such a category of disease. Among the indigenous elements, the Residual native-born has experienced the greatest likelihood of mortality from cardiovascular disease.

Accidents and violence rank lowest in accounting for group specific mortality levels. The logits are all negative. Thus in relation to the remaining three causes, this source of senescence is least important. Nevertheless, it is quite clear that there is a stratification reflecting

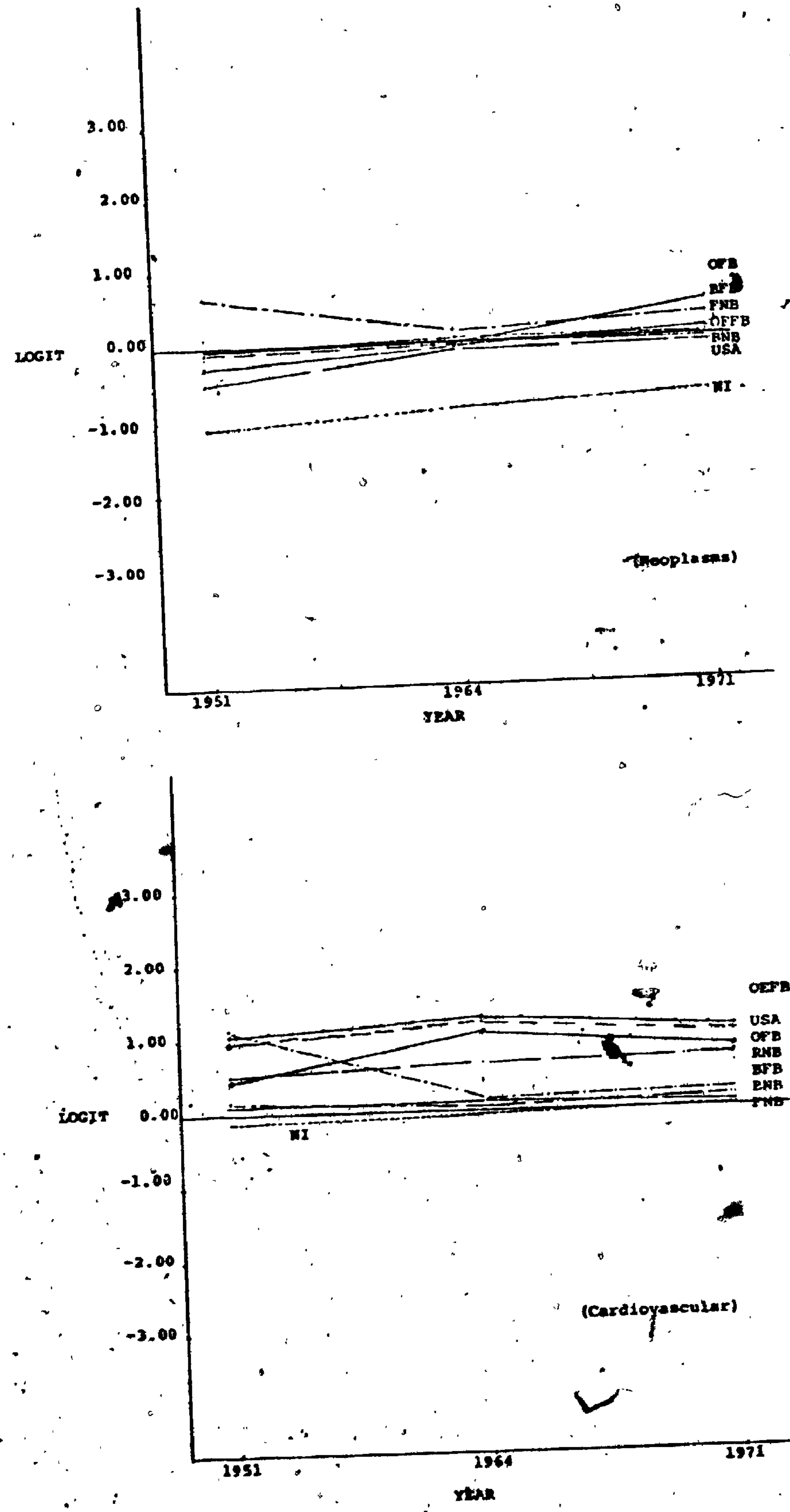
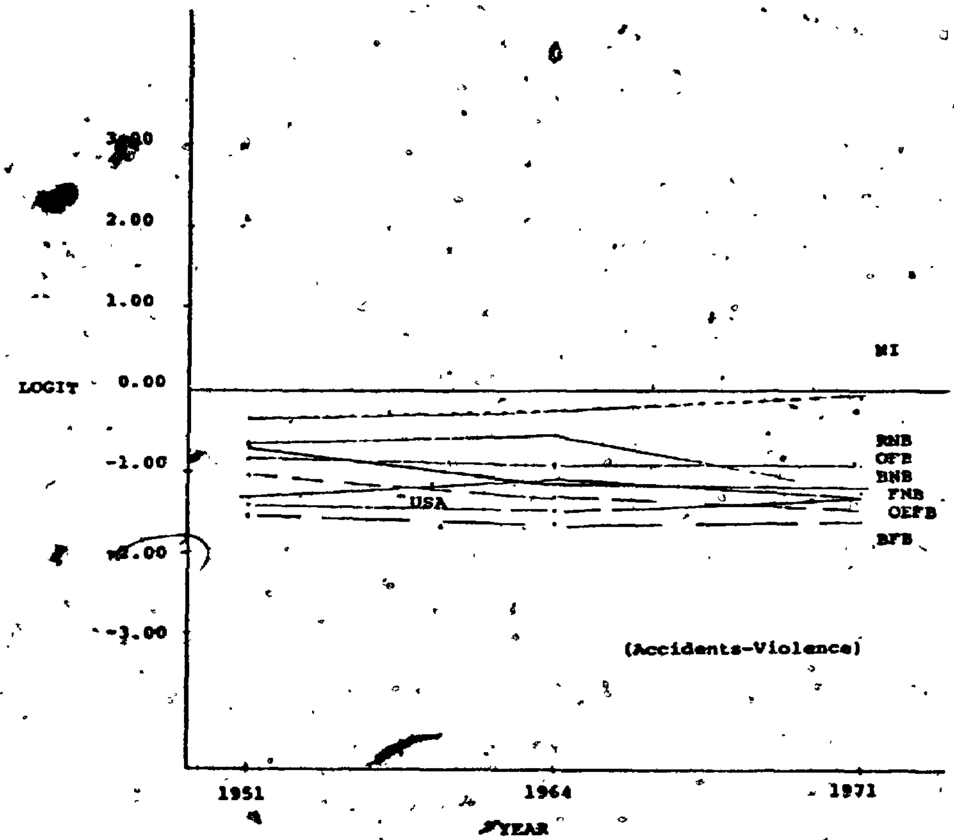


Figure 5.5 Logit Main Effects of Four Major Causes of Death on the Odds of Dying Among Native and Foreign-Born Subpopulations, 1951, 1964 and 1971.



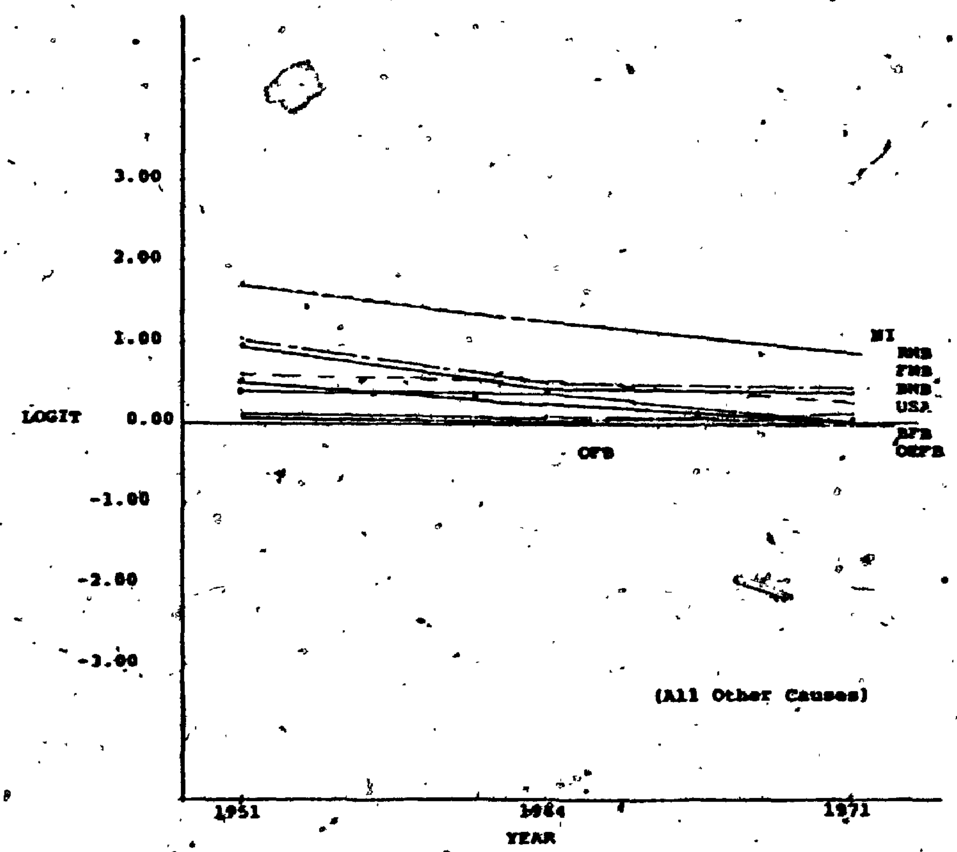


Figure 5.5 (Continued)

differences in the odds of dying from such a cause. As mentioned previously, the Native Indians rank first; and accidents have shown an increasing trend over time. The British native-born on the other hand rank lowest.

All other causes reflects a residual category of disease which encompasses many causes of death. This needs to be emphasized in our interpretations so that the results are judged with some degree of caution. For Native Indians this is the most important source of mortality, but over time it has shown a declining trend. A similar decline seems evident for most of the other groups in the graph in Figure 5.5

5.6 Evaluation of Hypotheses

5.6.1 Assimilation

For the most part, the data analyzed in Tables 5.12 to 5.15, do not provide evidence of complete assimilation among subgroups. As was the case in the previous chapter, tests for convergence cannot be initiated in a direct manner among foreign-born subpopulations. In any case, it could be argued that if the B effects associated with ethnicity/nativity were zero (or one in the multiplicative equations) this would constitute support for full assimilation. However, it can be determined from the previous tables that in no cause of death, do the B values converge to zero, irrespective of the group studied.

Among people born in Canada, substantial differentials are noticeable across all four causes of death, regardless of the point in time being observed. In fact, among some of the populations the cause-specific mortality effects tend to increase over time, such as in the case of the French. For other groups such as the British native-born, the tendency has been towards gradual declines in cause specific death rates. In other instances, groups have shown declining rates but their levels have remained positive. Such is generally the case for the Residual native-born. A further pattern may be identified in conjunction with Native Indians. They have experienced improvements (declines) in neoplasms and cardiovascular mortality, but have suffered increasing odds of death due to accidents and violence and "other" causes. Their relatively high death rates are a result of the overriding importance of accidents-violence and "other" causes of death.

For example, if one compares this group's mortality due to accidents and violence and "other" causes to the experience of the British native-born, the differences over time become substantial, and the results are more detrimental to the Natives:

Algebraic Differences BNB - NI	1951	1964	1971
Accident-violence	1.344	1.642	1.642
Other causes	1.944	1.646	1.038

In view of all this, it is clearly evident that the group specific mortality rates associated with different causes are simply too divergent to provide any substantive support for assimilation among the native-born components. There is some movement towards convergence, but it is hardly enough to suggest full assimilation.

Table 5.16 contains logit effects to test the assimilation thesis among the total native and foreign-born populations within the four causes of death. Note that the effects pertain to decedents aged 65 and above, which is in accordance with the specifications of this hypothesis in Chapter II. The contrasts in the table suggest that the cause-specific differences are generally small between the two populations. However, within each cause of death, there seems to be a <u>widening</u> of mortality variance. For example, in the case of neoplasms the differences over time increase from .004 in 1951, to .104 in 1971. A similar trend is evident in connection with cardiovascular deaths. Concerning accidents-violence, the gap between the native and foreign populations widened in 1964 but narrowed again in 1971.

If we agree that this is an adequate test of assimilation, our conclusion must be that small differentials persist between the two components of Canada's population. However, the variations are generally smaller than the differences we observed among specific native and foreign-born subpopulations.

TABLE 5.16 LOGIT EFFECTS FOR THE ASSIMILATION HYPOTHESIS BETWEEN NATIVE AND FOREIGN-BORN POPULATIONS IN CANADA, AGE 65+

MODEL FITTED: [ASNT] [DA] [DS] [DN] [DT] [DNT]*

VARIABLES	NEOPLASMS α	NEOPLASMS B	NEOPLASMS NB-FB DIFF.	CARDIOVASCULAR α	CARDIOVASCULAR B	CARDIOVASCULAR NB-FB DIFF.	ACCIDENTS-VIOLENCE α	ACCIDENTS-VIOLENCE B	ACCIDENTS-VIOLENCE NB-FB DIFF.	ALL OTHER CAUSES α	ALL OTHER CAUSES B	ALL OTHER CAUSES NB-FB DIFF.
NATIVITY-TIME INTERACTION (NET OF ALL OTHER EFFECTS)												
NB	-3.366			-1.620			-5.212			-3.090		
1951		-.002	.004		.004	.008		-.022	.044		.038	.076
1964		.054	.108		.056	.112		.054	.108		.026	.032
1971		-.052	.104		-.060	.120		-.032	.064		-.062	.124
FB												
1951		.002			-.004			.022			-.038	
1964		-.054			-.056			-.054			-.026	
1971		.052			.060			.032			.062	

* ADDITIVE EFFECTS SHOWN IN THIS TABLE.

A more direct test for assimilation may be provided for two of the immigrant subpopulations, the migrants from the United States and British Isles. In Chapter IV we utilized Preston et al. (1972) data to examine the general mortality of these two groups. This procedure will be repeated by focussing on cause-specific mortality. Unfortunately, 1971 data for the two origin populations are not available by cause of death. Therefore, our analysis must be confined to the periods, 1951 and 1964.

Table 5.17 shows logit regression equations based on four causes of death among United States immigrants and their origin population. It is clear that as far as neoplasms, cardiovascular and accidents-violence are concerned, the immigrants have slightly lower odds of dying. In relation to the rest of Canada, the immigrants derived the following cause-specific logits. The equations contained age, sex, time and population membership in a main effects model.

	Logits			
Population	Neoplasms	Cardio-vascular	Accidents-Violence	All Other Causes
Canada	-.068	-.165	.066	.077
USA Immigrants	.068	.165	-.066	-.077

These effects demonstrate that persons from the United States have a less favourable condition with regards to neoplasms and cardiovascular deaths. However, they have tended to die more than the general Canadian population from accidents-violence and "other" causes.

Evaluating the tabular results above, and from table 5.17, it is possible to speculate on which assimilation model from Chapter IV fits the United States immigrant mortality pattern concerning the various mortality causes. For example, with regards to neoplasms and cardiovascular related deaths, foreigners are positively selected in relation to their origin. However, in Canada they tend to suffer greater odds of death from these sources. Thus, no assimilation has occurred in these cases. Concerning accidents and violence the immigrants are again positively selected and in Canada, they share lower odds of such causes of death. Again no assimilation model is supported. In fact, the same claim may be advanced in connection with the residual category of mortality. In this instance however, immigrants have had higher likelihood of death in contrast to their "parent" population while in Canada they experience relatively lower probabilities of mortality than the general population.

A similar analysis was undertaken to contrast Canada versus the United States. The results from the logit equations derived the following effects.

	Logits			
Population	Neoplasms	Cardio-vascular	Accidents-Violence	All Other Causes
Canada	-.081	-.105	-.250	-.160
United States	.081	.105	.250	.160

TABLE 5.17 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO FOUR CAUSES OF DEATH AMONG USA IMMIGRANTS AND USA POPULATION, 1951 AND 1964

	ADDITIVE EFFECTS							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
VARIABLES	α	B	α	B	α	B	α	B
AGE	-6.968		-6.470		-7.178		-6.172	
0-4		-1.526		-2.438		.268		.980
5-9		-2.544		-4.450		-1.522		-2.155
10-14		-2.714		-3.932		-1.512		-2.348
15-19		-2.446		-3.294		-.480		-1.936
20-24		-2.280		-2.796		-.180		-1.612
25-29		-1.816		-2.288		-.296		-1.472
30-34		-1.308		-1.646		-.370		-1.126
35-39		-.728		-.906		-.340		-.858
40-44		-.162		-.188		-.299		-.536
45-49		.358		.424		-.224		-.212
50-54		.838		.986		-.142		.118
55-59		1.018		1.480		-.018		.652
60-64		1.592		1.958		.052		.786
65-69		1.890		2.426		.166		1.146
70-74		2.148		2.892		.462		1.502
75-79		2.372		3.370		.872		1.870
80-84		2.574		3.880		1.412		2.286
85+		2.734		4.518		2.154		2.916
SEX								
MALE		.094		.214		.416		.218
FEMALE		-.094		-.214		-.416		-.218
POPULATION								
USA IMMIGRANTS		-.300		-.078		-.150		.164
USA POPULATION		.300		.078		.150		-.164
YEAR								
1951		.028		.050		.038		.138
1964		-.028		-.050		-.038		-.138

The effects are consistently lower for Canada in comparison to the United States. Thus, immigrants originating in the latter place have been entering a country which has had relatively better chances of survival from all four causes analyzed in this dissertation. The fact that by and large, the foreigners have been positively selected and that in two cases (neoplasms and cardiovascular) they have experienced lower odds of survival in the host country is suggestive of an explanation outside of assimilation. Moreover, the finding that they have been positively selected in connection with accidents-violence and that they have experienced greater odds in relation to the rest of Canada suggests, again, something other than a mortality assimilation phenomenon.

Table 5.18 exhibits logit regression equations for the odds of dying due to four causes of death among the British foreigners and their origin population. Concerning the population net effects, the immigrants, with the exception of cardiovascular diseases, have benefitted from lower chances of death from neoplasms, accidents-violence and all other causes. This is consistent with a positive selection model elaborated in previous chapters. In order to evaluate the assimilation hypothesis it is necessary to examine the relative odds of mortality of British foreigners as opposed to the rest of Canada. The logit effects for this are shown below:

TABLE 5.18 LOGIT REGRESSION EQUATIONS FOR THE ODDS OF DYING DUE TO FOUR CAUSES OF DEATH AMONG BRITISH FOREIGN-BORN AND BRITISH ISLES, 1951 AND 1964

	ADDITIVE EFFECTS							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
VARIABLES	α	B	α	B	α	B	α	B
AGE	-6.970		-6.685		-7.550		-6.500	
0-4		-1.682		-2.766		.896		.644
5-9		-2.756		-4.282		-1.242		-2.402
10-14		-3.000		-3.632		-1.546		-2.602
15-19		-2.812		-3.140		-.610		-2.136
20-24		-2.512		-2.700		-.430		-1.780
25-29		-2.074		-2.244		-.648		-1.556
30-34		-1.590		-1.724		-.750		-1.400
35-39		-.922		-1.110		-.672		-1.246
40-44		-.322		-.428		-.570		-1.004
45-49		.230		.208		-.412		-.558
50-54		.724		.852		-.240		-.176
55-59		1.140		1.436		-.088		-.300
60-64		1.478		1.966		.136		1.256
65-69		1.834		2.572		.314		1.684
70-74		2.418		2.902		.642		2.288
75-79		2.810		3.520		1.154		2.486
80-84		3.258		4.034		1.848		2.778
85+		3.774		4.538		2.218		3.424
SEX								
MALE		.024		.304		.334		.430
FEMALE		-.024		-.304		-.334		-.430
POPULATION								
BRITISH IMMIGRANTS		-.242		.002		-.052		-.440
BRITISH ISLES POPULATION		.242		-.002		.052		.440
YEAR								
1951		-.230		.244		-.008		-.004
1964		.230		-.244		.008		.004

		Logits		
Population	Neoplasms	Cardio-vascular	Accidents-Violence	All Other Causes
Canada	.081	-.106	.213	.049
British FB	-.081	.106	-.213	-.049

The above coefficients indicate that only in the case of cardiovascular mortality does Canada as a whole experience lower odds of death. In the remaining cases, the foreigners of British Isles origin have fared rather well.

A comparison of the British Isles origin population with Canada will augment our understanding of British foreign-born mortality in the light of a possible assimilation effect. The logit parameters are presented below:

		Logits		
Population	Neoplasms	Cardio-vascular	Accidents-Violence	All Other Causes
Canada	-.112	-.086	-.189	-.322
British Isles	.112	.086	.189	.322

As evident from the above, Canada has lower odds of dying from all four major causes of death. As was true for the immigrants from the United States, persons from the British Isles have been entering a nation where the probabilities of dying from these major causes of death have been lower than the immigrants's country of origin. Thus, if foreigners are positively selected, and the destination population has lower odds of dying than the origin, and immigrants show lower odds than the host society, assimilation would imply a loss of immigrant superiority in their chances for survival (e.g., negative assimilation). This has not been supported by our investigation. The results suggest that in general foreigners from the British Isles in Canada have been favoured by relatively lower odds of mortality due to neoplasms, accidents-violence and "other" causes in relation to the general host population.

5.6.2 The Nativity Effect Hypothesis

5.6.2.1 The Migration Selection Effect

The hypothesis of immigrant selection concerning the likelihood of death in Canada cannot be fully evaluated for most of the ethnic/nativity categories in this dissertation. Such hypothesis requires that we compare the immigrants to their origin populations. We were able to do so for the United States and British foreigners only. Concerning these two groups, it was shown in Chapter IV that the British have followed a pattern of positive selection. For the United States immigrants, their experience after 1951 has been consistent with negative selection. In the present chapter it was determined that the British foreign-born have been positively selected with regards to three causes of death, and they were negatively selected -- but to a very small degree -- only in connection with cardiovascular related deaths. The United States foreign-born on the other hand were positively selected for neoplasms, cardiovascular and accidents-violence, but suffered negative selectivity with respect to "all other" causes.

These findings and interpretations need to be qualified by the fact that -- as was mentioned in Chapter II -- we have not been able to introduce a duration of residence variable in the multivariate analysis. Length of residence in Canada is a crucial factor especially in the evaluation of assimilation or selection. For example, it is quite possible that a given immigrant group is positively selected at the point of immigration and then after several decades in a host society looses this selectivity. Observing their mortality in relation to the country of origin, at this second point in time, would lead to the erroneous conclusion that no selectivity was evident. Due to this problem, it is suggested that the results be viewed with some degree of caution.

5.6.2.2 The Life Stresses Effect

The efficiency of this hypothesis is tested by fitting a saturated logit model so that all possible effects, main and interactions, are included for their impact on the expected odds of death. Given that subpopulation membership is found to have a non-zero value (in the additive model), a positive coefficient is assumed to reflect the mechanisms explicated in accordance with life stresses in Chapter II. On the other hand, a negative influence is congruent with a low life stress model of mortality.

Table 5.19 is included as a test of the life stresses effect. It shows the logits for subpopulation membership derived under the saturated model (containing all possible effects). As in previous tables, the British native-born appear to exhibit the lowest odds overall. Native Indians have had the highest probabilities associated with accidents-violence, "other causes", and surprisingly, come second highest in cardiovascular deaths. These results suggest that particularly among the native-born groups, the British are most advantaged while Native Indians are generally the most disadvantaged. The presumed causal mechanisms responsible for these effects may be stated within the framework of life stresses. The former group has had relatively lower rates of death due to their greater levels of sociooeconomic status, which contributes to better life chances and hence low life stresses which in turn translate into a lower likelihood of death. For Natives, their relatively deprived position in the hierarchy of Canadian society imposes lower life chances and thus greater "stressors" in their life experiences. The final outcome is hypothesized here as being evidence of the devastating effects of life stresses associated with the objective conditions of this group in the stratification system.

TABLE 5.19 LOGIT EFFECTS OF SUBPOPULATION MEMBERSHIP ON THE ODDS OF DYING DUE TO FOUR CAUSES OF DEATH UNDER THE SATURATED MODEL.

EFFECTS BY CAUSE OF DEATH	ADDITIVE EFFECTS α	β
NEOPLASMS	-6.878	
FRENCH NB		.064
BRITISH NB		-.382
NATIVE INDIANS		-.142
RESIDUAL NB		.230
BRITISH FB		-.130
USA		-.072
OTHER EUROPE FB		-.206
OTHER FB		.636
CARDIOVASCULAR	-6.620	
FRENCH NB		.058
BRITISH NB		-.408
NATIVE INDIANS		.216
RESIDUAL NB		.084
BRITISH FB		-.110
USA		.112
OTHER EUROPE FB		-.412
OTHER FB		.460
ACCIDENTS-VIOLENCE	-7.312	
FRENCH NB		-.320
BRITISH NB		-.548
NATIVE INDIAN		.884
RESIDUAL NB		.146
BRITISH FB		-.338
USA		.040
OTHER EUROPE FB		-.190
OTHER FB		.324
ALL OTHER CAUSES	-6.016	
FRENCH NB		.074
BRITISH NB		-.580
NATIVE INDIAN		.782
RESIDUAL NB		.208
BRITISH FB		-.486
USA		.242
OTHER EUROPE FB		-.408
OTHER FB		.166

The effect of life stresses is most clearly observed in the Native Indian's mortality pattern associated with accidents and violence and "other" complications.

This explanation assumes that underlying the Natives' mortality ~~pattern~~ is their alienation which derives from their relatively deprived position in the structure of Canadian society. Moreover, their low status imposes a multitude of limitations which range from lack of access to good health care to harmful personal life styles. All this traces back to the objective reality of their class position. It is well known in sociological investigations that social class may be either a limiting or "liberating" phenomenon not only in personality and access to positive life chances, but also to morbidity and death.

The use of the life stress concept as applied in this study is quite broad. It encompasses many intermediate social and psychosocial influences on senescence. What is most central to the concept is the notion that a group's social status predisposes its members to varying degrees of life stresses through the effects of limited life chances available or that are accessible to the group.

In all cases, the Residual Native-born appear to have suffered disproportionately negative life experiences with high levels of stresses in life: this subgroup ranks among the most susceptible to the risk of death in Canada in all four causes of death.

The French in Canada have been documented to have suffered high death rates relative to the British and "Other" groups (e.g., Roy, 1975). Our data provide support for the life stress effect as the B values are positive in three of the four causes. However, the strength of the effects is small. This suggests that they actually occupy an intermediate level of mortality which is not as extreme as some authors would suggest (e.g., Roy, 1975; Kalbach and McVey, 1979).

Among the immigrant categories the rankings in the levels of death due to each cause are fairly consistent. "Other" foreigners have had the greatest levels of life stresses while the United States foreigners follow a distant second. Other Europeans have negative parameters implying low life stresses. However, the British have had a generally more superior mortality experience presumably due to their lower levels of life stresses.

Not much is known about the class position of United States immigrants in Canada. Thus, it is not possible to provide a definite link between social status, life chances and life stresses in relation to their risk of death. The evidence here suggests that this group is perhaps less advantaged than most entities in the Canadian mosaic.

According to the detailed accounts of Richmond (1967) and of Richmond and Kalbach (1980), immigrants from Europe, and in particular, Britain, have been successful in establishing a firm social and economic footing in Canada. Perhaps one of the most important consequences of this has been relatively low mortality and presumably low levels of life stresses due to favourable life chances. The British however, seem to have benefitted to a somewhat greater degree than most groups in this relationship.

The data analysis in Chapter IV and in the present section has clearly documented that in Canada there has been a "mortality mosaic". That is, significant differentials in longevity have been observed in the census periods 1951 to 1971. Groups that are known to be relatively disadvantaged socioeconomically have also tended to demonstrate relatively high odds of deaths. Among the native-born component this contention has received considerable support in connection with the death patterns of Native Indians and French Canadians. Socioeconomically advantaged groups such as the British have shown the lowest likelihood of mortality over time. Among the foreign-born it is known that British and Other Europeans have constituted two of the most successful entities in Canada's immigration history. Their relatively low mortality is a reflection of this fact.

In this chapter our concern was to examine mortality differentials due to four major causes of death. Initially, the foreigners appeared to suffer greater risks, but when controls for age, sex, time and subpopulation membership were introduced in the multivariate framework, no clear-cut pattern could be identified.. In general, Native Indians (in connection with accidents-violence and "other" causes), Residual native-born and Residual foreign-born have shown relatively high probabilities of death. The British Native-born and their foreign counterparts on the other hand, have benefitted from lower chances of death. Among the native-born, French Canadians lag intermediate between British and Native Indians (only in connection with accidents-violence and "other" causes). Among the foreigners, the Other European generally occupy a intermediate mortality position between the relatively low rates of British immigrants and the high odds associated with "Other" foreign-born.

CHAPTER VI

CONCLUSIONS AND SUGGESTION FOR FUTURE STUDY

6.1 Conclusions

The main question developed and analyzed in this thesis relates to the issue of substantial differences in mortality between native and foreign-born populations in Canada. It was found that indeed variations have been the rule rather than the exception. Several hypotheses--assimilation, migration selection and life stresses--were evaluated for their efficiency in explaining the expected odds of dying among selected native and foreign-born subpopulations.

The assimilation hypothesis did not receive significant support in that no substantive evidence for convergences in death rates emerged among the various groups. In this context it needs to be emphasized however, that in the overall there appeared to be some indication of a trend towards eventual assimilation. A complete test for assimilation requires cohort data--which is unavailable--and perhaps more points of observation into the future. Assimilation is a process which varies in length depending on the type of phenomenon being studied. Thus, our conclusions about assimilation must remain tentative. Considerable support for the selectivity hypothesis was found. Subpopulations such as British immigrants and United States foreigners were compared to their origin populations and the findings, especially for the British, are congruent with the positive selection effect for immigrants. That is, those who leave their country of origin generally demonstrate lower death rates then their "parent" populations. The underlying assumption is that immigrants tend to be positively selected in physical and social characteristics thus accounting for relatively lower death rates.

Concerning the evaluation of the life stresses effect it was hypothesised that for Native Indians and French Canadians, the effect of subpopulation membership would be positive, thus contributing to an increase in the odds of death. The rationale for this was stated in terms of life stresses as the underlying cause for high mortality levels. It was found that in general Natives, French and Residual native-born fit this hypothesed relationship.

Overall, the statistical results in this study tend to be mixed. In the general case, the findings for most subgroups were not always consistent in demonstrating stability in their relative position with respect to the likelihood of death. The following findings emerged as the most salient features of the analysis.

(1) Of the eight groups studied the British native and foreign-born have demonstrated the lowest rates of general mortality in Canada.

(2) Native Indians have shown the greatest chances of dying. Accidents-violence and "Other" diseases are most accountable for this fact. With regards to complications due to neoplasms and cardiovascular causes their odds were below most groups.

(3) It was found that when the data were collapsed into the dichotomy native/foreign-born and all relevant controls were introduced the latter had slightly higher life expectancy at age zero, but at subsequent ages advantages in longevity varied in that on some occasions foreigners were most advantaged while in others, the native-born benefitted more. For the most part, the British native-born, the British foreign-born and Other European immigrants ranked lowest in the chances of death while Native Indians, Residual native-born and "Other" foreign-born have suffered the greatest odds of mortality. The French native-born and United States foreigners occupied intermediate positions in the expected odds of dying.

The findings of this inquiry suggest that inequality in death is widespread in Canada. In fact, it was argued in earlier chapters, that the situation may be described as the "mortality mosaic". It has been suggested by Porter (1965) and other sociologists that any system of stratification is bound to promote inequalities in life chances (Forcese, 1980). That is, one's position in society's heirarchy presents varying levels of constraints and limitations for the individual. Moreover, ethnicity, nationality and class position in combination, introduce further degrees of limitation in life chances. For example, studies by Clement (1972), and Olsen (1978), have documented that in Canada, class and ethnic origin are almost wholly responsible for one's access to the elite and positions of power.

In this study, it has been argued that differences in life opportunities are causally related to mortality. The causal mechanisms involved in this relationship assume many intervening factors. Unfortunately, it is not possible to introduce a multivariate framework containing all the relevant intervening variables which have been included in the theoretical model of this dissertation. Life chances vary on the basis of one's position in the stratification system. Essentially, this means that the lower the life chances, the greater the difficulty in coping with everyday life experiences; and hence, people who have relatively low opportunities tend to experience social, structural and personal stresses in their lives. Eventually, the end result of this process culminates in differences in morbidity and mortality. Our concern in this research has been with mortality variation. This is not to suggest that morbidity is a less important variable to study. Rather, the two are best analyzed separately, or if possible, assuming data availability, they could be analyzed in one multivariate framework. It is probably best to focus on the two separately because a given population may suffer high incidences and prevalences of morbidity without necessarily experiencing high death rates and vice-versa. Also, very often, morbidity takes its toll on the individual after some time-lag, perhaps ten to fifteen years if not more, from the onset of a given disease. This fact is perhaps most evident in the case of neoplasms.

6.2 Nativity, Ethnic Origin, Socioeconomic Status and Mortality

One of the main limitations of this study pertains to the inability to introduce controls for socioeconomic variables and secondly, the problem of studying infant mortality. In this section, a brief presentation will be made concerning both of the above features.

6.2.1 Socioeconomic Status and Mortality

Aggregate census data are not available for the periods of interest to this thesis. Moreover, it is difficult to gather aggregate data for each specific group on such variables as income and education for the years prior to 1971 because Public Use Sample Tapes for the 1951 and 1961 censuses are not available. Given the availability of the 1971 P.U.S.T., an attempt is made here to determine the relative socioeconomic position of the native and foreign-born, and their corresponding subpopulations. This will allow for the formulation of inferences about the possible association between subpopulation membership and mortality at one point in time, 1971.

Table 6.1 shows selected socioeconomic levels among native and foreign-born subpopulations in 1971. The first two rows of the table suggests that foreigners are generally wealthier and better educated than the indigenous population of Canada (cf. Richmond and Kalbach, 1980). The rest of the table concerns itself with specific subgroups. What stands out is the relatively disadvantaged position of Native Indians and French Canadians, while United States, British foreigners and British native-born have enjoyed a generally superior socioeconomic status. The Other Europeans and Residual native-born share intermediate socioeconomic levels. Although not perfectly consistent with the relative rankings of these groups on mortality, the data in this thesis are suggestive of an inverse relationship in that the higher the relative status, the lower the odds of mortality. As discussed previously, this is a further indication of a mortality inequality gradient in Canada.

6.3 Infant mortality and Nativity of the Mother

Do foreign-born mothers have lower or higher infant mortality in relation to indigenous mothers? Our results from previous chapters pertaining to general mortality tend to suggest that the immigrant sector will most likely show lower infant mortality rates.

TABLE 6.1 SELECTED SOCIOECONOMIC LEVELS AMONG NATIVE AND FOREIGN-BORN SUBPOPULATIONS, CANADA 1971

SUBPOPULATION	AVERAGE* EDUCATION	AVERAGE INCOME IN 1970	PROPORTION IN MANAGERIAL AND ADMINISTRATIVE OCCUPATIONS
ALL NATIVE-BORN	4.835 (2.203)	4492.39 (5332.54)	.0329 (.1783)
ALL FOREIGN-BORN	5.173 (2.595)	4949.70 (5783.81)	.0319 (.1758)
TOTAL	4.903 (2.291)	4583.61 (5428.61)	.0327 (.1778)
FRENCH NB	4.350 (2.100)	3966.03 (4652.30)	.0249 (.1559)
BRITISH NB	5.220 (2.246)	4864.94 (5723.89)	.0406 (.1974)
NATIVE INDIAN	3.680 (1.900)	2949.49 (3943.66)	.0141 (.1178)
RESIDUAL NB	5.051 (2.227)	4738.11 (5536.08)	.0319 (.1759)
BRITISH FB	5.716 (2.189)	5363.03 (5808.26)	.0489 (.2156)
USA	6.309 (3.000)	5430.46 (7969.41)	.0592 (.2361)
OTHER EUROPE FB	4.469 (2.360)	4764.43 (5344.98)	.0211 (.1437)
OTHER FB	6.423 (3.051)	4612.45 (584[illegible].12)	.0275 (.1635)

* Census categories, not actual years
Census Coding of Education:

1 = No schooling
2 = Below Grade Five
3 = Grades 5 to 8
4 = Grades 9 to 10
5 = Grade 11
6 = Grade 12
7 = Grade 13
8 = University 1-2 years
9 = University (3-4) - No degree
10 = University (3-4) - Degree
11 = University (5 years) - No degree
12 = University (5+years) - Degree

Respondens Age 20-65 only in this table
( ) = Standard deviations.

Table 6.2 contains infant mortality rates for native and foreign-born mothers in Canada in 1951 and 1975. Unquestionably, the figures (see Appendix L for derivation of rates) support the hypothesis stated above. In 1951, the foreign-born mothers had infant mortality rates which were approximately 3 to 4 per 1000 below the indigenous women. However, by 1975, this differential had virtually disappeared with the immigrant women having only slightly lower rates than the indigenous mothers.

A multivariate analysis was undertaken to separate the effects of year, sex of the infant, nativity of the mother and length of life in months of the infant on the expected odds of dying within the first year of life. Table 6.3 displays the gross effects while Table 6.4 exhibits the logit main effect parameters based on the main effects model.

There is nothing unusual about the derived values of the B coefficients: the month of death weights delineate a familiar pattern of survivorship in the first year of life with the highest likelihood of death in the first month, and a declining rate in subsequent months. Native-born mothers have slightly higher odds of experiencing infant deaths than do foreign-born women; male infants die more often than female babies and finally, the more recent the year, the lower the infant mortality rate. Next to the age factor, the time variable is of most importance. It reflects the

TABLE 6.2 INFANT MORTALITY RATES TO NATIVE AND FOREIGN-BORN MOTHERS AND CORRESPONDING FREQUENCIES, CANADA, 1951 AND 1975*

YEAR	NATIVE-BORN MALE	NATIVE-BORN FEMALE	FOREIGN-BORN MALE	FOREIGN-BORN FEMALE	TOTAL MALE	TOTAL FEMALE
1951	43.35	34.16	39.80	30.20	42.91	33.66
1975	14.87	11.86	14.76	11.28	15.10	11.78

FREQUENCIES

		NATIVE-BORN				FOREIGN-BORN				TOTAL	
		MALES	%	FEMALES	%	MALES	%	FEMALES	%	MALES	FEMALES
1951	DEATHS	7,402	(88.3)	5,512	(88.7)	976	(11.7)	700	(11.3)	8,378	6,212
	BIRTHS	170,737	(87.4)	161,355	(87.4)	24,525	(12.6)	23,177	(12.6)	195,262	184,532
1975	DEATHS	2,437	(87.7)	1,807	(88.0)	341	(12.3)	247	(12.0)	2,778	2,054
	BIRTHS	160,884	(87.4)	152,400	(87.4)	23,110	(12.6)	21,891	(12.6)	183,994	174,291

* Refer to Appendix K for a description of the data utilized here.

TABLE 6.3 GROSS EFFECTS ON THE ODDS OF INFANT MORTALITY TO NATIVE AND FOREIGN-BORN WOMEN, 1951 and 1975

VARIABLES	ADDITIVE EFFECTS α	B
	-7.502	
MONTH OF DEATH		
0		3.444
1		1.862
2		1.244
3		.746
4		.328
5		.436
6		-.384
7		-.862
8		-1.044
9		-1.406
10		-1.894
11		-2.466
NATIVITY OF THE MOTHER	-6.170	
NATIVE-BORN		.082
FOREIGN-BORN		-.082
SEX OF INFANT	-6.130	
MALE		.142
FEMALE		-.142
YEAR	-6.264	
1951		.540
1975		-.540

4

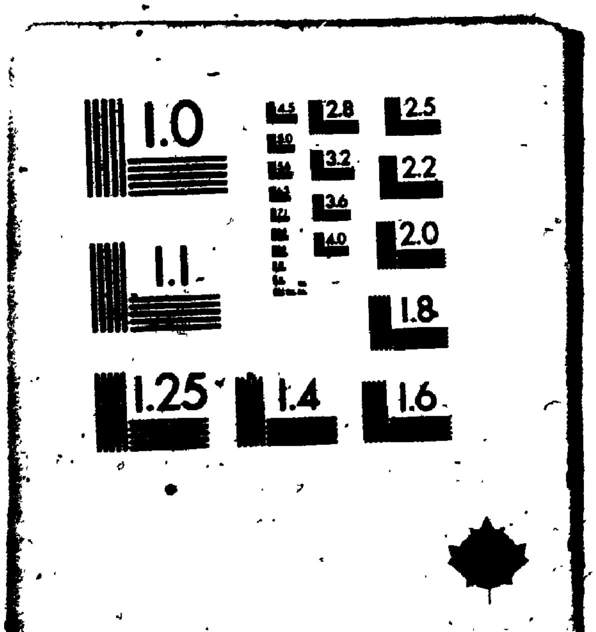


TABLE 6.4 LOGIT EFFECTS FOR THE ODDS OF INFANT MORTALITY, AMONG NATIVE AND FOREIGN-BORN MOTHERS, 1951 and 1975*

VARIABLES	ADDITIVE α	ADDITIVE B	MULTIPLICATIVE η	MULTIPLICATIVE τ
	-7.690		.021	
MONTH OF DEATH				
0		3.440		5.582
1		1.862		2.534
2		1.244		1.862
3		.746		1.452
4		.328		1.178
5		.436		1.243
6		-.382		.826
7		-.862		.650
8		-1.044		.593
9		-1.406		.495
10		-1.894		.388
11		-2.466		.291
NATIVITY OF THE MOTHER				
NATIVE-BORN		.050		1.025
FOREIGN-BORN		-.050		.976
SEX OF INFANT				
MALE		.136		1.070
FEMALE		-.136		.934
YEAR				
1951		.532		1.305
1975		-.532		.766

* Parameters derived from the main effects model; L^2 = 1020.65, D.F. = 81.

general improvements in combatting infant mortality in Canada over the decades since 1951.

These results support our earlier observations that overall, the immigrants in Canada fare slightly better than the native-born with regards to infant and general mortality. Further exploration of the data reveals that the age pattern of infant deaths is quite different among foreign and native-born mothers. For example, babies born to indigenous mothers are more likely to die in the first four months of life. This is mostly responsible for the native-born mothers' higher odds of infant mortality because it is precisely in the first, second and third months that the greatest proportion of infants are lost through death. In contrast, immigrant women are more likely to experience infant deaths in all subsequent months within the first year of life. The following table is included to highlight the difference in the age pattern of infant mortality for native and immigrant mothers. The Lambda parameters were derived from the saturated log-linear model (all possible effects included).

INFANT MORTALITY LAMBDA PARAMETERS (λ)

MONTH OF DEATH	NATIVE-BORN MOTHERS	FOREIGN-BORN MOTHERS
0	.081	-.081
1	.086	-.086
2	.061	-.061
3	.041	-.041
4	-.034	.034
5	-.041	.041
6	-.033	.033
7	-.061	.061
8	-.086	.086
9	-.013	.013
10	-.130	.130
11	-.193	.193

What accounts for the foreigners' slightly lower probability of experiencing infant deaths is not certain. However, the results seem consistent with a selection effect. Assuming that native and foreign-born mothers are exposed to the same environment and have equal access to good medical care, the most likely explanation may be that the latter are constitutionally healthier. An alternative explanation may be that the immigrants experience lower levels of life stresses as defined here in this thesis. In any case, our data do not permit us to go beyond these hypotheses.

6.4 Suggestions for future study

One possible avenue for furthering our knowledge of subgroup mortality differences is to determine the extent to which social background factors affect mortality independent of subpopulation membership. A major obstacle to this task lies in the unavailability of relevant socioeconomic data on the death certificate. There are several alternative ways to cope with this deficiency. Some suggestions are listed below:

(1) Use a record linkage system as was executed by Kitagawa and Hauser (1973) in the United States.

(2) The use of ecological level data is an established research tradition and most scholars are familiar with it. The problem is that it is an aggregate approach and hence does not allow for individual level inferences. In any case, it has many merits and should not be discounted.

(3) Adopt a semi-linkage algorithm by using micro census data along with micro vital statistics mortality data. Essentially, this approach requires that two data sets be merged into one. For example, the Public Use Sample Tapes contain ethnic, age, sex, socioeconomic and other specific information, while the Mortality Data Base

provides information on all of the decedent's identifying variables except the social and economic ones stated above. The task is to link the census SES variables to the mortality ethnic data as if, in fact, the two sources of information had perfect correspondence at the individual level. Of course, this assumption is somewhat questionable in that correspondence will always be less than perfect. However, this technique has merit above and beyond the ecological approach. The reasons for this are two: (a) it is less elaborate and less complicated; (b)it is more refined in that even though it is not truly an individual micro level analysis, it nevertheless decreases the degree of error assumed in ecological studies as it is a semi-micro level approach. Another advantage which may be weighted in its favour relative to either record linkage and ecological methodologies is its relatively lower expense in the actualization of such a data set. The present author is currently involved in utilizing this approach to study the effect of socioeconomic variables and nativity on mortality in Canada using 1971 Public Use Sample Tapes and the Mortality Data Base. A record linkage is financially out of reach as it requires funding in the million dollar range.

An alternative approach to investigating subcultural variations in mortality is to adopt the survey method. In effect, one would use sampling techniques to derive representative samples; the task would be to ask respondents to provide information on mortality in their families. This orientation, however, has some obvious drawbacks such as the problem of sensitivity to traumatic deaths in a family context. Researchers would probably encounter a great deal of resistance from persons being interviewed on such a sensitive topic as death.

A major barrier to the actualization of record linkage, ecological and the census-vital statistics merger approaches is the over-riding problem of accurate data availability on such variables as ethnicity and nativity. One of the problems encountered in this study was precisely the disproportionatenumber of missing cases associated with these two variables. In fact, after 1971, we have shown that the recording of ethnicity on the death certificate has been virtually discontinued in Canada. However, most provinces are still including the nativity (place of birth) variable. Therefore, nativity as a determinant of mortality may be studied, but the problem of missing cases must always be seriously considered by the researcher wishing to undertake such an endeavour.

A further challenge to students interested in the examination of sociocultural differences in mortality relates to the problem of infant mortality estimation for the various subgroups. In this thesis several attempts were introduced but their degree of efficiency were of questionable value and were therefore abandoned. It was decided to not focus specifically on a refined measure of infant mortality in the construction of life tables primarily because the principal objectives of the dissertation lay elsewhere, as noted throughout. Nevertheless, the taks of estimating infant mortality remains an interesting challenge.

A further improvement of the present study would be the application of a more refined cause-of-death classification. Four broad classes of diseases were used. The underlying reason (among others) for this was to minimize the problem of missing cases and the avoidance of many zero cells. Perhaps by concentrating on one or two subpopulations these obstacles would become less forbidding.

The above serves to alert the reader to one other important aspect of the analysis in this thesis. Along with its contributions, several problems render the study findings to be viewed with some degree of caution. This, of course, is not to suggest that the results lack substantive, theoretical and practical relevance; however, the disproportionate number of missing cases is something which cannot easily be set aside when interpreting specific results. It is felt however that the solutions adopted are logically and methodologically sound, thus providing a high degree of confidence in the substantive interpretation of results and analysis.

In closing, the most important contributions of this thesis lie in providing the analysis of a virtually unexplored area of Canadian social demography. On the practical side, the thesis provides some basis for evaluating the viability of a multicultural society. Stated differently, ethnic continuity is viable to the extent that subpopulations are able to maintain appropriate replacement levels through fertility and migration, and at the same time minimize their relative risk of dying. In this context all other things being equal, mortality levels are partly responsible in determining the degree of "generational overlap" -- the coexistence of several generations -- and the greater the number of generations coexisting, the greater the likelihood that ethnic culture is transmitted successfully to the new generations.

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MORTALITY DIFFERENCES AMONG THE NATIVE AND FOREIGN-BORN POPULATIONS IN CANADA, 1951-1971

-- VOLUME II --

by

Frank Trovato

Department of Sociology

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Ontario

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- - VOLUME II --

APPENDIX A

PROCEDURES USED TO DERIVE THE AGE-SEX COMPOSITIONS OF THE GROUPS STUDIED

1. AGE-SEX COMPOSITIONS FOR 1951

The following data sources were utilized:

1951 Census of Canada: General Review and Summary Tables Volume X; (particularly Tables 32, 34 and 35).

1951 Census of Canada: Population Cross-Classification of Characteristics Volume II; (particularly Tables 4, 10 and 40).

The 1951 Census provides a breakdown of Canada's age-sex distribution in five year age groups (0-4 to 95+). The data is partitioned on the basis of ethnicity. A separate tabulation contains the same kind of information classified by place of birth (e.g., Canada by province; United Kingdom, United States; Germany; Italy; Poland; Russia; Scandinavia; Asia; Other).

(a) Deriving the Total Native and Foreign-Born Age-Sex Structures

Table 10 in Volume II of the 1951 Census contains age-sex totals for persons born in Canada, and in a separate column, overall age-sex totals. By way of simple subtraction it was possible to obtain the age-sex composition of the foreign-born.

(b) DERIVING THE FRENCH, BRITISH, NATIVE INDIAN AND RESIDUAL NATIVE-BORN AGE-SEX STRUCTURES

British Native-Born

This group was obtained by substracting the age-sex specific figures of British foreigners (Table 10, Volume II) from the British Ethnicity figures by age and sex (Table 4, Volume II). It is assumed that the ethnic data contain both native and foreign-born persons of British origin and that the difference beween ethnicity and foreign-born figures reflect British persons born in Canada. The age-sex distributions of British foreigners for 1951, 1961 and 1971 are displayed in Table A.1.

French Canadians

A similar approach was taken as that described for the British utilizing the same sources of information. The major difference was that the census tables do not contain the French foreign-born into its age breakdown. Totals by sex were available, however. In order to derive the age-sex distribution of French foreigners the age-sex composition (proportions) of "Other Europe" was applied to the French foreign-born sex totals. The age-sex compositions of the "Other European" for 1951, 1961 and 1971 are displayed in Table A.2. The derived French foreign-born age-sex compositions for the same three periods are shown in Table A.3.

Once the French foreign-born figures were obtained, calculation of the French native-born by age and sex became a simple procedure: the foreigner's figures were subtracted from the French ethnicity age-sex composition.

Two assumptions are worth noting in this regard. First, it is assumed that this approach provides an adequate account of the French native-born population. Secondly, it is implied that French foreigners have an age-sex composition which is the same as the "Other Europeans". These seem reasonable assumptions.

Native Indians

The Census has recorded the population composition of this group. The figures were taken directly from the published tabulations. It is worth noting that Eskimos and Metis are included in this population. As Elliott has indicated (1979, ftn. p.34): "The Census counts as Indian anyone who calls himself Indian, whether registered or not, and who can trace Indian ancestry through the father's line."

Residual Native-Born

This category was obtained as follows: The sum of French, British and Native Indian age-sex figures were subtracted from the corresponding total native-born age-sex distribution for Canada. In formal terms this can be shown as follows:

$$RNB(i,j) = \sum_{\substack{i=1 \\ j=0-4}}^{\substack{j=85+ \\ i=2}} [TNB(i,j) - (FNB(i,j) + BNI(i,j) + NI(i,j))]$$

where:

$RNB(i,j)$ = Residual Native-Born population of sex (i) and age group (j).

$TNB(i,j)$ = Total Native-Born population of sex (i) age (j).

$FNB(i,j)$ = French Native-Born population of sex (i) age (j)

$BNB(i,j)$ = British Native-Born population of sex (i), age (j).

$NI(i,j)$ = Native Indian population of sex (i), age (j).

(c) Deriving The Age-Sex Structures for British, United States, Other Europe and Other Foreign-Born Populations

The age-sex compositions for three of the four populations (British, U.S.A., other Europe), were taken directly from the published census tabulations of age-sex distributions by place of birth (Table 10, 1951 Census, Volume II).

(d) RESIDUAL FOREIGN-BORN (OTHER FOREIGN-BORN)

This was approached in the same manner as was described in connection with the Native-Born Residual population. In formal terms:

$$RFB(i,j) = \sum_{\substack{i=1 \\ j=0-4}}^{\substack{j=85+ \\ i=2}} [TFB(i,j) - (BFB(i,j) + USA(i,j) + OEFB(i,j))]$$

where:

RFB (i,j)	=	Residual Foreign-Born population of sex (i), age group (j);
TFB (i,j)	=	Total Foreign-Born population of sex (i), age group (j);
BFB(i,j)	=	British Foreign-born population of sex (i), age group (j);
USA(i,j)	=	United States immigrant population of sex (i), age group (j);
OEFB(i,j)	=	Other Europe foreign-born population of sex (i), age group (j);

AGE-SEX COMPOSITIONS FOR 1961

The same procedures as described for 1951 were applied to the 1961 Census data. The following census sources were used:

1961 Census of Canada, Population: Single Years of Age. Catalogue 92-543, Volume I, Part 2 (particularly Tables 26 and 27);

1961 Census of Canada, Population: Birthplace and Citizenship by Age Groups. Catalogue 92-555, Volume I, Part 3 (particularly Table 89);

1961 Census of Canada, Population: Ethnic Groups by Age Groups. Catalogue 92-553, Volume I, Part 3 (particularly Table 81);

1961 Census of Canada, Population: Characteristics of Immigrants. Catalogue 92-562, Volume I, Part 3 (particularly Tables 124 and 125);

1961 Census of Canada, Population: Age Groups. Catalogue 92-542, Volume I, Part 2 (particularly Table 20).

3. AGE-SEX COMPOSITIONS FOR 1971

Essentially the same procedures as described for the previous two census periods were applied to the 1971 data. Some differences were observed, however. They will be noted below.

British Foreign-Born

In 1971, published census tabulations for the British omitted Ireland from this group's foreign-born population. Since Ireland was included in previous censuses, it was decided to use the Public Use Sample Tapes of the 1971 Census to obtain an estimate of the Irish foreign-born by age and sex. When this was derived, the figures were added to the British foreign-born. Table A.1 referenced earlier shows the relevant data for 1971.

French Foreign-Born

In 1971 the census tables do not show -- as in 1961 -- the desired breakdown for "Other Europe" place of birth (whose age-sex proportionate distribution would have been applied to the sex-specific French foreign-born to derive the latter's population composition). The published tabulations however provide the necessary data for "Other Western Europe" foreign-born. Therefore, this designation provided the desired basis for calculating the French foreigner's age-sex composition. Refer to Table A.2 for the results of this procedure.

The following data sources were relied on for 1971:

1971 Census of Canada, Population: Age Groups by Birthplace. Catalogue 92-737, Volume 1, Part 4, Bulletin 1.4-9, January, 1974 (particularly Table 25);

1971 Public Use Sample Tapes, 1/100 individual file.

TABLE A.1 AGE-SEX DISTRIBUTION FOR BRITISH FOREIGN-BORN IN CANADA, 1951, 1961 and 1971

AGE	MALES				FEMALES			
	1951	1961	1971	(Ireland)*	1951	1961	1971	(Ireland)*
0 - 4	3,493	3,728	5,155	200	3,173	3,655	4,815	200
5 - 9	11,822	13,060	15,675	600	11,247	12,129	14,605	200
10 - 14	3,410	18,238	14,275	300	3,206	17,151	13,490	300
15 - 19	2,763	19,400	17,115	600	2,609	17,948	16,470	200
20 - 24	6,056	10,605	24,345	1,100	9,343	13,724	26,365	1,200
25 - 29	16,176	18,186	35,250	2,000	31,042	22,085	36,775	1,800
30 - 34	21,720	26,388	25,575	900	29,563	30,067	27,495	1,400
35 - 39	25,800	31,851	26,305	1,500	25,596	44,719	28,205	2,400
40 - 44	43,950	31,344	29,375	1,600	39,956	37,805	30,830	1,800
45 - 49	50,375	30,948	32,570	1,600	46,583	29,231	44,355	800
50 - 54	48,338	45,195	30,015	1,600	52,188	41,130	35,765	1,400
55 - 59	45,946	47,257	27,730	700	48,548	44,740	27,970	1,100
60 - 64	52,852	40,310	37,620	1,500	48,037	46,033	36,990	1,500
65 - 69	51,696	36,501	37,740	1,000	44,519	42,916	41,320	1,400
70 - 74	35,726	38,719	27,425	1,800	33,191	41,467	39,455	900
75 - 79	18,553	30,868	20,285	400	18,065	32,135	31,770	1,200
80 - 84	8,888	15,788	16,445	700	9,293	17,800	23,685	900
85 +	3,890	7,300	11,985	900	4,862	9,294	17,795	300
TOTAL	451,454	465,686	434,885	18,900	461,028	504,029	498,155	19,000

* From 1971 Public Use Sample Tapes 1/100 Individual File (Figures were multiplied by 100 to obtain the estimates shown above).

TABLE A.2 AGE-SEX COMPOSITION OF THE "OTHER EUROPEAN" FOREIGN-BORN POPULATION, CANADA, 1951, 1961 and 1971

AGE	"Other European" Foreign-Born #											
	1951		%		1961		%		1971*		%	
	M	F	M	F	M	F	M	F	M	F	M	F
0 - 4	3,089	2,783	.0192	.0226	4,316	4,199	.0133	.0159	1,115	1,155	.0161	.0182
5 - 9	3,761	3,514	.0234	.0285	11,070	10,214	.0342	.0386	3,225	2,890	.0465	.0456
10 - 14	3,300	3,129	.0206	.0254	18,303	16,869	.0567	.0637	3,130	3,150	.0453	.0497
15 - 19	4,276	3,339	.0266	.0271	14,829	13,433	.0458	.0507	3,210	3,160	.0463	.0499
20 - 24	8,540	7,209	.0532	.0584	21,443	19,619	.0664	.0742	6,150	6,540	.0889	.1033
25 - 29	12,875	12,181	.0802	.0987	33,479	25,938	.1033	.0982	7,425	6,035	.1073	.0953
30 - 34	7,811	7,726	.0487	.0626	39,213	29,089	.1212	.1100	5,475	11,695	.0791	.0742
35 - 39	7,954	7.614	.0496	.0617	34,099	28,704	.1054	.1084	5,825	4,845	.0842	.0765
40 - 44	13,402	12,632	.0835	.1024	19,964	16,944	.0617	.0641	6,630	5,125	.0958	.0809
45 - 49	23,495	15,556	.1464	.1261	16,961	14,523	.0524	.0549	5,055	4,770	.0730	.0753
50 - 54	22,426	14,124	.1397	.1145	19,620	18,314	.0606	.0692	2,755	2,670	.0398	.0423
55 - 59	16,321	10,540	.1017	.0854	26,644	19,382	.0823	.0732	2,625	2,520	.0380	.0398
60 - 64	12,895	8,296	.0803	.0672	23,779	16,850	.0735	.0637	3,505	3,205	.0507	.0506
65 - 69	9,969	6,607	.0621	.0536	16,376	11,945	.0506	.0452	4,185	3,835	.0605	.0606
70 - 74	5,752	4,336	.0358	.0351	11,910	9,497	.0368	.0358	3,455	3,610	.0510	.0570
75 - 79	2,882	2,124	.0180	.0172	7,261	5,275	.0225	.0200	2,760	2,540	.0399	.0401
80 - 84	1,167	1,083	.0074	.0088	3,050	2,452	.0095	.0093	1,600	1,670	.0231	.0264
85 +	570	570	.0036	.0047	1,291	1,265	.0038	.0048	1,015	905	.0147	.0143
TOTAL	160,485	123,363	1.0000	1.0000	323,608	264,512	1.0000	1.0000	69,145	63,320	1.0000	1.0000

Published Census Tabulations

* 1971 figures based on "Other Western European Age-Sex distribution" (obtained from Table 25, 1971 Census, Publication: Cat. 92-737, Vol: 1 - Part: 4).

TABLE A.3 AGE-SEX DISTRIBUTION FOR FRENCH FOREIGN-BORN IN CANADA, 1951, 1961 and 1971.

AGE	MALES			FEMALES		
	1951	1961	1971	1951	1961	1971
0 - 4	616	560	730	808	733	1,289
5 - 9	751	1,441	1,877	1,019	1,780	1,626
10 - 14	661	2,390	3,114	908	2.937	1,449
15 - 19	853	1,930	2,516	968	2,338	1,546
20 - 24	1,707	2,798	3,647	2,087	3,421	3,332
25 - 29	2,573	4,354	5,674	3,527	4,528	5,631
30 - 34	1,562	5,108	6,657	2,237	5,072	3,571
35 - 39	1,592	4,442	5,789	2,205	4,998	3,521
40 - 44	2,679	2,600	3,389	3,660	2,956	5,842
45 - 49	4,697	2,208	2,878	4,507	2,531	7,195
50 - 54	4,483	2,554	3,326	4,092	3,191	6,533
55 - 59	3,263	3,469	4,520	3,052	3,375	4,872
60 - 64	2,576	3.098	4,048	2,402	2,937	3,834
65 - 69	1,992	2,133	2,774	1,916	2,084	3,058
70 - 74	1,149	1,551	2,021	1,254	1,651	2,003
75 - 79	577	948	1,232	615	922	982
80 - 84	237	400	522	315	429	503
85 +	115	160	209	167	221	268
TOTAL	32,083	42,146	54,926	35,739	46,104	57,055

APPENDIX B
MORTALITY DATA BASE
ETHNIC ORIGIN AND BIRTHPLACE CODES

Code	Birthplace		Code	Birthplace	
			01	Prince Edward Island	
			02	Nova Scotia	
			03	New Brunswick	
			04	Quebec	
			05	Ontario	
			06	Manitoba	(CDA)
			07	Saskatchewan	
			08	Alberta	
			09	British Columbia	
			10	Yukon	
			11	Northwest Territories	
			12	Newfoundland	
13	Canadian				
14	Eskimo				
15	Ward Indian (R)				
16	Non-Ward Indian (N.R.)	(NI)			
			17	Canada - Province not stated	(CDA)
17	Half Breed (Metis)				
37	British West Indian Race	(OTH)	18	Other British Possessions in America	(OTH)
				British Isles	
21	English		21	England	
23	Irish		22	Northern Ireland	
23	Irish	(BR)	23	Irish Free State	(BR)
24	Scottish		24	Scotland	
25	Welsh		25	Wales	
26	Other British - British Isles		26	Lesser Isles	
				British Possessions	
37	Australian		31	Australian and Mandates	
37	New Zealander		32	New Zealand and Mandates	
37	British South & South West African	(OTH)	33	South and South West Africa	
37	British - Other Africans		34	Other British Possessions - Africa	(OTH)
35	East Indian		35	India	
35	Pakistani		35	Pakistan	
37	British - Other Asiatics		36	Other British Possessions in Asia	
37	British - Other		37	Other British Possessions	

Code	Birthplace	
41	American	
72	Spanish	
46	Other Native North American Races	
72	Cuban, Dominican, Puerto Rican, Spanish	(OTH)
92	Negro (Haitian)	
72	Spanish	
72	Spanish	
70	Brazilian (Portuguese)	
51	Albanian	
52	Austrian	
53	Belgian	
54	Bulgaria	
55	Czechsolvakian	
56	Danish	
57	Estonian	
58	Finnish	
59	French* (FC)	
60	German	
61	Greek	
62	Dutch	(OE)
63	Hungarian	
64	Icelandic	
65	Italian	
66	Latvian (Lett)	
67	Lithuanian	
68	Norwegian	
69	Polish	
70	Portuguese	
71	Roumanian	
72	Spanish	
73	Swedish	
74	Swiss	
75	Yogoslavian	
76	Other European	
77	Ukrainian	
78	Tataric - Russian	
79	Russian	

Code	Birthplace	
	American Countries	
41	United States of America	(USA)
42	Mexico	(OTH)
43	Other North American Countries	(OTH)
44	Central American Countries	
45	South American Countries	(OTH)
	European Countries	
51	Albania	
52	Austria	
53	Belgium	
54	Bulgaria	
55	Czechoslovakia	
56	Denmark	
57	Estonia	
58	Finland	
59	France* (FC)	
60	Germany	
61	Greece	
62	Holland (Netherlands)	(OE)
63	Hungary	
64	Iceland	
65	Italy	
66	Latvia	
67	Lithuania	
68	Norway	
69	Poland	
70	Portugal	
71	Roumania	
72	Spain	
73	Sweden	
74	Switzerland	
75	Yugoslavia	
76	Other European	
77	Union of Soviet Socialist Republics (USSR)	

Code	Birthplace		Code	Birthplace	
				Asiatic Countries	
82	Chinese		82	China	
83	Japanese		83	Japan	
84	Syrian		84	Syria	(OTH)
85	Turkish		85	Turkey	
86	Asiatic - Semitic Mongols	(OTH)	86	Other Asiatic	
87	Asiatic - Dravidians				
88	Other Asiatic		45		
				Africa, Other Countries, etc	
91	African - Not Negro		91	African Countries (Not British)	
92	Negro				
93	Others	(OTH)	93	Other Countries	
96	Jewish, Hebrew		96	Palestine, Israel	
99	N/A		98	At Sea	(OTH)
99	N/A		99	Birthplace not shown	

CDA = CANADA
NI = NATIVE INDIAN
OTH = OTHER
OE = OTHER EUROPE
USA = UNITED STATES
FC = FRENCH CANADIAN
BR = BRITISH

* Used also to derive French Canadian (FC), by specifying nativity (Canada) and ethnic origin in combination.

APPENDIX C

AGE-SEX DISTRIBUTIONS, 1951, 1961, 1964 and 1971

1951 AGE-SEX DISTRIBUTIONS

FRENCH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	310229.	299739.	7.30	7.05
5- 9	264302.	253823.	6.22	5.97
10-14	207515.	201051.	4.88	4.73
15-19	187300.	189252.	4.41	4.49
20-24	178783.	187666.	4.21	4.41
25-29	168957.	176005.	3.98	4.14
30-34	148610.	156489.	3.50	3.68
35-39	139376.	140424.	3.28	3.30
40-44	118722.	117457.	2.79	2.76
45-49	96141.	95085.	2.26	2.24
50-54	78845.	79172.	1.86	1.86
55-59	64654.	64115.	1.52	1.51
60-64	54250.	53499.	1.28	1.26
65-69	44428.	42521.	1.05	1.00
70-74	31772.	30847.	.75	.73
75-79	19875.	19538.	.47	.46
80-84	9538.	10114.	.34	.38
85+	4952.	6059.		
TOTAL	2128249.	2122856.		

BRITISH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	392830.	374495.	6.78	6.47
5- 9	295994.	281743.	5.11	4.86
10-14	241926.	232681.	4.18	4.01
15-19	221897.	217043.	3.83	3.75
20-24	227364.	230030.	3.93	3.97
25-29	233715.	239860.	4.04	4.14
30-34	223652.	230284.	3.86	3.98
35-39	224144.	222589.	3.87	3.84
40-44	176626.	169543.	3.05	2.93
45-49	132705.	131200.	2.29	2.27
50-54	119728.	121925.	2.07	2.11
55-59	106757.	110547.	1.84	1.91
60-64	94144.	96300.	1.63	1.66
65-69	82077.	83577.	1.42	1.44
70-74	61944.	67130.	1.07	1.16
75-79	39406.	43550.	.68	.75
80-84	20242.	24456.	.53	.68
85+	10206.	14893.		
TOTAL	2905357.	2891846.		

NATIVE INDIANS

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	14028.	13841.	8.48	8.36
5- 9	11660.	11688.	7.05	7.06
10-14	9853.	10183.	5.95	6.15
15-19	8337.	8580.	5.04	5.18
20-24	6953.	6778.	4.20	4.10
25-29	5553.	5586.	3.36	3.38
30-34	4822.	4544.	2.91	2.75
35-39	4380.	4003.	2.65	2.42
40-44	3958.	3425.	2.39	2.07
45-49	3287.	2833.	1.99	1.71
50-54	3020.	2569.	1.82	1.55
55-59	2361.	1858.	1.43	1.12
60-64	1891.	1525.	1.14	.92
65-69	1500.	1238.	.91	.75
70-74	1297.	1169.	.78	.71
75-79	769.	736.	.46	.44
80-84	422.	458.	.38	.39
85+	213.	287.		
TOTAL	84304.	81303. *		

RESIDUAL NATIVE BORN

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	148296.	142475.	8.56	8.22
5- 9	118913.	114917.	6.86	6.63
10-14	102561.	99529.	5.92	5.74
15-19	98621.	97664.	5.69	5.62
20-24	90157.	89559.	5.20	5.17
25-29	82111.	82309.	4.74	4.75
30-34	79824.	79031.	4.61	4.56
35-39	69900.	66578.	4.03	3.84
40-44	40900.	36575.	2.36	2.11
45-49	23239.	19253.	1.34	1.11
50-54	12299.	8766.	.71	.51
55-59	5862.	4147.	.34	.24
60-64	3151.	2897.	.18	.17
65-69	2408.	2654.	.14	.15
70-74	2325.	2640.	.13	.15
75-79	1197.	1566.	.07	.09
80-84	770.	1136.	.08	.11
85+	588.	782.		
TOTAL	883122.	852478.		

* See Adjustments in Appendix D

BRITISH FOREIGN BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	3493.	3173.	.38	.35
5- 9	11822.	11247.	1.30	1.23
10-14	3410.	3206.	.37	.35
15-19	2763.	2609.	.30	.29
20-24	6056.	9343.	.66	1.02
25-29	16176.	31042.	1.77	3.40
30-34	21720.	29563.	2.38	3.24
35-39	25800.	25596.	2.83	2.81
40-44	43950.	39956.	4.82	4.38
45-49	50375.	46583.	5.52	5.11
50-54	48338.	52188.	5.[illegible]0	5.72
55-59	45946.	48548.	5.04	5.32
60-64	52852.	48037.	5.79	5.26
65-69	51696.	44519.	5.67	4.88
70-74	35726.	33191.	3.92	3.64
75-79	18553.	18065.	2.03	1.98
80-84	8888.	9293.	1.40	1.55
85+	3890.	4869.		
TOTAL	451454.	461028.		

UNITED STATES

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	2131.	1901.	.76	.67
5- 9	2136.	2015.	.76	.71
10-14	1989.	1875.	.71	.66
15-19	2510.	2803.	.89	.99
20-24	6684.	8825.	2.37	3.13
25-29	7200.	8914.	2.55	3.16
30-34	6625.	8622.	2.35	3.06
35-39	9386.	11733.	3.33	4.16
40-44	14211.	17266.	5.04	6.12
45-49	15204.	17761.	5.39	6.30
50-54	15240.	17576.	5.40	6.23
55-59	15010.	16252.	5.32	5.76
60-64	12909.	12861.	4.58	4.56
65-69	9997.	9318.	3.54	3.30
70-74	5849.	5542.	2.07	1.97
75-79	3527.	3460.	1.25	1.23
80-84	1572.	1698.	.77	.89
85+	609.	799.		
TOTAL	132789.	149221.		

OTHER EUROPE

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	7735.	7156.	.94	.87
5- 9	8724.	8225.	1.06	1.00
10-14	7111.	6767.	.86	.82
15-19	8854.	7279.	1.08	.89
20-24	20722.	18330.	2.52	2.23
25-29	38290.	33911.	4.66	4.12
30-34	26637.	20989.	3.24	2.55
35-39	29447.	23644.	3.58	2.88
40-44	44832.	37255.	5.45	4.53
45-49	64125.	43047.	7.80	5.24
50-54	59430.	38604.	7.23	4.70
55-59	47635.	31541.	5.79	3.84
60-64	40329.	25926.	4.91	3.15
65-69	32387.	21035.	3.94	2.56
70-74	19265.	13847.	2.34	1.68
75-79	9890.	7167.	1.20	.87
80-84	4236.	3609.	.78	.69
85+	2165.	2040.		
TOTAL	471814.	350372.		

OTHER FOREIGN BORN

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	321.	266.	.74	.62
5- 9	322.	294.	.74	.68
10-14	757.	369.	1.75	.85
15-19	1898.	562.	4.39	1.30
20-24	816.	575.	1.89	1.33
25-29	810.	774.	1.87	1.79
30-34	667.	655.	1.54	1.52
35-39	1138.	995.	2.63	2.30
40-44	2601.	1290.	6.02	2.98
45-49	2632.	1209.	6.09	2.80
50-54	3561.	1395.	8.24	3.23
55-59	4339.	1118.	10.04	2.59
60-64	4798.	783.	11.10	1.81
65-69	3583.	559.	8.29	1.29
70-74	2220.	308.	5.13	.71
75-79	913.	179.	2.11	.41
80-84	295.	64.	.94	.28
85+	111.	57.		
TOTAL	31782.	11452.		

1961 AGE-SEX DISTRIBUTIONS

FRENCH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	382664.	367418.	7.02	6.74
5- 9	352468.	338511.	6.46	6.21
10-14	315544.	304569.	5.79	5.59
15-19	257740.	252100.	4.73	4.62
20-24	192589.	198061.	3.53	3.63
25-29	182933.	185524.	3.36	3.40
30-34	181341.	185338.	3.33	3.40
35-39	171627.	176138.	3.15	3.23
40-44	150659.	155307.	2.76	2.85
45-49	134303.	135506.	2.46	2.49
50-54	112739.	112160.	2.07	2.06
55-59	87797.	90313.	1.61	1.66
60-64	67757.	70913.	1.24	1.30
65-69	53499.	56642.	.98	1.04
70-74	39649.	42873.	.73	.79
75-79	25680.	27601.	.47	.51
80-84	13668.	14976.	.38	.43
85+	6932.	8561.		
TOTAL	2729589.	2722511.		

BRITISH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	456037.	434364.	6.49	6.18
5- 9	431865.	410871.	6.15	5.85
10-14	390600.	373343.	5.56	5.31
15-19	282278.	269638.	4.02	3.84
20-24	219536.	220477.	3.12	3.14
25-29	218425.	211751.	3.11	3.01
30-34	231394.	229109.	3.29	3.26
35-39	235889.	239654.	3.36	3.41
40-44	224539.	225394.	3.20	3.21
45-49	212901.	210453.	3.03	2.99
50-54	164660.	159252.	2.34	2.27
55-59	119580.	120656.	1.70	1.72
60-64	98558.	105813.	1.40	1.51
65-69	85325.	95332.	1.21	1.36
70-74	68341.	81838.	.97	1.16
75-79	47575.	56617.	.68	.81
80-84	26138.	33280.	.58	.77
85+	14386.	21139.		
TOTAL	3528027.	3498981.		

NATIVE INDIANS

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	20777.	20524.	9.44	9.32
5- 9	16962.	16554.	7.71	7.52
10-14	14237.	13771.	6.47	6.26
15-19	10866.	10840.	4.94	4.92
20-24	8418.	8912.	3.82	4.05
25-29	7121.	7313.	3.24	3.32
30-34	6192.	5918.	2.81	2.69
35-39	5039.	5066.	2.29	2.30
40-44	4378.	4040.	1.99	1.84
45-49	3946.	3468.	1.79	1.58
50-54	3510.	2977.	1.59	1.35
55-59	2784.	2384.	1.26	1.08
60-64	2540.	2060.	1.15	.94
65-69	1886.	1610.	.86	.73
70-74	1445.	1132.	.66	.51
75-79	895.	806.	.41	.37
80-84	513.	531.	.38	.42
85+	317.	389.		
TOTAL	111822.	108295.		

RESIDUAL NATIVE BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	274763.	260976.	10.20	9.68
5- 9	214885.	205199.	7.97	7.61
10-14	156076.	149924.	5.79	5.56
15-19	119615.	116080.	4.44	4.31
20-24	99821.	98156.	3.70	3.64
25-29	99932.	96406.	3.71	3.58
30-34	92651.	89436.	3.44	3.32
35-39	83693.	83914.	3.11	3.11
40-44	82529.	80955.	3.06	3.00
45-49	69408.	65693.	2.58	2.44
50-54	40151.	35865.	1.49	1.33
55-59	21216.	18046.	.79	.67
60-64	10148.	7515.	.38	.28
65-69	5399.	3963.	.20	.15
70-74	3127.	2087.	.12	.08
75-79	1724.	1470.	.06	.05
80-84	1053.	1377.	.06	.08
85+	616.	886.		
TOTAL	1376807.	1317948.		

BRITISH FOREIGN BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	3728.	3655.	.38	.38
5- 9	13060.	12129.	1.35	1.25
10-14	18238.	17151.	1.88	1.77
15-19	19400.	17948.	2.00	1.85
20-24	10605.	13724.	1.09	1.42
25-29	18186.	22085.	1.88	2.28
30-34	26388.	30067.	2.72	3.10
35-39	31851.	44719.	3.28	4.61
40-44	31344.	37805.	3.23	3.90
45-49	30948.	29231.	3.19	3.01
50-54	45195.	41130.	4.66	4.24
55-59	47257.	44740.	4.87	4.61
60-64	40310.	46033.	4.16	4.75
65-69	36501.	42916.	3.76	4.43
70-74	38719.	41467.	3.99	4.28
75-79	30868.	32135.	3.18	3.31
80-84	15788.	17800.	2.38	2.79
85+	7300.	9294.		
TOTAL	465686.	504029.		

UNITED STATES

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	4014.	3916.	1.41	1.38
5- 9	5351.	5162.	1.88	1.82
10-14	4222.	3977.	1.49	1.40
15-19	2792.	2901.	.98	1.02
20-24	2263.	3632.	.80	1.28
25-29	3528.	5186.	1.24	1.83
30-34	9681.	11103.	3.41	3.91
35-39	9035.	10569.	3.18	3.72
40-44	7581.	9269.	2.67	3.26
45-49	9611.	11707.	3.39	4.12
50-54	13829.	16641.	4.87	5.86
55-59	14068.	16801.	4.96	5.92
60-64	13330.	15719.	4.70	5.54
65-69	12205.	14435.	4.30	5.08
70-74	9549.	10940.	3.36	3.85
75-79	5861.	6552.	2.06	2.31
80-84	2638.	2888.	1.38	1.61
85+	1273.	1679.		
TOTAL	130831.	153077.		

OTHER EUROPE

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	11316.	10742.	.75	.71
5- 9	27042.	25155.	1.78	1.66
10-14	45924.	42549.	3.03	2.81
15-19	34684.	32605.	2.29	2.15
20-24	50879.	50173.	3.36	3.31
25-29	77509.	63353.	5.11	4.18
30-34	92866.	73740.	6.13	4.86
35-39	91920.	77917.	6.06	5.14
40-44	57611.	44747.	3.80	2.95
45-49	52983.	41984.	3.50	2.77
50-54	60152.	50001.	3.97	3.30
55-59	66997.	48910.	4.42	3.23
60-64	57024.	41268.	3.76	2.72
65-69	41435.	31178.	2.73	2.06
70-74	31740.	24843.	2.09	1.64
75-79	19600.	14399.	1.29	.95
80-84	8421.	6724.	.81	.68
85+	3914.	3640.		
TOTAL	832017.	683928.		

OTHER FOREIGN BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	792.	715.	1.06	.96
5- 9	2207.	2101.	2.95	2.81
10-14	3319.	2555.	4.44	3.42
15-19	1660.	1412.	2.22	1.89
20-24	3028.	3372.	4.05	4.51
25-29	6263.	3782.	8.38	5.06
30-34	3894.	2692.	5.21	3.60
35-39	2018.	1875.	2.70	2.51
40-44	1355.	1448.	1.81	1.94
45-49	1416.	1759.	1.89	2.35
50-54	2673.	2251.	3.58	3.01
55-59	2446.	1380.	3.27	1.85
60-64	2902.	1745.	3.88	2.33
65-69	3435.	1538.	4.60	2.46
70-74	3506.	919.	4.69	1.23
75-79	1983.	471.	2.65	.63
80-84	827.	195.	1.62	.41
85+	386.	114.		
TOTAL	44110.	30624.		

1964 AGE-SEX DISTRIBUTIONS

FRENCH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	345706.	325588.	6.14	5.78
5- 9	349922.	335420.	6.22	5.96
10-14	330497.	317580.	5.87	5.64
15-19	280620.	271775.	4.98	4.83
20-24	219157.	220174.	3.89	3.91
25-29	200007.	200104.	3.55	3.55
30-34	182554.	185459.	3.24	3.29
35-39	172424.	176669.	3.06	3.14
40-44	156249.	155919.	2.78	2.77
45-49	141829.	157993.	2.52	2.81
50-54	119120.	120217.	2.12	2.14
55-59	96445.	100723.	1.71	1.79
60-64	75219.	78819.	1.34	1.40
65-69	57768.	62632.	1.03	1.11
70-74	41201.	46584.	.73	.83
75-79	26356.	30179.	.47	.54
80-84	14289.	17044.	.39	.47
85+	7642.	9551.		
TOTAL	2817005.	2812430.		

BRITISH NATIVE BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	436488.	417982.	5.79	5.54
5- 9	446819.	425955.	5.92	5.65
10-14	424272.	404683.	5.63	5.37
15-19	336636.	322108.	4.46	4.27
20-24	271752.	271370.	3.60	3.60
25-29	242819.	235279.	3.22	3.12
30-34	233170.	230237.	3.09	3.05
35-39	233022.	234327.	3.09	3.11
40-44	227146.	227081.	3.01	3.01
45-49	218718.	219692.	2.90	2.91
50-54	209474.	179048.	2.78	2.37
55-59	144357.	147564.	1.91	1.96
60-64	112943.	121097.	1.50	1.61
65-69	89983.	102340.	1.19	1.36
70-74	69334.	86228.	.92	1.14
75-79	49151.	62565.	.65	.83
80-84	27962.	38428.	.59	.85
85+	16222.	26033.		
TOTAL	3790268.	3752017.		

NATIVE INDIANS

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	21956.	21653.	8.86	8.74
5- 9	19239.	18979.	7.77	7.66
10-14	16427.	15876.	6.63	6.41
15-19	12656.	12740.	5.11	5.14
20-24	9906.	10320.	4.00	4.17
25-29	8220.	8459.	3.32	3.42
30-34	6797.	6806.	2.74	2.75
35-39	5810.	5857.	2.35	2.36
40-44	4944.	4625.	2.00	1.87
45-49	4287.	4010.	1.73	1.62
50-54	3760.	3268.	1.52	1.32
55-59	3102.	2682.	1.25	1.08
60-64	2748.	2240.	1.11	.90
65-69	2118.	1802.	.86	.73
70-74	1574.	1262.	.64	.51
75-79	982.	872.	.40	.35
80-84	564.	535.	.38	.31
85+	378.	244.		
TOTAL	125468.	122230. *		

RESIDUAL NATIVE BORN

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	258328.	245810.	9.04	8.60
5- 9	223799.	213383.	7.83	7.47
10-14	178144.	171337.	6.23	6.00
15-19	138268.	134108.	4.84	4.69
20-24	109413.	107464.	3.83	3.76
25-29	102719.	97598.	3.59	3.42
30-34	92358.	88449.	3.23	3.10
35-39	86132.	84944.	3.01	2.97
40-44	82873.	80569.	2.90	2.82
45-49	71316.	67484.	2.50	2.36
50-54	49275.	45960.	1.72	1.61
55-59	32784.	29785.	1.15	1.04
60-64	17066.	14276.	.60	.50
65-69	8940.	7249.	.31	.25
70-74	4700.	3278.	.16	.11
75-79	2361.	2100.	.08	.07
80-84	1459.	1665.	.09	.10
85+	1106.	1298.		
TOTAL	1461040.	1396757.		

* See Adjustments in Appendix D

OTHER EUROPE

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	10977.	10407.	.71	.67
5- 9	25411.	23868.	1.64	1.54
10-14	40269.	37416.	2.60	2.41
15-19	36442.	34625.	2.35	2.23
20-24	56231.	55617.	3.63	3.59
25-29	75970.	64261.	4.90	4.14
30-34	89509.	75224.	5.77	4.85
35-39	91184.	77759.	5.88	5.01
40-44	61815.	54753.	3.99	3.53
45-49	57691.	53660.	3.72	3.46
50-54	57972.	48048.	3.74	3.10
55-59	61423.	46261.	3.96	2.98
60-64	55182.	42904.	3.56	2.77
65-69	45179.	35677.	2.91	2.30
70-74	33289.	27569.	2.15	1.78
75-79	20609.	16424.	1.33	1.06
80-84	9648.	8289.	.92	.84
85+	4659.	4727.		
TOTAL	833460.	717489.		

OTHER FOREIGN BORN

AGE GROUP	(N) MALE	FEMALE	(%) MALE	FEMALE
0- 4	2156.	2192.	1.40	1.42
5- 9	4816.	4577.	3.12	2.97
10-14	5270.	5021.	3.42	3.26
15-19	5033.	4636.	3.27	3.01
20-24	8205.	9002.	5.32	5.84
25-29	12011.	11008.	7.79	7.14
30-34	10356.	6951.	6.72	4.52
35-39	8054.	4633.	5.23	3.01
40-44	5235.	3355.	3.40	2.18
45-49	3605.	2873.	2.34	1.86
50-54	3412.	3218.	2.21	2.09
55-59	2939.	2589.	1.91	1.68
60-64	3385.	2896.	2.20	1.88
65-69	3550.	2646.	2.30	1.72
70-74	3379.	1603.	2.19	1.04
75-79	2199.	973.	1.43	.63
80-84	1087.	469.	1.04	.48
85+	520.	266.		
TOTAL	85212.	68918.		

BRITISH FOREIGN BORN

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	4215.	4062.	.43	.42
5- 9	14024.	12931.	1.45	1.33
10-14	17139.	16142.	1.77	1.66
15-19	18894.	17564.	1.95	1.81
20-24	15057.	17876.	1.55	1.84
25-29	23905.	27032.	2.46	2.79
30-34	26413.	29715.	2.72	3.06
35-39	30636.	40484.	3.16	4.17
40-44	31233.	36252.	3.22	3.74
45-49	31914.	34008.	3.29	3.51
50-54	41120.	39940.	4.24	4.12
55-59	41608.	40039.	4.29	4.13
60-64	39955.	43770.	4.12	4.51
65-69	37202.	42857.	3.84	4.42
70-74	35810.	41133.	3.69	4.24
75-79	27812.	32331.	2.87	3.33
80-84	16194.	19835.	2.59	3.28
85+	8975.	11934.		
TOTAL	462106.	507905.		

UNITED STATES

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	4565.	4101.	1.56	1.41
5- 9	6457.	6139.	2.21	2.10
10-14	5680.	5264.	1.95	1.80
15-19	4271.	4361.	1.46	1.49
20-24	4183.	5561.	1.43	1.91
25-29	4838.	6529.	1.66	2.24
30-34	8488.	9881.	2.91	3.39
35-39	8105.	9463.	2.78	3.24
40-44	8336.	9918.	2.86	3.40
45-49	9505.	11336.	3.26	3.88
50-54	11925.	14396.	4.09	4.93
55-59	12549.	15138.	4.30	5.19
60-64	12946.	15636.	4.44	5.36
65-69	11963.	14615.	4.10	5.01
70-74	9462.	11571.	3.24	3.96
75-79	6264.	7661.	2.15	2.63
80-84	3184.	3812.	1.63	2.05
85+	1560.	2183.		
TOTAL	134281.	157565.		

1971 AGE-SEX DISTRIBUTIONS

FRENCH NATIVE BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	259472.	246857.	4.28	4.07
5- 9	343982.	328318.	5.67	5.41
10-14	365388.	350144.	6.02	5.77
15-19	334008.	323864.	5.50	5.34
20-24	281149.	283115.	4.63	4.64
25-29	239848.	238739.	3.95	3.93
30-34	185386.	185742.	3.06	3.06
35-39	174286.	175916.	2.87	2.93
40-44	169694.	173435.	2.80	2.86
45-49	159391.	164445.	2.63	2.71
50-54	134010.	141342.	2.21	2.33
55-59	116624.	124924.	1.92	2.06
60-64	92631.	100868.	1.53	1.66
65-69	67732.	79193.	1.12	1.31
70-74	44824.	56542.	.74	.93
75-79	27934.	37173.	.46	.61
80-84	15740.	21872.	.41	.58
85+	8040.	13529.		
TOTAL	3020139.	3046018.		

BRITISH NATIVE BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	399400.	379760.	4.62	4.39
5- 9	481713.	461153.	5.57	5.33
10-14	502843.	477810.	5.81	5.52
15-19	463474.	444540.	5.36	5.14
20-24	393590.	392635.	4.55	4.51
25-29	299740.	290180.	3.46	3.35
30-34	237314.	232870.	2.74	2.69
35-39	226334.	221900.	2.62	2.56
40-44	233230.	23102[illegible].	2.70	2.67
45-49	232294.	241250.	2.68	2.79
50-54	214040.	225240.	2.47	2.60
55-59	202173.	210350.	2.34	2.43
60-64	146510.	156760.	1.69	1.81
65-69	100853.	118693.	1.17	1.37
70-74	71653.	96472.	.83	1.11
75-79	52831.	76445.	~~.61~~	.88
80-84	32221.	50440.	.61	1.02
85+	22502.	37454.		
TOTAL	4312715.	4344972.		

NATIVE INDIANS

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	24710.	24290.	7.90	7.77
5- 9	24555.	24648.	7.85	7.88
10-14	21540.	20790.	6.89	6.65
15-19	16835.	17176.	5.38	5.49
20-24	13380.	13606.	4.28	4.35
25-29	10785.	11136.	3.45	3.56
30-34	8210.	8881.	2.62	2.84
35-39	7610.	7706.	2.43	2.46
40-44	6265.	5990.	2.00	1.92
45-49	5085.	5276.	1.63	1.69
50-54	4345.	3950.	1.39	1.26
55-59	3845.	3380.	1.23	1.08
60-64	3235.	2660.	1.03	.85
65-69	2660.	2250.	.85	.72
70-74	1875.	1566.	.60	.50
75-79	1185.	1026.	.38	.33
80-84	685.	546.	.39	.36
85+	530.	566.*		
TOTAL	157335.	155435.		

RESIDUAL NATIVE BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	220073.	211587.	6.80	6.54
5- 9	244355.	233019.	7.55	7.20
10-14	229619.	222271.	7.09	6.87
15-19	181223.	178395.	5.60	5.51
20-24	130542.	130134.	4.03	4.02
25-29	107387.	100965.	3.32	3.12
30-34	90675.	87622.	2.80	2.71
35-39	91475.	87348.	2.83	2.70
40-44	82566.	80875.	2.55	2.50
45-49	75605.	72654.	2.34	2.24
50-54	69380.	67818.	2.14	2.09
55-59	59833.	57841.	1.85	1.79
60-64	32740.	28797.	1.01	.89
65-69	16831.	15314.	.52	.47
70-74	8953.	6690.	.28	.21
75-79	4485.	3874.	.14	.12
80-84	1219.	2823.	.07	.12
85+	1150	1936		
TOTAL	1648111.	1589213.		

*See Adjustments in Appendix D

BRITISH FOREIGN BORN

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	5355.	5015.	.55	.52
5- 9	16275.	14805.	1.68	1.52
10-14	14575.	13790.	1.50	1.42
15-19	17715.	16670.	1.82	1.72
20-24	25445.	27585.	2.62	2.84
25-29	37250.	38575.	3.84	3.97
30-34	26474.	28895.	2.73	2.98
35-39	27804.	30605.	2.86	3.15
40-44	30974.	32630.	3.19	3.35
45-49	34170.	45155.	3.52	4.65
50-54	31614.	37165.	3.26	3.83
55-59	28430.	29070.	2.93	2.99
60-64	39128.	38490.	4.03	3.96
65-69	38840.	42720.	4.00	4.40
70-74	29824.	40354.	2.99	4.16
75-79	20684.	32970.	2.13	3.40
80-84	17144.	24585.	3.09	4.40
85+	12884.	18096.		
TOTAL	453785.	517155.		

UNITED STATES

AGE GROUP	(N) MALE	(N) FEMALE	(%) MALE	(%) FEMALE
0- 4	5070.	4535.	1.64	1.46
5- 9	9040.	8420.	2.92	2.72
10-14	9085.	8270.	2.93	2.67
15-19	7725.	7770.	2.49	2.51
20-24	8665.	10065.	2.80	3.25
25-29	7895.	9665.	2.55	3.12
30-34	5705.	7030.	1.84	2.27
35-39	5935.	6885.	1.92	2.22
40-44	10100.	11435.	3.26	3.69
45-49	9260.	10470.	2.99	3.38
50-54	7485.	9160.	2.42	2.96
55-59	9005.	11260.	2.91	3.64
60-64	12050.	15445.	3.89	4.99
65-69	11400.	15035.	3.68	4.86
70-74	9260.	13045.	2.99	4.21
75-79	7205.	12157.	2.33	3.31
80-84	4460.	5970.	2.16	3.01
85+	2230.	3360.		
TOTAL	141575.	169977.		

OTHER FOREIGN BORN

AGE GROUP	MALE (N)	FEMALE (N)	MALE (%)	FEMALE (%)
0- 4	5340.	4886.	1.57	1.44
5- 9	10905.	10355.	3.21	3.04
10-14	11325.	10775.	3.33	3.17
15-19	12905.	12160.	3.79	3.58
20-24	20285.	22140.	5.96	6.51
25-29	25425.	27870.	7.48	8.19
30-34	25390.	16925.	7.46	4.98
35-39	22140.	11070.	6.51	3.25
40-44	14290.	7805.	4.20	2.29
45-49	8715.	5475.	2.56	1.61
50-54	5135.	5475.	1.51	1.61
55-59	4090.	5410.	1.20	1.59
60-64	4515.	5580.	1.33	1.64
65-69	3820.	4530.	1.12	1.33
70-74	3085.	3200.	.91	.94
75-79	2705.	2145.	.80	.63
80-84	1695.	1110.	.74	.51
85+	835.	620.		
TOTAL	182600.	157531.		

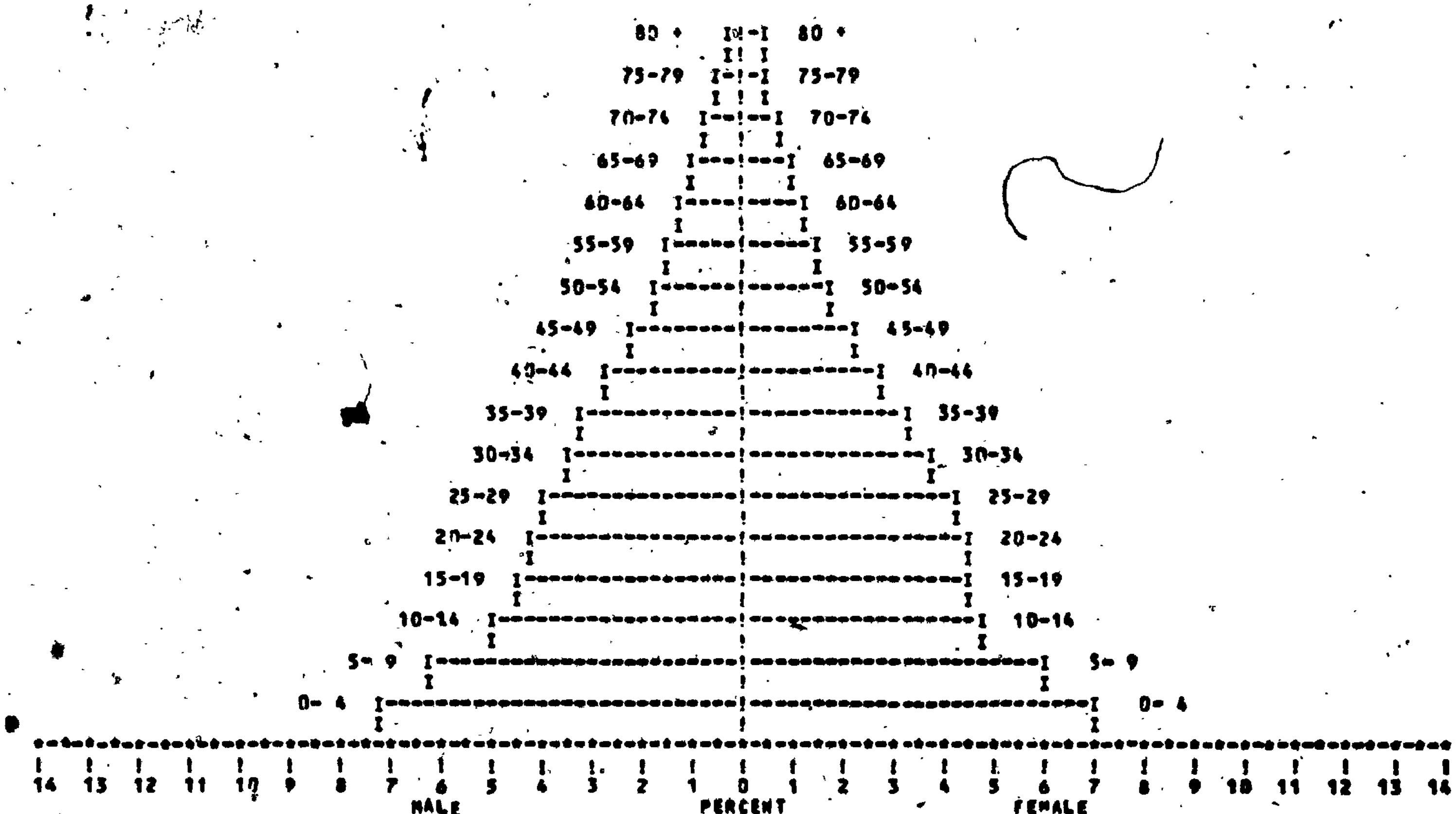
OTHER EUROPE

AGE GROUP	MALE	FEMALE	MALE	FEMALE
0- 4	10185.	9625.	.61	.57
5- 9	21605.	20865.	1.29	1.25
10-14	27075.	25440.	1.62	1.52
15-19	40545.	39340.	2.42	2.35
20-24	68719.	68320.	4.10	4.08
25-29	72380.	66280.	4.32	3.96
30-34	81721.	78685.	4.88	4.70
35-39	89461.	77390.	5.34	4.62
40-44	93646.	78100.	5.59	4.66
45-49	88895.	80905.	5.31	4.83
50-54	52886.	43490.	3.16	2.60
55-59	48415.	40080.	2.89	2.39
60-64	50881.	46720.	3.04	2.79
65-69	53914.	46175.	3.22	2.76
70-74	36901.	33931.	2.20	2.03
75-79	22966.	19729.	1.37	1.26
80-84	12516.	11945.	1.13	1.15
85+	6394.	7264.		
TOTAL	879105.	794284.		

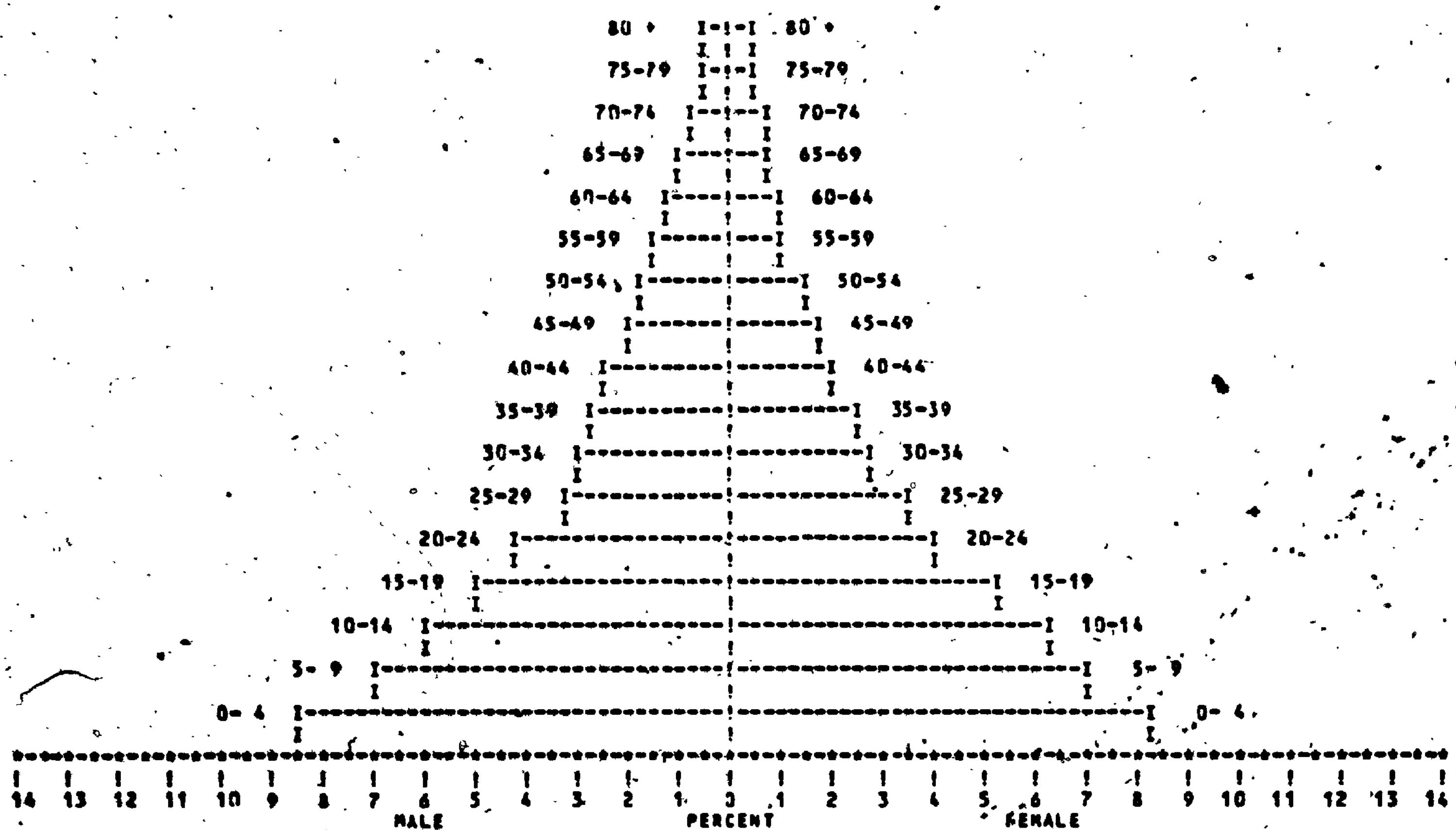
APPENDIX D

AGE PYRAMIDS, 1951, 1961, 1964 AND 1971

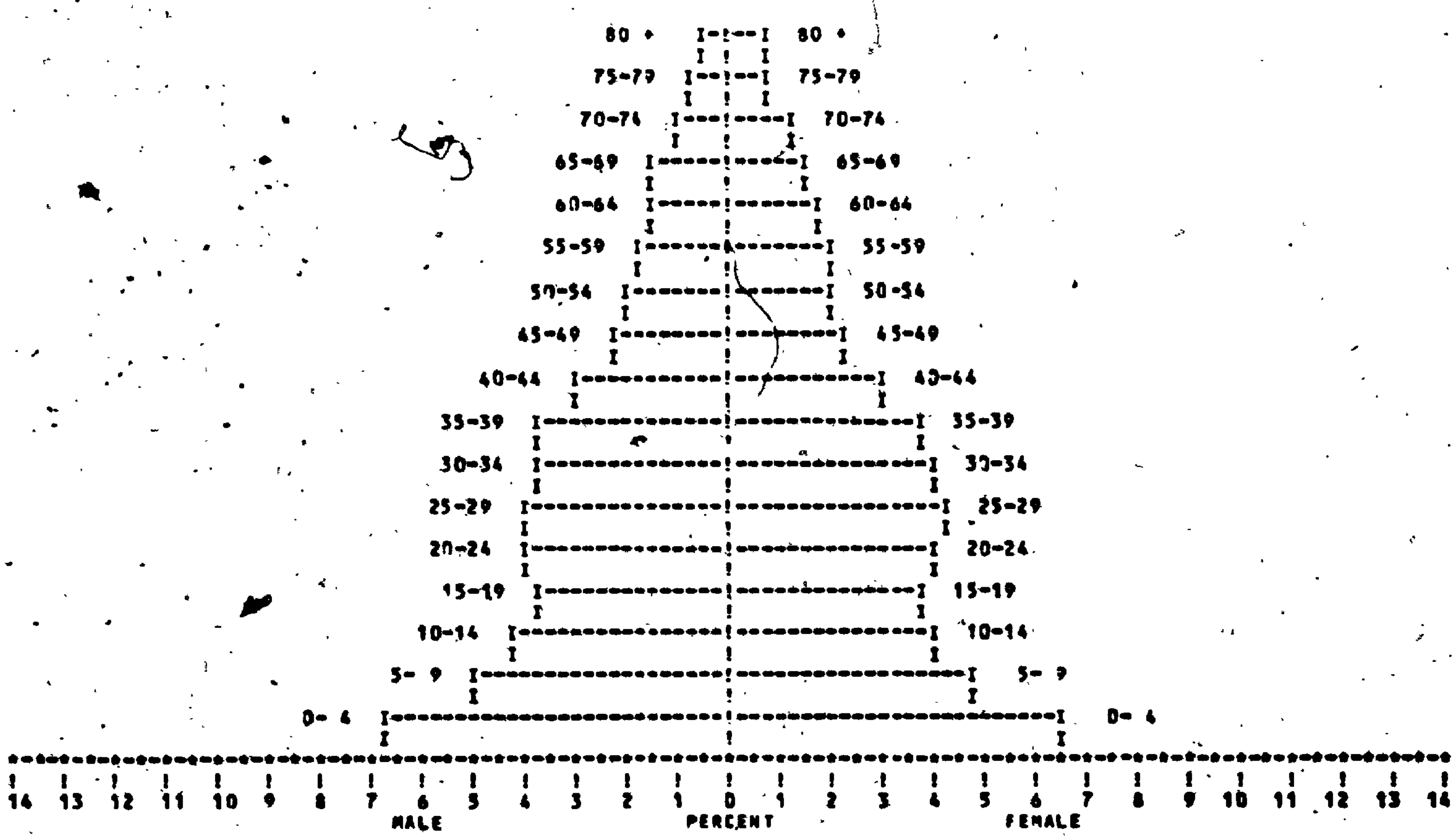
POPULATION PYRAMID--1951--FRENCH NB



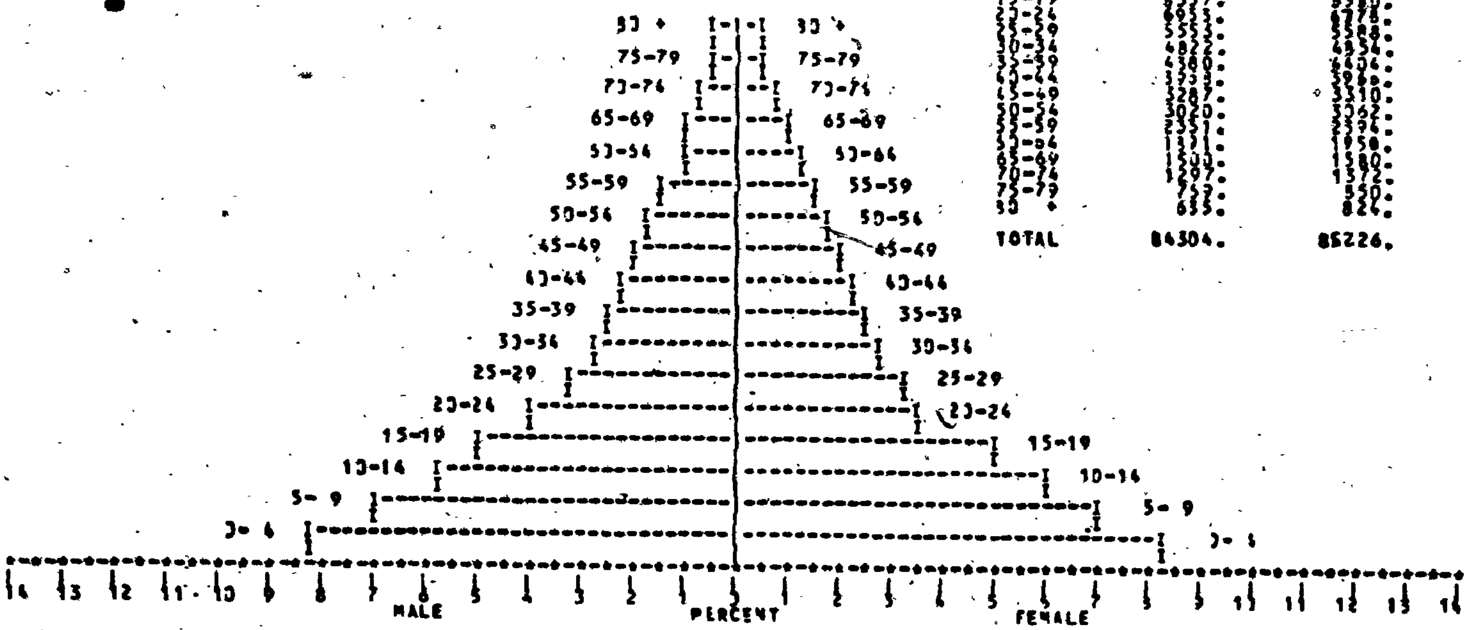
POPULATION PYRAMID—1951—NATIVES[3]



POPULATION PYRAMID--1951--BRITISH NB

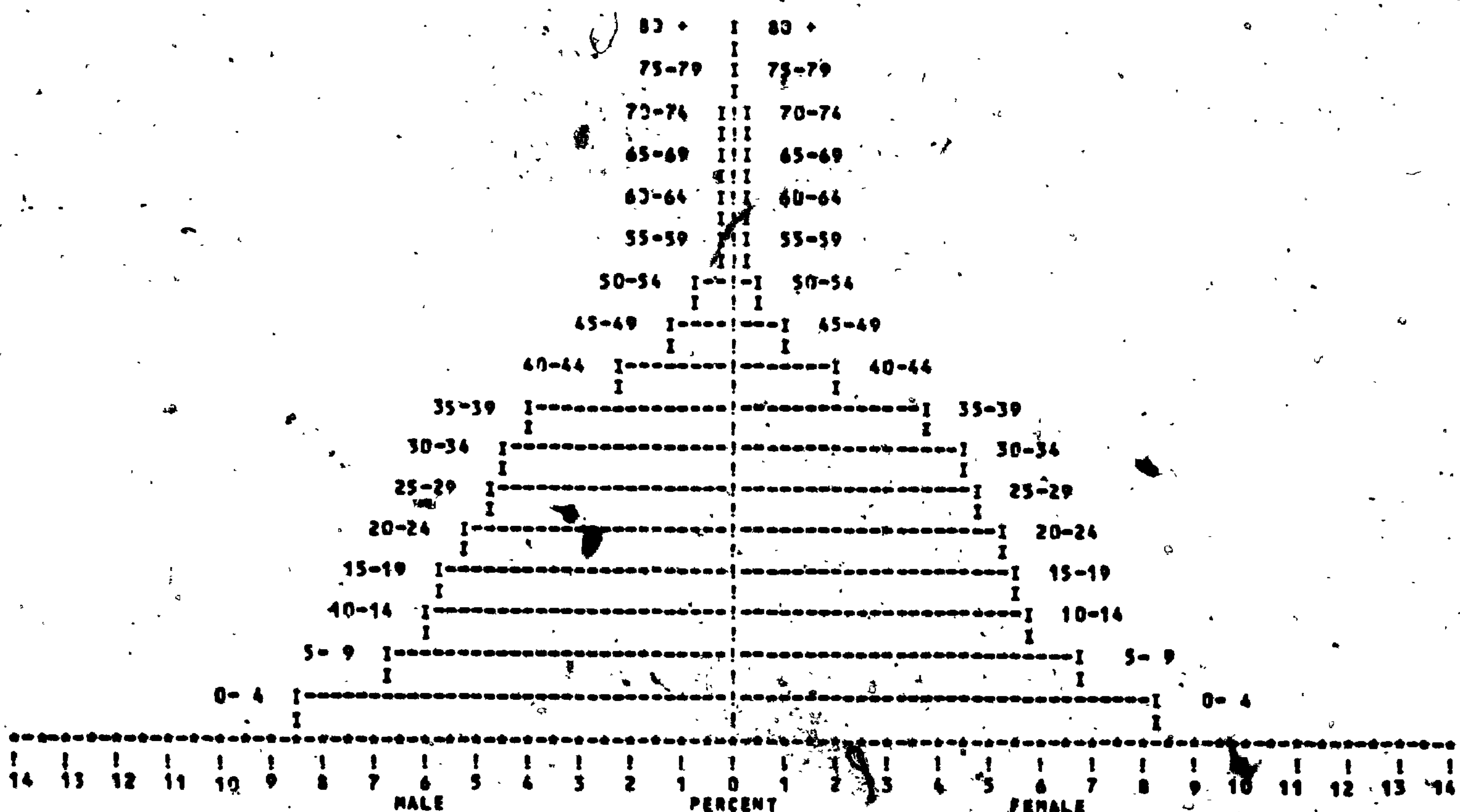


ADJUSTED POP PYR.--1951--NATIVES

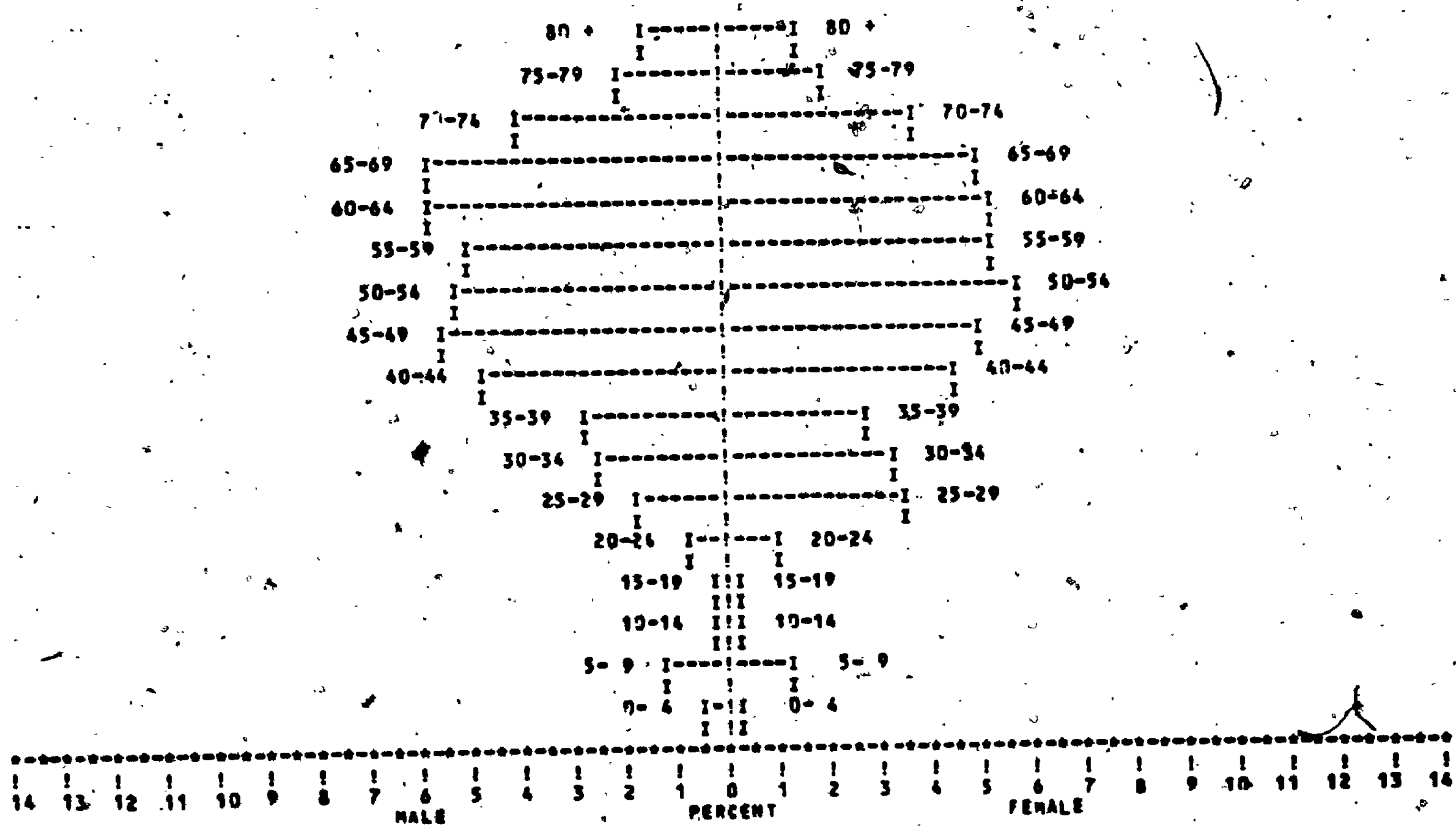


AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	14028.	13841.	8.31	8.33
5- 9	11550.	11586.	6.91	6.93
10-14	9553.	10183.	5.84	6.03
15-19	8337.	8580.	4.94	5.08
20-24	6953.	6778.	4.12	4.07
25-29	5553.	5568.	3.29	3.31
30-34	4822.	4854.	2.86	2.85
35-39	4380.	4406.	2.59	2.61
40-44	3733.	3969.	2.36	2.35
45-49	3287.	3310.	1.95	1.95
50-54	3020.	3262.	1.79	1.91
55-59	2351.	2376.	1.49	1.42
60-64	1371.	1958.	1.13	1.15
65-69	1500.	1580.	.89	.94
70-74	1297.	1372.	.77	.81
75-79	753.	550.	.48	.33
80 +	635.	826.	.38	.47
TOTAL	84304.	85226.		

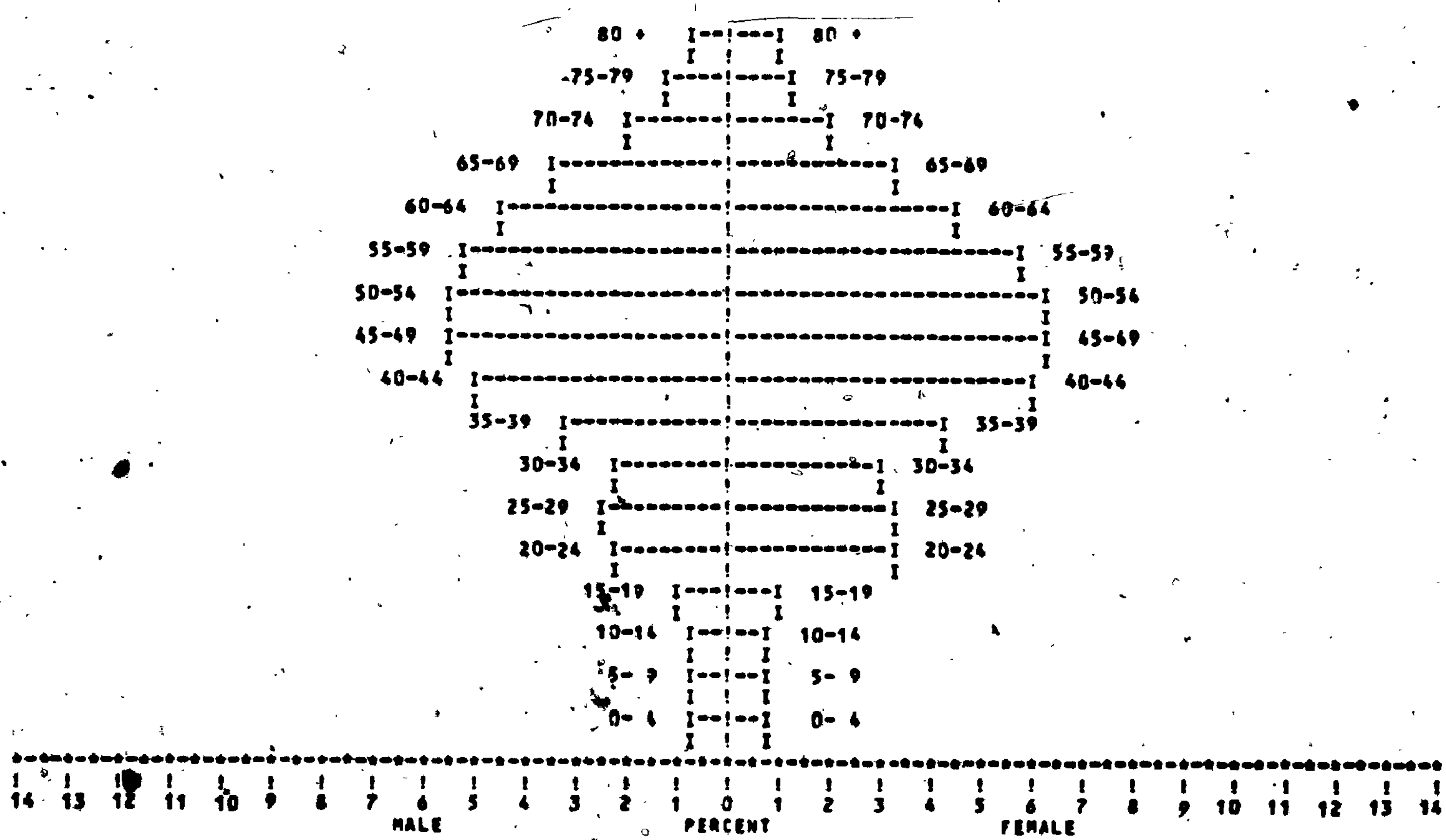
POPULATION PYRAMID---1951---RESIDUAL NB



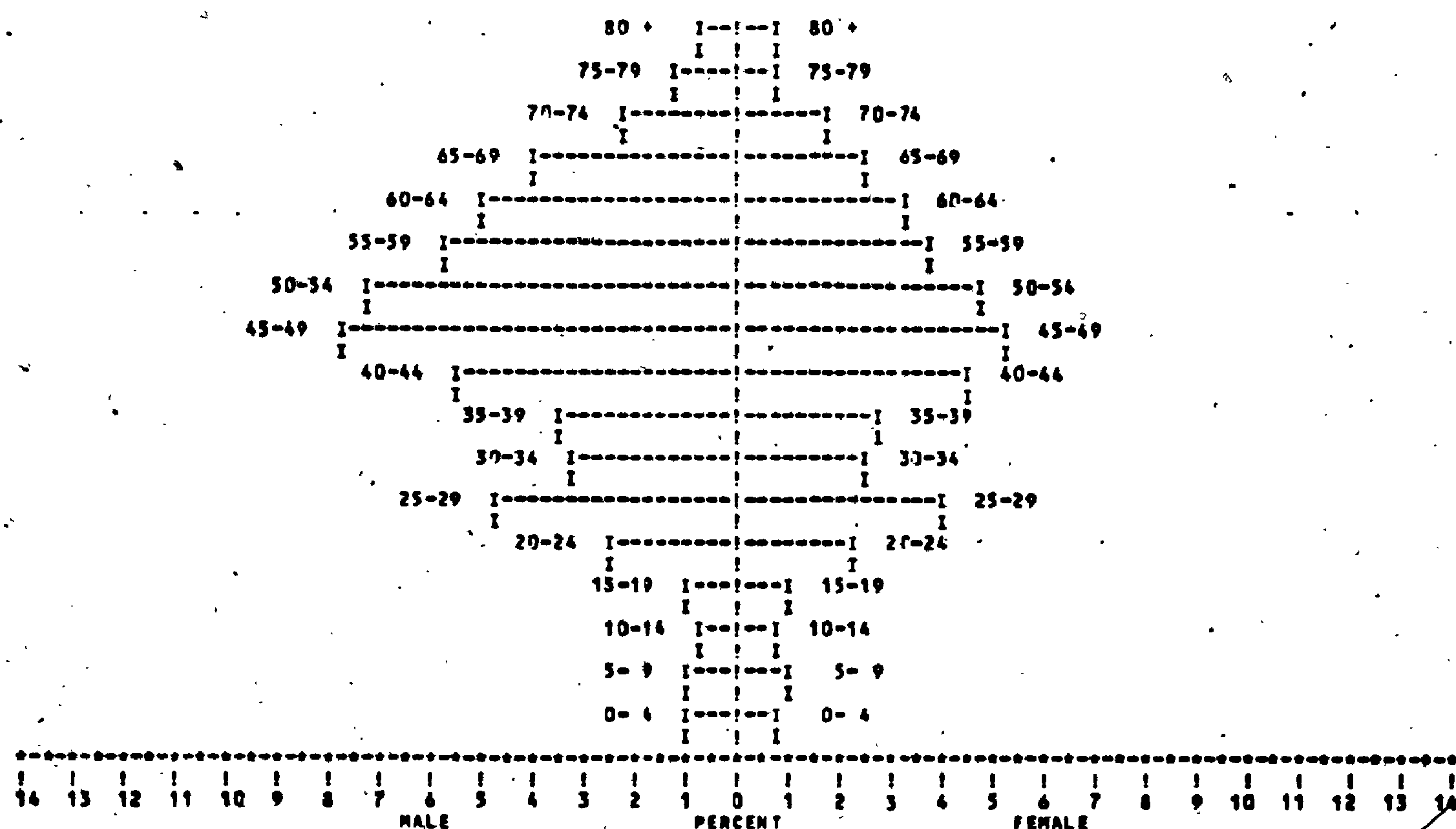
POPULATION PYRAMID--1951--BRITISH FB



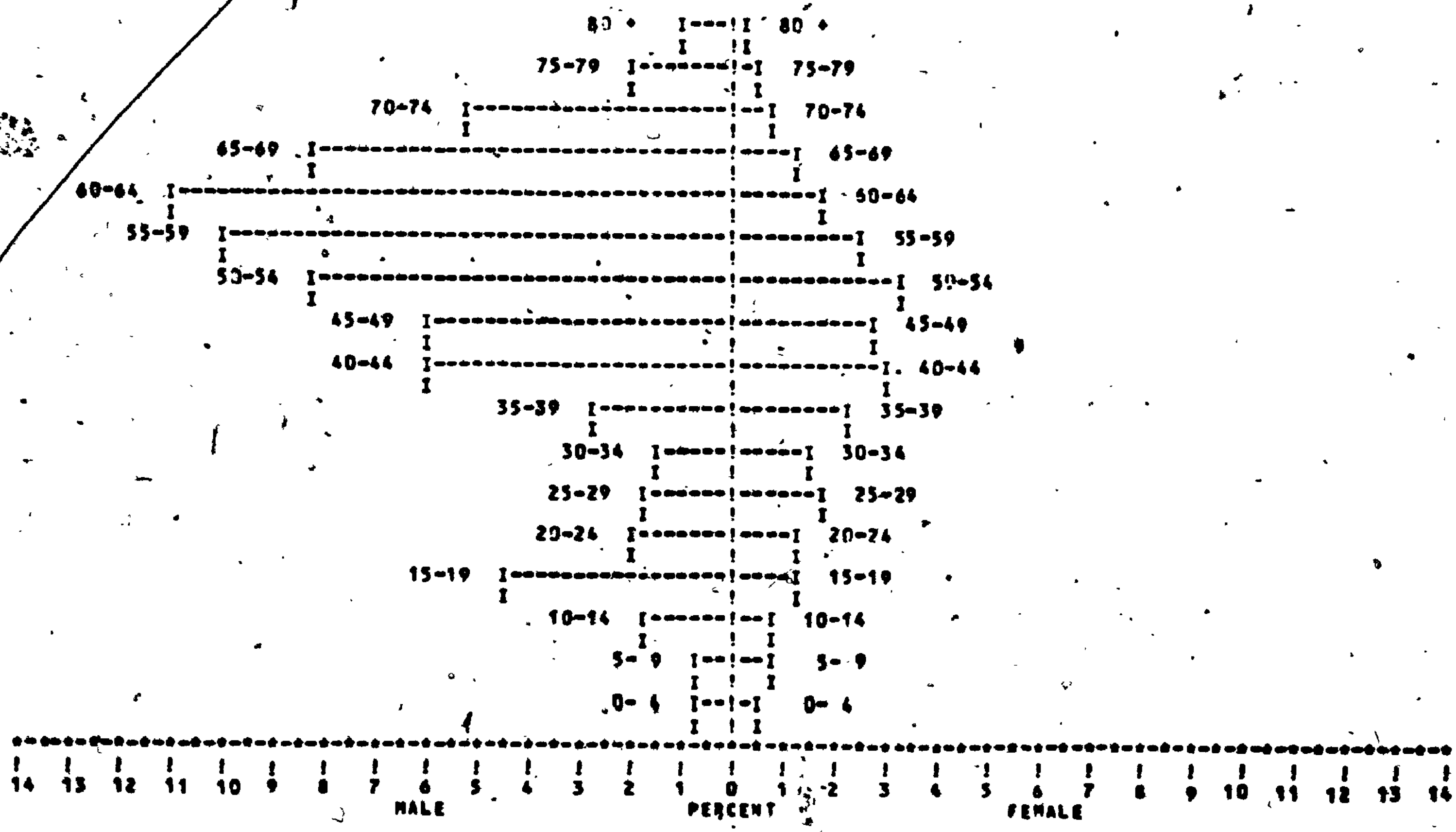
POPULATION PYRAMID--1951--UNITED STATES



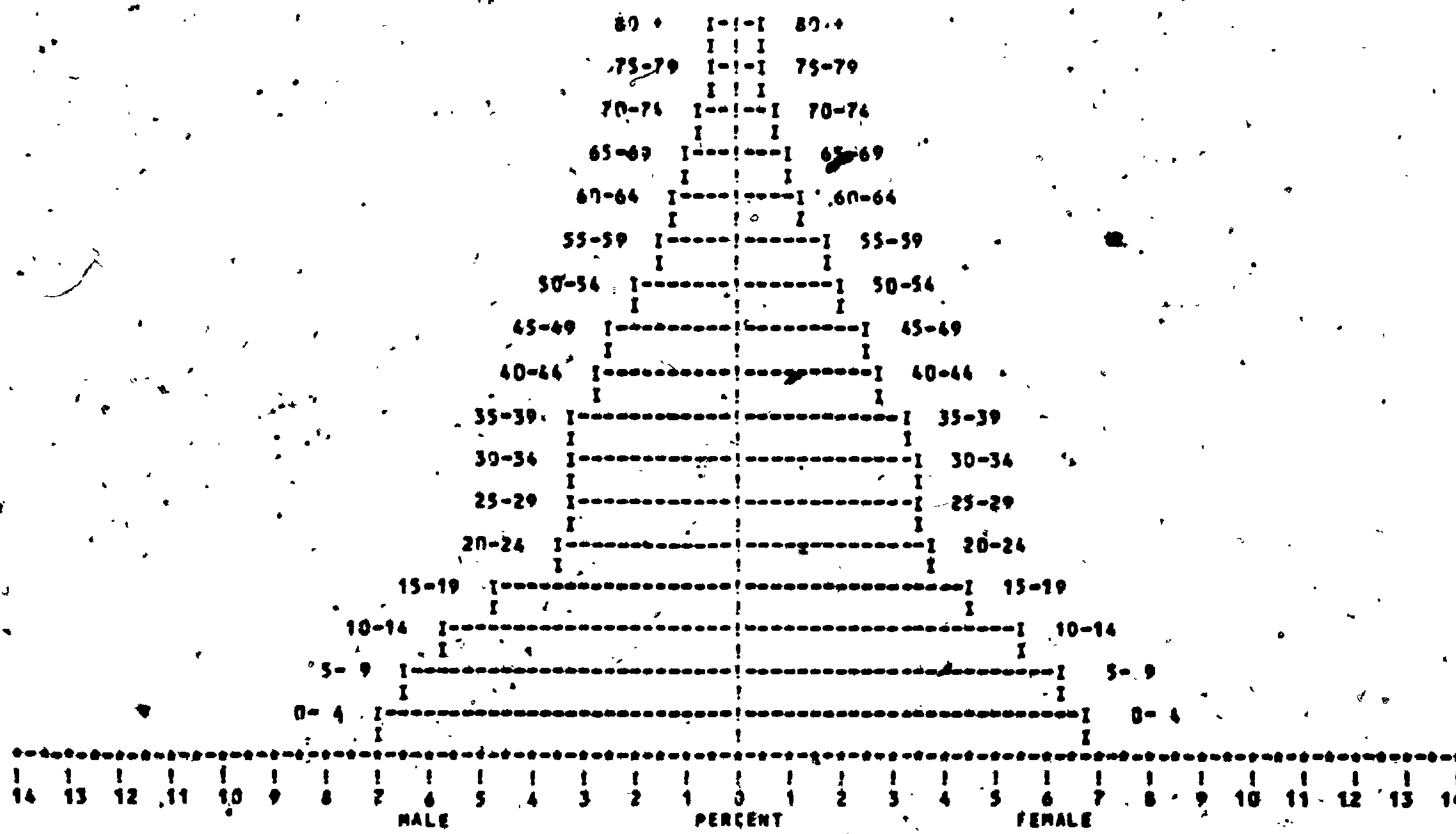
POPULATION PYRAMID--1951--OTHER EUROPE FB



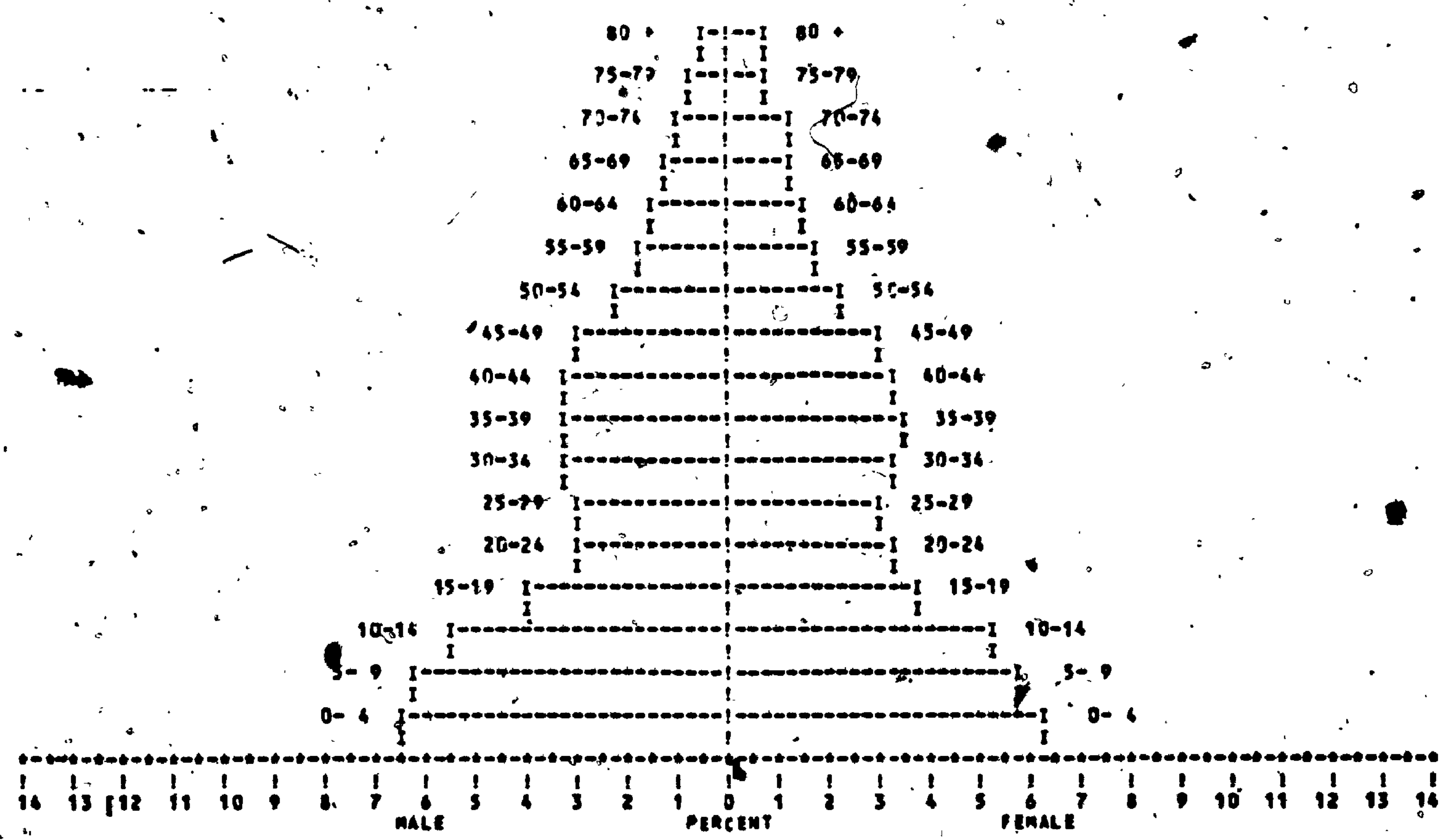
POPULATION PYRAMID--1951--OTHER FB



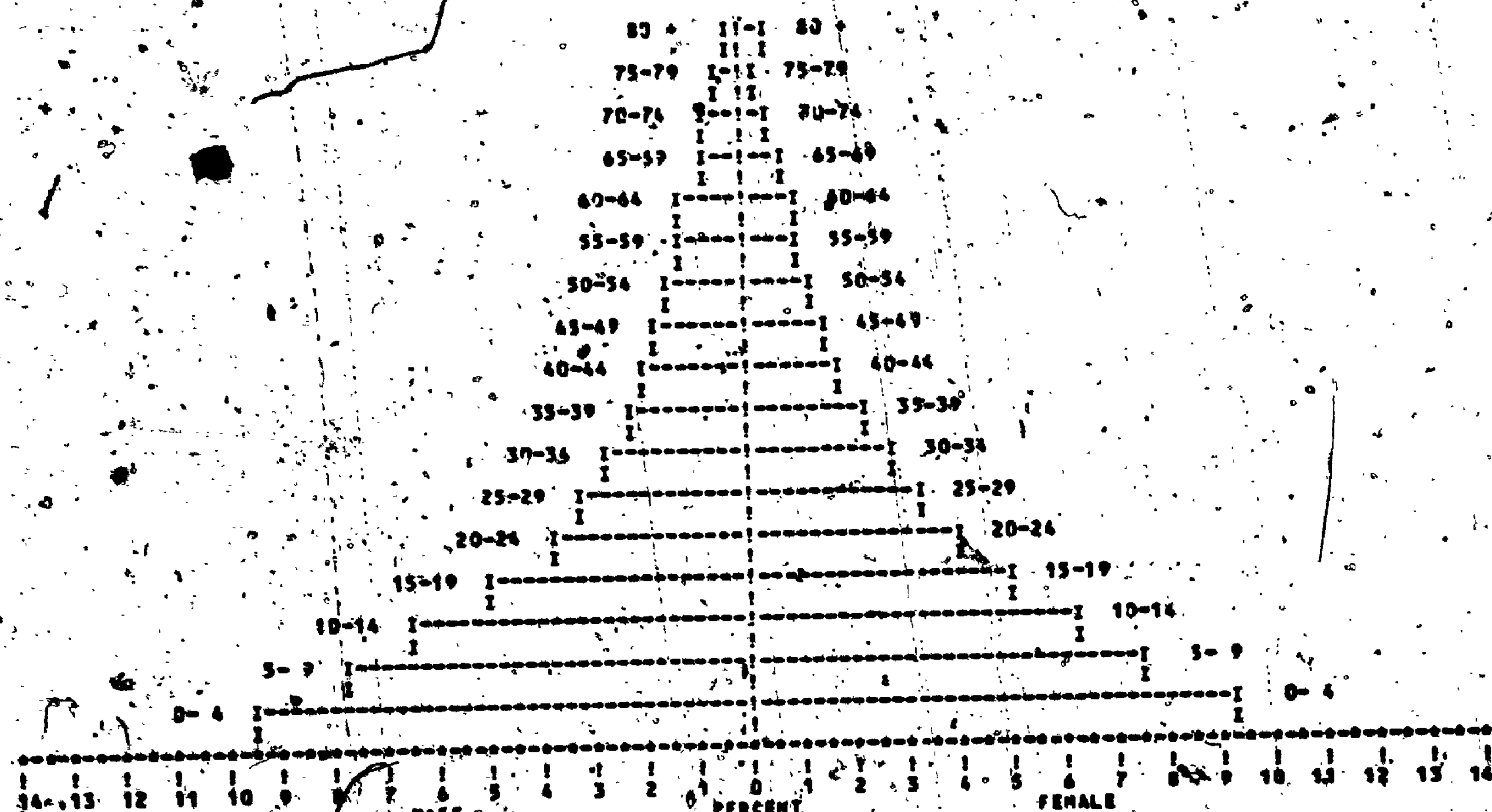
POPULATION PYRAMID--1961--FRENCH NB



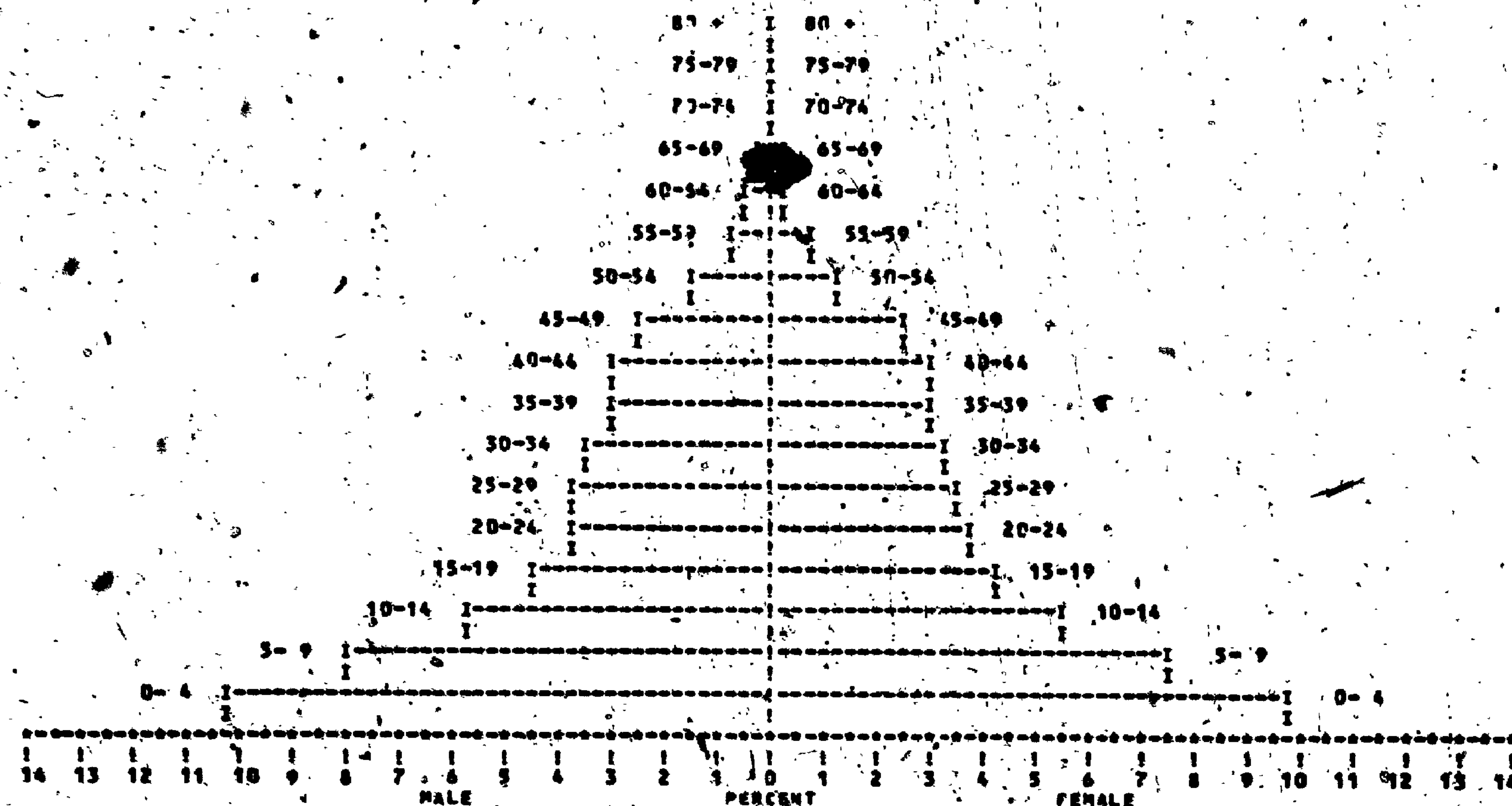
POPULATION PYRAMID--1961--BRITISH



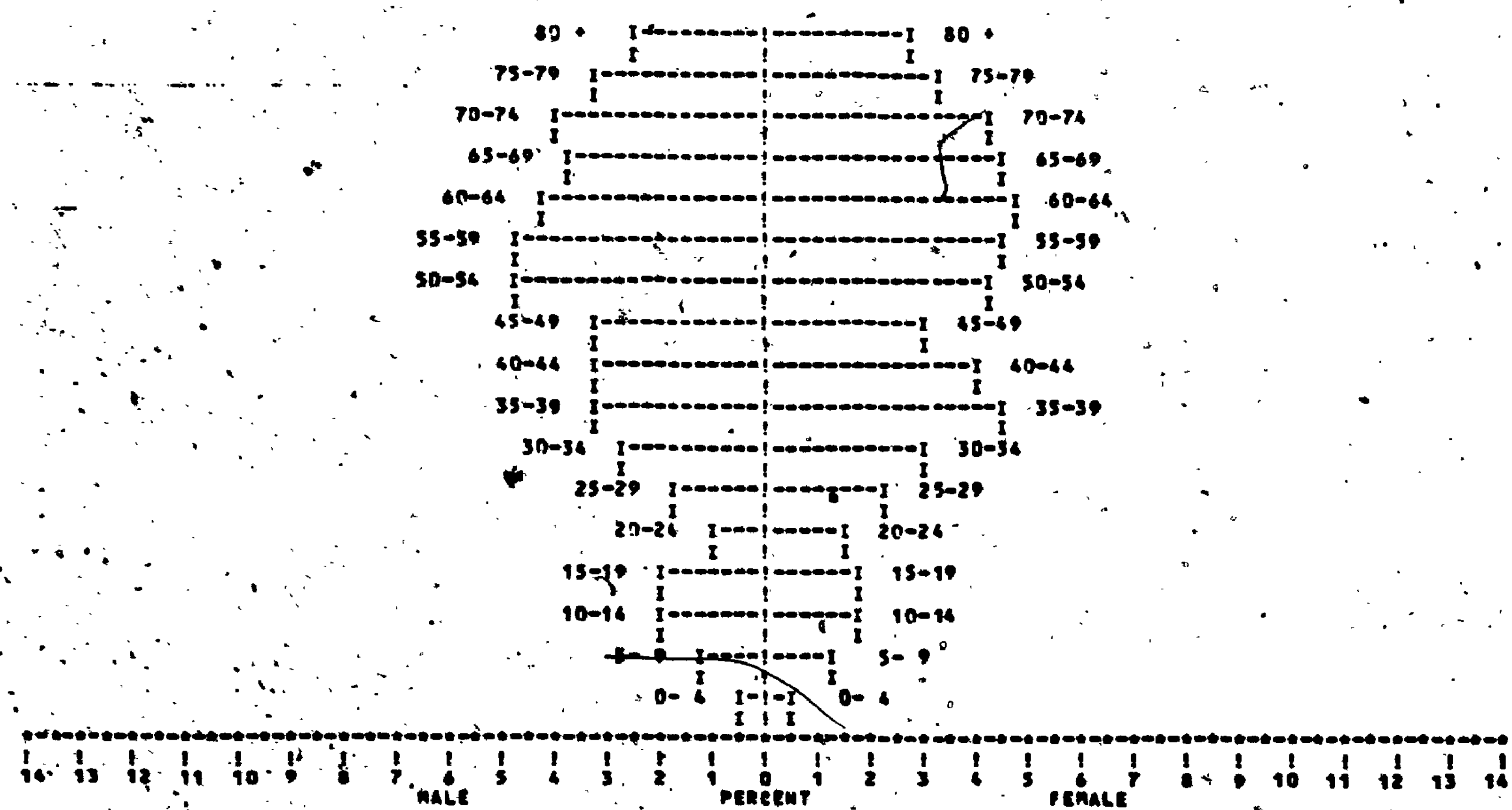
POPULATION PYRAMID—1961—NATIVES



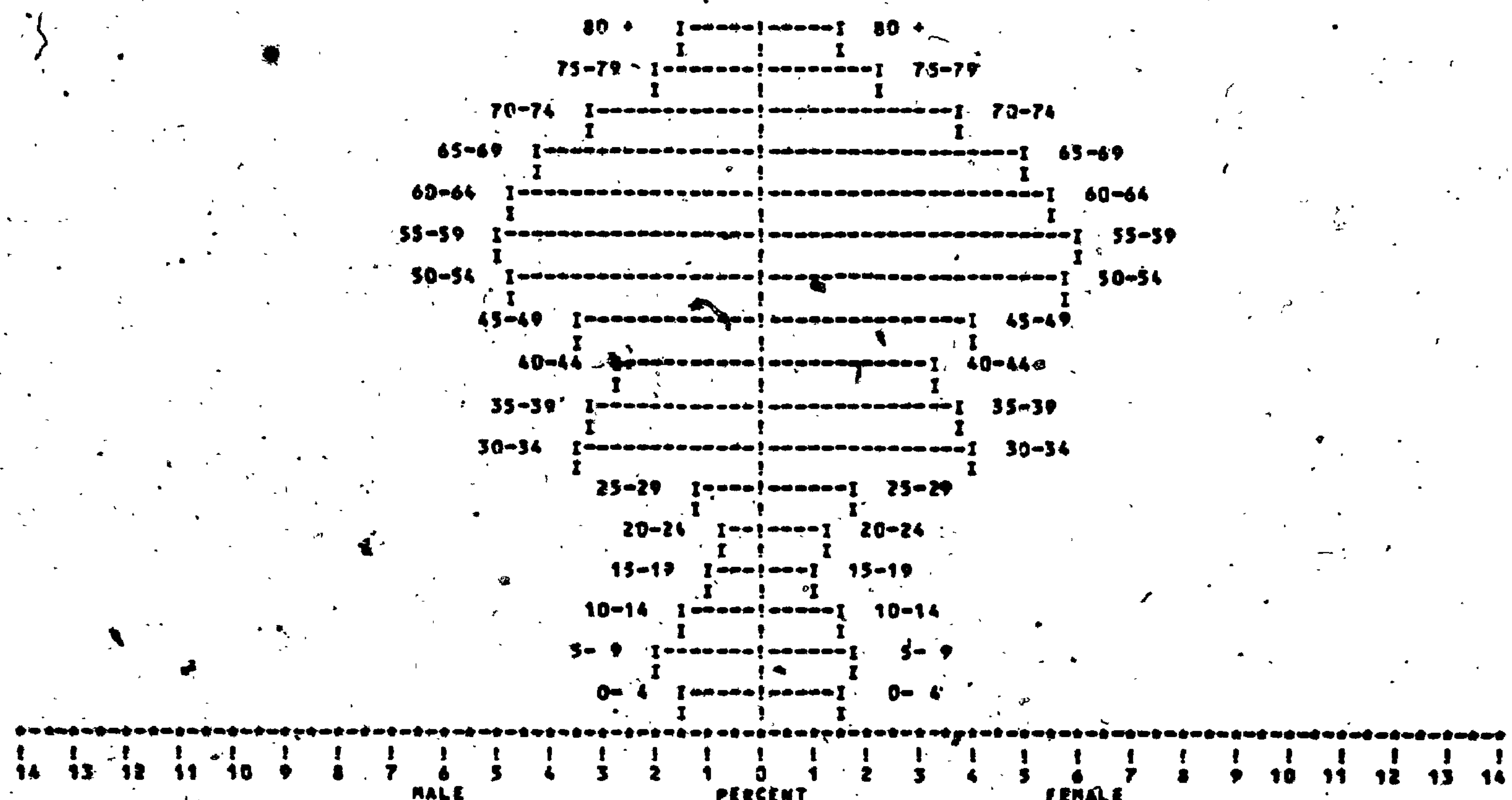
POPULATION PYRAMID--1961--RESIDUAL NB



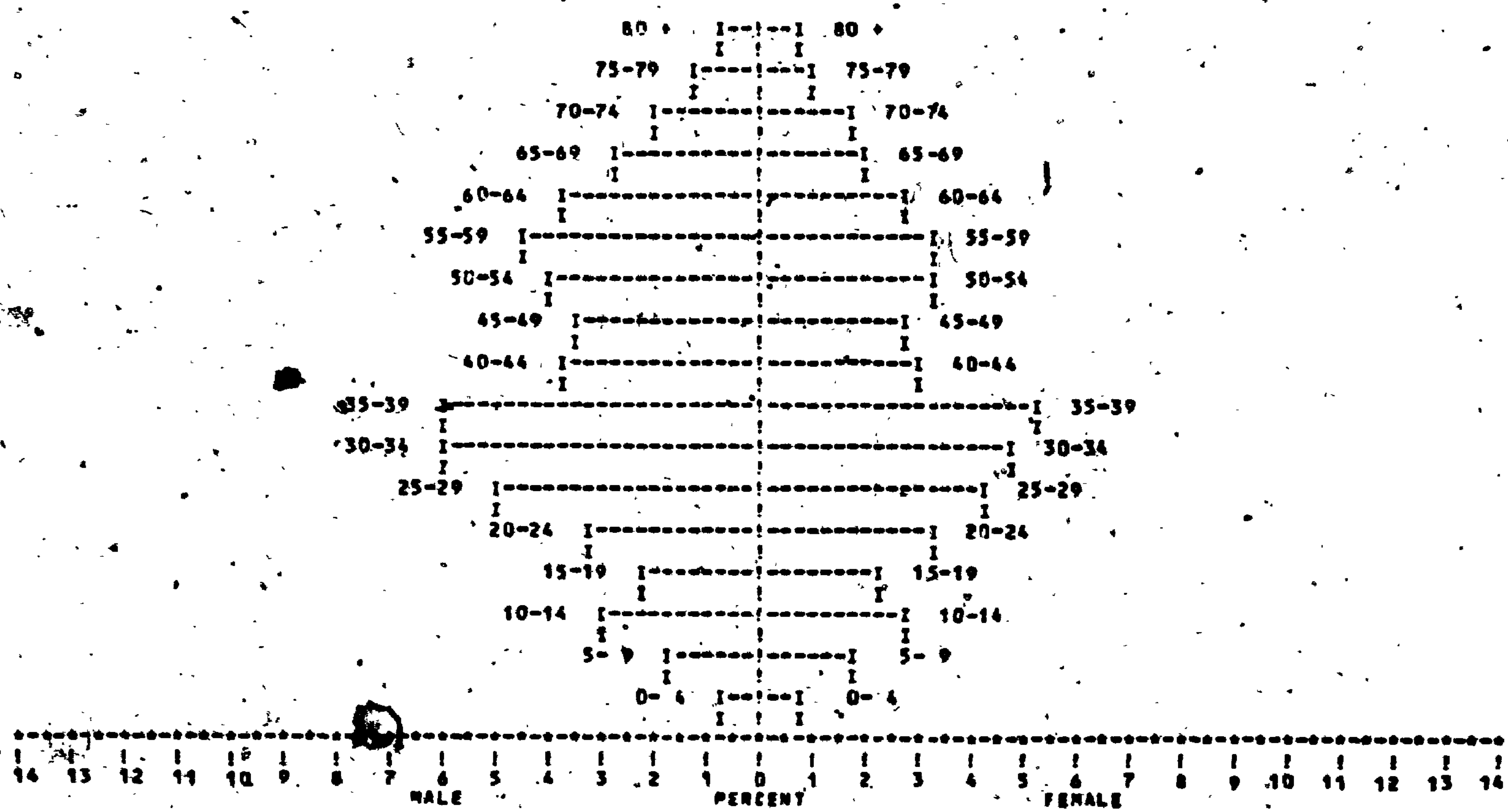
POPULATION PYRAMID--1961--BRITISH FB



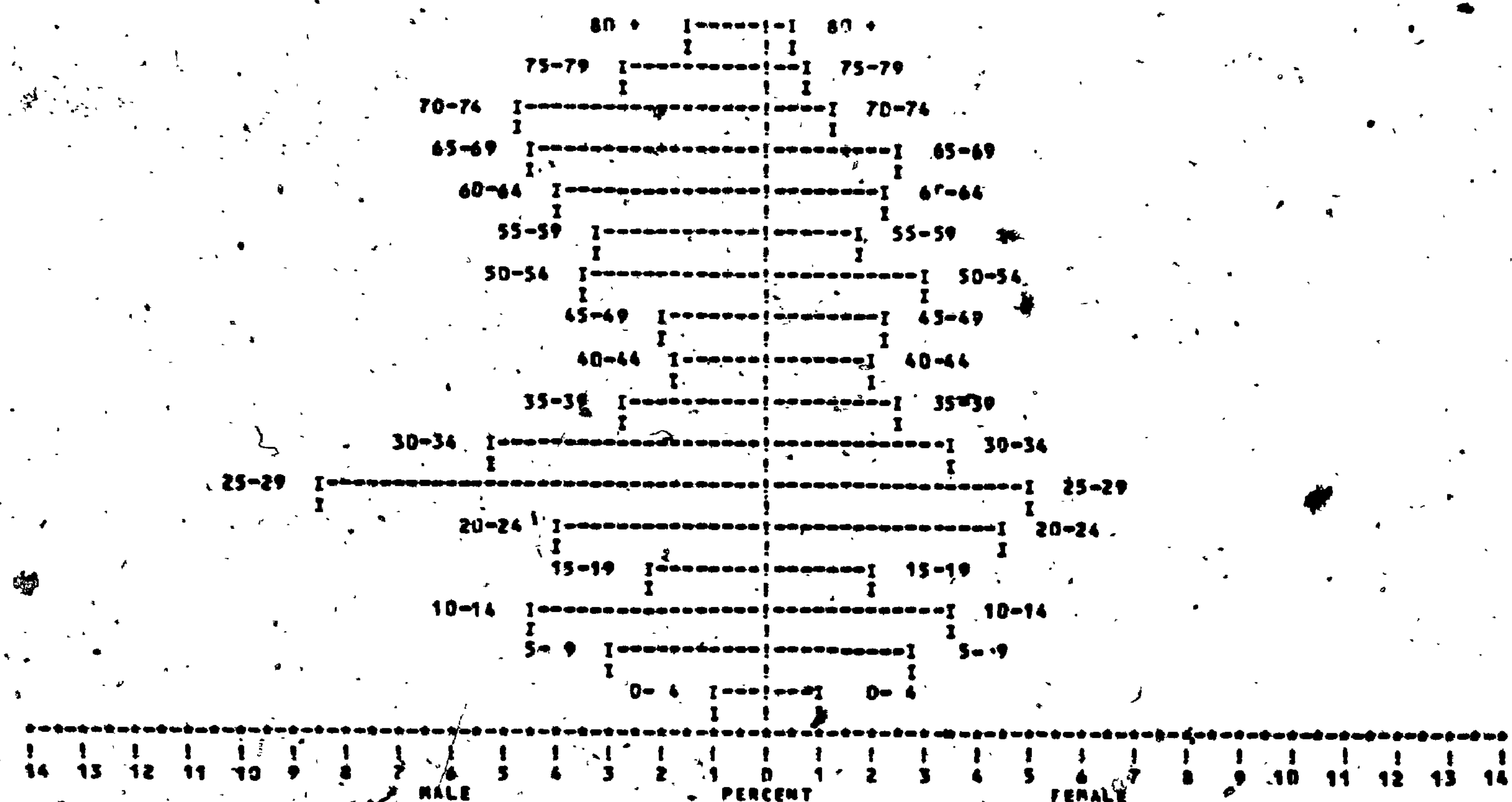
POPULATION PYRAMID--1961--UNITED STATES



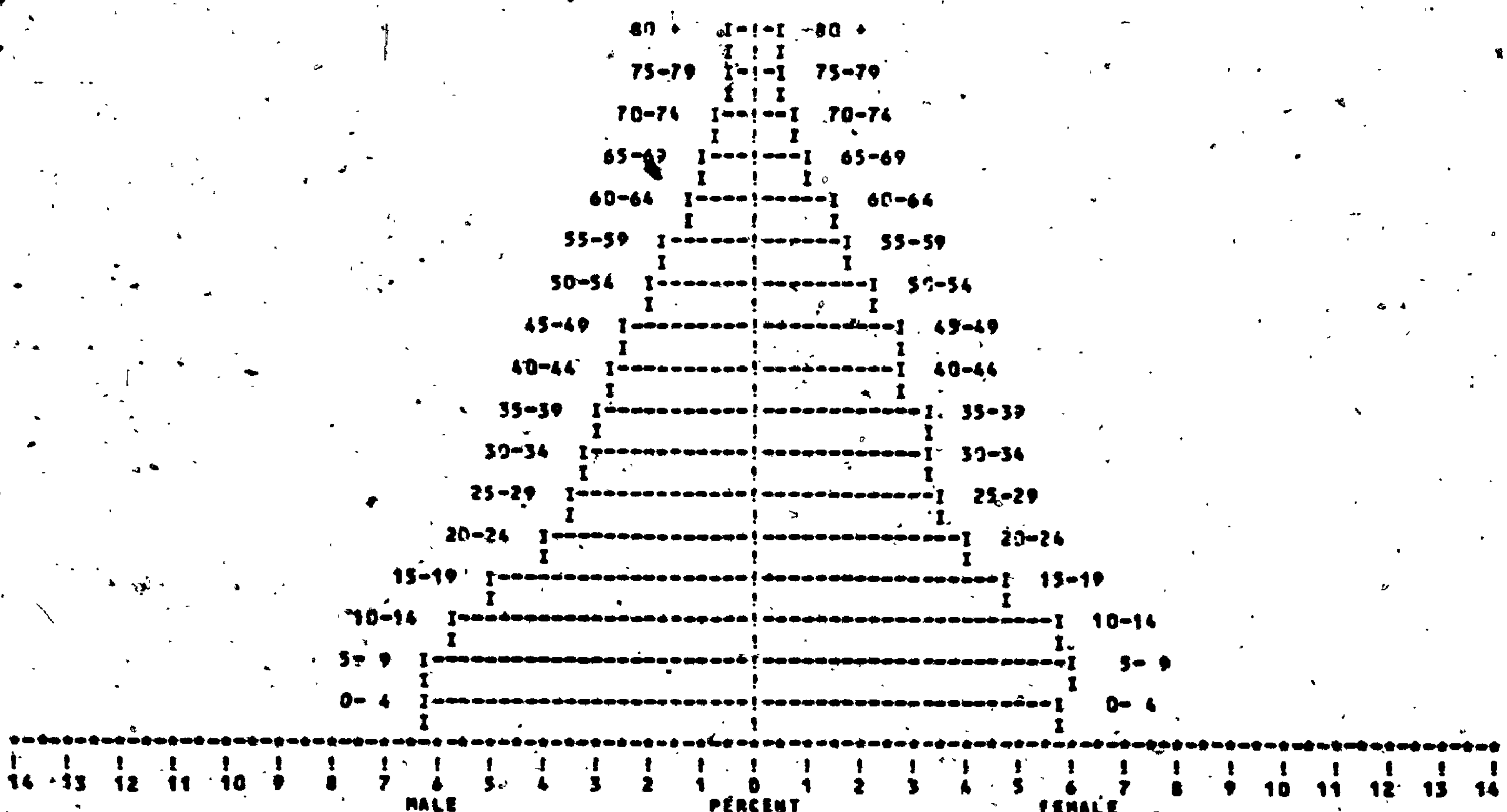
POPULATION PYRAMID—1961—OTHER EUROPE FB



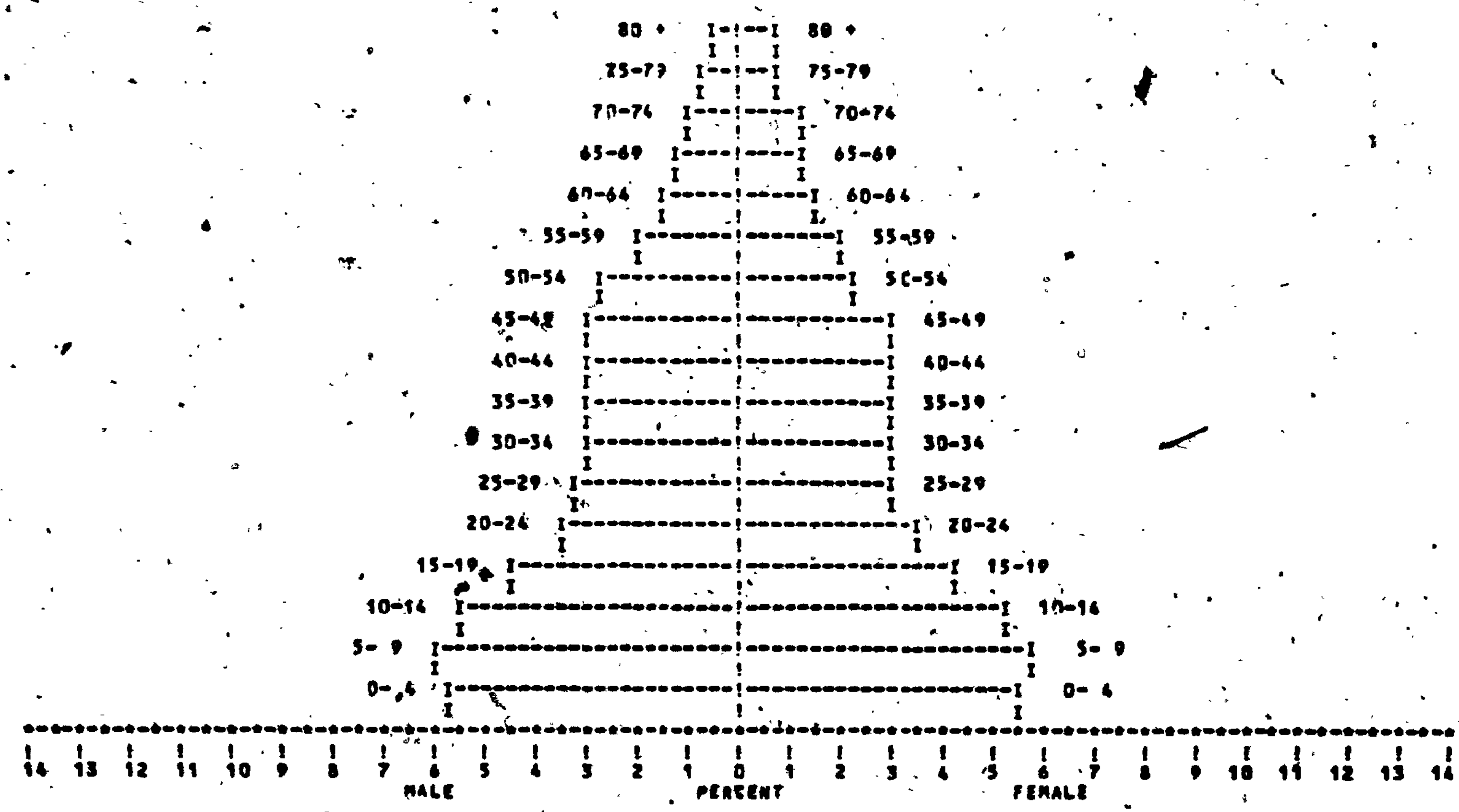
POPULATION PYRAMID--1961--OTHER FB



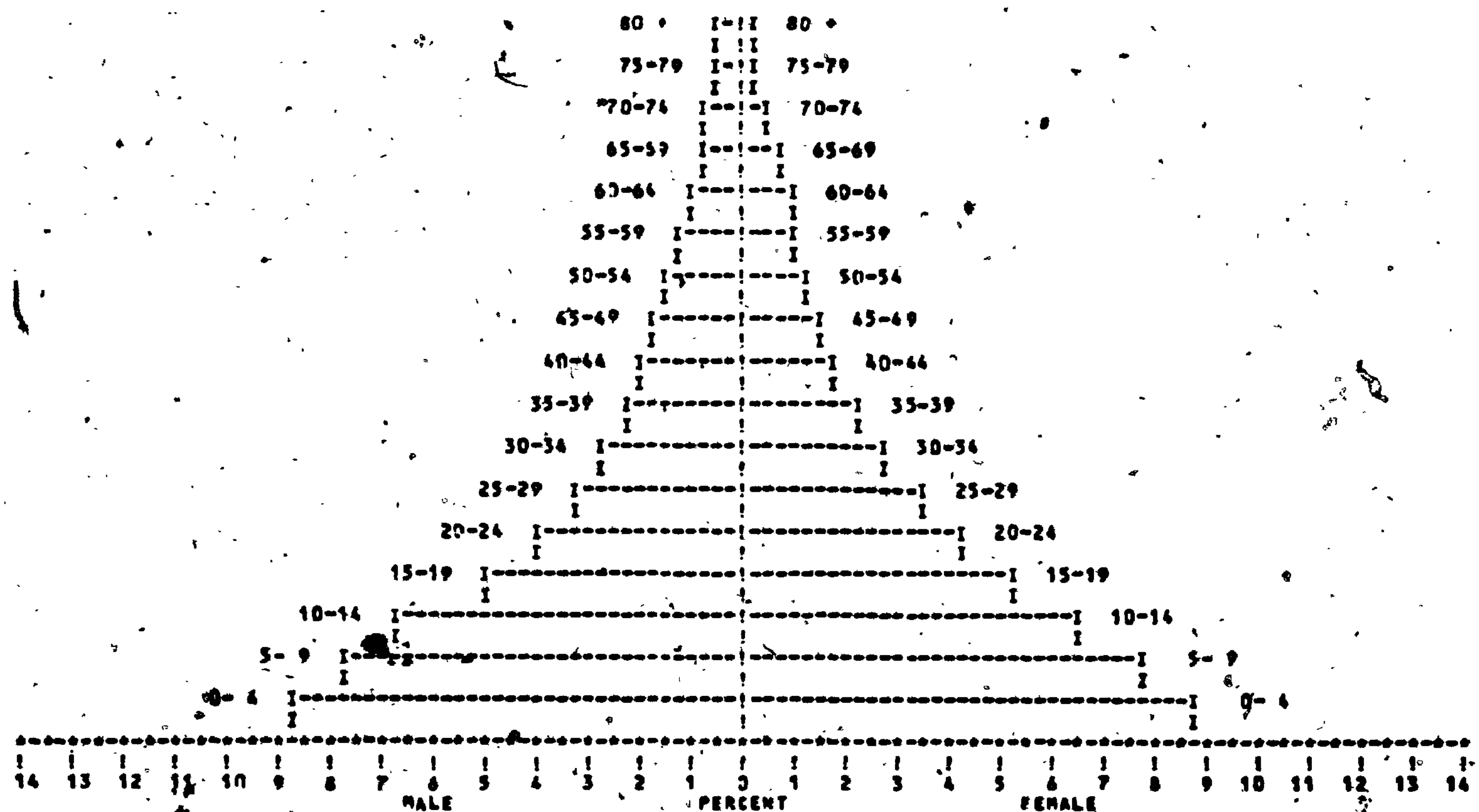
POPULATION PYRAMID--1964--FRENCH NB



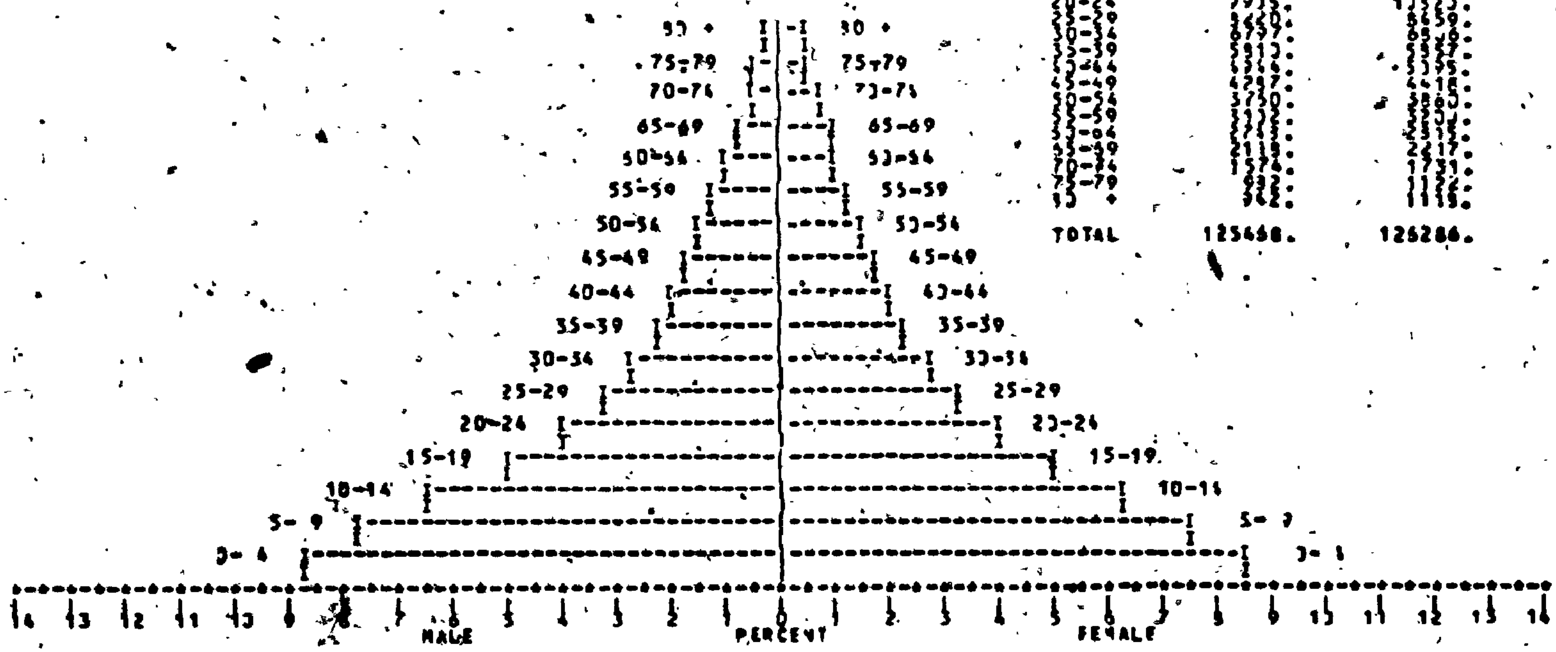
POPULATION PYRAMID—1964—BRITISH NB



POPULATION PYRAMID—1964—NATIVES

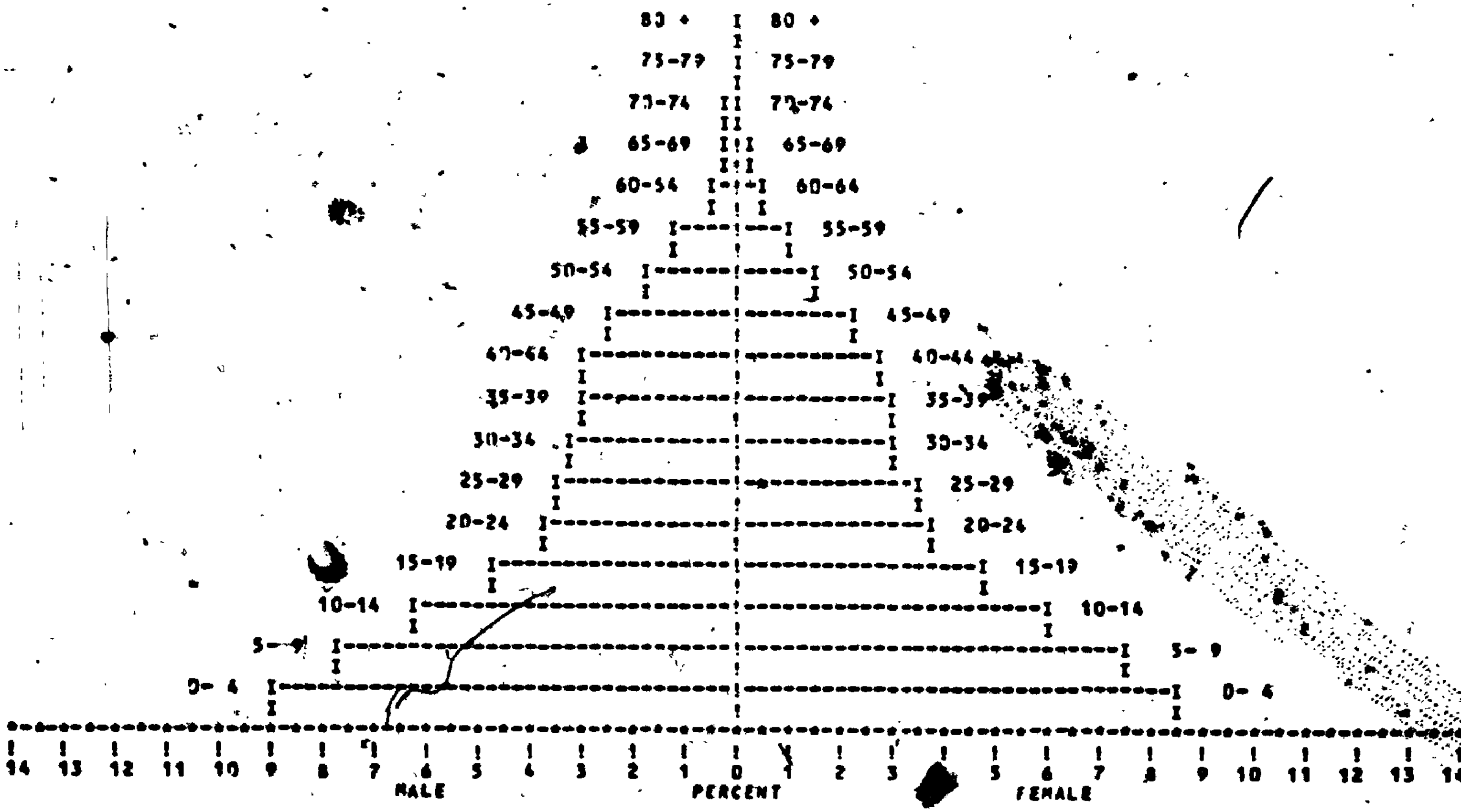


ADJUSTED POP PYR.--1954--NATIVES

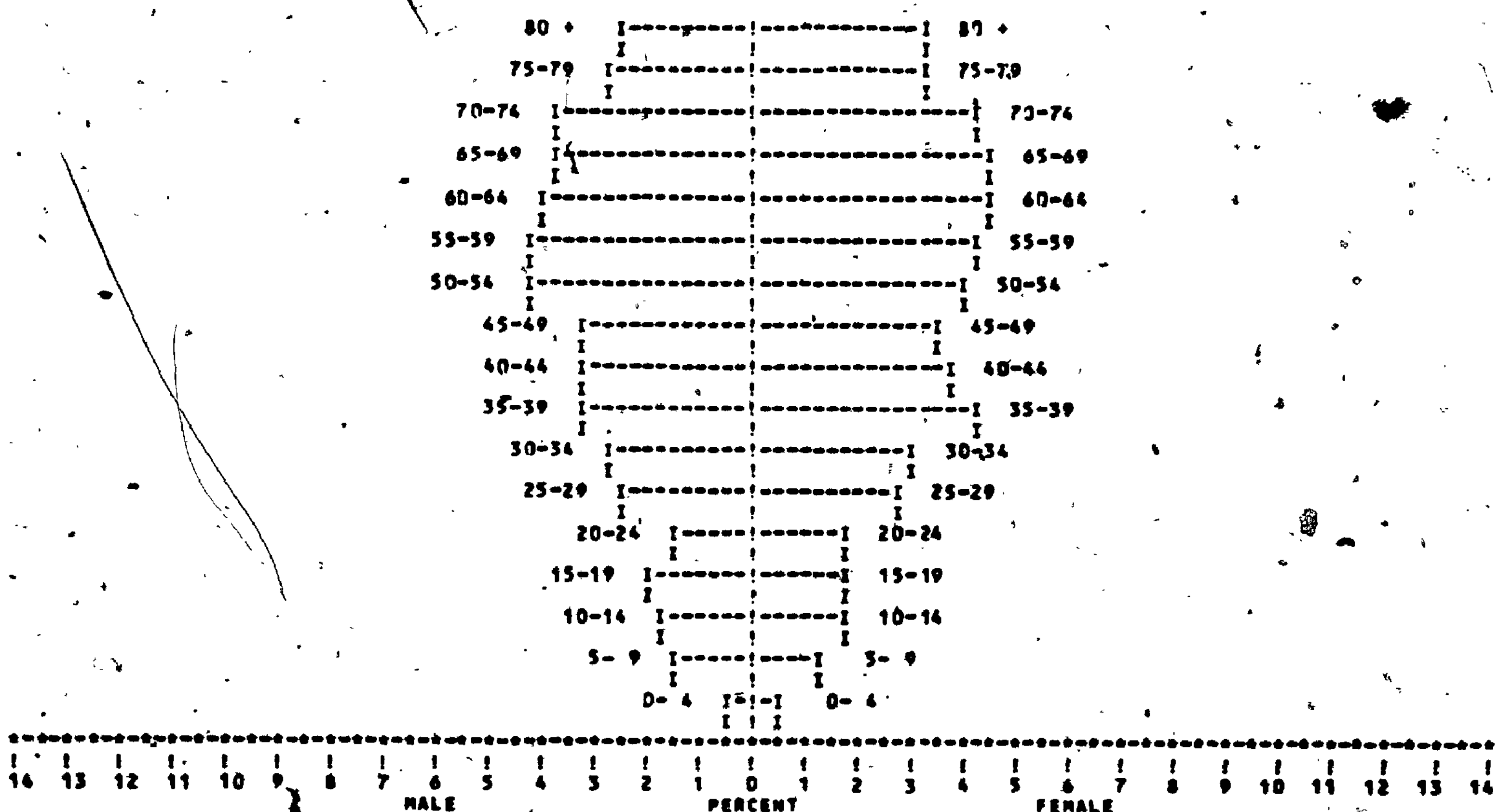


AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	21935.	21553.	8.72	8.53
5- 9	17239.	19979.	7.46	7.31
10-14	10427.	15476.	6.37	6.31
15-19	13535.	12745.	5.33	5.29
20-24	[illegible]	11323.	5.33	[illegible]
25-29	8450.	8659.	[illegible]	[illegible]
30-34	6797.	6546.	[illegible]	[illegible]
35-39	5913.	5357.	[illegible]	[illegible]
40-44	[illegible]	5395.	[illegible]	[illegible]
45-49	4297.	4415.	1.70	[illegible]
50-54	3730.	3865.	1.49	1.54
55-59	[illegible]	[illegible]	1.23	[illegible]
60-64	[illegible]	2515.	1.09	[illegible]
65-69	2119.	2617.	.84	.93
70-74	1574.	1731.	.63	.69
75-79	932.	1172.	.39	[illegible]
80 +	962.	1115.	.37	.44
TOTAL	125458.	126286.		

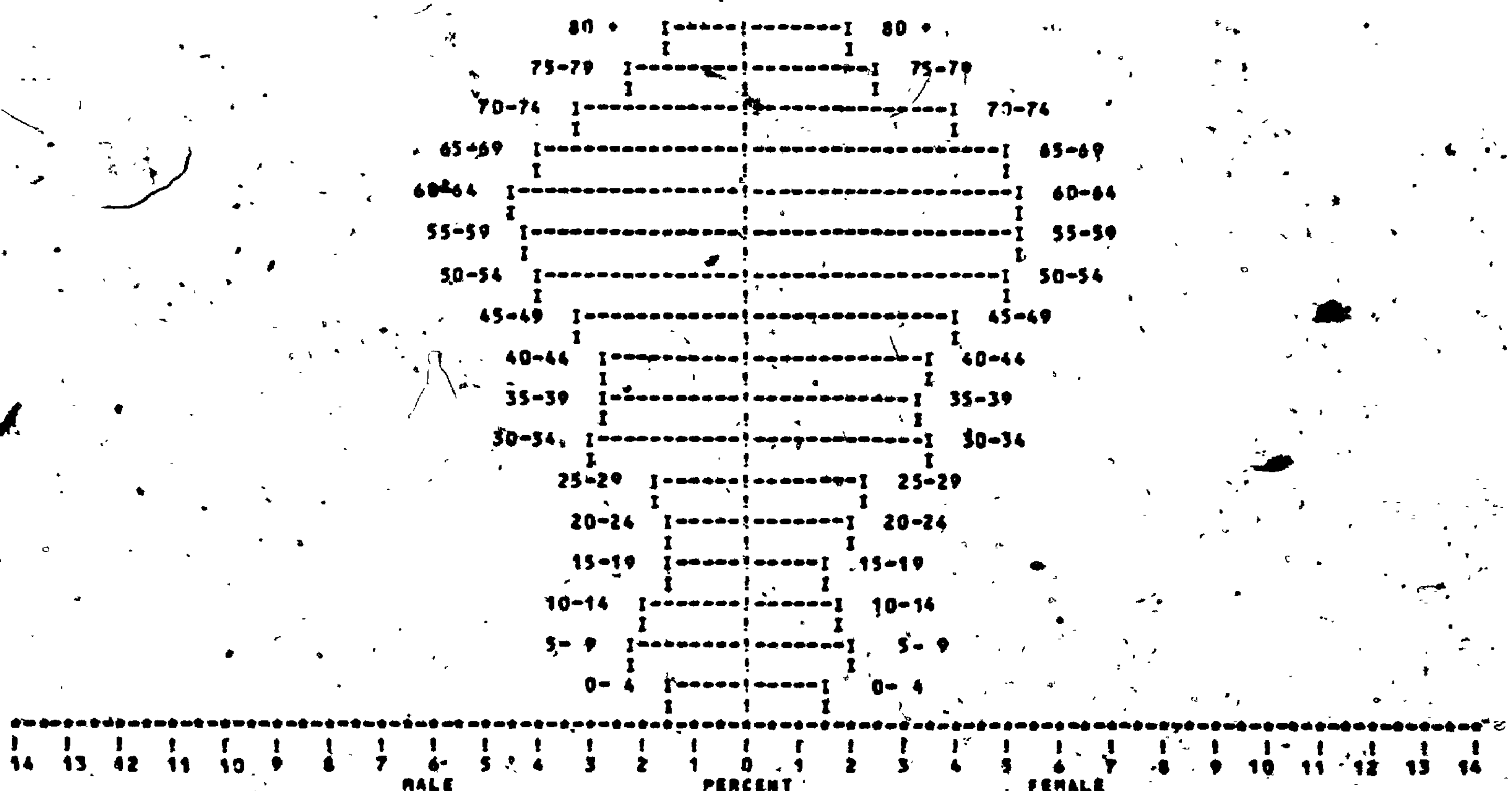
PULATION PYRAMID--1964--RESIDUAL ND



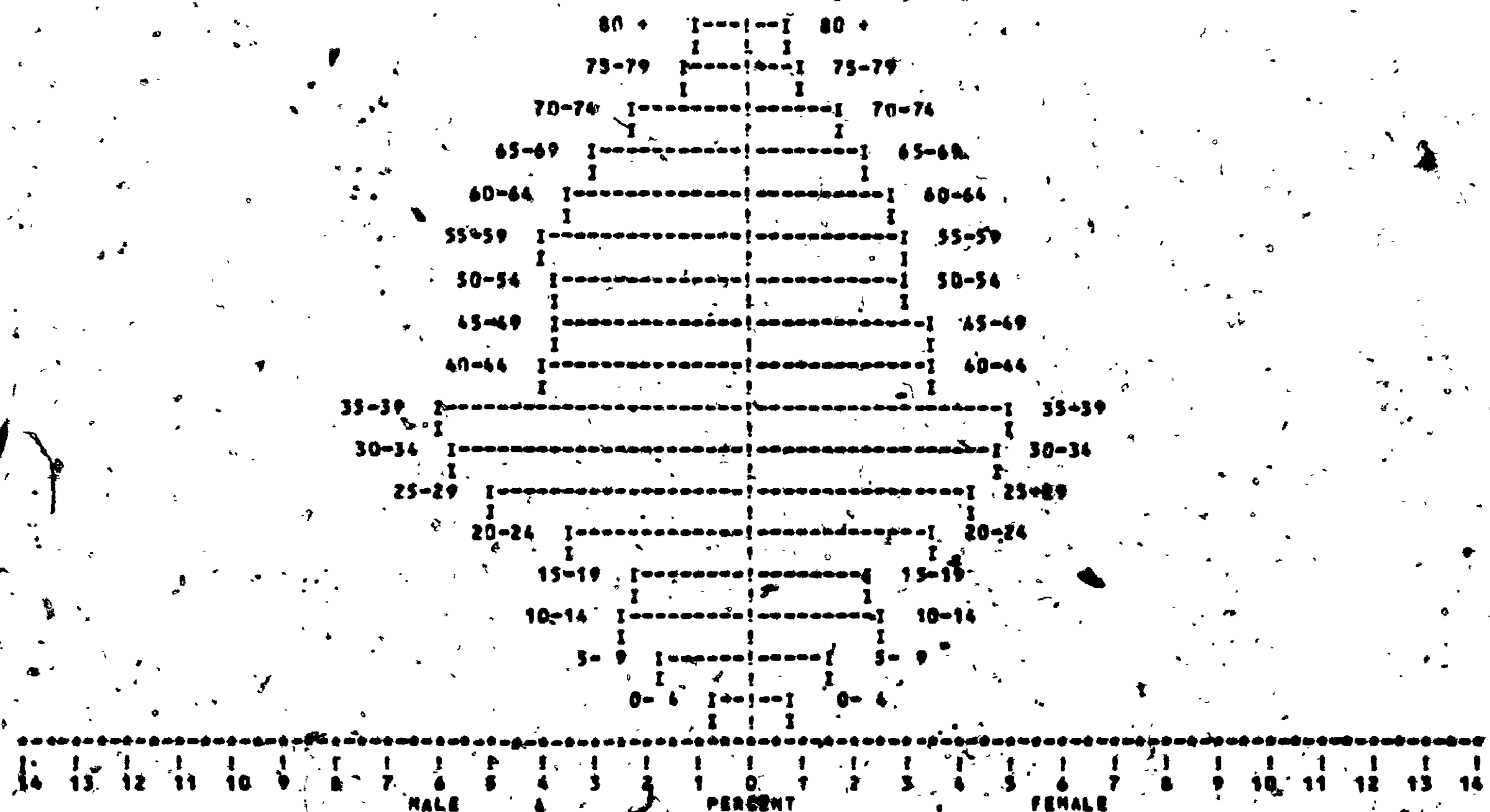
POPULATION PYRAMID--1966--BRITISH FB



POPULATION PYRAMID--1964--UNITED STATES



POPULATION PYRAMID--1966--OTHER EUROPE FB



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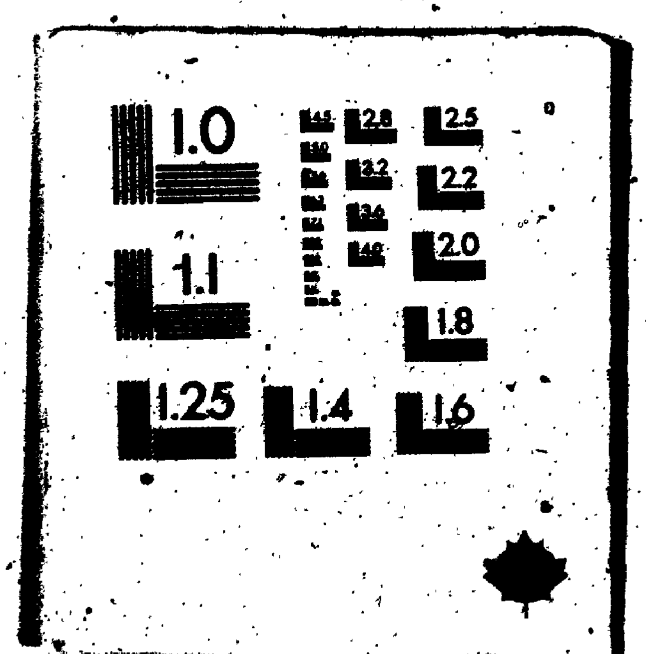
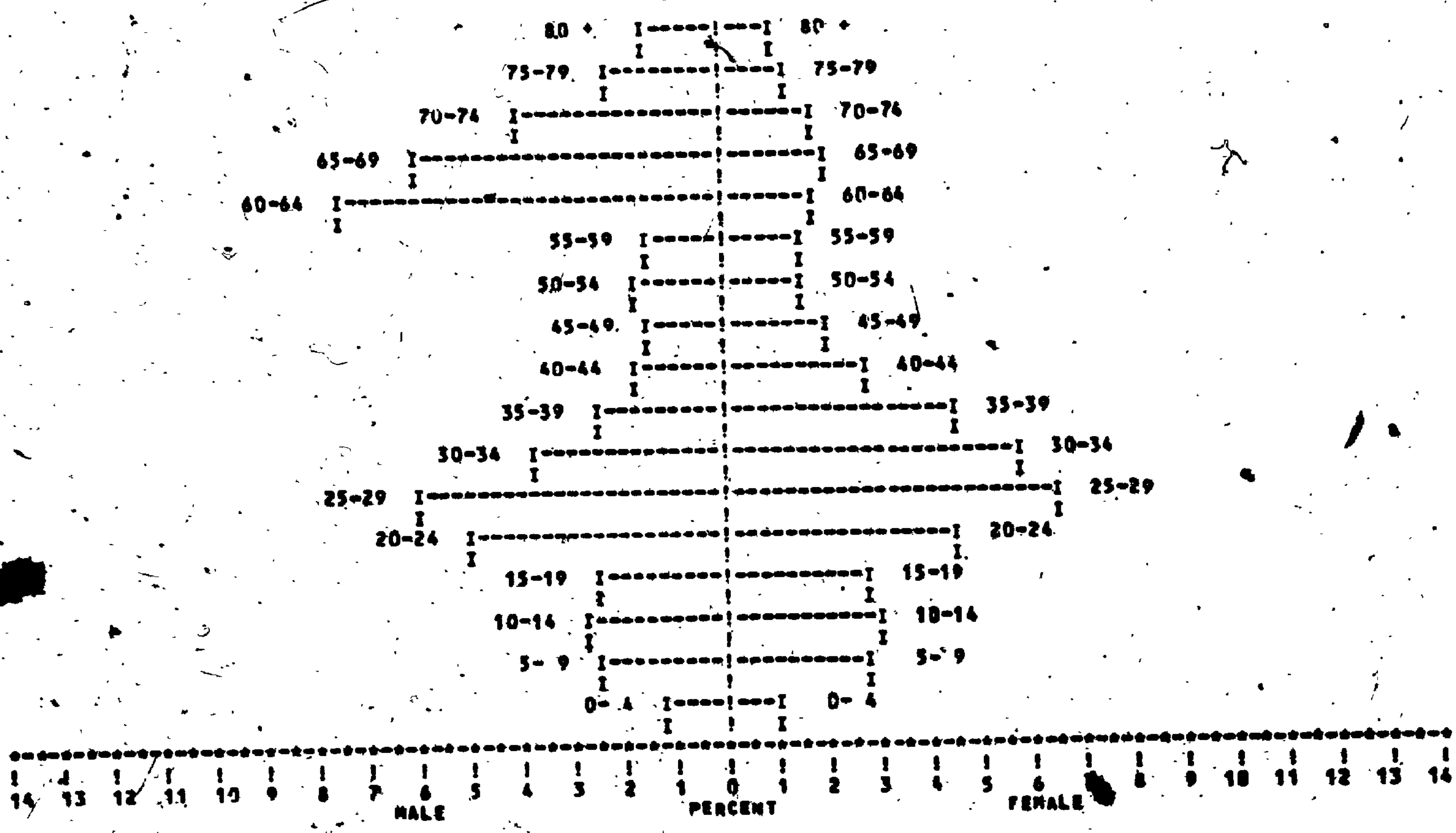
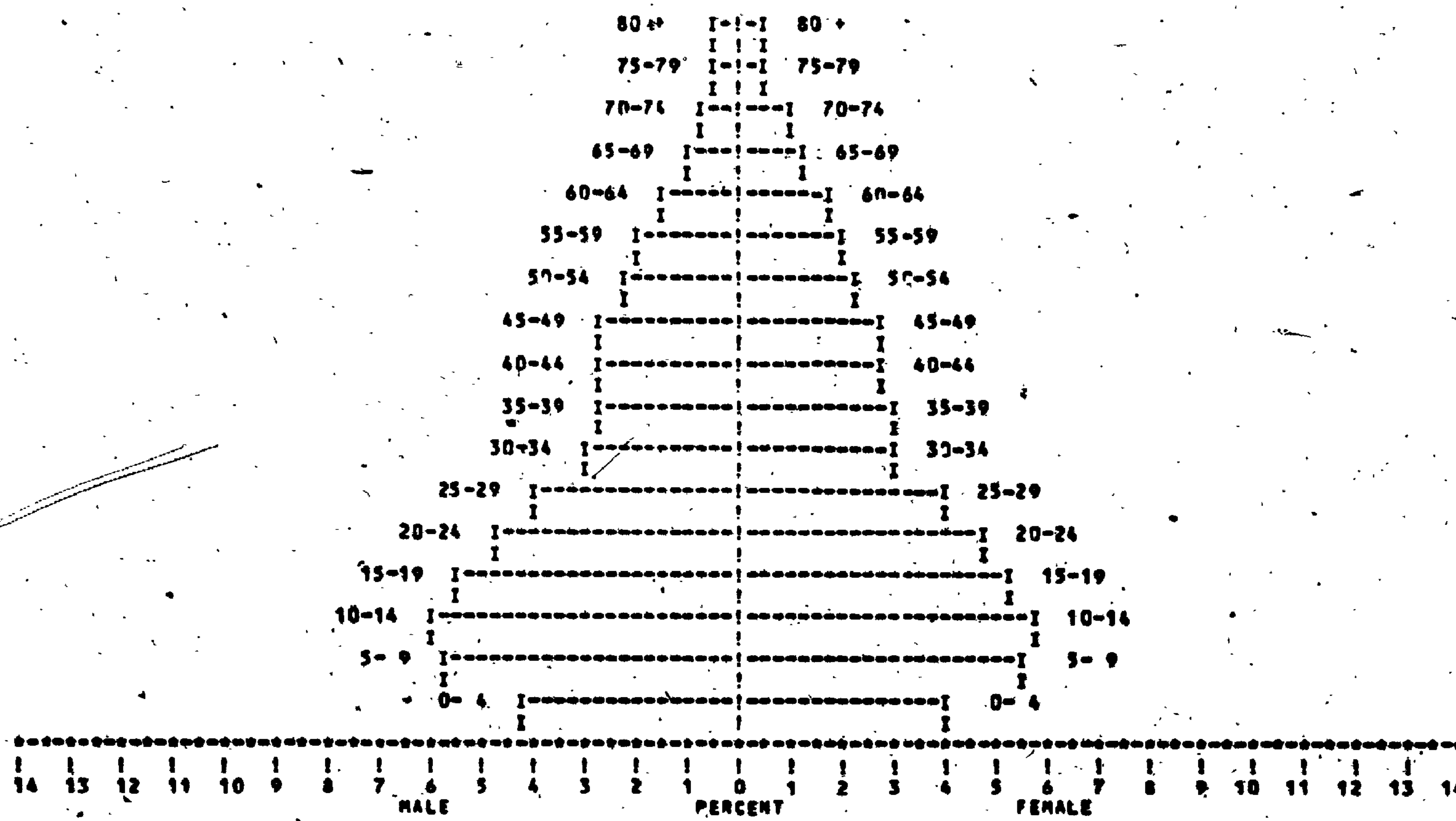


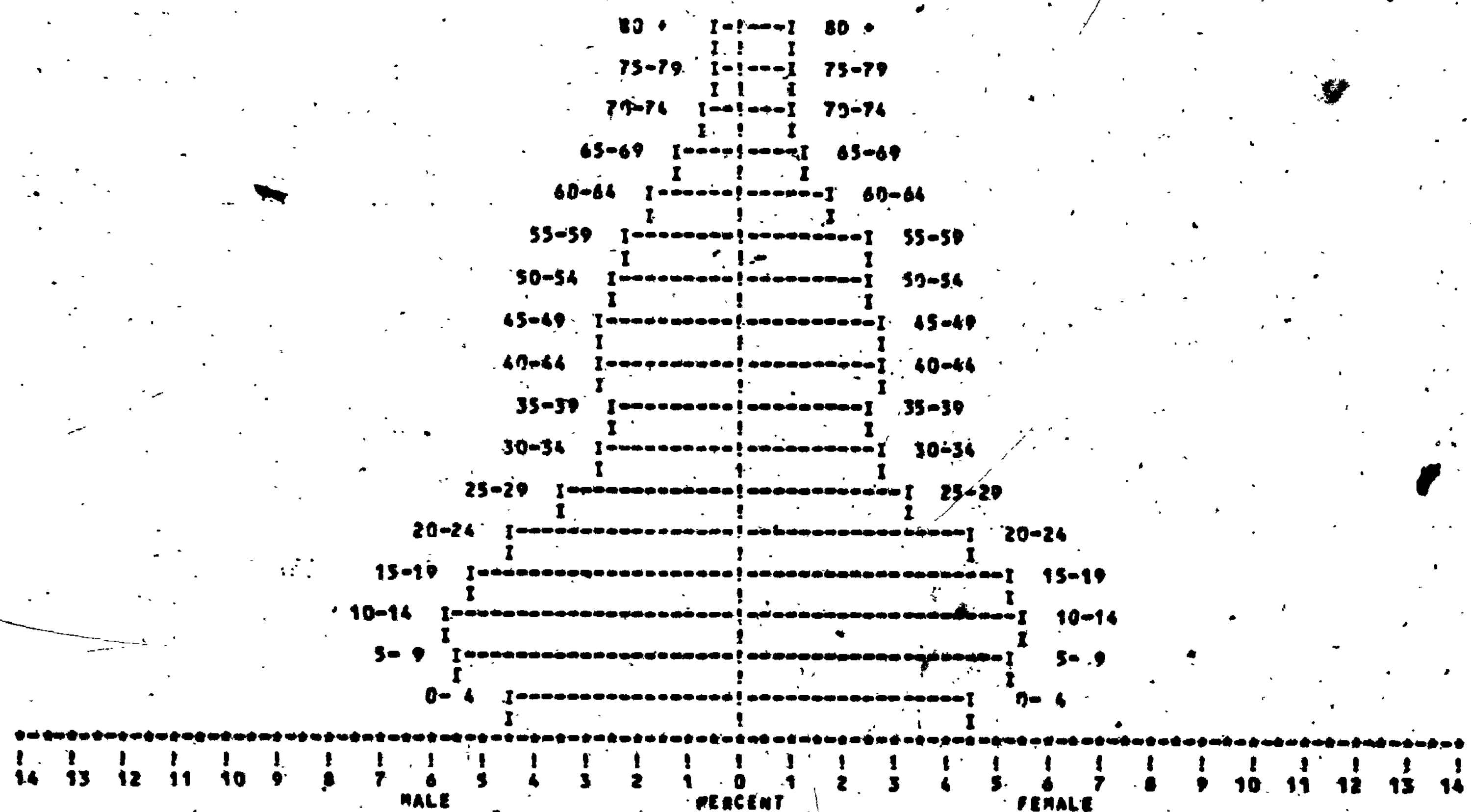
POPULATION PYRAMID--1966--OTHER FB



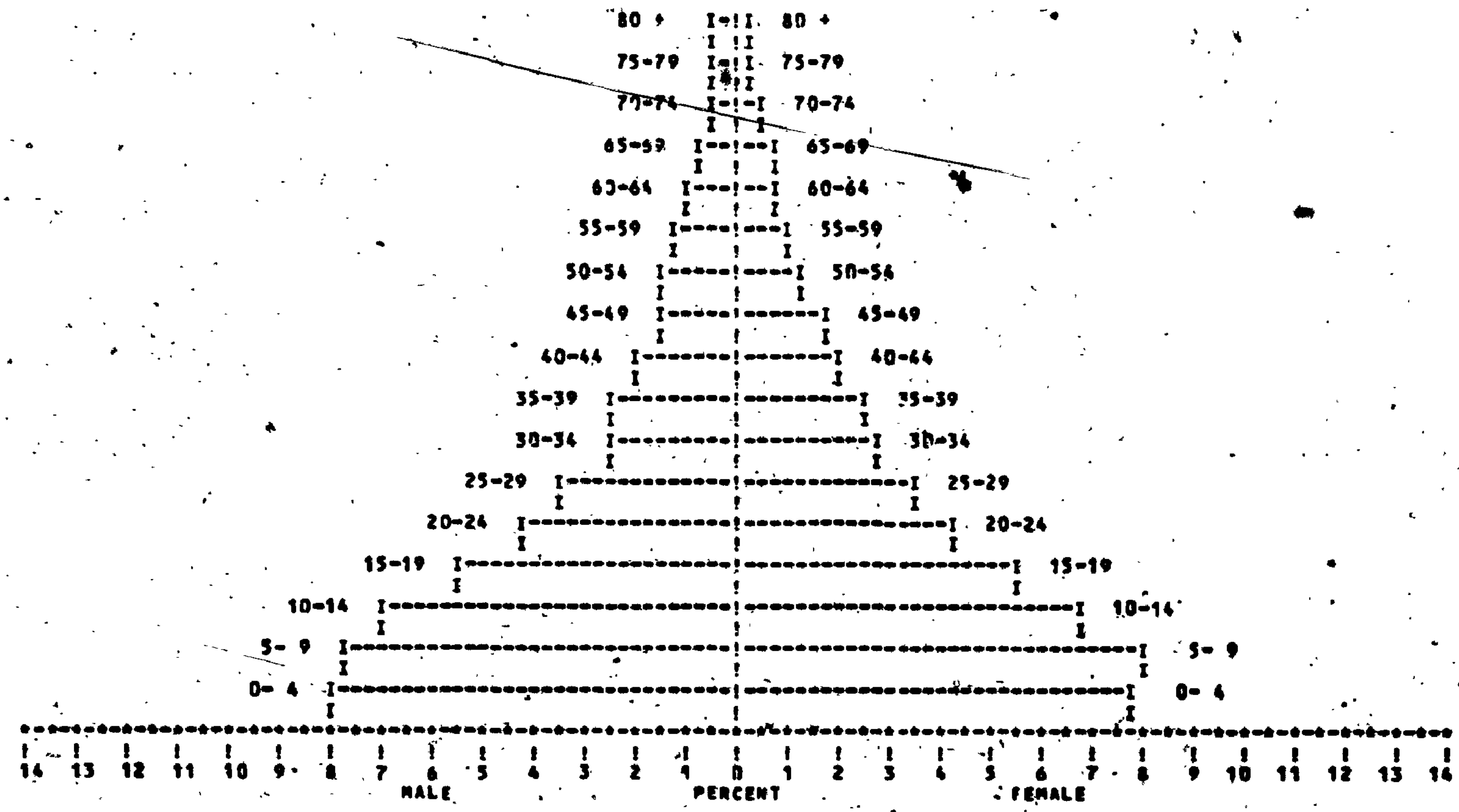
POPULATION PYRAMID--1971--FRENCH NB



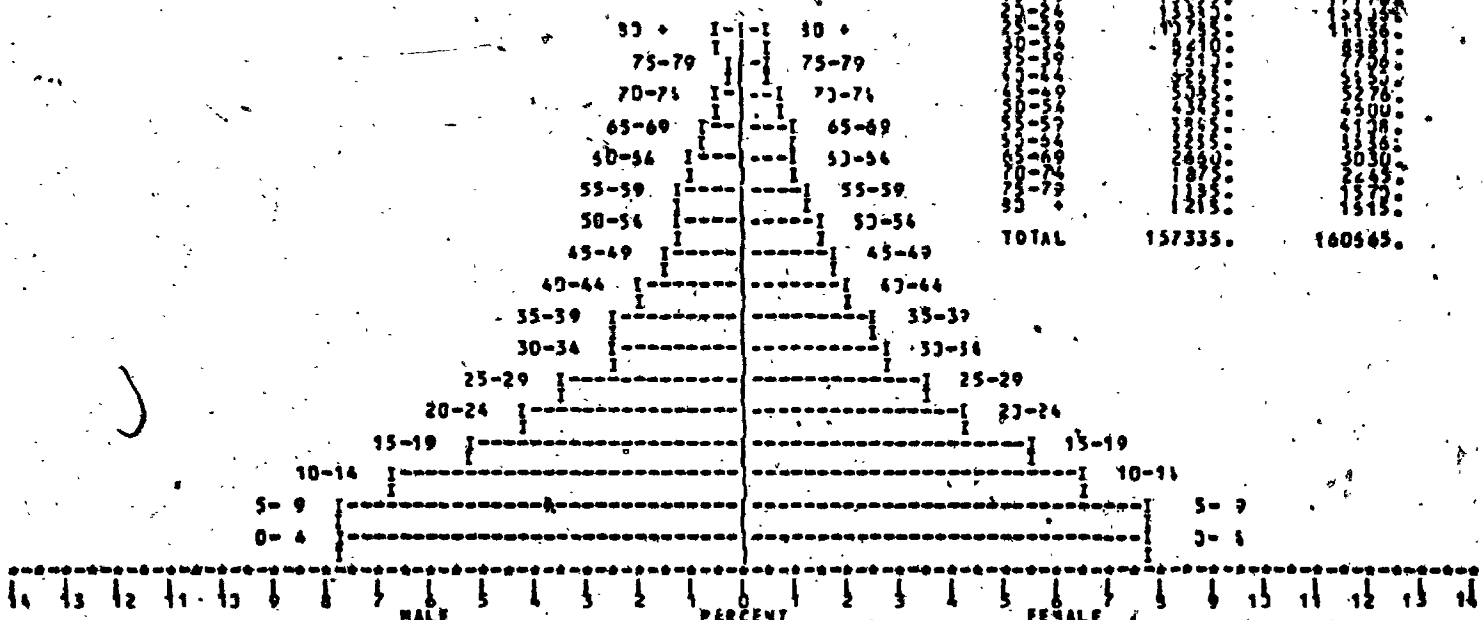
POPULATION PYRAMID--1971--BRITISH HB



POPULATION PYRAMID--1971--NATIVES

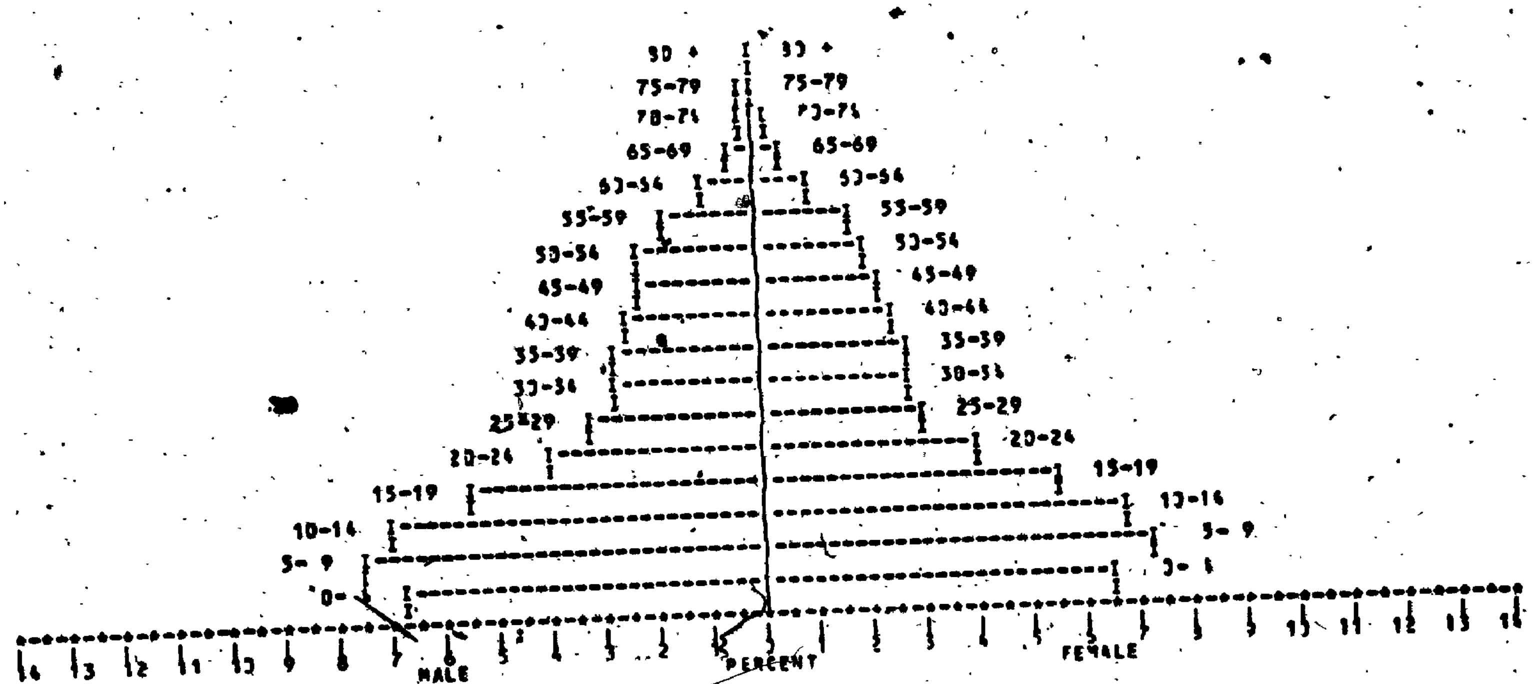


ADJUSTED POP PYR.--1971--NATIVES



	NUMBER		PERCENT	
AGE GROUP	MALE	FEMALE	MALE	FEMALE
0- 4	24713.	24390.	7.77	7.54
5- 9	24555.	24540.	7.72	7.73
10-14	21540.	22790.	6.77	[illegible]
15-19	[illegible]	[illegible]	[illegible]	[illegible]
20-24	[illegible]	[illegible]	[illegible]	[illegible]
25-29	10735.	11136.	[illegible]	[illegible]
30-34	9410.	8381.	[illegible]	[illegible]
35-39	7513.	7706.	[illegible]	[illegible]
40-44	[illegible]	[illegible]	[illegible]	[illegible]
45-49	5385.	5276.	[illegible]	[illegible]
50-54	4345.	4500.	1.60	[illegible]
55-59	3865.	4138.	1.37	[illegible]
60-64	3235.	3336.	1.21	[illegible]
65-69	2690.	3030.	[illegible]	.95
70-74	1875.	2645.	.59	[illegible]
75-79	1135.	1570.	.37	.49
80 +	1215.	1515.	.38	.31
TOTAL	157335.	160565.		

POPULATION PYRAMIDS--1971--RESIDUAL VS



SYMBOL DEFINITIONS
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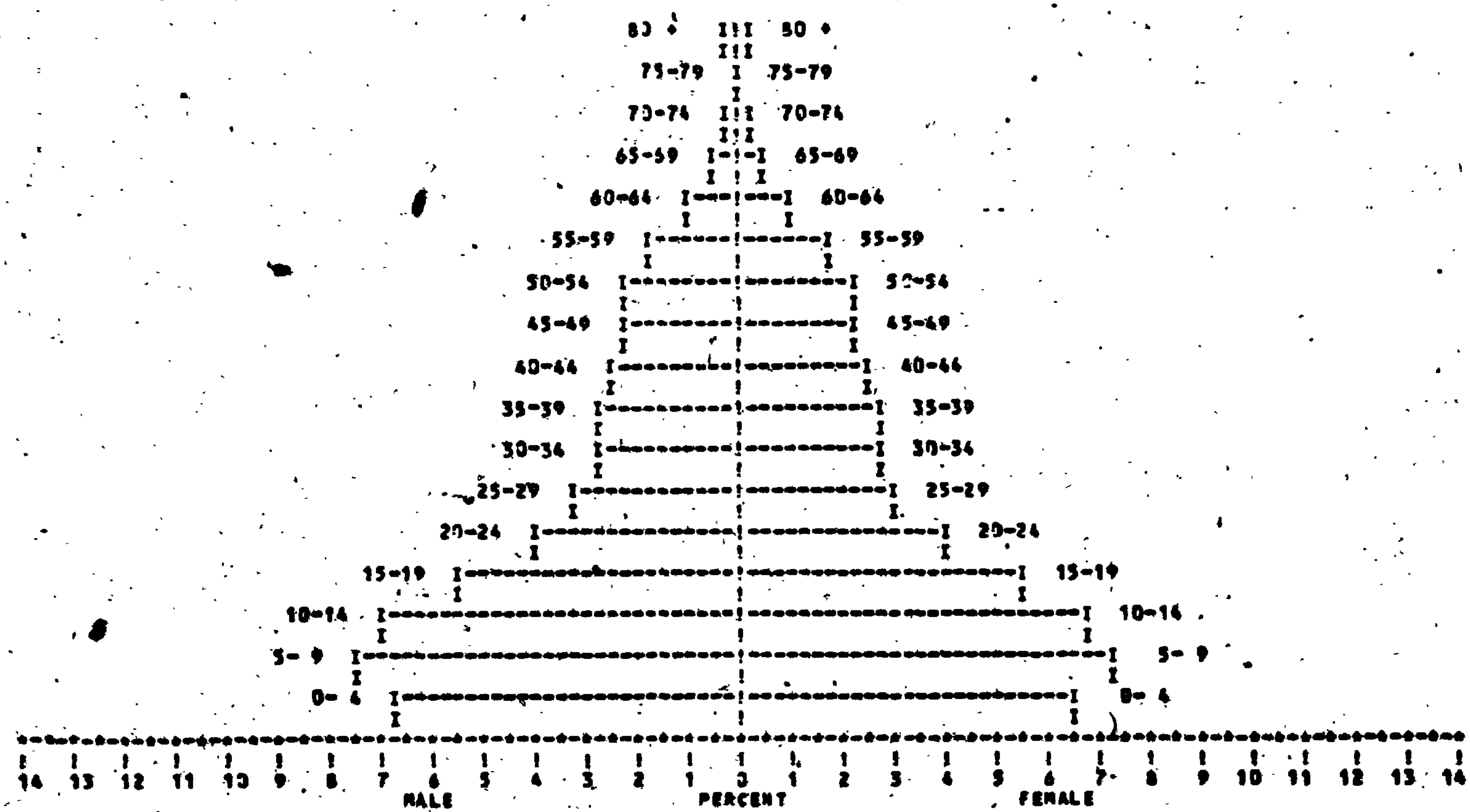
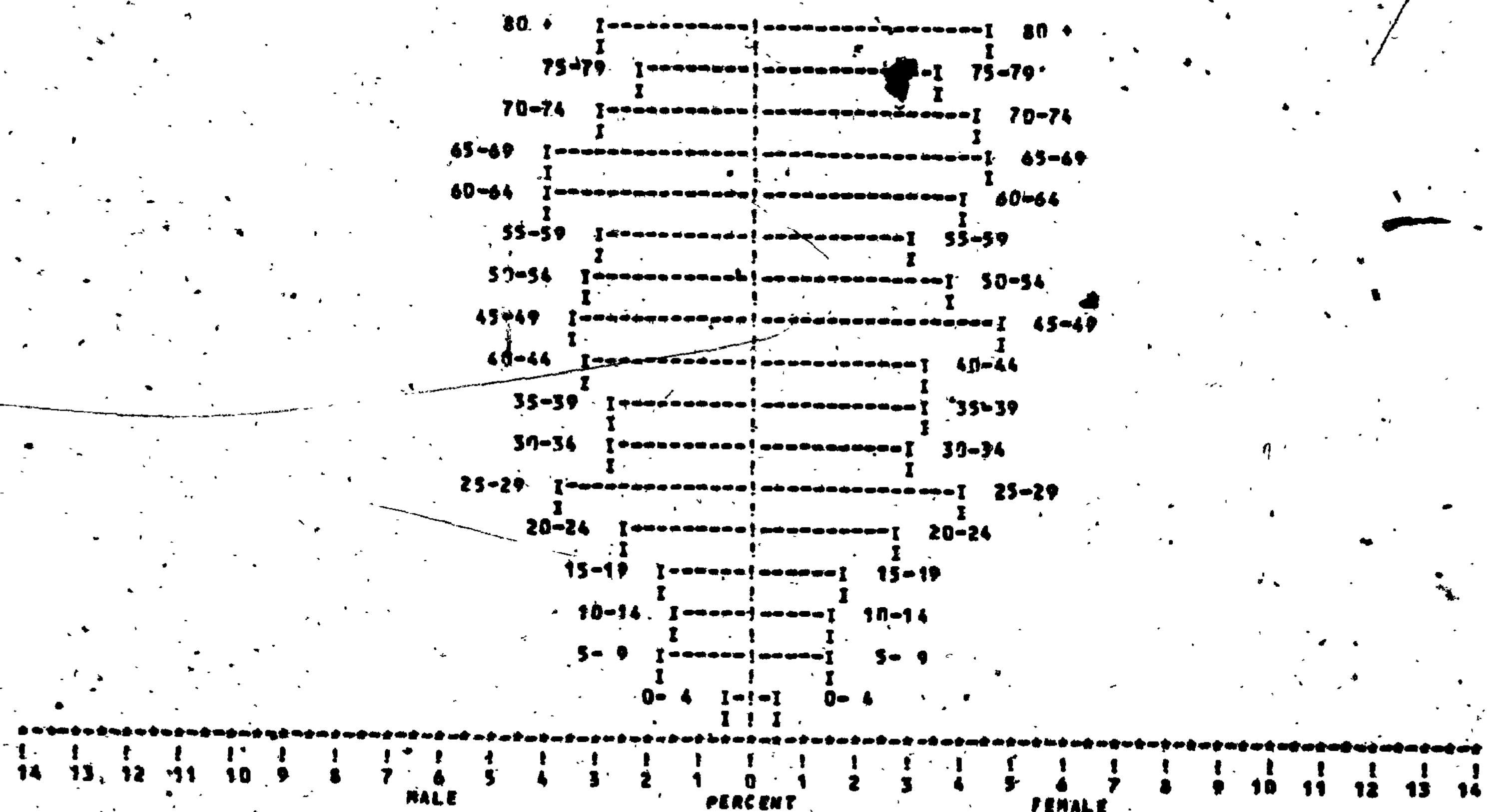
POPULATION PYRAMID--1971--RESIDUAL NB



POPULATION PYRAMID--1971--BRITISH FB



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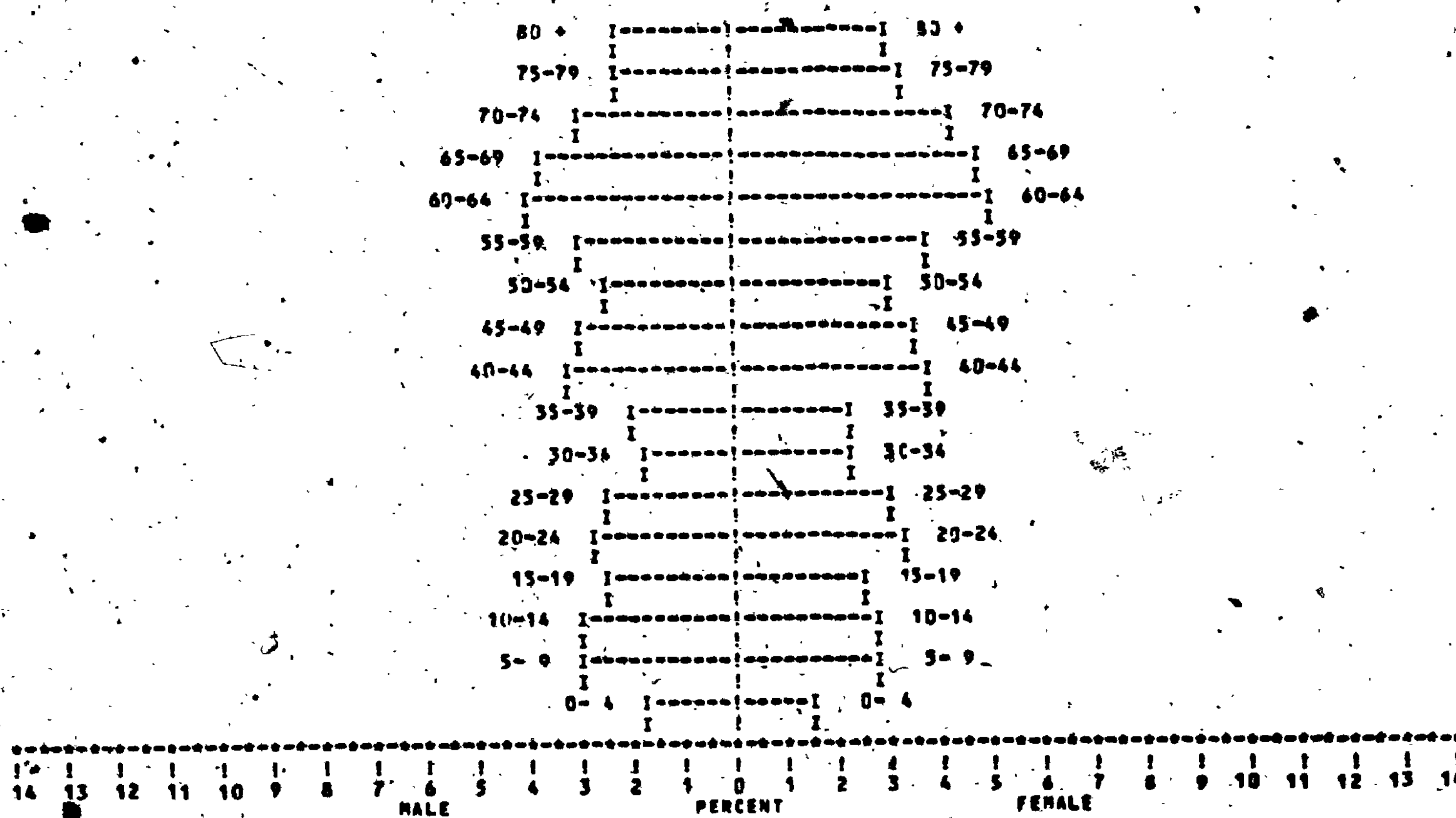
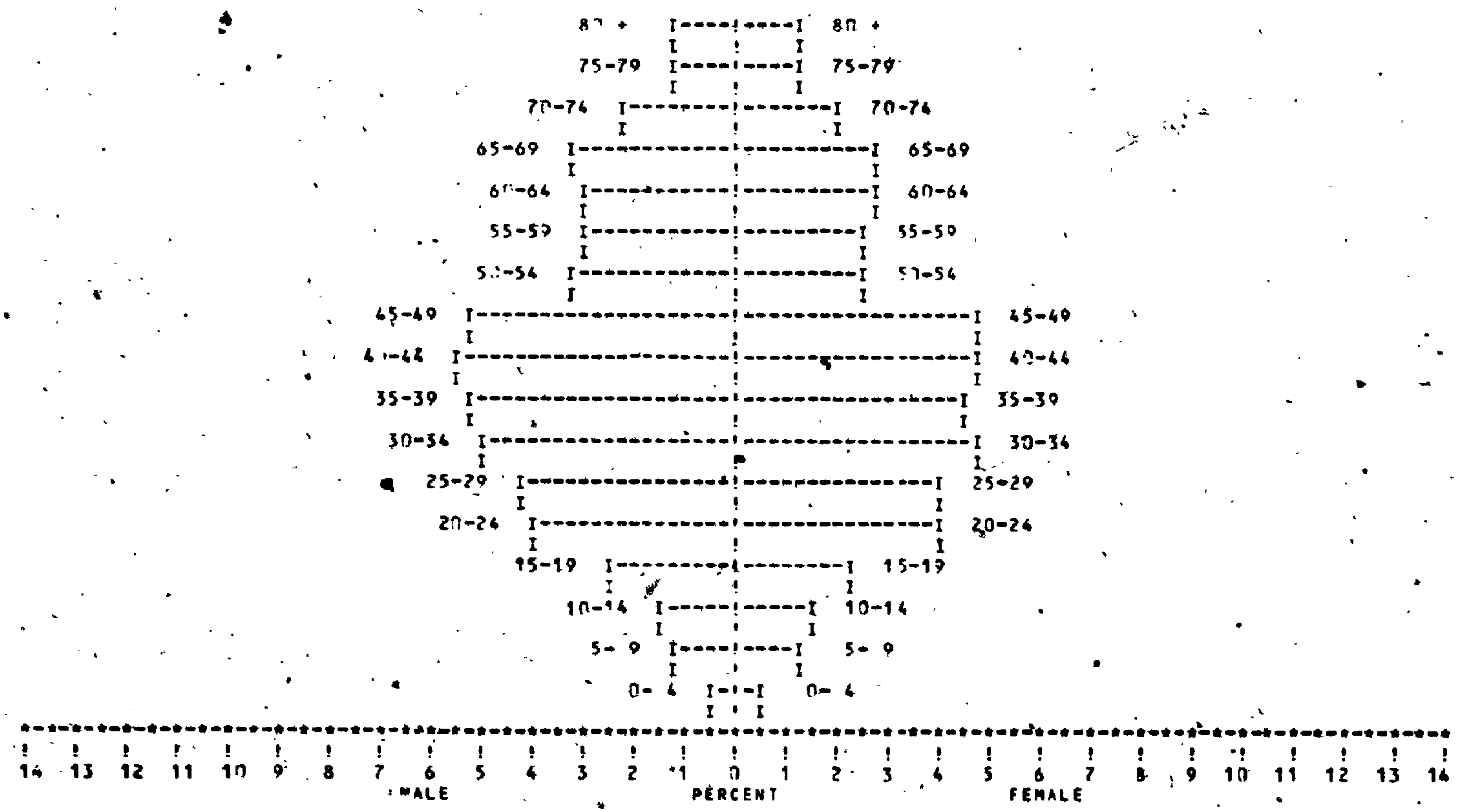
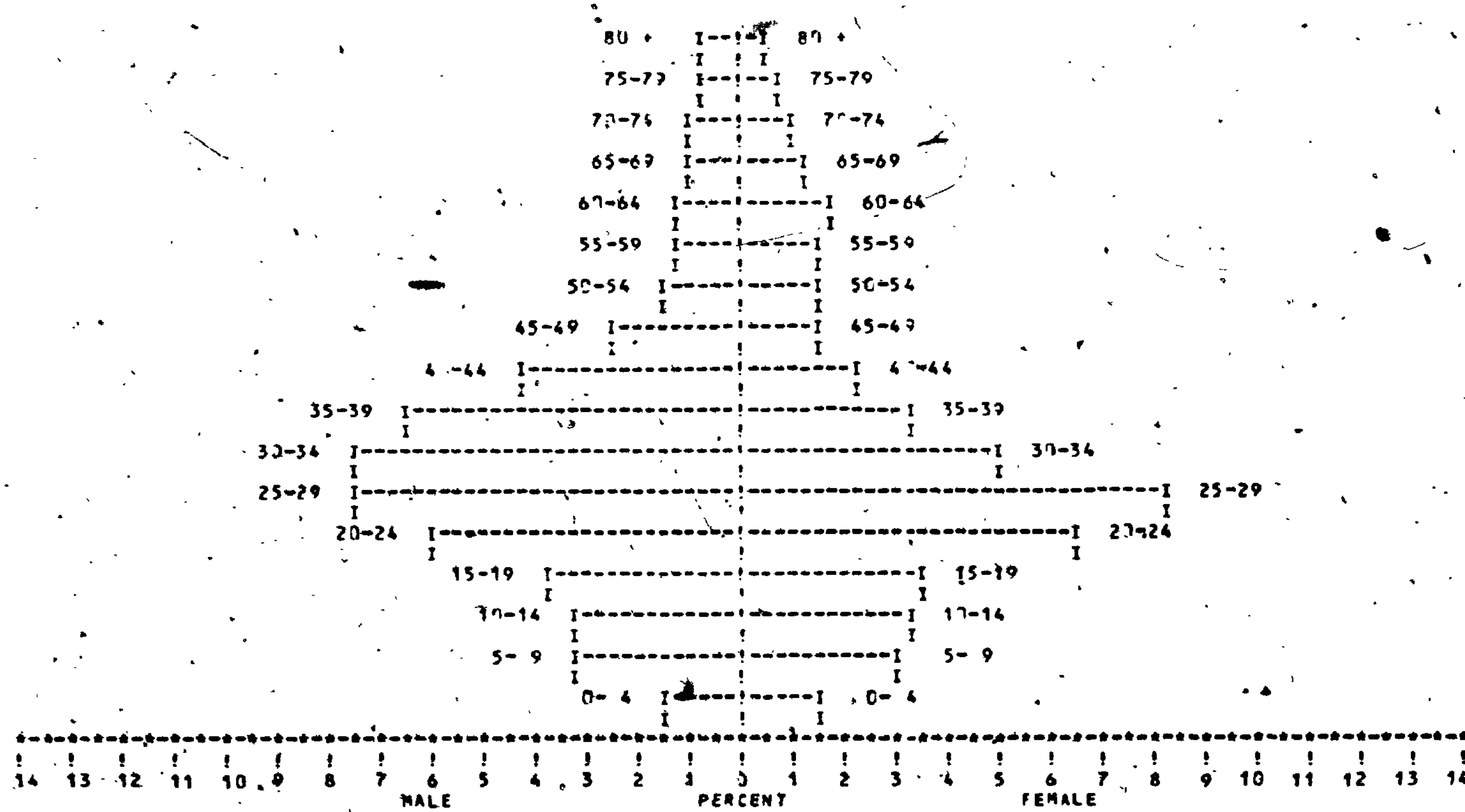


POPULATION PYRAMID--1971--OTHER EUROPE FB



POPULATION PYRAMID--1971--OTHER FB



APPENDIX E

POPULATION AGE-SEX DISTRIBUTIONS AND PYRAMIDS, NATIVE, FOREIGN-BORN AND TOTAL CANADA POPULATIONS, 1951, 1964 AND 1971

NATIVE-BORN

(1951)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	865383.	830550.	7.25	6.95
5- 9	690869.	662171.	5.78	5.54
10-14	561855.	543444.	4.70	4.55
15-19	516155.	512539.	4.32	4.29
20-24	503257.	514033.	4.21	4.30
25-29	490336.	503762.	4.11	4.22
30-34	456908.	470658.	3.83	3.94
35-39	437800.	433995.	3.67	3.63
40-44	340206.	327543.	2.85	2.74
45-49	255372.	248848.	2.14	2.09
50-54	213892.	212925.	1.79	1.78
55-59	169634.	181203.	1.42	1.52
60-64	153436.	154546.	1.28	1.[illegible]
65-69	130413.	130332.	1.09	1.09
70-74	97338.	101959.	.81	.85
75-79	61247.	65504.	.51	.55
80 +	46931.	58264.	.39	.49
TOTAL	5991032.	5952406.		

(1964)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	1062478.	1011033.	6.57	6.26
5- 9	1039779.	993737.	6.43	6.15
10-14	949340.	909476.	5.87	5.63
15-19	768130.	740731.	4.75	4.58
20-24	610228.	609328.	3.78	3.77
25-29	553765.	541440.	3.43	3.35
30-34	514879.	510951.	3.19	3.16
35-39	497388.	501797.	3.05	3.10
40-44	471212.	468664.	2.89	2.90
45-49	436150.	449587.	2.67	2.78
50-54	381629.	349105.	2.34	2.16
55-59	276688.	281272.	1.70	1.74
60-64	207976.	217007.	1.29	1.34
65-69	158809.	174438.	.98	1.08
70-74	116809.	137821.	.72	.85
75-79	78550.	95966.	.49	.59
80 +	69622.	95137.	.43	.59
TOTAL	8193782.	8087490.		

(1971)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	903665.	862494.	4.94	4.72
5- 9	1094605.	1047130.	5.99	5.73
10-14	1119390.	1071015.	6.12	5.86
15-19	995540.	963975.	5.45	5.27
20-24	818561.	819540.	4.48	4.48
25-29	657760.	640435.	3.60	3.50
30-34	521585.	513640.	2.85	2.81
35-39	499705.	492870.	2.73	2.70
40-44	491755.	492260.	2.69	2.69
45-49	472375.	482635.	2.58	2.64
50-54	421775.	439000.	2.31	2.40
55-59	382475.	397223.	2.09	2.17
60-64	275115.	289961.	1.51	1.59
65-69	188076.	216230.	1.03	1.18
70-74	127305.	162157.	.70	.89
75-79	86435.	119062.	.47	.65
80 +	82087.	128869.	.45	.71
TOTAL	9138310.	9138496.		

FOREIGN-BORN

	AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
	0- 4	13680.	12496.	.66	.61
(1951)	5- 9	23004.	21781.	1.12	1.05
	10-14	13267.	12217.	.64	.59
	15-19	16025.	13253.	.78	.64
	20-24	34278.	37073.	1.66	1.80
	25-29	62476.	74641.	3.03	3.62
	30-34	55649.	59829.	2.70	2.90
	35-39	65771.	61968.	3.19	3.01
	40-44	105594.	95767.	5.13	4.65
	45-49	132336.	108600.	6.42	5.27
	50-54	126569.	109763.	6.14	5.33
	55-59	112930.	97459.	5.48	4.73
	60-64	110888.	87607.	5.38	4.25
	65-69	97663.	75431.	4.74	3.66
	70-74	63060.	52888.	3.06	2.57
	75-79	32883.	28871.	1.60	1.40
	80 +	21766.	22429.	1.06	1.09
	TOTAL	1087839.	971973.		

	AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
	0- 4	21913.	20762.	.74	.70
(1964)	5- 9	50708.	47515.	1.71	1.60
	10-14	68358.	63843.	2.30	2.15
	15-19	64640.	61186.	2.18	2.06
	20-24	83676.	88056.	2.82	2.97
	25-29	116724.	108830.	3.93	3.67
	30-34	134765.	121781.	4.54	4.10
	35-39	137979.	132339.	4.65	4.46
	40-44	106619.	104273.	3.59	3.51
	45-49	102715.	101877.	3.46	3.43
	50-54	114429.	105602.	3.85	3.56
	55-59	118519.	104027.	3.99	3.51
	60-64	111468.	105206.	3.76	3.55
	65-69	97894.	95795.	3.30	3.23
	70-74	81940.	81876.	2.76	2.76
	75-79	56884.	57389.	1.92	1.93
	80 +	45827.	51515.	1.54	1.74
	TOTAL	1515059.	1451877.		

	AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
	0- 4	25950.	24061.	.79	.73
(1971)	5- 9	57825.	54445.	1.75	1.65
	10-14	62060.	58275.	1.88	1.77
	15-19	78890.	75940.	2.39	2.30
	20-24	123114.	128090.	3.74	3.89
	25-29	142950.	142390.	4.34	4.32
	30-34	139290.	131535.	4.23	3.99
	35-39	145340.	125950.	4.41	3.82
	40-44	149010.	129970.	4.52	3.94
	45-49	141040.	142005.	4.28	4.31
	50-54	97120.	95290.	2.95	2.89
	55-59	89940.	85820.	2.73	2.60
	60-64	106574.	106235.	3.23	3.22
	65-69	107974.	108460.	3.28	3.29
	70-74	78270.	90530.	2.38	2.75
	75-79	53560.	66515.	1.63	2.02
	80 +	58158	72950.	1.76	2.21
	TOTAL	1657065.	1638461.		

TOTAL POPULATION

(1951)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMILE
0- 4	879063.	843046.	6.28	6.02
5- 9	713373.	683952.	5.10	4.88
10-14	575122.	555661.	4.11	3.97
15-19	532180.	525792.	3.80	3.75
20-24	537535.	551106.	3.84	3.94
25-29	552812.	578403.	3.95	4.13
30-34	512557.	530487.	3.66	3.79
35-39	503571.	495963.	3.60	3.54
40-44	445800.	423310.	3.18	3.02
45-49	387708.	357448.	2.77	2.55
50-54	340461.	322688.	2.43	2.30
55-59	282564.	278662.	2.02	1.99
60-64	264324.	242253.	1.89	1.73
65-69	228076.	205763.	1.65	1.47
70-74	160398.	154877.	1.15	1.11
75-79	94130.	94375.	.67	.67
80 +	68697.	80693.	.49	.58
TOTAL	7078871.	6924479.		

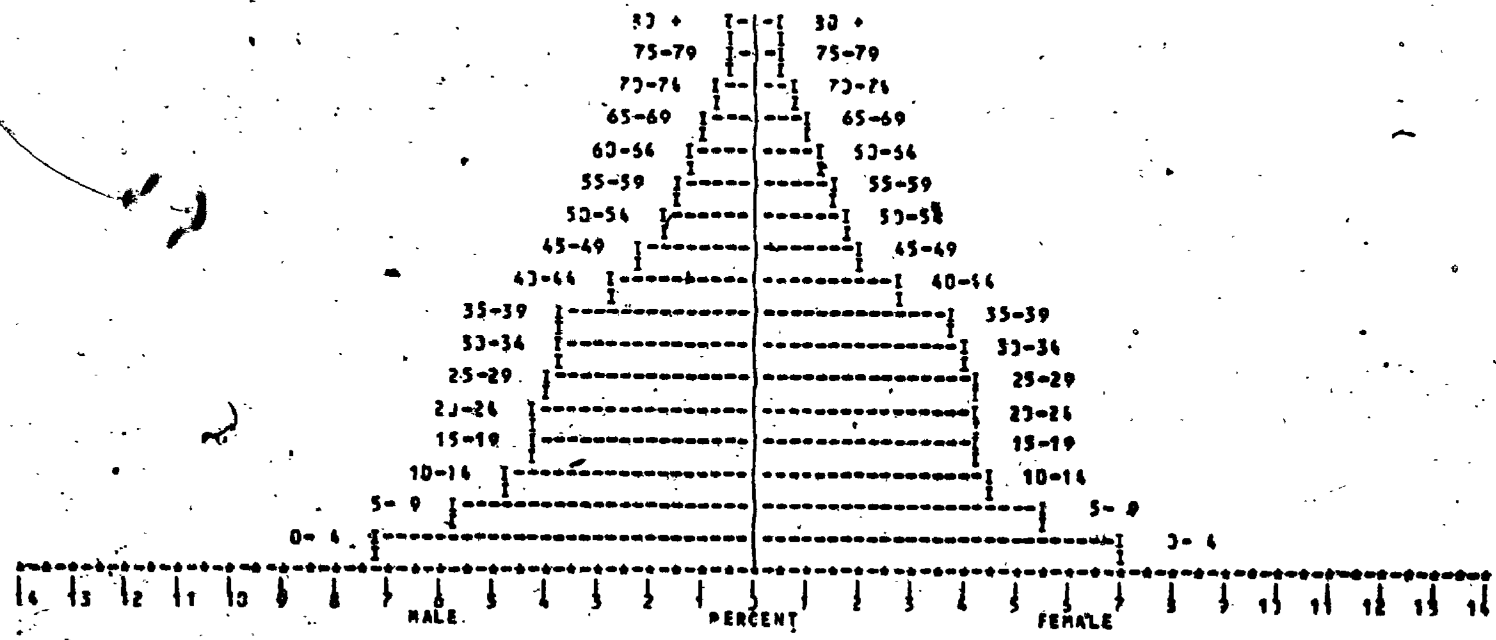
(1964)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	1034391.	1031795.	5.63	5.36
5- 9	1090487.	1041252.	5.57	5.41
10-14	1017698.	973319.	5.29	5.06
15-19	832820.	801917.	4.33	4.17
20-24	673704.	697384.	3.51	3.62
25-29	670489.	650270.	3.48	3.35
30-34	649645.	632732.	3.38	3.25
35-39	635357.	634136.	3.30	3.29
40-44	577331.	572942.	3.00	2.94
45-49	538865.	551464.	2.80	2.87
50-54	495058.	454707.	2.58	2.36
55-59	395207.	385299.	2.05	2.00
60-64	319444.	322213.	1.66	1.57
65-69	256703.	270233.	1.33	1.40
70-74	198749.	219697.	1.03	1.14
75-79	135734.	153355.	.71	.80
80 +	115449.	146552.	.60	.75
TOTAL	9708841.	9539367.		

(1971)

AGE GROUP	NUMBER MALE	NUMBER FEMALE	PERCENT MALE	PERCENT FEMALE
0- 4	929605.	886555.	4.31	4.11
5- 9	1152430.	1101575.	5.34	5.11
10-14	1181450.	1129290.	5.48	5.23
15-19	1074430.	1039715.	4.93	4.82
20-24	941775.	947630.	4.37	4.39
25-29	800710.	783410.	3.71	3.63
30-34	660875.	646550.	3.06	3.00
35-39	645045.	618820.	2.99	2.87
40-44	640765.	621760.	2.97	2.88
45-49	613415.	625630.	2.84	2.90
50-54	518895.	534290.	2.41	2.48
55-59	472415.	483043.	2.19	2.24
60-64	381690.	395196.	1.77	1.84
65-69	296050.	324690.	1.37	1.50
70-74	205575.	252479.	.95	1.17
75-79	139995.	186059.	.65	.86
80 +	140245.	201819.	.65	.94
TOTAL	10795365.	10779811.		

POPULATION PYRAMID--1951--NATIVE-BORN



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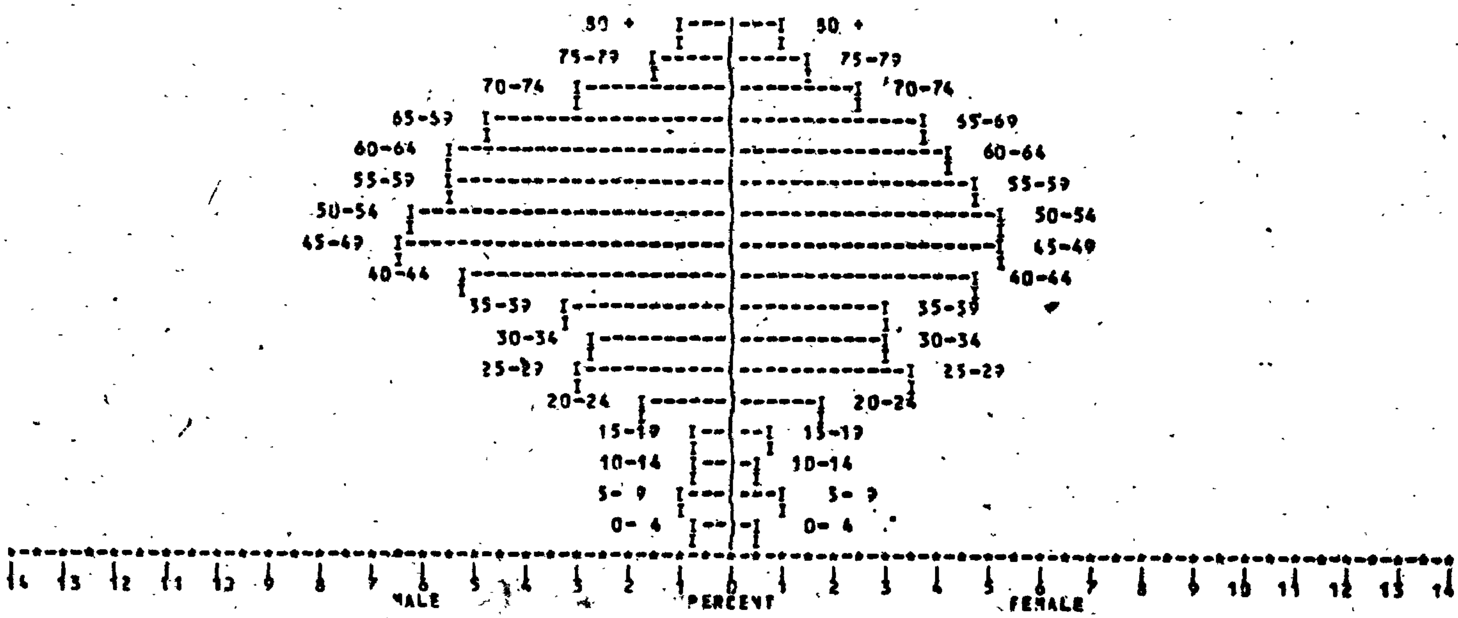

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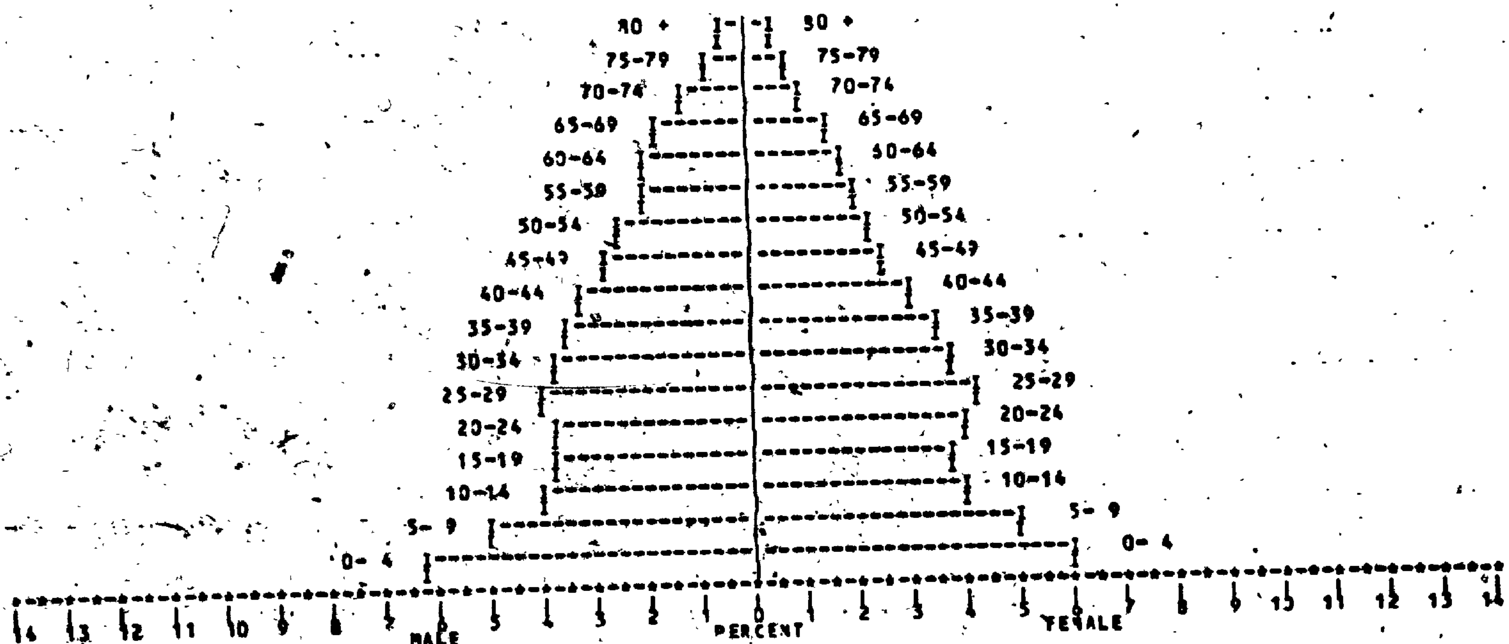

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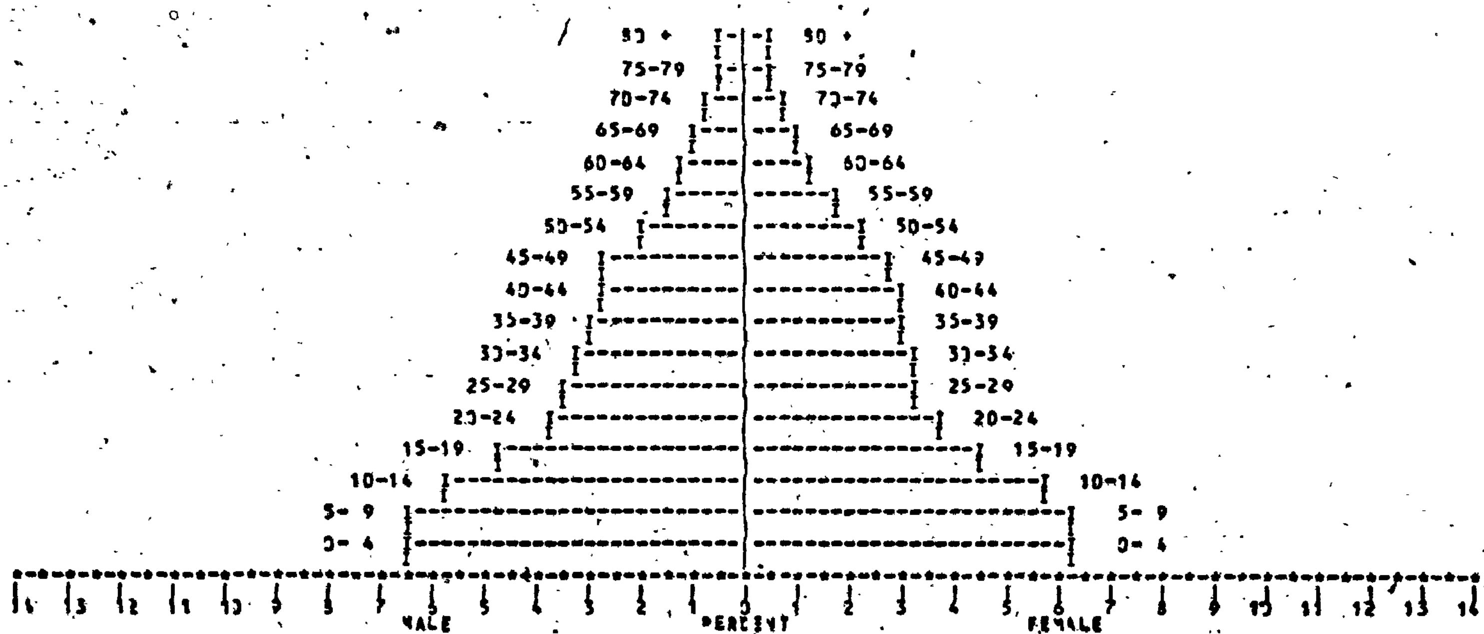

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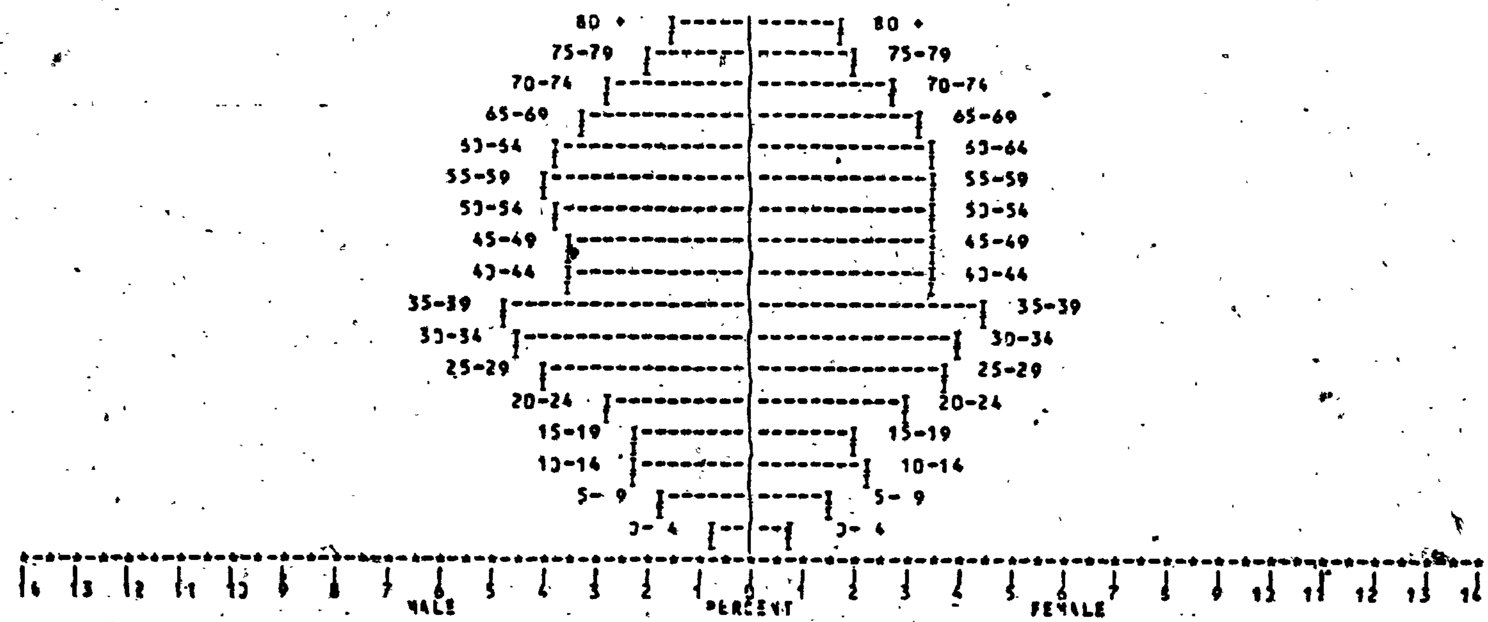

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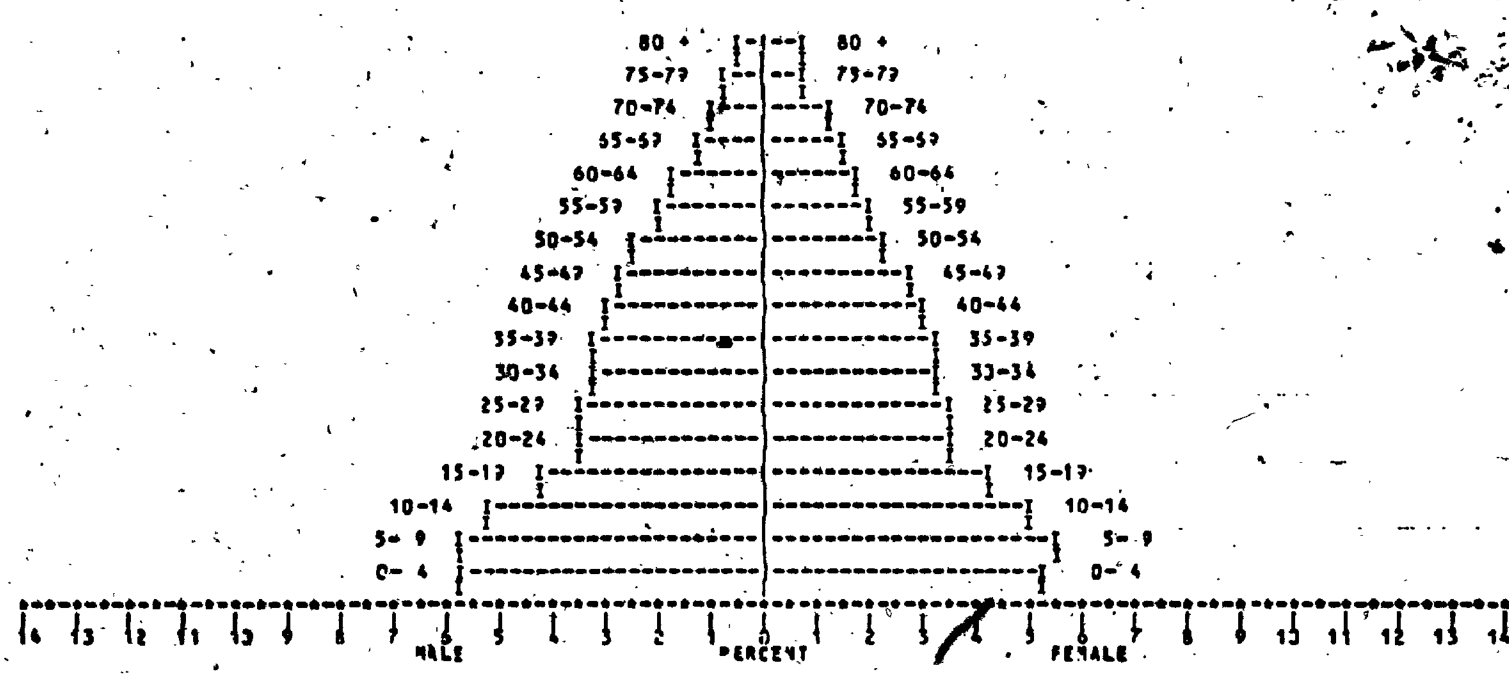
POPULATION PYRAMID—1964—TOTAL POPULATION



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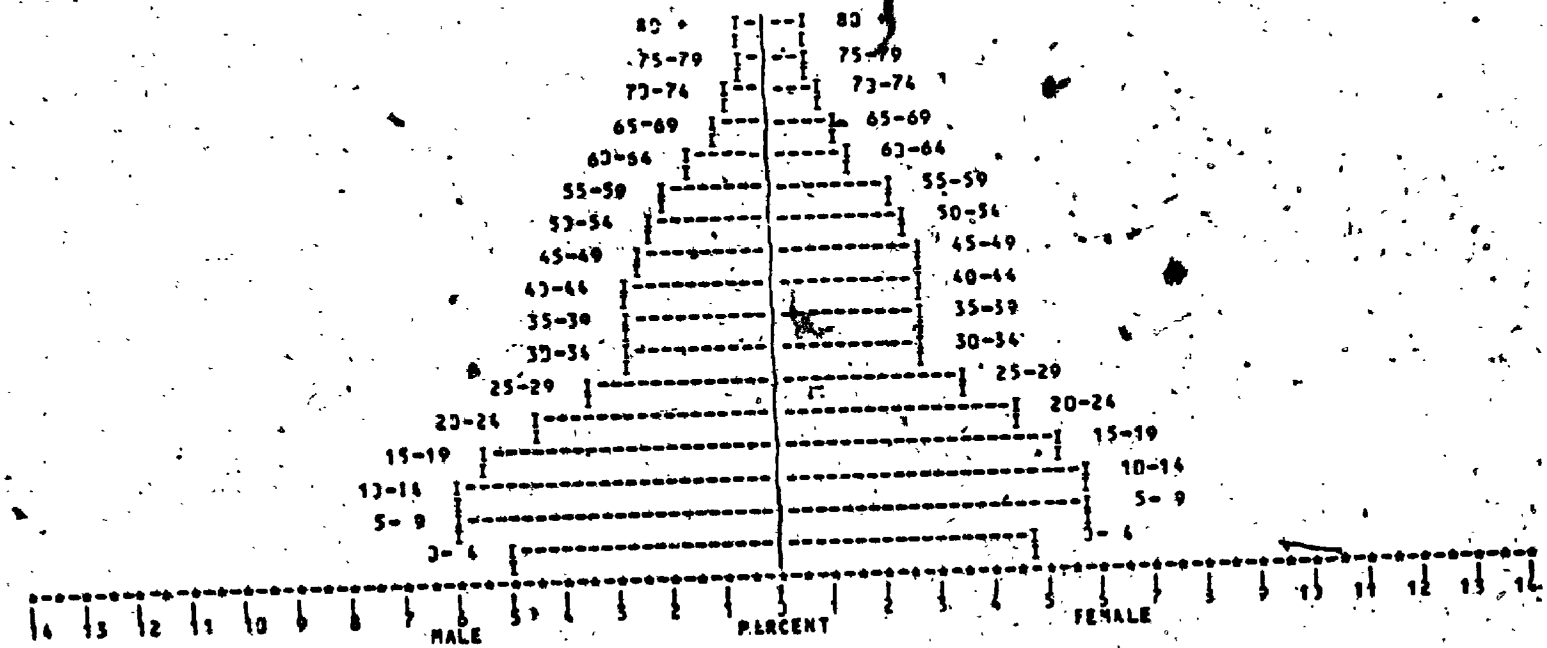

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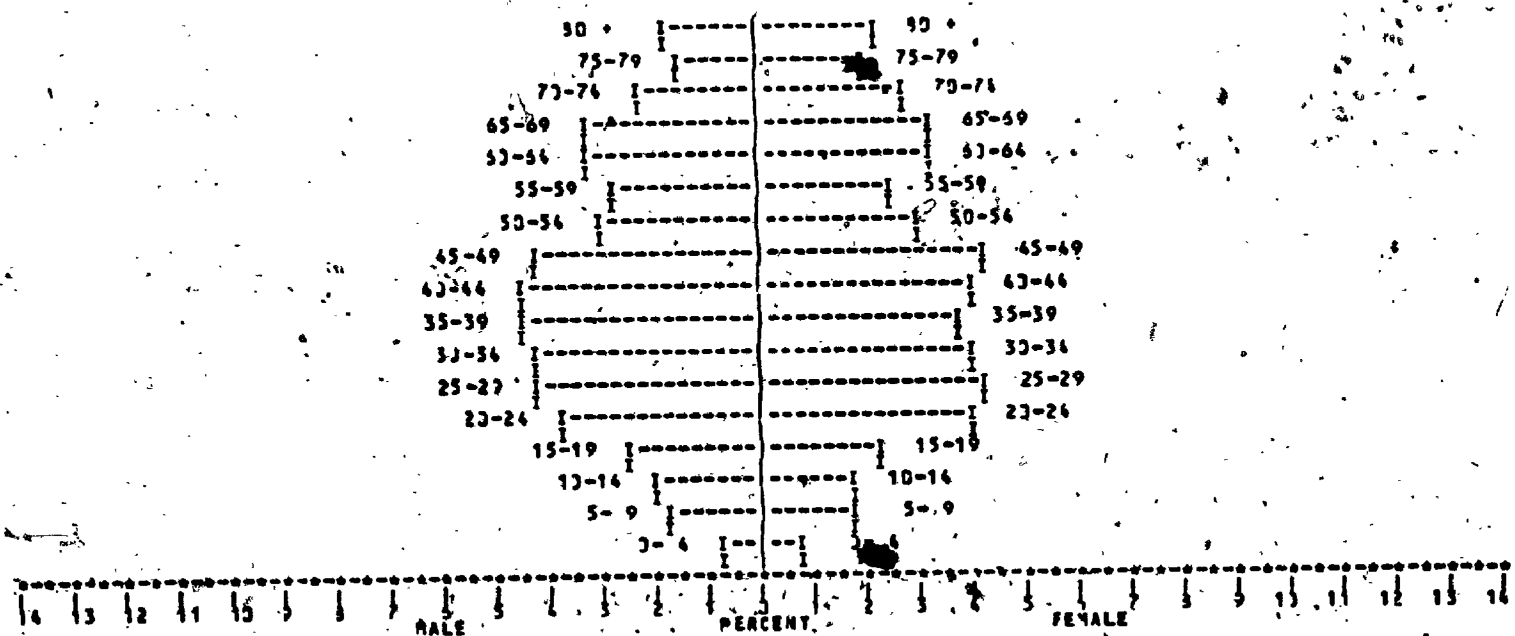
POPULATION PYRAMID--1971--FOREIGN-BORN



SYMBOL DEFINITIONS
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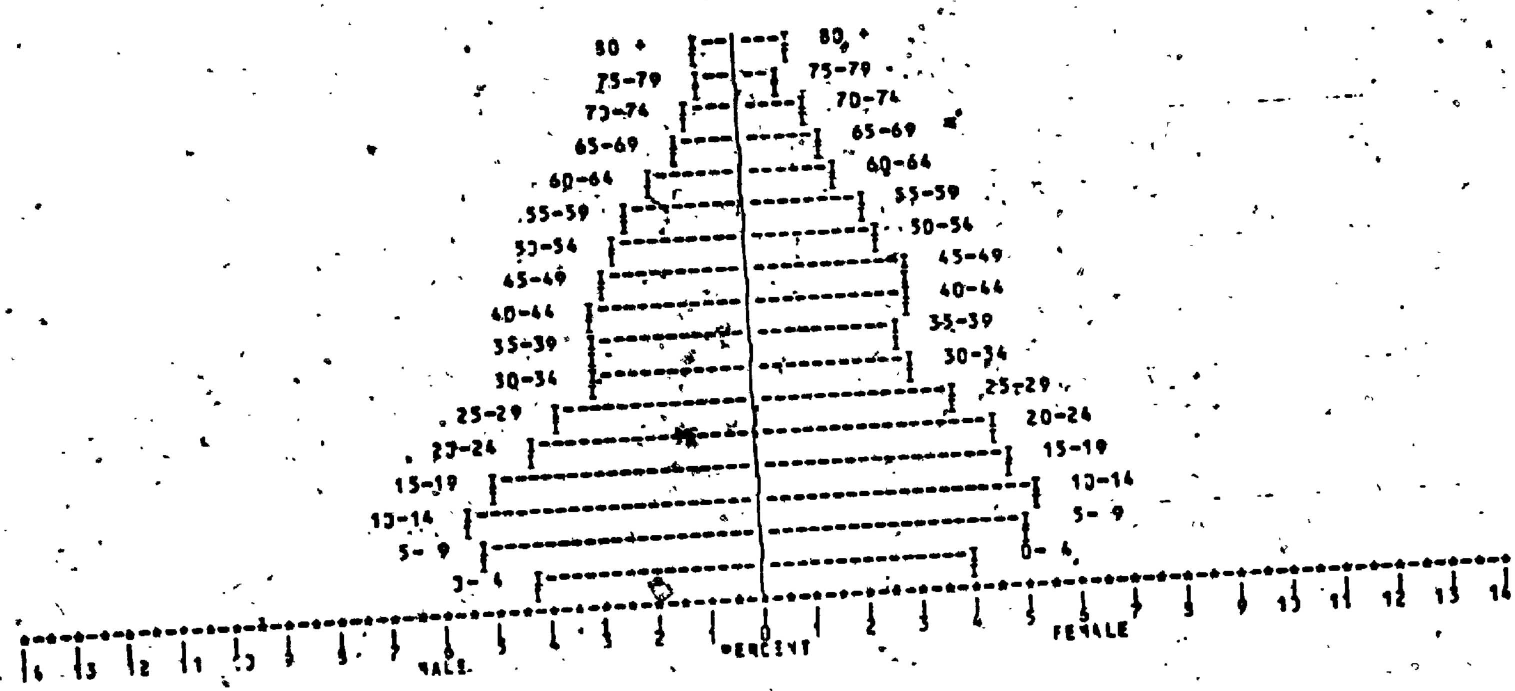
POPULATION PYRAMID--1971--TOTAL POPULATION



SYMBOL DEFINITIONS
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APPENDIX F

ICDA LISTINGS FOR THE CAUSES OF DEATH CATEGORIES USED IN THIS STUDY

Originally, the dissertation attempted to use Preston and colleague's 12-cause classification system. This proved unfeasible, as discussed in the main text. Below are the Preston groups and the four-cause classification adopted here.

PRESTON ET AL., CATEGORIES	ICDA DETAILED LIST 6TH AND 7TH REVISIONS	THESIS CATEGORIES
1. RESPIRATORY	001-008	OTHER CAUSES
2. INFECTIOUS DISEASES	010-138	
3. MALIGNANT AND BENIGN NEOPLASMS	140-239	NEOPLASMS
4. CARDIOVASCULAR DISEASES (CIRCULATORY AND CEREBROVASCULAR)	330-334, 400-468	CARDIOVASCULAR
5. INFLUENZA, PNEUMONIA, BRONCHITIS	480-502	OTHER CAUSES
6. DIARRHEA, GASTRATIS, ENTERITIS	543,571,572	OTHER CAUSES
7. CERTAIN DEGENERATIVE DISEASES (NEPHRITIS, CIRRHOSIS OF LIVER, ULCERS OF STOMACH AND DUODENUM, DIABETES)	260;540;541;581; 590-594	OTHER CAUSES
8. COMPLICATIONS OF PREGNANCY	640-689	OTHER CAUSES
9. CERTAIN DISEASES OF INFANCY	760-776	OTHER CAUSES
10. MOTOR VEHICLE ACCIDENTS	E810-E835	ACCIDENT VIOLENCE
11. OTHER ACCIDENTS AND VIOLENCE	E800-E802;E840-E999	
12. ALL OTHER AND UNKNOWN CAUSES	RESIDUAL	OTHER CAUSES

APPENDIX G

ADJUSTMENT OF FEMALE NATIVE INDIAN AGE FIGURES, AGE 30 AND ABOVE.

The census of 1951, 1961 and 1971 show Native Indian males to be in excess over females at ages 30 and above. Given our general knowledge of the sex differential in mortality, which favours females, and the sparse publications concerning Natives' mortality, the figures (see Appendix A) cannot be assumed correct. Before introducing further speculations on this matter let us examine the actual sex ratios.

Table G.1 shows sex ratios based on three census years, 1951, 1961 and 1971; also the 1964 ratios based on interpolated figures. Noticeable in particular is the pattern in sex ratios above age 30: for the most part, females are consistently outnumbered by males; this problem is less severe in 1971, however.

We have mentioned that generally mortality favours females, particularly at the ages beyond 30. In fact, available life tables (Statistics Canada, 1960-64 Natives Life Tables) support this contention. Hence a more balanced pattern in the sex ratios would have to be expected. If anything, there should be more females in relation to males.

A most probable cause of this imbalance may be due to the fact that the rate of exogamy among female Native Indians is considerably higher than the males. Moreover, women who marry non-Indian males are by law considered non-Indian. This being the case, it is likely that women fitting this category through out-marriage define themselves as being something other than Indian on the census ethnic question. This would explain the anomaly reported in connection with female undernumeration at ages 30 and above. Table G.2 displays statistics on exogamy among Natives. The figures denote that a considerably higher proportion of women marry outside their Native Indian group then is the case for males. This is a pattern which has remained consistent over time.

Assuming that Indian deaths are registered accurately (as was argued in the main text) regardless of their legal status, death rates calculated with the unadjusted age figures (denominators) would derive biased results. The rates would tend to be lower among males in relation to females an outcome which would run counter to reality. For all practical purposes, it became necessary to inflate the age figures for Native Indian females aged 30 and above.

The method chosen involved the application of Indian life table stationary population sex ratios. Age-sex ratios were calculated first by utilizing the stationary population (Lx in the life tables) from the 1961-62, 1963-64 and 1967-68 Indian life tables: the ratios and stationary populations are recorded in Table G.3. The actual age figures were adjusted with the use of the formula:

$$P_f^x = \left(\frac{M_x}{F_x} \div \left(\frac{M_{sp}^x}{F_{sp}^x} \cdot 1.05\right) \cdot P_f^x\right.$$

where:

p_f^x = adjusted female figure in age group x;

$\frac{m^x}{f^x}$ = actual sex ratio based on census figures for age group x;

$\frac{M^x{}_{sp}}{F^x{}_{sp}}$ = stationary population sex ratio for age group x;

$p^x{}_f$ = actual census figure for females in age group x.

1.05 is the universal sex ratio;

The formula inflates the actual age figures from the census so that the adjusted results would produce a new sex ratio which conforms to the stationary population' sex ratios. The assumption inherent in this approach is that sex ratios of the life table stationary population are a true representation of the actual Indian sex ratios. The adjusted figures for the periods of interest are displayed in Table G.4

TABLE G.1 NATIVE INDIAN SEX RATIOS BASED ON CENSUS AGE FIGURES, 1951, 1961, 1971 AND 1964 INTERPOLATED FIGURES.

AGE	YEAR			
	1951	1961*	1964*	1971***
0 - 4	101.0	101.2	101.4	101.7
5 - 9	99.8	102.5	101.4	99.6
10 - 14	96.8	103.4	103.5	103.6
15 - 19	97.2	100.2	99.3	98.0
20 - 24	102.6	94.4	96.0	98.3
25 - 29	99.4	97.4	97.2	96.8
30 - 34	106.1	104.6	99.9	92.4
35 - 39	109.4	99.5	99.2	98.7
40 - 44	115.5	108.4	106.9	104.6
45 - 49	116.0	113.8	106.9	96.4
50 - 54	117.5	117.9	115.0	110.0
55 - 59	127.1	116.8	115.6	113.7
60 - 64	124.0	123.3	122.7	121.6
65 - 69	121.2	117.1	117.5	118.2
70 - 74	110.9	127.6	124.7	119.7
75 - 79	104.5	111.0	112.6	115.5
80 - 84	92.1	96.6	106.0	125.5
85 +	74.2	81.5	154.9	93.6
TOTAL	103.7	103.2	102.6	101.2

* Based on 1960-61 Natives life table: Department of Indian and Northern Affairs Program Reference Centre.

** Based on 1963-64 life table; same source as above.

***Based on 1967-68 life table (latest year available); source is same as previous footnote.

TABLE G.2 EXOGAMY OF REGISTERED NATIVE INDIANS BY SEX AND YEAR, CANADA 1965-1972

SEX	1965	1966	1967	1968	1969	1970	1971	1972
	YEAR (%)							
MALE	12.7	15.7	17.3	19.6	16.9	17.9	19.4	18.7
FEMALE	22.2	30.0	30.2	29.9	21.1	25.8	21.7	22.7

Source: Calculated from Statistics Provided by D.I.N.A.

TABLE G.3. LIFE TABLE STATIONARY POPULATION SEX RATIOS FOR NATIVE INDIANS, 1961-62; 1963-64 AND 1967-68

	1951**	1961-62 STATIONARY POPULATION			1963-64 STATIONARY POPULATION			1967-68 STATIONARY POPULATION		
AGE	SEX RATIO	M	F	SEX RATIO*	M	F	SEX RATIO*	M	F	SEX RATIO*
0-4	103.5	455017	461755	103.5	458738	468347	102.8	470245	476406	103.6
5-9	103.5	443479	450091	103.5	447671	458482	102.5	462981	470155	103.4
10-14	103.3	440325	447539	103.3	444537	456320	102.3	459744	468024	103.1
15-19	103.0	436046	444626	103.0	440221	453233	102.0	454665	465407	102.6
20-24	102.0	428044	440375	102.0	431524	448242	101.0	444085	460622	101.2
25-29	100.5	416254	434939	100.5	421844	443298	99.9	430432	453726	99.6
30-34	99.3	403953	426908	99.3	411378	436562	98.9	416482	444670	98.3
35-39	99.4	393728	415859	99.4	397125	426035	97.9	402388	432331	97.7
40-44	99.7	383793	404297	99.7	382782	414309	97.0	386761	418572	97.0
45-49	99.2	370795	392561	99.2	368095	398901	96.9	368733	404609	95.7
50-54	98.6	355072	378164	98.6	350667	380293	96.8	347872	386609	94.5
55-59	97.6	334401	359643	97.6	330479	358201	96.9	322985	362231	93.6
60-64	96.0	305921	334355	96.0	303675	327143	97.5	291506	333475	91.5
65-69	95.0	271683	300397	95.0	264875	290509	95.7	252853	301723	88.0
70-74	94.5	226657	251781	94.5	215349	248428	91.0	206457	259818	83.7
75-79	90.5	167368	194167	90.5	159745	191739	87.5	149886	208445	75.5
80-84	83.8	103934	130146	83.8	102135	129007	83.1	97856	147426	70.0
85+	66.6	105323	106008	66.6	113613	139472	85.5	91383	151706	63.5

* Sex ratio from life table Stable Population M/F x 1.05
**Sex ratios are assumed to be the same as 1961-62

Note: Sex Ratios are rounded to nearest decimal.

TABLE G.4 ADJUSTED NATIVE FEMALE FIGURES FOR AGES 30 AND ABOVE.
CANADA 1951, 1961, 1964 and 1971

AGE	1951	1961	1964	1971
	YEAR			
30-34	4854	6233	----	----
35-39	4404	5066*	----	----
40-44	3968	4390	5095	6460
45-49	3310	3973	4418	5276*
50-54	3062	3543	3880	4600
55-59	2394	2853	3200	4108
60-64	1950	2640	2815	3536
65-69	1580	1885	2217	3030
70-74	1372	1535	1731	2245
75-79	850	989	1122	1570
80-84	504	613	676	980
85+	320	476	442	635

* Original figure retained
- no adjustment necessary

Appendix H

A NOTE ON THE ADJUSTMENT OF THE DISTRIBUTION OF DEATHS AND SOLUTIONS ADOPTED

As was mentioned in Chapter three, a major problem facing this thesis is the large proportion of missing cases. One further problem exists in relation to over-representation of deaths among the Residual native-born subgroup, and underrepresentation among the British Native-born subpopulation. This problem occurs in the periods 1963-65 and 1970-72, the 1950-52 period poses no problem as virtually all provinces coded ethnicity and birthplace on the death records.

If one inspects Table H1, it will become evident that there is a spectacular increase in the number of deaths within the Residual native-born group. It seems unlikely that this group increased in their share of deaths to the extent that is reflected in the frequencies. For example if one compares 1950-52 with the subsequent two periods, male deaths increased by 20,859 and females by 12,320 between 1950-52 and 1963-65. This becomes more interesting if the British Native-born figures are compared. This group actually declined by 37,436 and 35,939 for males and females respectively, between the same two periods. Moreover, the changes reflected here do not seem plausible given the

TABLE H 1. DISTRIBUTION OF DEATHS BY SEX, PERIOD AND SUBPOPULATION PRIOR TO ADJUSTMENTS FOR MISSING CASES.

	1950-52		1963-65		1970-72	
	M	F	M	F	M	F
French NB	56508	44352	54885	39616	59838	42001
British NB	70767	59952	33331	24013	25126	18189
Native Indians	4470	4047	3710	2933	2377	1754
Residual NB	17042	13481	37901	25801	43762	32227
TOTAL NB	148787	121832	129827	92363	131103	94171
British FB	30861	21949	30456	22899	32461	26188
USA	7048	5346	8631	6735	9905	8260
Other Europe FB	20200	10667	25757	13877	32806	19187
Other FB	3611	1225	4060	1616	5050	3921
TOTAL FB	61720	39187	68904	45127	80222	57555
GRAND TOTAL	206,896	161,019	198,731	137,490	211,325	151,726

relative population distributions of the British and Residual Native-born groups in Canada (see Appendix A). Because the former population is much larger, the expectation is that it should accordingly contribute more deaths than the latter. The same rationale applies in the subsequent period, 1970-72.

The most likely explanation for these discrepant figures is that many British native-born decedents were not classified as British and hence are included in the residual category -- they are erroneously included in the Residual native-born group.

In order to provide a solution to this problem the proportionate changes in the overall native-born deaths within sex, over the period 1950-52 to 1963-65, was assumed to apply to the Residual native-born group. Table H2 shows these proportions. Thus, if the male deaths in 1950-52, to this group, increased by .2167 in 1963-65, the expected number of deaths would be 20,917, as shown in the second panel of Table H2. The other adjustments are shown in the table also, along with corresponding distribution factors below.

The difference between the adjusted deaths and the original deaths shown in Table H1 corresponding to Residual native-born, is assumed to belong to the British native-born population.

TABLE H2. PERCENT CHANGE IN DISTRIBUTION OF DEATHS FOR THE NATIVE AND FOREIGN-BORN POPULATION

	1950-52 TO	1963-65	1963-65 TO	1970-72
	M	F	M	F
Native Born Deaths	.2167	.1155	.0435	.0177
Foreign Born Deaths	.1606	.1861	.1552	.2752

PREDICTED DEATHS FOR THE RESIDUAL NATIVE-BORN POPULATION FOR 1963-65 AND 1970-72, ADJUSTED BY THE FACTORS ABOVE

	Residual Native-Born Deaths	
	1963-65	1970-72
Males	20,917	21,827
Females	14,888	15,151

NUMBER OF EXCESS DEATHS ATTRIBUTED TO RESIDUAL NATIVE-BORN TO BE DISTRIBUTED TO THE BRITISH NATIVE-BORN AGE-SEX DISTRIBUTION OF DEATHS, 1963-65 AND 1970-72

	1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE
Deaths	16,984	10,913	21,935	17,076
Distribution Factor*	16,984 / 33,331 = .5095556689	10,913 / 24,013 = .4544621663	21,935 / 25,126 = .8730000796	17,076 / 18,189 = .9388091704

* To be applied to inflate the British NB Age-Sex figures.

Why the British and not the remaining indigenous groups? Most French Canadians are in Quebec; and this province has had complete registration of ethnicity and place of birth until the mid 70's. If one takes this as a valid assumption, there is no reason to believe that French decedents have been incorrectly allocated to other ethnic categories. We assume that the French figures are correct. In the case of Native Indians, the figures appear to conform to one's expectation given their small population in Canada. Tables H3 and H4 are further attempts to verify our assumptions. They show computed crude death rates before and after the reallocation procedure described earlier. Given our knowledge of previous research on mortality differentials in Canada, we expect to find that Natives would show the highest rates in 1950-52, followed by French and then the British, along with the Residual native-born. We are not certain about the ranking of these last two, but in any event, the ranking of the Natives and French is well known. Table H3 shows, in fact, that this is confirmed: Native Indians have the highest rates followed by French, British and Residual Native-born. In the same Table, however, this pattern changes significantly in several respects. First, the British rates are extremely low relative to their rates in 1950-52; secondly, the Residual native-born surpasses French Canadians and British. This seems unlikely in reality because the general pattern across

TABLE H4. REVISED BRITISH NATIVE-BORN AND RESIDUAL NATIVE-BORN DEATHS AFTER REALLOCATING EXCESS DEATHS FROM RESIDUAL NATIVE-BORN

	1950-52*		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
British NB	70767	59952	50315	34926	47061	35265
Residual NB	17042	13481	20917	14888	21827	15151

REVISED CRUDE DEATH RATES FOR THE ABOVE GROUPS

	1950-52*		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
British NB	8.11	6.90	4.42	3.10	3.63	2.70
Residual NB	6.43	5.27	4.77	3.55	4.41	3.17

* Original Figures

TABLE H4. REVISED BRITISH NATIVE-BORN AND RESIDUAL NATIVE-BORN DEATHS AFTER REALLOCATING EXCESS DEATHS FROM RESIDUAL NATIVE-BORN

	1950-52		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
British NB	70767	59952	50315	34926	47061	35265
Residual NB	17042	13481	20917	14888	21827	15151

REVISED CRUDE DEATH RATES FOR THE ABOVE GROUPS

	1950-52		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
British NB	8.11	6.90	4.42	3.10	3.63	2.70
Residual NB	6.43	5.27	4.77	3.55	4.41	3.17

groups is one of declining rates, but for the Residual class, mortality increases almost to the levels of Native Indians in 1963-65; and interestingly, surpasses the Natives in 1970-72. Obviously, these rates do not reflect a realistic pattern of mortality.

Table H3 (second panel) shows the crude death rates of British and Residual native-born subspopulations after the excess deaths contained in the latter were allocated and distributed to the former. Although beyond 1950-52 the British experience lower rates, the differentials are more realistic; and furthermore, among both groups, the pattern is one of declining mortality, as expected. Another point is that relative to Native Indians and French, the Residual class has lower mortality. Again, this conforms to our expectations.

Overall, it seems that our solution to this problem posed in this section of thesis is an appropriate one given the limitations and constraints encountered throughout. Subsequent to these adjustments, the missing cases were distributed by the method outlined in Chapter three.

ADJUSTMENTS BY CAUSE OF DEATH

The same approach was taken in connection with the distribution of deaths by cause among the British and Residual native-born. The same assumptions were introduced.

Table H5 shows the distribution of deaths by cause, period, sex and subpopulation. Table H6 contains the proportionate changes over time in the number of cases associated with each cause. These proportions were applied to derive Tables H7, H9 and H10.

As before, the missing cases shown in Chapter three, were subsequently distributed by the method discussed in that chapter.

TABLE H5. DISTRIBUTION OF DEATHS DUE TO FOUR MAJOR CAUSES OF DEATH BY SUBPOPULATION, SEX AND PERIOD PRIOR TO ADJUSTMENTS FOR MISSING CASES

	FNB		BNB		N I		RNB		BFB		USA	
	M	F	M	F	M	F	M	F	M	F	M	F
1950-52												
Neoplasms	6749	6491	8832	9753	157	171	1665	1642	5837	4483	925	1040
Cardiovascular	14063	14983	33435	31017	558	487	5263	3986	17688	12935	3750	2811
Accident-violence	3967	1228	5855	2516	530	221	1900	611	1269	653	438	158
Other	26693	16144	22139	14166	3225	3168	8720	7242	6104	3759	1935	1337
Total	56472	38846	70261	57452	4470	4047	17548	13481	30898	21829	7048	5346
1963-65												
Neoplasms	9057	7896	5080	4676	168	218	6101	5766	6000	4345	1306	1335
Cardiovascular	24911	17969	16352	11965	517	405	15437	9626	17671	14089	4622	3704
Accident-violence	4316	1356	2665	1016	678	341	3554	1222	861	550	326	204
Other	16024	12305	9254	7107	2347	1969	12789	8436	6500	4006	2377	1492
Total	54308	39526	33351	24764	3710	2933	37881	25050	31032	22990	8631	6735
1970-72												
Neoplasms	11674	9443	4559	3885	158	160	5519	5882	7093	5389	1734	1615
Cardiovascular	27315	19868	12631	9504	467	350	18465	14322	17735	16849	5438	4648
Accident-violence	4163	1567	1609	619	624	288	4703	1710	968	827	592	300
Other	16596	16841	7525	6623	1128	956	13877	12871	6618	3145	2141	1697
Total	59928	47719	26324	20631	2377	1754	42564	34785	32374	26200	9905	8260

TABLE H5. (Continued) DISTRIBUTION OF DEATHS DUE TO FOUR MAJOR CAUSES OF DEATH BY SUBPOPULATION, SEX AND PERIOD PRIOR TO ADJUSTMENTS FOR MISSING CASES

	OEFB		OFB		TOTAL (NB)		TOTAL (FB)		OVERALL TOTALS	
	M	F	M	F	M	F	M	F	M	F
1950-52										
Neoplasms	3760	2064	561	2313	1740	18057	11083	7817	28286	25874
Cardiovascular	10443	5944	1884	7199	5831	50473	33765	22409	92084	72882
Accident-violence	1686	381	197	402	1225	9576	3590	1232	15842	10808
Other	4311	2278	969	2357	6077	40720	13319	7609	74096	48329
Total	20200	10667	3611	12251	14875	113826	61757	39067	210508	157893
1963-65										
Neoplasms	5563	3012	750	332	20406	18556	13619	9024	34025	27580
Cardiovascular	13666	7762	2128	877	57217	39965	38087	26432	95304	66396
Accident-violence	1543	469	187	81	11213	3935	2917	1304	14130	5239
Other	4985	2634	995	326	40414	29817	14857	8458	55271	38275
Total	25757	13877	4060	1616	129250	92273	69480	45218	198730	137491
1970-72										
Neoplasms	7616	2983	1046	1861	21910	19370	17448	11848	39358	31218
Cardiovascular	16903	10039	2519	1361	58878	44044	42595	32897	101473	76941
Accident-violence	1773	618	324	144	11099	4184	3657	1889	14756	6073
Other	6514	5547	1161	555	39306	37291	16434	10934	55740	48225
Total	32806	19187	5050	3921	131193	104889	80134	57568	211327	162457

TABLE H6. PERCENT CHANGE IN FOUR CAUSES OF DEATH, 1963-65 -- 1950-52 AND 1970-72 -- 1963-65; NATIVE-BORN

	1963-65--1950-52		1970-72--1963-65	
NATIVE BORN	MALE	FEMALE	MALE	FEMALE
Neoplasms	.5615	.3740	.2331	.1578
Cardiovascular	.4520	.2448	.0079	-.1659
Accidents-Violence	.2498	.2678	.0086	.1235
Other Causes	-.1184	-.0896	.0137	.1344

TABLE H7. ADJUSTED DEATHS FOR BRITISH AND RESIDUAL NATIVE-BORN SUBPOPULATIONS, BASED ON THE REALLOCATION OF EXCESS RESIDUAL NATIVE-BORN DEATHS TO THE BRITISH NATIVE-BORN

	1950-52		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
BRITISH NB						
Neoplasms	(No change)		8581	8186	6872	7155
Cardiovascular	(No change)		24147	16429	21583	19688
Accidents-violence	(No change)		3844	1463	3918	1458
Other causes	(No change)		14355	8950	13646	12015
Total			50927	35028	46019	40316
RESIDUAL NB						
Neoplasms	(No change)		2600	2256	3206	2612
Cardiovascular	(No change)		7642	4962	9513	4138
Accidents-violence	(No change)		2375	775	2394	871
Other causes	(No change)		7688	6593	7756	7479
Total			20305	14586	22869	15100

TABLE H8. NUMBER OF EXCESS DEATHS ATTRIBUTED TO THE RESIDUAL NATIVE-BORN SUBPOPULATION WITHIN FOUR MAJOR CAUSES OF DEATH (THESE DEATHS ARE TO BE DISTRIBUTED TO THE BRITISH NATIVE-BORN AGE-SEX-CAUSE SPECIFIC DISTRIBUTION OF DEATHS, 1963-65 AND 1970-72).

	1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE
CAUSE OF DEATH				
Neoplasms	3501	3510	2313	3270
Cardiovascular	7795	4464	8952	10184
Accidents-violence	1179	447	2309	839
Other causes	5101	1843	6121	5392
Total	17576	10264	19695	19685
DISTRIBUTION FACTORS*				
Neoplasms	.6891732283	.750641574	.5073481027	.8416988417
Cardiovascular	.4767000978	.3730881738	.7087324836	1.071548822
Accidents-violence	.4424015009	.4399606299	1.435052828	1.355411995
Other causes	.5512210936	.1052483467	.8134219269	.8141325683

* To be applied to inflate the British NB Age-Sex, Cause-Specific Figures

TABLE H9. ADJUSTED DEATHS BY SUBPOPULATION, AGE, SEX AND PERIOD OF OBSERVATION

SUBPOPULATION	1950-52		1963-65		1970-72	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
French NB	57,500	44,405	77,417	56,044	84,726	60,234
British NB	72,668	60,049	80,576	57,749	81,584	55,993
Native Indian	5,244	4,145	4,907	3,781	3,419	2,606
Residual NB	17,192	13,347	22,774	18,458	24,021	19,599
Total NB	152,604	121,946	185,674	136,032	193,750	138,432
British FB	32,059	22,580	32,793	24,244	34,704	27,778
USA	7,394	5,569	9,412	7,189	10,733	8,752
Other Europe FB	21,314	11,129	28,261	14,911	35,514	20,581
Other FB	3,714	1,243	4,374	1,719	5,504	4,178
Total FB	64,481	40,521	74,840	48,063	86,456	61,289
Overall Total	217,085	162,467	260,514	184,095	280,206	199,721

TABLE H10. DISTRIBUTION OF DEATHS DUE TO FOUR MAJOR CAUSES OF DEATH BY SEX, PERIOD AND SUBPOPULATION AFTER ADJUSTMENTS

YEAR AND SUBPOPULATION	CAUSE OF DEATH AND SEX							
	NEOPLASMS		CARDIOVASCULAR		ACCIDENTS-VIOLENCE		ALL OTHER CAUSES	
	M	F	M	F	M	F	M	F
1950-52								
French NB	6821	6485	19315	15006	4164	1225	27200	21689
British NB	8877	9792	37558	31045	6024	2514	20209	16698
Native Indians	205	193	660	499	636	231	3743	3222
Residual NB	1651	1614	5066	3961	1876	625	8599	7147
British FB	5981	4596	18150	13232	1414	695	6514	4057
USA	948	1066	3849	2875	481	164	2116	1464
Other Europe FB	3875	2124	10799	6083	1869	419	4771	2503
Other FB	568	222	1922	724	205	40	1019	257
1963-65								
French NB	12173	10631	37003	27517	6038	1837	22203	16059
British NB	11579	10136	42110	32025	6159	2150	20729	13437
Native Indians	269	311	864	681	855	408	2919	2381
Residual NB	3636	4442	8939	6501	2325	922	7874	6593
British FB	6333	4547	18995	14866	1072	615	6393	4216
USA	1392	1397	4984	3908	400	228	2636	1656
Other Europe FB	5929	3193	14841	8239	1952	541	5539	2938
Other FB	789	342	2265	918	238	87	1082	372
1970-72								
French NB	17095	13590	38731	28046	5861	2482	23039	16116
British NB	15696	11998	40499	28172	5321	2333	20068	13486
Native Indians	305	285	779	583	803	408	1532	1330
Residual NB	3428	4343	9503	7752	2736	1343	8354	6161
British FB	7427	5679	18901	17753	1135	907	7241	3439
USA	1837	1707	5799	4826	693	345	2404	1874
Other Europe FB	8067	3211	18147	10660	2111	707	7189	6003
Other FB	1105	1942	2684	1435	399	161	1316	640

APPENDIX I

LIFE TABLES FOR THE TOTAL NATIVE AND FOREIGN-BORN POPULATIONS OF CANADA, 1951, 1964 AND 1971

TABLE I.1 ESTIMATED INFANT MORTALITY (q_0), AND CHILDHOOD MORTALITY (q_{1-4}), BASED ON COALE-DEMENY WEST REGION MODEL LIFE TABLES LEVELS 21, 22 AND 23, APPLIED TO THE NATIVE AND FOREIGN-BORN POPULATIONS IN CANADA, 1950-52, 1963-65 and 1970-72.

	YEAR					
	1951		1964		1971	
NATIVITY AND SEX	q_0	q_{1-4}	q_0	q_{1-4}	q_0	q_{1-4}
NATIVE-BORN						
MALES	(.0433) .0424	(.0121) .0120	(.0294) .0290	(.0057) .0057	(.0212) .0210	(.0030) .0030
FEMALES	(.0353) .0347	(.0110) .0109	(.0220) .0218	(.0044) .0044	(.0161) .0160	(.0025) .0025
FOREIGN-BORN						
MALES	(.0310) .0305	(.0086) .0086	(.0260) .0257	(.0051) .0051	(.0167) .0166	(.0024) .0023
FEMALES	(.0239) .0236	(.0048) .0048	(.0190) .0188	(.0030) .0030	(.0123) .0124	(.0020) .0020

Notes: M_x in parentheses.

These probabilities were entered as the infant and childhood q_x's respectively in the life tables shown in the following pages (see text, Chapter III).

NATIVE BORN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	044300	.0424	100000.	96821.	6603369.	66.03
1	012100	.0120	95762.	380744.	650[illegible]54[illegible]	67.95
5	001000	.0050	94610.	471970	6125204	64.75
10	000830	.0041	94135.	469716.	5653934	60.06
15	001390	.0069	9374[illegible].	467118.	51[illegible]421[illegible]	55.30
20	001850	.0092	93079	463352	4717100	50.67
25	001760	.0088	92242	459188.	4253749	46.12
30	.002060	.0102	91434.	454526.	3794559	41.50
35	.002610	.0130	90497.	449550	333[illegible]733	36.90
40	004050	.0200	89323.	442140	2890193.	32.36
45	006570	.0323	87533.	430591.	2449043	27.97
50	010620	.0517	84704.	412565	2017453	23.82
55	017250	.0827	80322.	385008.	1604888.	19.98
60	024640	.1162	73691.	346995	121[illegible]880.	16.56
65	034420	.1593	65117	269650	872885	13.40
70	.053660	.2346	54743	241340	573235	10.47
75	089290	.3515	41793.	172239.	331895.	7.94
80	134230	.5125	27103.	101464.	159656.	5.89
85	231700	1.0000	13473.	58192.	58192	4.32

FOREIGN BORN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.031000	.0305	100000.	97710.	6640932	66.41
1	.001600	.0066	96947.	386129.	6543221.	67.49
5	.001220	.0061	96117	478124.	6157092	64.06
10	.001330	.0066	95533	476080.	5677968	59.43
15	.002240	.0111	[illegible]	471855.	520188[illegible]	54.91
20	.002520	.0125	93842.	466275.	4730033.	50.40
25	.002030	.0101	92667	460998.	4263759	46.01
30	.002080	.0103	91732.	456295.	3802761.	41.46
35	.002730	.0136	90783.	450836.	3346475.	36.86
40	.003880	.0192	89552	443457.	2895640	32.33
45	.006320	.0311	87831	432725	2452182	27.92
50	.010140	.0494	85099.	414975.	2019457	23.74
55	.016210	.0779	80891.	385703	1604482.	19.84
60	.024700	.1163	74590	351260.	1218[illegible]	16.30
65	.036760	.1681	65914.	301873	864919	13.12
70	.054850	.2412	54835.	241114.	563046	10.27
75	.087[illegible]0	.3603	41610.	170575.	321932	7.74
80	.137390	.5113	26620	99071.	151357.	5.69
85	.248000	1.0000	13009	52285	52285	4.02

NATIVE-BORN MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.029400	.0290	100000.	97972.	6805777.	68.06
1	.005700	.0057	97103.	387303.	6707806.	69.08
5	.000650	.0032	96549.	481962.	6320502.	65.46
10	.000370	.0019	96236.	480710.	5838540.	60.67
15	.001090	.0054	96048.	479937.	5357829.	55.78
20	.001720	.0086	95526.	475587.	4878893.	51.07
25	.001410	.0070	94705.	471978.	4403306.	46.49
30	.001750	.0087	94043.	469167.	3931428.	41.80
35	.002430	.0121	93224.	463304.	3463261.	37.15
40	.003780	.0187	92098.	456178.	2999958.	32.57
45	.006050	.0298	90373.	445135.	2543779.	28.15
50	.009940	.0475	87680.	427772.	2098645.	23.94
55	.016310	.0784	83428.	400799.	1670873.	20.03
60	.024800	.1168	76891.	362012.	1270073.	16.52
65	.036940	.1683	67913.	310831.	908061.	13.37
70	.056730	.2494	56419.	247056.	597231.	10.59
75	.087030	.3574	42403.	174131.	350175.	8.26
80	.121200	.4651	27249.	104562.	176044.	6.46
85	.203910	1.0000	14576.	71482.	71482.	4.90

FOREIGN-BORN, MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.026000	.0257	100000.	98203.	6909126.	69.09
1	.005100	.0051	97433.	388740.	6810923.	69.90
5	.000910	.0045	96936.	483582.	6422183.	66.25
10	.000530	.0026	96496.	481844.	5938601.	61.54
15	.001460	.0073	96241.	479455.	5456758.	56.70
20	.001580	.0079	95541.	475826.	4977302.	52.10
25	.001080	.0054	94739.	472670.	4501477.	47.49
30	.001160	.0058	94279.	470031.	4028807.	42.73
35	.001760	.0088	93733.	466614.	3558777.	37.97
40	.002960	.0147	92912.	461149.	3092162.	33.28
45	.003590	.0178	91547.	453665.	2631013.	28.74
50	.008970	.0439	89919.	439732.	2177349.	24.21
55	.013770	.0666	85974.	415565.	1737617.	20.21
60	.023770	.1122	80252.	378752.	1322052.	16.47
65	.033380	.1540	71249.	328806.	943300.	13.24
70	.056670	.2452	60273.	263969.	614494.	10.20
75	.093970	.3805	45314.	183470.	350525.	7.74
80	.138990	.5157	28074.	104171.	167055.	5.95
85	.216190	1.0000	13595.	62884.	62884.	4.63

NATIVE BORN, MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.021200	.0210	100000.	98427.	6922349	69.22
1	.003000	.0030	97902.	391022.	6823922.	69.70
5	.000550	.0027	97609	487375.	6432900	65.90
10	.000510	.0025	97341	486085	5945525	61.08
15	.001470	.0073	97093.	483687.	5459440	56.23
20	.001920	.0076	96382	479600.	4975753	51.63
25	.001560	.0078	95461.	475451.	4496145	47.10
30	.001780	.0089	94719	471499.	4020694	42.45
35	.002370	.0116	93880	466636.	3549194.	37.81
40	.003840	.0190	92774.	459460	3082558.	33.23
45	.005870	.0269	91010	448468.	2623098	28.82
50	.009780	.0477	88377	431341.	2174630	24.61
55	.014960	.0721	84159	405624.	1743289	20.71
60	.023760	.1121	78091.	365561	1337665	17.13
65	.035670	.1637	69334.	318286	969104	13.98
70	.052250	.2311	57980.	256409	650819	11.22
75	.076580	.3214	44583.	187096.	394409.	8.85
80	.115980	.4493	30255.	117296.	207313.	6.85
85	.185110	1.0000	16663	90017	90017	5.40

FOREIGN BORN MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.016700	.0166	100000.	98758	6964112	69 64
1	.002400	.0024	98344.	392904	6865354	67 51
5	.000900	.0045	98109	489439	6472451	65 97
10	.000940	.0047	97668	487193	5983011	61 26
15	.001790	.0089	97210	483883.	5495818	56 54
20	.001840	.0092	96343	479512.	5011936.	52 02
25	.001380	.0069	95461	475665	4532424	47 43
30	.001410	.0070	94805	472359	4056759.	42 79
35	.001830	.0091	94139.	468550.	3584400	38 08
40	.003000	.0149	93281.	462934.	3115850	33 40
45	.005040	.0249	91892	453745	2652916	28 87
50	.008060	.0395	89606	439179	2199171	24 54
55	.014010	.0677	86066.	415767	1759992	20 45
60	.022580	.1069	80241.	379767	1344225.	16 75
65	.038000	.1651	71666.	328742	964458	13 46
70	.055150	.2423	59931	262907.	635716	10 63
75	.083900	.3468	45332	187360.	372809	8 22
80	.124370	.4758	29612	112837.	185449	6 26
85	.213770	1.0000	15522.	72612.	72612.	4 68

NATIVE BORN FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.035300	.0347	100000.	97395	7037006	70.37
1	.011000	.0109	96531	384013	6939607	71.89
5	.000710	.0035	95475	476530	6555594	68.66
10	.000560	.0028	95137	475019	6079064	63.90
15	.000750	.0039	94871	473419	5604045	59.07
20	.000990	.0049	94497	471318	5130626	54.29
25	.001160	.0058	94030	468792	4659308	49.55
30	.001470	.0073	93476	465724	4190517	44.82
35	.002060	.0102	92602	461632	3724796	40.14
40	.003040	.0151	91851	455790	3263164	35.53
45	.004770	.0236	90465	446966	2807374	31.03
50	.006750	.0332	88333	434336	2360376	26.72
55	.010370	.0505	85401	416216	1926042	22.55
60	.014320	.0734	81085	389533	1509826	18.62
65	.025460	.1197	74723	351281	1120293	14.99
70	.041970	.1835	65734	297754	769012	11.69
75	.070190	.2986	53317	226791	471257	8.84
80	.115740	.4488	37359	145030	244467	6.54
85	.207300	1.0000	20613	99436	99436	4.82

FOREIGN BORN FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	I(X)	E(X)
0	.023900	.0236	100000	98229	7199332	71.99
1	.004800	.0048	97635	389418	7091104	72.63
5	.000860	.0043	97171	484411	6701486	68.97
10	.000650	.0032	96754	482954	6216675	64.25
15	.001130	.0056	96440	480841	5733621	59.45
20	.000980	.0049	95396	478310	5252[illegible]50	54.74
25	.000900	.0045	95420	476067	4774540	50.03
30	.001270	.0063	94999	473493	4298472	45.25
35	.001900	.00[illegible]9	94395	469665	3824979	40.52
40	.003000	.0149	93460	463864	3355315	35.90
45	.004180	.0207	92076	455621	2891454	31.40
50	.006150	.0303	90172	444033	2435833	27.01
55	.009360	.0458	87441	427188	1991801	22.73
60	.015220	.0733	83434	401979	1564613	18.75
65	.023900	.1128	77317	364791	1162734	15.04
70	.040530	.1840	68599	311438	797943	11.63
75	.070730	.3005	55976	237828	486504	8.69
80	.117610	.4544	39155	151291	248676	6.35
85	.217350	1.0000	21361	97385	97385	4.56

NATIVE-BORN FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.022000	.0218	100000.	98477.	7615673.	76.16
1	.004400	.0044	97824.	390435.	7517196.	76.84
5	.000320	.0016	97394.	486578.	7126761.	73.17
10	.000290	.0014	97236.	485837.	6640183.	68.29
15	.000500	.0025	97097.	484578.	6154346.	63.39
20	.000470	.0023	96854.	483704.	5669467.	58.54
25	.000530	.0026	96627.	482496.	5185763.	53.67
30	.000840	.0042	96371.	480847.	4703267.	48.80
35	.001300	.0065	95967.	478283.	4222420.	44.00
40	.001150	.0057	95346.	475362.	3744137.	39.27
45	.002240	.0111	94799.	471356.	3268775.	34.48
50	.004730	.0234	93743.	463238.	2797419.	29.84
55	.007000	.0344	91552.	449188.	2334181.	25.50
60	.010333	.0504	88403.	430984.	1884293.	21.31
65	.019980	.0951	83951.	399784.	1453409.	17.31
70	.025180	.1184	75963.	357321.	1053626.	13.87
75	.050950	.2260	66966.	296998.	696305.	10.40
80	.098810	.3634	51834.	212090.	399307.	7.70
85	.176250	1.0000	32999.	187226.	187226.	5.67

FOREIGN-BORN FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.019000	.0188	100000.	98683.	7657520.	76.57
1	.003000	.0030	98113.	391863.	7558837.	76.99
5	.000580	.0029	97824.	488409.	7161954.	73.21
10	.000350	.0017	97540.	487275.	6673545.	68.42
15	.000550	.0027	97370.	486180.	6186270.	63.53
20	.000490	.0024	97102.	484917.	57[illegible].	58.70
25	.000430	.0021	96865.	483803.	5215173.	53.84
30	.000480	.0024	96657.	482704.	4731369.	48.95
35	.000950	.0047	96425.	480962.	424[illegible]665.	44.06
40	.001720	.0086	95968.	477786.	3767[illegible]3.	39.26
45	.002150	.0107	95146.	473188.	32[illegible]897.	34.5[illegible]
50	.003750	.0186	94129.	466273.	281[illegible].	29.92
55	.006800	.0334	92350.	454181.	2350436.	25.44
60	.010950	.0533	89292.	434563.	1896255.	21.24
65	.016730	.0803	84533.	405699.	1461692.	17.29
70	.024230	.1318	77746.	363104.	1055993.	13.5[illegible]
75	.051550	.2283	67496.	29[illegible]51.	6928[illegible].	10.27
80	.091210	.3714	52085.	212067.	393937.	7.56
85	.180030	1.0000	32742.	181870.	181870.	5.55

NATIVE BORN FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.016100	.0160	100000.	[illegible]	7653600	76.54
1	.002500	.0025	98403	393120.	7554606	76.77
5	.000370	.0018	98157	490732	7161676	72.96
10	.000320	.0016	97976	489487	6671353	68.09
15	.000600	.0030	97819	488363.	6181866	63.20
20	.000590	.0029	97526	486912.	5693503	58.38
25	.000690	.0034	97239	485357	5206591	53.54
30	.000970	.0048	96904	483347.	4721234	48.72
35	.001430	.0071	96435	480458	4237887	43.95
40	.002210	.0110	95743	476110.	3757429	39.24
45	.003220	.0160	94696	469698	3281320.	34.65
50	.004940	.0244	93183	460233	2811622	30.17
55	.007530	.0372	90910	446096	2351389.	25.87
60	.011510	.0559	87529	425401	1905293.	21.77
65	.017760	.0850	82632	395596	1479892	17.91
70	.028890	.1347	75606	352567	1084296	14.34
75	.047950	.2141	65421.	292089	731729	11.18
80	.079400	.3312	51415.	214497.	439640	8.59
85	.152720	1.0000	34384	225143	225143.	6.55

FOREIGN-BORN FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	T(X)	E(X)
0	.012200	.0121	100000.	99091.	7644995.	76.45
1	.001100	.0011	98787.	394932.	7545904.	76.39
5	.000530	.0026	98679.	492741.	7150972.	72.47
10	.000490	.0024	98418.	491486.	6658231.	67.65
15	.000720	.0036	98177.	490002.	6166746.	62.81
20	.000570	.0028	97824.	488424.	5676744.	58.03
25	.000520	.0026	97546.	487095.	5188320.	53.19
30	.000740	.0037	97292.	485563.	4701226.	48.32
35	.001040	.0052	96933.	483408.	4215663.	43.49
40	.001730	.0086	96430.	480075.	3732255.	38.70
45	.002810	.0140	95600.	474664.	3252180.	34.02
50	.004690	.0232	94266.	465867.	2777516.	29.46
55	.007340	.0360	92081.	452109.	2311649.	25.10
60	.010500	.0512	88762.	432460.	1859541.	20.95
65	.018000	.0861	84222.	402974.	1427080.	16.94
70	.029230	.1362	76968.	358633.	1024106.	13.31
75	.058550	.2554	66485.	289980.	665473.	10.01
80	.098810	.3962	49507.	198500.	375492.	7.58
85	.168895	1.0000	29893.	176992.	176992.	5.92

APPENDIX J

CONSTRUCTION OF LIFE TABLES AND DERIVED LIFE TABLES FOR THE EIGHT SUBPOPULATIONS

APPENDIX 3

LIFE TABLES FOR THE EIGHT SUBPOPULATIONS

In Chapter III, it was indicated that the age group 0-4 could not be disaggregated. This is unfortunate because it impedes the calculation of infant mortality and childhood deaths separately. The problem is a function of several factors: (1) the census does not publish single year age-sex population distributions corresponding to the subpopulations of interest to this thesis. Instead, it provides tabulations containing 0-4 as the initial age class. Several methods were applied in order to allow the disaggregation of the 0-4 age group (e.g., Beers Multipliers); however, it was impossible to provide correspondence in the methodologies' assumptions with the reality of the populations studied. For example, the use of separation factors such as Beers Multipliers assume a fairly regular progression in the distribution over age. This cannot be assumed in the majority of the cases in the present context. For example, the age distribution of immigrants is irregular and for very good reasons--the selectivity of migration. In any case, it was decided to attempt using Beers Multipliers to see what results would derive. The results proved to be highly unrealistic. On several occasions the derived estimates for age zero were negative (especially for the foreign-born groups).

Given the focus of the thesis as being primarily social demographic, it was decided to compute abridged life tables using age 0-4 as the initial entry. It is well recognized that this poses serious limitations on the usefulness and validity of the life table functions. With these points in mind, the tables are meant to provide a general idea of the mortality experience of the populations. The most serious limitation associated with this approach is that we are forced to assume that the distribution of deatbs between zero and subsequent ages is uniform. We know that in reality that is not so. Thus it is suggested that the life tables in this appendix be viewed only as approximations.

FRENCH NATIVE-BORN, 1971

AGE	DEATH RATE	Q(X)	L(X)	LL(X)	S(X)	T(X)	E(X)
0	.003670	.0136	100000.	496606.	.99195	6849675.	68.50
5	.000490	.0024	98642.	492608.	.99760	6353068.	64.41
10	.000470	.0023	98401.	491428.	.99581	5860460.	59.56
15	.001210	.0060	98170.	489370.	.99335	5369032.	54.69
20	.001460	.0073	97578.	486115.	.99283	4879662.	50.01
25	.001420	.0071	96868.	482628.	.99191	4393546.	45.36
30	.001830	.0091	96133.	478724.	.98905	3910917.	40.66
35	.002580	.0128	95307.	473480.	.98318	3432194.	36.01
40	.004220	.0209	94085.	465515.	.97153	2958714.	31.45
45	.007380	.0362	92121.	452260.	.95111	2493199.	27.06
50	.012800	.0620	88783.	430151.	.92094	2040940.	22.99
55	.020440	.0772	83277.	396143.	.88703	1610789.	19.34
60	.027900	.1304	75180.	351391.	.84625	1214646.	16.16
65	.039690	.1505	65376.	297374.	.77935	863255.	13.20
70	.062320	.2696	53573.	231759.	.67979	565881.	10.56
75	.096740	.3895	39130.	157548.	.57480	334122.	8.54
80	.127590	.4037	23869.	90559.	.48713	176574.	7.39
85	.143400	1.0000	12335.	86015.	0.00000	86015.	6.97

FRENCH NB MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	DL(X)	S(X)	T(X)	E(X)
0	.006850	.0250	100000.	493739.	.98562	6788962.	67.89
5	.000690	.0034	97496.	486638.	.99690	6295223.	64.57
10	.000550	.0027	97160.	485132.	.99549	5808584.	59.78
15	.001260	.0063	96893.	482944.	.99211	5323452.	54.94
20	.001910	.0095	96234.	479134.	.99136	4840509.	50.27
25	.001560	.0078	95369.	474994.	.99154	4361374.	45.73
30	.001840	.0092	94623.	470975.	.98851	3886380.	41.07
35	.002790	.0139	93762.	465561.	.98383	3415405.	36.43
40	.003740	.0185	92463.	458032.	.97476	2949844.	31.90
45	.006520	.0321	90750.	446471.	.96123	2491812.	27.46
50	.007350	.0457	87837.	429162.	.92879	2045341.	23.29
55	.020600	.0980	83826.	398603.	.88998	1616178.	19.28
60	.026300	.1234	75615.	354750.	.85538	1217576.	16.10
65	.036080	.1688	66285.	303447.	.79159	862826.	13.02
70	.058720	.2560	55094.	240207.	.68268	559379.	10.15
75	.099910	.3997	40939.	163985.	.55573	319172.	7.79
80	.139990	.5185	24605.	91132.	.41276	155187.	6.31
85	.184960	1.0000	11848.	64055.	0.00000	64055.	5.41

FRE NBCRN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.015108	.0728	100000.	481802.	.95954	6424138.	64.24
5	.001122	.0056	92721.	462308.	.99496	5942336.	64.09
10	.000899	.0045	92202.	459977.	.99425	5480028.	59.43
15	.001410	.0070	91789.	457331.	.99171	5020050.	54.69
20	.001920	.0096	91144.	453542.	.99011	4562719.	50.06
25	.002057	.0102	90273.	449056.	.98922	4109177.	45.52
30	.002279	.0113	89349.	444216.	.98710	3660121.	40.96
35	.002920	.0145	88337.	438484.	.98190	3215905.	36.40
40	.004398	.0218	87057.	430549.	.97185	2777421.	31.90
45	.007059	.0347	85163.	418431.	.95513	2346872.	27.56
50	.011399	.0554	82209.	399658.	.92539	1928441.	23.46
55	.019930	.0949	77654.	369841.	.89394	1528783.	19.69
60	.025161	.1184	70283.	330617.	.86143	1158942.	16.49
65	.035138	.1615	61964.	284802.	.80279	828325.	13.37
70	.054490	.2398	51957.	228637.	.71183	543523.	10.46
75	.085382	.3518	39498.	162751.	.58814	314886.	7.97
80	.134939	.5045	25602.	95720.	.37082	152135.	5.94
85	.224869	1.0000	12686.	56414.	0.00000	56414.	4.45

BRITISH-NATIVE-BORN 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003[illegible]80	.0122	100000.	496962.	.99304	7354722.	73.55
5	.000340	.0017	98785.	493505.	.99835	6857760.	69.42
10	.000320	.0016	98617.	492692.	.99663	6364255.	64.53
15	.001030	.0051	98459.	491033.	.99412	5871563.	59.63
20	.001330	.0066	97954.	488146.	.99402	5380530.	54.93
25	.001070	.0053	97304.	485224.	.99444	4892384.	50.28
30	.001160	.0058	96785.	482527.	.99295	4407160.	45.54
35	.001670	.0083	96226.	479128.	.98910	3924633.	40.79
40	.002720	.0135	95425.	473905.	.98281	3445505.	36.11
45	.004230	.0209	94136.	465757.	.97205	29[illegible]600.	31.57
50	.007150	.0351	92166.	452739.	.95596	2505344.	27.19
55	.010950	.0533	88929.	432798.	.92903	2053105.	23.09
60	.01877[illegible]	.0896	84190.	402082.	.88794	1620307.	19.25
65	.029340	.1367	76643.	357027.	.83738	1218225.	15.89
70	.042640	.1927	66168.	298969.	.77366	861198.	13.02
75	.061910	.2681	53420.	231299.	.68891	562229.	10.52
80	.090760	.3699	39100.	159345.	.51849	330930.	8.46
85	.143590	1.0000	24638.	171585.	0.00000	171585.	6.96

BRITISH NATIVE-BORN 1964

AGE	DEATH RATE	Q(X)	L(X)	5L(X)	S(X)	T(X)	E(X)
0	.005720	.0210	100000.	494750.	.98830	7183593.	71.84
5	.000440	.0022	97900.	488962.	.99798	6688842.	68.32
10	.000370	.0018	97685.	487973.	.99678	6199880.	63.47
15	.000920	.0046	97504.	486403.	.99434	5711907.	58.58
20	.001350	.0067	97057.	483652.	.99382	5225504.	53.84
25	.001130	.0056	96404.	480662.	.99380	4741852.	49.19
30	.001360	.0068	95861.	477680.	.99204	4261190.	44.45
35	.001840	.0092	95211.	473876.	.98821	3783510.	39.74
40	.002910	.0144	94369.	468289.	.98158	3309634.	35.08
45	.004540	.0224	92976.	459665.	.97112	2841345.	30.56
50	.007220	.0355	90890.	446391.	.95282	2381680.	26.20
55	.012230	.0593	87667.	425329.	.92624	1935289.	22.08
60	.018650	.0891	82465.	393956.	.88833	1509960.	18.31
65	.029290	.1365	75118.	349962.	.83111	1116004.	14.86
70	.046040	.2064	64867.	290858.	.75136	766042.	11.81
75	.071090	.3018	51476.	218540.	.64899	475184.	9.23
80	.106800	.4215	35940.	141831.	.44736	256643.	7.14
85	.181100	1.0000	20792.	114812.	0.00000	114812.	5.52

BRI ABORN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.006303	.0310	100000.	492243.	.98235	6913643.	69.14
5	.000771	.0038	96897.	483555.	.99637	6421399.	66.27
10	.000684	.0034	96525.	481799.	.99526	5937845.	61.52
15	.001217	.0061	96195.	479516.	.99297	5456046.	56.72
20	.001608	.0080	95611.	476143.	.99255	4976529.	52.05
25	.001383	.0069	94846.	472595.	.99225	4500386.	47.45
30	.001732	.0086	94192.	468931.	.99025	4027791.	42.76
35	.002190	.0109	93380.	464358.	.98557	3558861.	38.11
40	.003633	.0180	92363.	457659.	.97652	3094503.	33.50
45	.005897	.0291	90700.	446913.	.96215	2636844.	29.07
50	.009607	.0469	88065.	429997.	.94109	2189931.	24.87
55	.014832	.0715	83934.	404665.	.91231	1759933.	20.97
60	.022192	.1051	77932.	369178.	.87648	1355269.	17.39
65	.031053	.1441	69739.	323576.	.82322	986091.	14.14
70	.048173	.2150	59691.	268376.	.73736	662515.	11.10
75	.077144	.3234	46859.	196415.	.61889	396139.	8.45
80	.121671	.4665	31707.	121559.	.39137	199724.	6.30
85	.216421	1.0000	16917.	78166.	0.00000	78166.	4.62

IND ABORN MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.011697	.0568	100000.	485794.	.96833	6617031.	66.17
5	.001003	.0050	94318.	470409.	.99503	6131237.	65.01
10	.000989	.0049	93846.	468072.	.98989	5660828.	60.32
15	.003086	.0153	93383.	463340.	.98033	5192756.	55.61
20	.004878	.0241	91953.	454226.	.97583	4729416.	51.43
25	.004909	.0242	89737.	443247.	.97762	4275190.	47.64
30	.004137	.0205	87561.	433326.	.97757	3831943.	43.76
35	.004945	.0244	85769.	423607.	.97163	3398617.	39.63
40	.006591	.0324	83674.	411588.	.96334	2975010.	35.55
45	.008382	.0410	80961.	396498.	.95418	2563422.	31.66
50	.010423	.0508	77638.	378331.	.94410	2166924.	27.91
55	.012644	.0613	73694.	357182.	.92803	1788594.	24.27
60	.017396	.0834	69178.	331475.	.89621	1431412.	20.69
65	.026915	.1261	63412.	297070.	.84971	1099936.	17.35
70	.039072	.1780	55416.	252425.	.78248	802866.	14.49
75	.061261	.2656	45554.	197517.	.70539	550441.	12.08
80	.080212	.3341	33453.	139328.	.60522	352924.	10.55
85	.104298	1.0000	22278.	213596.	0.00000	213596.	9.59

INDIAN NB MALES, 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.022019	.1044	100000.	473912.	.94025	5925725.	59.26
5	.002000	.0100	89565.	445597.	.99200	5451813.	60.87
10	.001210	.0060	88674.	442032.	.98975	5006216.	56.46
15	.002920	.0145	88139.	437501.	.98044	4564185.	51.78
20	.005000	.0247	86861.	428945.	.97613	4126684.	47.51
25	.004660	.0230	84717.	418705.	.97499	3697739.	43.65
30	.005480	.0270	82765.	408235.	.97211	3279034.	39.62
35	.005840	.0288	80528.	396848.	.96605	2870799.	35.65
40	.008010	.0393	78211.	383377.	.95841	2473951.	31.63
45	.009000	.0440	75140.	367432.	.94903	2090575.	27.82
50	.012000	.0583	71833.	348704.	.92959	1723142.	23.99
55	.017390	.0833	67649.	324150.	.90113	1374438.	20.32
60	.024590	.1158	62012.	292101.	.86385	1050288.	16.94
65	.034580	.1591	54829.	252330.	.81179	758187.	13.83
70	.050140	.2228	46103.	204840.	.72170	505857.	10.97
75	.084770	.3497	35833.	147833.	.60776	301017.	8.40
80	.118675	.4576	23301.	89847.	.41347	153184.	6.57
85	.199540	1.0000	12638.	63336.	0.00000	63336.	5.01

IND ABORN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.050159	.2229	100000.	444287.	.86424	4751756.	47.52
5	.004798	.0237	77715.	383969.	.97801	4307469.	55.43
10	.004089	.0202	75873.	375525.	.97326	3923500.	51.71
15	.006790	.0334	74337.	365482.	.96217	3547975.	47.73
20	.008669	.0424	71856.	351657.	.95779	3182493.	44.29
25	.008575	.0420	68807.	336815.	.95886	2830837.	41.14
30	.008218	.0403	65919.	322959.	.95975	2494022.	37.83
35	.008211	.0402	63265.	309961.	.96227	2171063.	34.32
40	.007151	.0351	60720.	298266.	.95292	1861102.	30.65
45	.012258	.0595	58587.	284224.	.94234	1562835.	26.68
50	.011467	.0557	55103.	267836.	.93889	1278611.	23.20
55	.013822	.0668	52032.	251468.	.90117	1010776.	19.43
60	.028528	.1331	48556.	226616.	.84518	759308.	15.64
65	.039516	.1798	42091.	191533.	.77317	532691.	12.66
70	.066240	.2841	34522.	148088.	.68528	341159.	9.88
75	.087039	.3574	24713.	101482.	.58332	193071.	7.81
80	.136514	.5089	15880.	59197.	.35367	91589.	5.77
85	.240760	1.0000	7799.	32392.	0.00000	32392.	4.15

RESIDUAL-NATIVE-BORN 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003720	.0138	100000.	496560.	.99213	6922507.	69.23
5	.000380	.0019	98624.	492653.	.99808	6425947.	65.16
10	.000390	.0019	98437.	491706.	.99581	5933294.	60.28
15	.001290	.0064	98245.	489647.	.99251	5441588.	55.39
20	.001720	.0086	97614.	485978.	.99240	4951941.	50.73
25	.001330	.0066	96778.	482285.	.99280	4465943.	46.15
30	.001560	.0078	96136.	478814.	.99087	3983678.	41.44
35	.002110	.0105	95389.	474444.	.98624	3504864.	36.74
40	.003440	.0171	94338.	467917.	.97817	3030420.	32.11
45	.005410	.0267	92779.	457703.	.96460	2562503.	27.62
50	.007070	.0443	90302.	441501.	.97306	2104801.	23.31
55	.001424	.0071	86298.	429959.	.93913	1663300.	19.27
60	.024410	.1150	85686.	403788.	.85375	1233340.	14.39
65	.039930	.1815	75829.	344733.	.75729	829553.	10.94
70	.075470	.3175	62064.	261064.	.57890	484819.	7.81
75	.160600	.5730	42362.	151129.	.38184	223755.	5.28
80	.226970	.7240	18090.	57707.	.20542	72626.	4.01
85	.334640	1.0000	4992.	14919.	0.00000	14919.	2.99

RESIDUAL NB MALES 1984

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004430	.0163	100000.	495915.	.99075	6821547.	68.22
5	.000410	.0020	98366.	491326.	.99805	6325632.	64.31
10	.000370	.0018	98164.	490369.	.99678	5834306.	59.43
15	.000920	.0046	97983.	488791.	.99420	5343937.	54.54
20	.001410	.0070	97533.	485754.	.99359	4855146.	49.78
25	.001160	.0058	96848.	482840.	.99340	4369193.	45.11
30	.001490	.0074	96286.	479653.	.99117	3886302.	40.36
35	.002060	.0102	95573.	475418.	.98644	3406699.	35.64
40	.003410	.0169	94594.	468972.	.97721	2931280.	30.99
45	.005840	.0288	92995.	458283.	.95891	2462308.	26.48
50	.011050	.0538	90318.	439452.	.92975	2004025.	22.19
55	.018340	.0877	85462.	408579.	.89466	1564573.	18.31
60	.026600	.1247	77969.	365537.	.83823	1155994.	14.83
65	.045460	.2041	68246.	306406.	.74471	790457.	11.58
70	.076080	.3196	54317.	228183.	.64771	484050.	8.91
75	.100098	.4003	36956.	147797.	.51268	255868.	6.92
80	.184966	.6324	22162.	75773.	.29886	108071.	4.88
85	.252242	1.0000	8147.	32298.	0.00000	32298.	3.96

RESIDUAL NB MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.012258	.0439	100000.	489013.	.97546	6641186.	66.41
5	.000849	.0042	95605.	477014.	.99616	6152172.	64.35
10	.000690	.0034	95200.	475182.	.99513	5675158.	59.61
15	.001263	.0063	94872.	472869.	.99287	5199977.	54.81
20	.001599	.0080	94275.	469499.	.99236	4727108.	50.14
25	.001468	.0073	93524.	465912.	.99356	4257609.	45.52
30	.001115	.0056	92840.	462912.	.99245	3791696.	40.84
35	.001920	.0096	92324.	459416.	.98646	3328784.	36.06
40	.003543	.0176	91442.	453197.	.97545	2869368.	31.38
45	.006437	.0317	89837.	442669.	.96162	2416171.	26.90
50	.009270	.0453	86991.	425103.	.93513	1974102.	22.69
55	.017833	.0854	83050.	397529.	.87120	1548999.	18.65
60	.038666	.1763	75961.	346328.	.81465	1151470.	15.16
65	.043544	.1963	62570.	282137.	.78955	805142.	12.87
70	.051467	.2280	50285.	222781.	.71013	523006.	10.40
75	.090804	.3700	38820.	158189.	.55759	300244.	7.73
80	.154523	.5573	24456.	88204.	.37905	142056.	5.81
85	.201036	1.0000	10826.	53851.	0.00000	53851.	4.97

BRITISH FB MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	EL(X)	S(X)	T(X)	E(X)
0	.002860	.0106	100000.	497347.	.99258	7051574.	70.52
5	.000839	.0042	98939.	493659.	.99620	6554226.	66.25
10	.000685	.0034	98525.	491781.	.99422	6060567.	61.51
15	.001635	.0081	98188.	488941.	.99228	5568786.	56.72
20	.001466	.0073	97388.	485164.	.99301	5079846.	52.16
25	.001341	.0067	96677.	481771.	.99396	4594682.	47.53
30	.001082	.0054	96031.	478860.	.99399	4112911.	42.83
35	.001329	.0066	95513.	475983.	.98979	3634051.	38.05
40	.002784	.0138	94880.	471123.	.98036	31580[illegible]7.	33.28
45	.005175	.0255	93569.	461869.	.96660	2686[illegible]44.	28.72
50	.008469	.0415	91179.	446441.	.94336	2225076.	24.40
55	.015039	.0725	87398.	421154.	.90791	1778635.	20.35
60	.024008	.1132	81064.	382370.	.85974	1337481.	16.75
65	.037330	.1707	71884.	328740.	.79719	975111.	13.57
70	.054934	.2415	59612.	262069.	.71142	646370.	10.84
75	.085037	.3506	45216.	186442.	.60498	384301.	8.50
80	.120621	.4634	29361.	112793.	.42993	197859.	6.74
85	.185221	1.0000	15756.	85066.	0.00000	85066.	5.40

BRITISH FBORN MALES, 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.006557	.0323	100000.	491936.	.98233	7031697.	70.32
5	.000522	.0026	96774.	483241.	.99758	6539762.	67.58
10	.000447	.0022	96522.	482072.	.99516	6056520.	62.75
15	.001498	.0075	96307.	479737.	.99198	5574448.	57.88
20	.001725	.0086	95528.	475888.	.99413	5094712.	53.30
25	.000627	.0031	94767.	473094.	.99633	4618824.	48.74
30	.000845	.0042	94470.	471357.	.99360	4145730.	43.88
35	.001728	.0086	94072.	468338.	.98854	3674374.	39.06
40	.002869	.0143	93263.	462971.	.98425	3206036.	34.38
45	.003464	.0172	91925.	455681.	.97343	2743066.	29.84
50	.007361	.0361	90347.	443572.	.94924	2287385.	25.32
55	.013637	.0659	87082.	421054.	.91246	1843813.	21.17
60	.023428	.1107	81340.	384197.	.87623	1422760.	17.49
65	.029762	.1385	72339.	336646.	.83163	1038563.	14.36
70	.045193	.2030	62320.	279967.	.73706	701917.	11.26
75	.081382	.3381	49667.	206352.	.60565	421950.	8.50
80	.126073	.4793	32874.	124978.	.42032	215598.	6.56
85	.188892	1.0000	17117.	90620.	0.00000	90620.	5.29

BRITISH BORN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.006101	.0300	100000.	492488.	.98205	6723305.	67.23
5	.001098	.0055	96995.	483649.	.99313	6235816.	64.29
10	.001660	.0083	96464.	480328.	.98870	5752167.	59.63
15	.002892	.0144	95667.	474901.	.98815	5271839.	55.11
20	.001869	.0093	94294.	469275.	.99064	4796938.	50.87
25	.001894	.0094	93416.	464881.	.99063	4327663.	46.33
30	.001870	.0093	92536.	460527.	.98898	3862782.	41.74
35	.002568	.0128	91675.	455450.	.98507	3402255.	37.11
40	.003455	.0171	90505.	448651.	.97634	2946805.	32.56
45	.006154	.0303	88955.	438036.	.95963	2498155.	28.08
50	.010416	.0508	86259.	420351.	.93643	2060118.	23.88
55	.016032	.0771	81881.	393629.	.90500	1639767.	20.03
60	.024276	.1144	75570.	356232.	.86339	1246139.	16.49
65	.035171	.1616	66922.	307569.	.80432	889907.	13.30
70	.053586	.2363	56105.	247384.	.71148	582338.	10.38
75	.086889	.3569	42849.	176010.	.58502	334954.	7.82
80	.135216	.5053	27555.	102969.	.35217	158944.	5.77
85	.243544	1.0000	13632.	55975.	0.00000	55975.	4.11

UNITED STATES MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.007616	.0278	100000.	493058.	.98457	6702630.	67.03
5	.000547	.0027	97223.	485453.	.99599	6209571.	63.87
10	.001060	.0053	96958.	483508.	.99111	5724119.	59.04
15	.002520	.0125	96445.	479209.	.98459	5240611.	54.34
20	.003700	.0183	95238.	471824.	.98403	4761404.	49.99
25	.002730	.0136	93492.	464291.	.98850	4289580.	45.88
30	.001890	.0094	92224.	458953.	.98535	3825290.	41.48
35	.004030	.0199	91357.	452229.	.97824	3366336.	36.85
40	.004780	.0236	89534.	442386.	.97091	2914108.	32.55
45	.007060	.0347	87420.	429518.	.95397	2471722.	28.27
50	.011900	.0578	84387.	409747.	.92674	2042203.	24.20
55	.018780	.0897	79511.	379729.	.89804	1632456.	20.53
60	.024500	.1154	72380.	341014.	.86174	1252727.	17.31
65	.035746	.1641	64025.	293865.	.81868	911713.	14.24
70	.044930	.2020	53521.	240581.	.74742	617848.	11.54
75	.075060	.3160	42712.	179815.	.63061	377267.	8.83
80	.115280	.4474	29215.	113393.	.42572	197452.	6.76
85	.192040	1.0000	16143.	84059.	0.00000	84059.	5.21

UNITED STATES MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.009260	.0336	100000.	491610.	.98068	6617679.	66.18
5	.000920	.0046	96644.	482111.	.99509	6126069.	63.39
10	.001050	.0052	96200.	479743.	.99155	5643957.	58.67
15	.002350	.0117	95697.	475689.	.9[illegible]19	5164214.	53.96
20	.003220	.0160	94579.	469118.	.98403	4688525.	49.57
25	.002890	.0143	93068.	462004.	.98742	4219407.	45.34
30	.002170	.0103	91733.	456191.	.98298	37[illegible]403.	40.76
35	.004720	.0233	90743.	448425.	.97646	3301212.	36.38
40	.004810	.0238	88627.	437868.	.97105	2852733.	32.19
45	.006970	.0343	86520.	425194.	.95556	2414920.	27.91
50	.011310	.0550	83557.	406296.	.92955	1989726.	23.81
55	.018150	.0868	78962.	377672.	.89875	1583430.	20.05
60	.024870	.1171	72107.	339431.	.86487	1205758.	16.72
65	.033740	.1556	63665.	293564.	.80483	866328.	13.61
70	.055080	.2421	53760.	236268.	.70830	572763.	10.65
75	.086970	.3572	40747.	167346.	.59734	336495.	8.26
80	.124040	.4734	26193.	99964.	.40901	169147.	6.46
85	.199370	1.0000	13793.	69183.	0.00000	69183.	5.02

UNITED STATES MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.014595	.0519	100000.	487027.	.97072	6503777.	65.04
5	.001091	.0054	94811.	472765.	.99478	6016750.	63.46
10	.001004	.0050	94295.	470295.	.99108	5543985.	58.79
15	.002586	.0128	93823.	466101.	.98653	5073690.	54.08
20	.002839	.0141	92618.	459824.	.98702	4607589.	49.75
25	.002382	.0118	91312.	453858.	.98883	4147765.	45.42
30	.002111	.0105	90231.	448787.	.98589	3693907.	40.94
35	.003583	.0178	89284.	442455.	.97894	3245120.	36.35
40	.004944	.0244	87693.	433138.	.96975	2802665.	31.96
45	.007381	.0362	85557.	420034.	.95805	2369527.	27.70
50	.009811	.0479	82457.	402413.	.93711	1949493.	23.64
55	.016373	.0786	78509.	377107.	.90409	1547080.	19.71
60	.024325	.1147	72334.	340938.	.85555	1169973.	16.17
65	.039106	.1751	64041.	291688.	.79130	829035.	12.95
70	.056079	.2459	52634.	230812.	.70657	537348.	10.21
75	.086750	.3564	39690.	163084.	.58332	306536.	7.72
80	.137011	.5103	25543.	95130.	.33685	143453.	5.62
85	.258867	1.0000	12509.	48322.	0.00000	48322.	3.86

OTHER EUROPE MALES 1971

AGE	DEATH RATE	q(X)	L(X)	CL(X)	S(Y)	T(X)	E(X)
0	.003949	.0113	100000.	497182.	.99267	7191918.	71.91
5	.000679	.0033	98873.	493538.	.99622	6693836.	67.70
10	.000847	.0042	95542.	491670.	.99431	6200293.	62.92
15	.001436	.0072	98120.	488874.	.99205	5708623.	58.15
20	.001755	.0087	97424.	484989.	.99253	5219755.	53.58
25	.001240	.0062	96572.	481368.	.99355	4734765.	49.03
30	.001350	.0067	95975.	478262.	.99220	4253397.	44.32
35	.001735	.0089	95333.	474538.	.98865	3775135.	[illegible]
40	.002786	.0138	94492.	469145.	.98184	35[illegible]605.	34.93
45	.004561	.0225	93175.	461626.	.97239	2831461.	30.39
50	.006579	.0323	91075.	447908.	.95569	2370934.	26.03
55	.011565	.0562	88067.	428068.	.92753	1922928.	21.33
60	.018735	.0897	83137.	397938.	.88024	1494867.	17.98
65	.030815	.1402	75678.	351569.	.82742	1097830.	14.51
70	.046990	.2103	65069.	291144.	.75901	745961.	11.46
75	.065090	.2799	51333.	220983.	.64022	454815.	8.35
80	.123120	.4707	37005.	141477.	.39497	233837.	6.32
85	.212071	1.0000	19586.	92357.	0.00000	92357.	4.72

EUROP FBORN MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004550	.0225	100000.	494376.	.98659	7184086.	71.84
5	.000825	.0041	97751.	487747.	.99680	6689709.	68.44
10	.000455	.0023	97348.	486188.	.99575	6201962.	63.71
15	.001252	.0062	97127.	484120.	.99359	5715774.	58.85
20	.001321	.0066	96521.	481016.	.99396	5231655.	54.20
25	.001100	.0055	95685.	478112.	.99459	4750639.	49.54
30	.001071	.0053	95360.	475524.	.99361	4272526.	44.80
35	.001494	.0074	94850.	472486.	.98951	3797002.	40.03
40	.002731	.0136	94144.	467530.	.98596	3324516.	35.31
45	.002926	.0145	92868.	460966.	.97865	2856986.	30.76
50	.005738	.0283	91519.	451122.	.96036	2396020.	26.18
55	.010534	.0513	88930.	433242.	.92548	1944898.	21.87
60	.020825	.0990	84366.	400957.	.88559	1511657.	17.92
65	.028163	.1316	76016.	355082.	.83524	1110699.	14.61
70	.045185	.2030	66016.	296579.	.74057	755617.	11.45
75	.079109	.3302	52615.	219638.	.61558	459038.	8.72
80	.121285	.4653	35240.	135204.	.43524	239400.	6.79
85	.180831	1.0000	18842.	104195.	0.00000	104195.	5.53

Other Europe FB Males 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	D(X)	T(X)	E(X)
0	.005640	.020[illegible]	100000.	4[illegible]4322.	.98616	67[illegible]	[illegible]
5	.001370	.0069	97729.	487973.	.99332	[illegible]	64.28
10	.001310	.0065	97210.	484714.	.99159	5807020.	59.71
15	.002070	.0103	96625.	480639.	.98906	5322306.	55.08
20	.002330	.0116	95679.	475337.	.98960	[illegible]	[illegible]
25	.001350	.0092	94523.	470438.	.99032	4366284.	[illegible]
30	.002040	.0101	93652.	465836.	.98892	[illegible]	41.60
35	.002420	.0120	92702.	460723.	.98484	34[illegible]	37.00
40	.003700	.0133	91587.	453738.	.97640	29[illegible]	32.45
45	.005880	.0230	[illegible]	443029.	.96247	2513499.	27.99
50	.009490	.0464	87303.	426400.	.94078	2072470.	23.74
55	.015090	.0727	83257.	401150.	.90987	1646071.	19.77
60	.023040	.1089	77203.	364993.	.86655	1244920.	16.13
65	.035010	.1610	68794.	316287.	.78920	879977.	12.79
70	.062480	.2702	57721.	249614.	.68421	563641.	9.76
75	.093300	.3783	42[illegible]25.	170788.	.56058	314027.	7.45
80	.147110	.5378	26190.	95741.	.33130	143239.	5.47
85	.254870	1.0000	12106.	47498.	0.00000	47498.	3.92

POOR COPY

OTHER FB MALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.002430	.0090	100000.	497742.	.99318	6843463.	68.43
5	.000920	.0046	99097.	494348.	.99566	6345721.	64.04
10	.000820	.0041	98642.	492202.	.99422	5851373.	59.32
15	.001500	.0075	98239.	489358.	.99302	5359171.	54.55
20	.001300	.0065	97505.	485943.	.99374	4869813.	49.94
25	.001210	.0060	96873.	482903.	.99350	4383070.	45.25
30	.001400	.0070	96288.	479763.	.99147	3900966.	40.51
35	.002030	.0101	95617.	475670.	.98796	3421203.	35.78
40	.002820	.0140	94651.	469943.	.97959	2945533.	31.12
45	.005454	.0269	93326.	460353.	.96250	2475590.	26.53
50	.009920	.0484	90815.	443087.	.93178	2015237.	22.19
55	.018640	.0891	86420.	412860.	.88579	1572150.	18.19
60	.030530	.1418	78724.	365708.	.82017	1159290.	14.73
65	.050480	.2241	67559.	299942.	.74252	793582.	11.75
70	.070720	.3005	52418.	222714.	.65817	493640.	9.42
75	.100300	.4010	36663.	146582.	.54350	270926.	7.39
80	.146400	.5359	21965.	80400.	.35340	124343.	5.66
85	.232000	1.0000	10195.	43943.	0.00000	43943.	4.31

OTHER FB MALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.007877	.0287	100000.	492827.	.98392	6609076.	66.09
5	.000622	.0031	97131.	484900.	.99719	6116249.	62.97
10	.000505	.0025	96829.	483536.	.99561	5631348.	58.16
15	.001257	.0063	96535.	481413.	.99263	5147812.	53.30
20	.001704	.0085	95980.	477864.	.99306	4666400.	48.62
25	.001081	.0054	95165.	474548.	.99307	4188536.	44.01
30	.001704	.0085	94653.	471256.	.99082	3713990.	39.24
35	.001985	.0099	93850.	466931.	.98610	3242734.	34.55
40	.003626	.0180	92923.	460440.	.97562	2773803.	29.87
45	.006281	.0309	91253.	449212.	.95743	2315363.	25.37
50	.011324	.0546	88432.	430090.	.91615	1866150.	21.10
55	.024360	.1148	83604.	394026.	.86281	1436060.	17.18
60	.035366	.1625	74006.	339971.	.80774	1042034.	14.08
65	.051427	.2278	61983.	274607.	.73882	702063.	11.33
70	.071796	.3044	47860.	202886.	.63110	427456.	8.93
75	.120052	.4617	33294.	128041.	.49744	224570.	6.75
80	.162780	.5785	17922.	63692.	.34018	96530.	5.39
85	.230060	1.0000	7555.	32837.	0.00000	32837.	4.35

OTHER FOREIGN MALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.010520	.0380	100000.	490512.	.97804	6437339.	64.37
5	.001070	.0053	96205.	479740.	.99514	5946828.	61.81
10	.000880	.0044	95691.	477407.	.99432	5467087.	57.13
15	.001400	.0070	95271.	474695.	.98517	4989681.	52.37
20	.004600	.0227	94607.	467656.	.97847	4514985.	47.72
25	.004100	.0203	92455.	457587.	.98019	4047330.	43.78
30	.003900	.0193	90579.	448524.	.97875	3589743.	39.63
35	.004700	.0232	88837.	438993.	.97557	3141219.	35.36
40	.005200	.0257	86767.	428267.	.97682	2702226	31.14
45	.004170	.0206	84540.	418338.	.96567	2273960.	26.90
50	.009900	.0483	82795.	403979.	.92828	1855621.	22.41
55	.020240	.0963	78796.	375095.	.87474	1451643.	18.42
60	.034141	.1573	71206.	328032.	.81984	1076638.	15.12
65	.046260	.2073	60007.	268933.	.76476	748606.	12.48
70	.062550	.2705	47566.	205669.	.71150	479673.	10.08
75	.074280	.3132	34702.	146333.	.58164	274004.	7.90
80	.160000	.5714	23832.	85114.	.33333	127671.	5.36
85	.240000	1.0000	10214.	42557.	0.00000	42557.	4.17

FRENCH NR FEMALES 197[illegible]

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004350	.0161	100000.	495987.	.99104	7586464.	75.06
5	.000350	.0017	98395.	491545.	.99838	7090477.	72.06
10	.000300	.0015	98223.	490746.	.99808	6598932.	67.18
15	.000470	.0023	98076.	4[illegible]9803.	.99808	6108166.	62.28
20	.000300	.0015	97845.	48886[illegible].	.99796	5618383.	57.42
25	.000518	.0026	97699.	487862.	.99381	5129522.	52.50
30	.001970	.0098	97446.	484843.	.99242	4641660.	47.63
35	.001070	.0053	96491.	481168.	.99313	4156817.	43.08
40	.001690	.0034	95976.	477862.	.98824	3675650.	38.30
45	.003050	.0151	95169.	472242.	.98124	3197788.	33.60
50	.004540	.0224	93728.	463382.	.97148	2725546.	29.08
55	.007070	.0347	91624.	450165.	.95615	2262165.	24.69
60	.010750	.0533	88442.	430426.	.92514	1811999.	20,49
65	.020530	.0976	83729.	398205.	.88204	1381574.	16.50
70	.030220	.1405	75553.	351232.	.80072	983368.	13.02
75	.061810	.2677	64939.	281238.	.66858	632137.	9.73
80	.105830	.4184	47556.	188031.	.46414	350899.	7.38
85	.169810	1.0000	27657.	162868.	0.00000	1628[illegible].	5.89

FRENCH NF FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.005940	.0218	100000.	494553.	.98760	7255056.	72.55
5	.000560	.0028	97821.	488421.	.99765	6760503.	69.11
10	.000380	.0019	97548.	487275.	.99755	6272082.	64.30
15	.000600	.0030	97362.	486083.	.99693	5784807.	59.42
20	.000630	.0031	97071.	484590.	.99661	5298725.	54.59
25	.000730	.0036	96765.	482946.	.99534	4814134.	49.75
30	.001140	.0057	96413.	480694.	.99313	4331187.	44.92
35	.001620	.0081	95865.	477391.	.98895	3850494.	40.17
40	.002630	.0141	95091.	472117.	.98326	3373103.	35.47
45	.003930	.0195	93755.	464216.	.97303	2900936.	30.94
50	.007050	.0346	91931.	451694.	.75841	2436770.	26.51
55	.010000	.0488	88747.	432910.	.93750	1985076.	22.37
60	.016000	.0769	84417.	405853.	.89888	1552166.	18.39
65	.027200	.1273	77924.	364812.	.83676	1146312.	14.71
70	.045530	.2044	68001.	305259.	.75019	781500.	11.49
75	.072510	.3069	54103.	229001.	.63431	476242.	8.80
80	.116290	.4505	37498.	145258.	.41248	247241.	6.59
85	.202050	1.0000	20606.	101983.	0.00000	101983.	4.95

FRENCH NB FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	LL(X)	S(X)	T(X)	E(Y)
0	.011550	.0415	100000.	489621.	.97692	6969387.	69.69
5	.000770	.0038	95849.	478322.	.99668	6479766	67.60
10	.000560	.0028	95450.	476734.	.99645	6001444.	62.87
15	.000861	.0043	95213.	475045.	.99516	5524710.	58.02
20	.001080	.0054	94805.	472747.	.99375	5049665.	53.26
25	.001430	.0071	94294.	469791.	.99169	4576915.	48.54
30	.001831	.0091	93622.	465980.	.98934	4107126.	43.87
35	.002461	.0122	92770.	461013.	.98530	3641146.	39.25
40	.003470	.0172	91636.	454237.	.97834	3180133.	34.70
45	.005310	.0262	90059.	444397.	.96859	2725896	30.27
50	.007490	.0368	87770.	431433.	.95399	2281499.	26.01
55	.011440	.0556	84476.	410634.	.93099	1850061.	21.91
60	.017360	.0832	79776.	382298.	.89431	1440427.	18.06
65	.027860	.1302	73141.	341893.	.83472	1058129.	14.47
70	.046040	.2064	63616.	285248.	.74629	716236.	11.26
75	.074290	.3433	50463.	212879.	.62149	430987.	8.54
80	.124920	.4760	34608.	132090.	.39438	218108.	6.29
85	.211210	1.0000	18168.	86017.	0.00000	86017.	4.73

BRITISH NB FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003000	.0111	100000.	497217.	.99371	7709482.	77.09
5	.000280	.0014	98888.	494092.	.99878	7212264.	72.93
10	.000210	.0010	98749.	493487.	.99853	6718172.	68.03
15	.000380	.0019	98646.	492760.	.99808	6224685.	63.10
20	.000390	.0019	98458.	491812.	.99793	5731926.	58.22
25	.000440	.0022	98266.	490793.	.99738	5240114.	53.33
30	.000610	.0030	98051.	489506.	.99623	4749321.	48.44
35	.000900	.0045	97752.	487662.	.99407	4259815.	43.58
40	.001480	.0074	97313.	484772.	.98987	3772153.	38.76
45	.002600	.0129	96596.	479359.	.98269	3287381.	34.03
50	.004400	.0218	95348.	471553.	.97434	2807522.	29.45
55	.006020	.0297	93273.	459451.	.96285	2335970.	25.04
60	.009180	.0449	90507.	442383.	.93221	1876519.	20.73
65	.019240	.0918	86446.	412395.	.88594	1434135.	16.59
70	.029780	.1386	78512.	365357.	.79911	1021741.	13.01
75	.063290	.2732	67631.	291961.	.66596	656383.	9.71
80	.105600	.4177	49153.	194435.	.46646	364422.	7.41
85	.168370	1.0000	28621.	169988.	0.00000	169988.	5.94

BRITISH NB FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004900	.0180	100000.	495489.	.99020	7512630.	75.13
5	.000280	.0014	98196.	490635.	.99885	7017191.	71.46
10	.000180	.0009	98058.	490071.	.99863	6526536.	66.56
15	.000370	.0018	97970.	[illegible]	.99808	6036485.	61.62
20	.000400	.0020	97789.	[illegible]	.99803	5547087.	56.73
25	.000390	.0019	97594.	[illegible]	.99763	5058631.	51.83
30	.000560	.0028	97403.	486337.	.99628	4571138.	46.93
35	.000930	.0046	97131.	484529.	[illegible]	4084302.	42.05
40	.001970	.0099	96681.	481010.	[illegible]	3600272.	37.24
45	.002470	.0123	95723.	475679.	.98394	3119263.	32.59
50	.004020	.0199	94548.	468038.	.97450	2643584.	27.96
55	.006340	.0312	92667.	456105.	.96285	[illegible]	23.48
60	.008850	.0433	89775.	439159.	.92263	1719440.	19.15
65	.023930	.1129	[illegible]	405202.	.84516	1280281.	14.91
70	.044970	.2021	76192.	342460.	.73210	875079.	11.49
75	.084950	.3503	60792.	250713.	.59861	532620.	8.76
80	.126300	.4800	39494.	150080.	.46762	281906.	7.14
85	.155800	1.0000	20538.	131826.	0.00000	131826.	6.42

BRITISH NB FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.006230	.0228	100000.	494293.	.98700	7291544.	72.92
5	.000590	.0029	97717.	487866.	.99715	6797251.	69.56
10	.000550	.0027	97429.	486477.	.99703	6309385.	64.76
15	.000640	.0032	97162.	485032.	.99648	5822908.	59.93
20	.000770	.0038	96851.	483326.	.99608	5337875.	55.11
25	.000800	.0040	96479.	481433.	.99526	4854550.	50.32
30	.001100	.0055	96094.	479152.	.99308	4373117.	45.51
35	.001680	.0084	95567.	475836.	.98961	3893965.	40.75
40	.002500	.0124	94767.	470894.	.98155	3418129.	36.07
45	.004970	.0245	93590.	462208.	.97152	2947235.	31.49
50	.006610	.0325	91293.	449045.	.96535	2485026.	27.22
55	.007510	.0369	88325.	433486.	.94315	2035981.	23.05
60	.016150	.0776	85069.	408840.	.90150	1602496.	18.84
65	.025790	.1211	78467.	368570.	.85487	1193656.	15.21
70	.037740	.1724	68961.	315078.	.77090	825086.	11.96
75	.069920	.2976	57070.	242893.	.63984	510007.	8.94
80	.115880	.4493	40087.	155412.	.41818	267114.	6.66
85	.197650	1.0000	22078.	111702.	0.00000	111702.	5.06

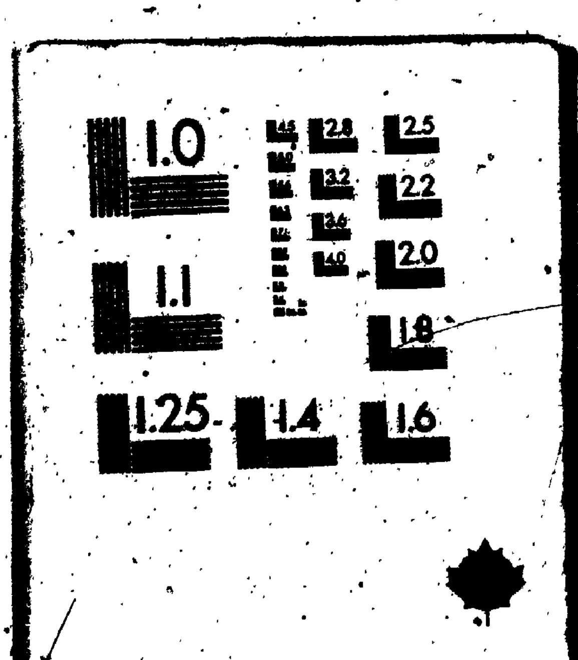
INDIAN NB-FEMALES, 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.012309	.0597	100000.	485073.	.96535	7144470.	71.44
5	.001608	.0080	94029.	468264.	.99443	6659397.	70.82
10	.000625	.0031	93276.	465654.	.99516	[illegible]191133.	66.37
15	.001318	.0066	92985.	463399.	.99179	5725480.	61.57
20	.001982	.0099	92374.	459595.	.98752	5262080.	56.96
25	.003050	.0151	91464.	453857.	.98380	4802485.	52.51
30	.003487	.0173	90079.	446504.	.977[illegible]	4348628.	48.28
35	.005661	.0279	88522.	436435.	.97108	3902124.	44.08
40	.006083	.0300	86052.	423813.	.96874	3465689.	40.27
45	.006627	.0326	83474.	410566.	.96664	3041876.	36.44
50	.006949	.0342	80753.	396869.	.96292	2631310.	32.58
55	.008187	.0401	77995.	382153.	.95262	2234440.	28.65
60	.011301	.0550	74866.	364046.	.93181	1852287.	24.74
65	.017144	.0822	70752.	339222.	.90448	1488241.	21.03
70	.023288	.1100	64937.	306820.	.86097	1149019.	17.69
75	.037542	.1716	57791.	264164.	.80922	842200.	14.57
80	.047911	.2139	47874.	213766.	.63019	578036.	12.07
85	.103309	1.0000	37632.	364270.	0.00000	364270.	9.68

INDIAN NB FEMALES, 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.025944	.0887	100000.	477834.	.95095	6488979.	64.89
5	.001120	.0056	91134.	454396.	.99558	6011145.	65.96
10	.000650	.0032	90625.	452388.	.99415	5556749.	61.32
15	.001699	.0085	90331.	449743.	.99088	5104361.	56.51
20	.001968	.0098	89567.	445640.	.98885	4654618.	51.97
25	.002519	.0125	88690.	440672.	.98253	4208978.	47.46
30	.004550	.0225	87579.	432972.	.97259	3768305.	43.03
35	.006595	.0324	85609.	421104.	.96973	3335333.	38.96
40	.005686	.0280	82832.	408[illegible]56.	.96755	2914229.	35.18
45	.007537	.0370	80510.	395107.	.96156	2505873.	31.12
50	.008153	.0400	77532.	379918.	.95212	2110766.	27.22
55	.011551	.0561	74435.	361729.	.92777	1730847.	23.25
60	.018690	.0893	70257.	335602.	.89702	1369118.	19.49
65	.025084	.1180	63984.	301043.	.87777	1033516.	16.15
70	.027125	.12[illegible]0	56433.	264245.	.81226	732474.	12.98
75	.059061	.2573	49265.	214635.	.69419	468229.	9.50
80	.091132	.3711	36589.	148997.	.41246	253594.	6.93
85	.219990	1.0000	23010.	104597.	0.00000	104597.	4.55

6 OF / DE 6



IND ABCRN FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.042584	.1924	100000.	451892.	.88335	5071870.	50.72
5	.004615	.0228	80757.	399178.	.97965	4619978.	57.21
10	.003597	.0178	78914.	391056.	.97642	4220800.	53.49
15	.005977	.0294	77508.	381834.	.96700	3829745.	49.41
20	.007468	.0367	75226.	369234.	.96381	3447911.	45.83
25	.007270	.0357	72468.	355873.	.96381	3078677.	42.48
30	.007478	.0367	69881.	342993.	.96132	2722804.	38.96
35	.008317	.0407	67316.	329725.	.95418	2379812.	35.35
40	.010490	.0511	64574.	314618.	.94478	2050087.	31.75
45	.012274	.0595	61273.	297246.	.94092	1735469.	28.32
50	.012071	.0586	57625.	279685.	.92850	1438223.	24.96
55	.017804	.0852	54249.	259686.	.91114	1158538.	21.36
60	.019468	.0928	49625.	236612.	.88251	898852.	18.11
65	.031192	.1447	45019.	208812.	.82179	662241.	14.71
70	.048785	.2174	38506.	171600.	.74956	453428.	11.78
75	.068559	.2926	30134.	128626.	.66760	281828.	9.35
80	.096464	.3886	21316.	85871.	.4[illegible]49	153202.	7.19
85	.193556	1.0000	13032.	67332.	0.00000	67332.	5.17

RESIDUAL NU FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003250	.0120	100000.	496990.	.99342	7597701.	75.98
5	.000210	.0010	98796.	493720.	.99885	7100711.	71.87
10	.000250	.0012	98692.	493153.	.99825	6606990.	66.95
15	.000450	.0022	98569.	492291.	.99793	6113837.	62.03
20	.000380	.0019	98347.	491270.	.99788	5621546.	57.16
25	.000470	.0023	98161.	490228.	.99636	5130276.	52.26
30	.000990	.0049	97930.	488443.	.99451	4640048.	47.38
35	.001200	.0060	97447.	485777.	.99194	4151606.	42.60
40	.002042	.0102	96864.	481859.	.98592	3665829.	37.85
45	.003640	.0180	95880.	475076.	.97862	3183970.	33.21
50	.005020	.0248	94151.	464918.	.96596	2708893.	28.77
55	.008900	.0435	91817.	449091.	.95043	2243975.	24.44
60	.011500	.0559	87820.	426828.	.92193	1794084.	20.4[illegible]
65	.021400	.1016	82911.	393504.	.88133	1368056.	16.50
70	.029380	.1377	74490.	346805.	.78442	974552.	13.08
75	.072220	.3059	64232.	272042.	.65463	627747.	9.77
80	.100710	.4023	44585.	178087.	.49934	355705.	7.98
85	.150040	1.0000	26650.	177618.	0.00000	177618.	6.66

RESIDUAL NB FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003950	.0146	100000.	496351.	.99178	7395567.	73.96
5	.000350	.0017	98540.	492271.	.99840	6897216.	70.01
10	.000290	.0014	98368.	491484.	.99793	6406745.	65.13
15	.000540	.0027	98226.	490466.	.99708	5915461.	60.22
20	.000630	.0031	97961.	489033.	.99676	5424996.	55.38
25	.000670	.0033	97653.	487447.	.99593	4935962.	50.55
30	.000960	.0048	97326.	485465.	.99380	4448516.	45.71
35	.001530	.0076	96860.	482454.	.99023	3963051.	40.92
40	.002400	.0119	96122.	477743.	.98428	3480596.	36.21
45	.003950	.0196	94975.	470233.	.97629	3002854.	31.62
50	.005670	.0280	93118.	459082.	.96326	2532621.	27.20
55	.009370	.0458	90515.	442215.	.94684	2073540.	22.91
60	.012560	.0609	86371.	418709.	.91723	1631324.	18.89
65	.022400	.1061	81112.	384054.	.86293	1212615.	14.95
70	.037580	.1718	72509.	331411.	.75473	828561.	11.43
75	.080200	.3340	60055.	250125.	.60855	497150.	8.28
80	.125510	.4777	39995.	152214.	.38381	247025.	6.18
85	.220340	1.0000	20891.	94811.	0.00000	94811.	4.54

RESIC AB FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.009300	.0337	100000.	491575.	.98117	7119836.	71.20
5	.000690	.0034	96630.	482318.	.99675	6628261.	68.59
10	.000610	.0030	96297.	480753.	.99661	6145943.	63.82
15	.000750	.0037	96004.	479121.	.99578	5665190.	59.01
20	.000940	.0047	95645.	477102.	.99526	5186069.	54.22
25	.000960	.0048	95196.	474841.	.99412	4708967.	49.47
30	.001400	.0070	94740.	472049.	.99179	4234126.	44.69
35	.001900	.0095	94079.	468173.	.98745	3762076.	39.99
40	.003160	.0157	93190.	462297.	.98094	3293903.	35.35
45	.004550	.0225	91729.	453487.	.97409	2831606.	30.87
50	.005970	.0294	89666.	441736.	.96239	2378119.	26.52
55	.009430	.0461	87029.	425120.	.93556	1936383.	22.25
60	.017470	.0837	83020.	397727.	.90407	1511263.	18.20
65	.023120	.1093	76071.	359573.	.85807	1113535.	14.64
70	.039220	.1786	67758.	308538.	.75056	753962.	11.13
75	.080680	.3357	55657.	231577.	.59337	445424.	8.00
80	.138150	.5134	36974.	137410.	.35744	213847.	5.78
85	.235360	1.0000	17990.	76438.	0.00000	76438.	4.25

BRITISH [illegible] FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.001660	.0062	100000.	498453.	.99567	7695666.	76.96
5	.000495	.0025	99331.	496293.	.99773	7197213.	72.42
10	.000414	.0021	99136.	495166.	.99742	6700920.	67.59
15	.000619	.0031	98931.	493839.	.99721	6205754.	62.73
20	.000499	.0025	98625.	492510.	.99751	5711865.	57.91
25	.000500	.0025	98379.	491282.	.99725	5219351.	53.05
30	.000600	.0030	98134.	489933.	.99607	4728073.	48.18
35	.000975	.0049	97840.	488007.	.99311	4238140.	43.32
40	.001794	.0089	97364.	484645.	.98817	3750131.	38.52
45	.002972	.0148	96494.	478913.	.98085	3265486.	33.84
50	.004773	.0236	95071.	469744.	.97067	2786572.	29.31
55	.007163	.0352	92827.	455968.	.95720	2316828.	24.96
60	.010402	.0507	89560.	436452.	.93325	1860861.	20.78
65	.017[illegible]	.0837	85021.	407320.	.89113	1424408.	16.75
70	.029274	.1364	77907.	362973.	.81074	1017088.	13.06
75	.057269	.2505	67282.	294277.	.69044	654115.	9.72
80	.096393	.3384	50429.	203181.	.43535	359838.	7.14
85	.196886	1.0000	30844.	156657.	0.00000	156657.	5.08

BRITISH FB FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003953	.0146	100000.	496348.	.99119	7625525.	76.26
5	.000586	.0029	98539.	491976.	.99721	7129177.	72.35
10	.000530	.0026	98251.	490605.	.99702	6637201.	67.55
15	.000663	.0033	97971.	489144.	.99714	6146597.	62.73
20	.000484	.0024	97667.	487743.	.99749	5657452.	57.93
25	.000520	.0026	97431.	486520.	.99710	5169709.	53.06
30	.000640	.0032	97178.	485112.	.99594	4683189.	48.19
35	.000990	.0049	96867.	483140.	.99303	4198077.	43.34
40	.001809	.0090	96389.	479774.	.98800	3714937.	38.54
45	.003026	.0150	95521.	474019.	.98050	3235163.	33.87
50	.004868	.0240	94087.	464776.	.97014	2761144.	29.35
55	.007395	.0358	91824.	450897.	.95671	2296368.	25.01
60	.010476	.0510	88535.	431376.	.93289	1845471.	20.84
65	.017546	.0840	84016.	402426.	.88797	1414095.	16.83
70	.030704	.1426	76955.	357344.	.82067	1011670.	13.15
75	.049991	.2222	65983.	293263.	.70021	654326.	9.92
80	.099865	.3996	51322.	205345.	.43128	361064.	7.04
85	.197892	1.0000	30816.	155719.	0.00000	155719.	5.05

BRITISH FECRA FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004303	.0213	100000.	494678.	.98727	7290797.	72.91
5	.000799	.0040	97871.	488381.	.99593	6796118.	69.44
10	.000831	.0041	97481.	486395.	.99633	6307737.	64.71
15	.000638	.0032	97077.	484612.	.99610	5821341.	59.97
20	.000927	.0046	96768.	482720.	.99555	5336730.	55.15
25	.000858	.0043	96320.	480571.	.99458	4854009.	50.39
30	.001318	.0066	95908.	477965.	.99200	4373438.	45.60
35	.001899	.0095	95278.	474139.	.98766	3895473.	40.89
40	.003075	.0153	94378.	468288.	.98151	3421334.	36.25
45	.004403	.0218	92936.	459629.	.97481	2953046.	31.77
50	.005819	.0287	90914.	448052.	.96390	2493417.	27.43
55	.008944	.0437	88307.	431877.	.94366	2045365.	23.16
60	.014405	.0695	84444.	407543.	.91277	1613489.	19.11
65	.022447	.1063	78573.	371991.	.86100	1205945.	15.35
70	.038506	.1756	70223.	320284.	.77081	833954.	11.85
75	.068978	.2942	57890.	246879.	.64166	513670.	8.87
80	.115865	.4493	40861.	158412.	.40623	266791.	6.53
85	.207638	1.0000	22504.	108379.	0.00000	108379.	4.82

UNITED STATES FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.007340	.0268	100000.	493303.	.98428	7421661.	74.22
5	.000870	.0043	97321.	485550.	.99554	6928358.	71.19
10	.000920	.0046	96899.	483382.	.99549	6442807.	66.49
15	.000890	.0044	96454.	481200.	.99514	5959425.	61.79
20	.001060	.0053	96026.	478860.	.99486	5478225.	57.05
25	.001000	.0050	95518.	476400.	.99490	4999365.	52.34
30	.001047	.0052	95042.	473969.	.99341	4522965.	47.59
35	.001600	.0080	94546.	470845.	.99040	4048997.	42.83
40	.002260	.0112	93792.	466326.	.98646	3578152.	38.15
45	.003200	.0159	92738.	460012.	.97717	3111826.	33.55
50	.006070	.0299	91266.	449510.	.95917	2651814.	29.06
55	.010700	.0521	88538.	431155.	.94750	2202304.	24.87
60	.010870	.0529	83924.	408521.	.92456	1771148.	21.10
65	.020880	.0992	79484.	377703.	.88008	1362628.	17.14
70	.030780	.1429	71597.	332408.	.83417	984925.	13.76
75	.042620	.1926	61366.	277285.	.72814	652517.	10.63
80	.090910	.3700	49548.	201903.	.46193	375232.	7.57
85	.180080	1.0000	31213.	173329.	0.00000	173329.	5.55

470

UNITED STATES FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.007957	.0390	100000.	490248.	.97746	7303566.	73.04
5	.001085	.0054	96099.	479196.	.99493	6813319.	70.90
10	.000949	.0047	95579.	476765.	.99535	6334123.	66.27
15	.000916	.0046	95127.	474547.	.99488	5857358.	61.57
20	.001138	.0057	94692.	472117.	.99475	5382811.	56.85
25	.000969	.0048	94155.	469636.	.99515	4910694.	52.16
30	.000977	.0049	93700.	467357.	.99319	4441058.	47.40
35	.001759	.0088	93243.	464174.	.98995	3973701.	42.62
40	.002283	.0114	92427.	459510.	.98676	3509527.	37.97
45	.003055	.0152	91374.	453425.	.98001	3050017.	33.38
50	.005043	.0249	89992.	444359.	.96656	2596592.	28.85
55	.008623	.0422	87751.	429498.	.94567	2152233.	24.53
60	.013864	.0670	84048.	406162.	.91971	1722734.	20.50
65	.019845	.0945	78417.	373551.	.87648	1316573.	16.79
70	.033729	.1555	71004.	327410.	.80795	943021.	13.28
75	.053334	.2353	59960.	264531.	.69185	615611.	10.27
80	.101070	.4034	45852.	183016.	.47873	351080.	7.66
85	.162763	1.0000	27355.	168064.	0.00000	168064.	6.14

UNITED STATES FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.010430	.0378	100000.	490538.	.97829	7037975.	70.38
5	.000990	.0049	96215.	479888.	.99621	6547437.	68.05
10	.000530	.0026	95740.	478067.	.99336	6067549.	63.38
15	.002140	.0106	95487.	474893.	.99202	5589482.	58.54
20	.001060	.0053	94470.	471104.	.99447	5114589.	54.14
25	.001160	.0058	93971.	468497.	.99442	4643486.	49.41
30	.001080	.0054	93428.	465880.	.99133	4174989.	44.69
35	.002410	.0120	92924.	461840.	.98570	3709109.	39.92
40	.003360	.0167	91811.	455233.	.98120	3247270.	35.37
45	.004240	.0210	90282.	446674.	.97219	2792037.	30.93
50	.007080	.0348	88388.	434253.	.95954	2345362.	26.53
55	.009490	.0464	85313.	416681.	.94060	1911109.	22.40
60	.015170	.0731	81359.	391931.	.90370	1494428.	18.37
65	.025840	.1214	75413.	354187.	.84457	1102496.	14.62
70	.043020	.1942	66261.	299135.	.75433	748309.	11.29
75	.073240	.3095	53393.	225647.	.63193	449175.	8.41
80	.117080	.4529	36866.	142594.	.36208	223528.	6.06
85	.249230	1.0000	20171.	80934.	0.00000	80934.	4.01

OTHER EUROP FEMALES 1971

AGE	DEATH RATE	Q(X)	L(X)	C_(X)	S(X)	T(X)	E(X)
0	.001534	.0069	100000.	498292.	.99542	7667486.	76.67
5	.000463	.0023	99317.	496011.	.99796	7169193.	72.18
10	.000353	.0018	99087.	495000.	.99760	6673183.	67.35
15	.000609	.0030	98913.	493811.	.99719	6178163.	62.46
20	.000517	.0026	98612.	492423.	.99753	5684372.	57.64
25	.000472	.0024	98357.	491207.	.99735	5191949.	52.79
30	.000588	.0029	98123.	489907.	.99649	4700743.	47.91
35	.000817	.0041	97537.	488190.	.99483	4210836.	43.04
40	.001258	.0063	97438.	485665.	.99165	3722646.	38.21
45	.002100	.0104	96828.	481609.	.98564	3236982.	33.43
50	.003698	.0183	95816.	474692.	.97678	2755372.	28.76
55	.005724	.0282	94041.	463669.	.96178	2280680.	24.25
60	.009944	.0485	91407.	445947.	.93179	1817012.	19.88
65	.018608	.0889	86972.	415530.	.86552	1371065.	15.76
70	.040650	.1845	79240.	359650.	.76477	955534.	12.06
75	.069880	.2974	64620.	275050.	.66046	595884.	9.22
80	.099[illegible]5	.3995	45400.	181659.	.43379	320834.	7.07
85	.195896	1.0000	27264.	139175.	0.00000	139175.	5.10

EUROP FR FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.003008	.0112	100000.	497211.	.99321	7521925.	75.22
5	.000476	.0024	98885.	493835.	.99771	7024714.	71.04
10	.000359	.0018	98650.	492805.	.99736	6530879.	66.20
15	.000700	.0035	98473.	491503.	.99693	6038073.	61.32
20	.000529	.0026	98129.	489995.	.99747	5546570.	56.52
25	.000483	.0024	97869.	488757.	.99728	5056576.	51.67
30	.000606	.0030	97633.	487428.	.99613	4567819.	46.79
35	.000925	.0046	97338.	485567.	.99391	4080391.	41.92
40	.001520	.0076	96887.	482610.	.98972	3594825.	37.10
45	.002620	.0130	96155.	477647.	.98345	3112215.	32.37
50	.004068	.0201	94904.	469741.	.96338	2634568.	27.76
55	.010982	.0534	92993.	452540.	.94880	2164826.	23.28
60	.010098	.0492	88023.	429278.	.93343	1712287.	19.45
65	.017709	.0848	83688.	400701.	.85271	1283009.	15.33
70	.048325	.2156	76592.	341681.	.74112	882308.	11.52
75	.074520	.3141	60080.	253226.	.64988	540626.	9.00
80	.100833	.4027	41210.	164566.	.42740	287400.	6.97
85	.200403	1.0000	24616.	122834.	0.00000	122834.	4.99

EURCP FBCRN FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.004095	.0203	100000.	494933.	.98756	7302721.	73.03
5	.000891	.0044	97973.	488777.	.99618	6807788.	69.49
10	.000640	.0032	97538.	486510.	.99635	6319010.	64.79
15	.000823	.0041	97226.	485132.	.99573	5832100.	59.98
20	.000890	.0044	96827.	483060.	.99582	5346968.	55.22
25	.000785	.0039	96397.	481041.	.99516	4863908.	50.46
30	.001158	.0058	96019.	478711.	.99270	4382868.	45.65
35	.001774	.0038	95465.	475217.	.98904	3904157.	40.90
40	.002637	.0131	94622.	470011.	.98444	3428940.	36.24
45	.003643	.0181	93383.	462699.	.97668	2958929.	31.69
50	.005822	.0287	91697.	451907.	.96278	2496230.	27.22
55	.009417	.0460	89066.	435087.	.94020	2044323.	22.95
60	.015426	.0743	84969.	409068.	.90671	1609236.	18.94
65	.024142	.1138	78658.	370906.	.85307	1200169.	15.26
70	.040594	.1843	69704.	316409.	.76861	829263.	11.90
75	.067604	.2892	56860.	243196.	.65545	512853.	9.02
80	.107125	.4225	40419.	159403.	.40887	269658.	6.67
85	.211716	1.0000	23343.	110254.	0.00000	110254.	4.72

OTHER FB FEMALES 1971

AGE	DEATH RATE	G(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.002113	.0079	100000.	498035.	.99469	7499761.	75.00
5	.000547	.0027	99214.	495392.	.99757	7001726.	70.57
10	.000426	.0021	98943.	494138.	.99783	6506335.	65.76
15	.000442	.0022	98732.	493117.	.99785	6012147.	60.39
20	.000417	.0021	98514.	492059.	.99815	5519030.	56.02
25	.000322	.0016	98309.	491151.	.99669	5026971.	51.13
30	.001007	.0050	98151.	489523.	.99470	4535320.	46.21
35	.001117	.0056	97658.	486931.	.99138	4046297.	41.43
40	.002752	.0117	97114.	482733.	.98455	3559366.	36.65
45	.003888	.0193	95979.	475274.	.97629	3076634.	32.06
50	.005731	.0283	94131.	464007.	.96423	2601359.	27.64
55	.008872	.0434	91472.	447435.	.94287	2137353.	23.37
60	.014827	.0715	87502.	421673.	.91165	1689916.	19.31
65	.022502	.1065	81247.	384599.	.87463	1268046.	15.61
70	.031610	.1465	72593.	336381.	.76077	883446.	12.17
75	.084233	.3479	61960.	255909.	.63099	547065.	8.83
80	.100435	.4014	40404.	161475.	.44540	291156.	7.21
85	.186503	1.0000	24186.	129682.	0.00000	129682.	5.36

OTHER FR FEMALES 1964

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.005469	.0201	100000.	494976.	.98846	7310317.	73.10
5	.000564	.0028	97990.	489262.	.99752	6815343.	69.55
10	.000430	.0021	97714.	488047.	.99857	6326081.	64.74
15	.000144	.0007	97505.	487347.	.99835	5838034.	59.87
20	.000518	.0026	97434.	486542.	.99765	5350687.	54.92
25	.000423	.0021	97182.	485398.	.99644	4864145.	50.05
30	.001005	.0050	96977.	483670.	.99463	4378747.	45.15
35	.001150	.0057	96491.	481072.	.99122	3895077.	40.37
40	.002382	.0118	95938.	476849.	.98435	3414005.	35.59
45	.003941	.0195	94802.	469385.	.97576	2937157.	30.98
50	.005898	.0291	92952.	458007.	.96383	2467772.	26.55
55	.008891	.0435	90251.	441441.	.94229	2009765.	22.27
60	.015063	.0726	86326.	415965.	.91076	1568324.	18.17
65	.022653	.1072	80060.	378846.	.87362	1152359.	14.39
70	.031934	.1479	71478.	330968.	.71900	773514.	10.82
75	.111913	.4372	60909.	237966.	.54460	442546.	7.27
80	.128985	.4677	34277.	129597.	.36652	204580.	5.97
85	.234207	1.0000	17561.	74982.	0.00000	74982.	4.27

RESIDUAL FB FEMALES 1951

AGE	DEATH RATE	Q(X)	L(X)	CL(X)	S(X)	T(X)	E(X)
0	.010520	.0380	100000.	490512.	.97838	6761526.	67.62
5	.000930	.0046	96205.	479908.	.99740	6271014.	65.18
10	.000111	.0006	95758.	478659.	.99785	5791106.	60.49
15	.000750	.0037	95705.	477631.	.99571	5312447.	55.51
20	.000970	.0048	95347.	475582.	.99558	4834816.	50.71
25	.000800	.0040	94886.	473482.	.99131	4359234.	45.94
30	.002700	.0134	94507.	469367.	.98610	3885752.	41.12
35	.002900	.0144	93240.	462843.	.98465	3416386.	36.64
40	.003290	.0163	91897.	455739.	.98009	2953543.	32.14
45	.004770	.0236	90398.	446664.	.97359	2497804.	27.63
50	.005950	.0293	88267.	434869.	.96201	2051140.	23.24
55	.009610	.0469	85680.	418349.	.92093	1616272.	18.86
60	.023910	.1128	81660.	385269.	.76767	1197923.	14.67
65	.089910	.3670	72448.	295760.	.70636	812654.	11.22
70	.039000	.1777	45856.	208912.	.76972	516894.	11.27
75	.069000	.2942	37709.	160804.	.60182	307982.	8.17
80	.150000	.5455	26613.	96775.	.34247	147178.	5.53
85	.240000	1.0000	12097.	50404.	0.00000	50404.	4.17

APPENDIX K

LOGIT EQUATIONS FOR THE TOTAL NATIVE AND FOREIGN-BORN POPULATIONS AND THEIR SUBGROUPS

TABLE K.1 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO AGE, SEX AND CAUSE OF DEATH AMONG THE NATIVE AND FOREIGN-BORN POPULATIONS, 1951, 1964 AND 1971; ADDITIVE MAIN EFFECTS

	NATIVE-BORN						FOREIGN-BORN					
	1951		1964		1971		1951		1964		1971	
VARIABLES	α	β	α	β	α	β	α	β	α	β	α	β
AGE	-6.526		-6.748		-6.806		-6.542		-6.556		-6.888	
0-4		.294		-.040		-.386		-.144		-.156		-.556
5-9		-2.188		-2.530		-2.556		-2.016		-2.000		-2.088
10-14		-2.394		-2.772		-2.690		-2.030		-2.391		-2.092
15-19		-1.948		-1.994		-1.770		-1.514		-1.630		-1.532
20-24		-1.684		-1.704		-1.540		-1.520		-1.621		-1.584
25-29		-1.654		-1.816		-1.652		-1.714		-1.800		-1.818
30-34		-1.470		-1.554		-1.478		-1.558		-1.657		-1.690
35-39		-1.190		-1.206		-1.158		-1.220		-1.326		-1.402
40-44		-.772		-.752		-.886		-.844		-.883		-.904
45-49		-.302		-.404		-.262		-.416		-.500		-.402
50-54		.124		.118		.224		.024		-.200		.084
55-59		.552		.599		.656		.478		.336		.600
60-64		.982		.862		1.152		.922		.785		1.036
65-69		1.364		1.503		1.598		1.336		1.340		1.526
70-74		1.828		2.099		2.026		1.784		1.834		1.968
75-79		2.314		2.643		2.454		2.288		2.668		2.430
80-84		2.790		3.172		2.892		2.764		3.278		2.898
85+		3.358		3.776		3.376		3.378		3.923		3.528
SEX												
MALE		.136		.218		.262		.168		.176		.246
FEMALE		-.136		-.218		-.262		-.168		-.176		-.246
CAUSE												
NEOPLASMS		-.386		-.172		.006		.016		.118		.164
CARDIOVASCULAR		.760		.896		.822		1.098		1.160		1.106
ACCIDENTS-VIOLENCE		-1.106		-1.110		-1.136		-1.284		-1.424		-1.404
ALL OTHER		.734		.386		.308		.170		.148		.132

TABLE K.2 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO AGE, SEX AND CAUSE OF DEATH, EIGHT SUBPOPULLATIONS: ADDITIVE MAIN EFFECTS, 1951.

	FRENCH NB		BRITISH NB		NATIVE INDIANS		RESIDUAL NB		BRITISH FB		U. S. A.		OTHER EUROPE FB		OTHER FB	
VARIABLES	α	β	α	β	α	β	α	β	α	β	α	β	α	β	α	β
AGE	-6.482		-6.918		-5.990		-6.028		-6.638		-6.372		-6.520		-5.556	
0-4		.476		-1.118		.922		-.142		-.364		.554		-.418		-.596
5-9		-2.170		-2.408		-1.354		-2.746		-2.046		-1.938		-1.826		-1.552
10-14		-2.430		-2.330		-1.546		-2.938		-1.680		-2.134		-1.946		-2.230
15-19		-1.992		-1.962		-1.048		-2.530		-1.342		-1.242		-1.572		-2.044
20-24		-1.716		-1.710		-.810		-2.156		-1.690		-1.550		-1.506		-1.216
25-29		-1.566		-1.556		-.822		-2.126		-1.782		-1.572		-1.714		-1.180
30-34		-1.402		-1.218		-.834		-1.938		-1.570		-1.742		-1.520		-.994
35-39		-1.132		-.818		-.784		-1.620		-1.236		-1.128		-1.268		-1.120
40-44		-.752		-.432		-.724		-1.156		-.870		-.812		-.860		-.834
45-49		-.298		-.022		-.388		-.616		-.386		-.484		-.442		-.176
50-54		.124		.316		-.432		.132		.040		-.104		.034		-.122
55-59		.528		.664		-.142		1.088		.470		.316		.500		.278
60-64		.936		1.038		.288		1.820		.914		.742		.946		.688
65-69		1.328		1.348		.672		2.266		1.312		1.240		1.372		1.174
70-74		1.796		1.776		1.160		2.480		1.776		1.660		1.814		1.610
75-79		2.260		2.276		1.466		3.124		2.302		2.150		2.294		2.196
80-84		2.748		2.766		1.870		3.368		2.780		2.680		2.734		2.908
85+		3.272		3.390		2.508		3.692		3.372		3.366		3.382		3.214
SEX																
MALE		.132		.216		.132		.140		.170		.166		.164		.014
FEMALE		-.132		-.216		-.132		-.140		-.170		-.166		-.164		-.014
CAUSE																
NEOPLASMS		-.336		-.198		-1.154		-.580		.134		-.160		-.064		-.152
CARDIOVASCULAR		.604		.266		-.118		.408		1.212		1.032		.962		.344
ACCIDENTS-VIOLENCE		-1.236		-.686		-.394		-.838		-1.476		-1.282		-1.024		-.698
ALL OTHER		.970		.618		1.666		1.010		.130		.410		.126		.506

TABLE K.3 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO AGE, SEX AND CAUSE OF DEATH, EIGHT SUBPOPULATIONS: ADDITIVE MAIN EFFECTS, 1964.

VARIABLES	FRENCH NB		BRITISH NB		NATIVE INDIANS		RESIDUAL NB		BRITISH FB		U. S. A.		OTHER EUROPE FB		OTHER FB	
	α	β	α	β	α	β	α	β	α	β	α	β	α	β	α	β
AGE	-6.518		-7.278		-6.154		-6.340		-7.166		-6.518		-7.038		-6.542	
0-4		-.120		-1.160		.920		-.682		.072		-.004		-.212		-1.02
5-9		-2.332		-2.538		-1.968		-3.076		-2.298		-1.572		-1.968		-2.022
10-14		-2.704		-2.702		-2.494		-3.216		-2.460		-1.932		-2.552		-2.486
15-19		-2.016		-1.990		-1.612		-2.420		-1.492		-1.342		-1.664		-2.204
20-24		-1.770		-1.678		-1.208		-2.088		-1.500		-1.180		-1.682		-1.888
25-29		-1.868		-1.610		-1.172		-2.192		-2.308		-1.488		-1.796		-2.248
30-34		-1.506		-1.242		-.838		-1.902		-2.078		-1.596		-1.826		-1.678
35-39		-1.214		-.832		-.624		-1.524		-1.384		-.984		-1.360		-1.518
40-44		-.744		-.388		-.528		-1.044		-.746		-.930		-.796		-.894
45-49		-.310		.024		-.338		-.522		-.502		-.556		-.730		-.372
50-54		.274		.422		-.100		.126		.094		-.074		-.036		.128
55-59		.684		.752		.216		.630		.710		.418		.562		.922
60-64		1.128		1.050		.618		1.428		1.216		.794		1.196		1.264
65-69		1.532		1.430		.938		2.184		1.520		1.120		1.536		1.614
70-74		1.994		1.874		1.192		3.026		1.956		1.626		2.046		2.168
75-79		2.518		2.336		1.820		3.646		2.556		2.082		2.638		2.690
80-84		2.956		2.842		2.206		3.684		3.066		2.566		3.096		3.024
85+		3.574		3.416		2.946		3.942		3.576		3.050		3.548		3.598
SEX																
MALE		.206		.320		.146		.066		.236		.238		.230		.198
FEMALE		-.206		-.320		-.146		-.066		-.236		-.238		-.230		-.198
CAUSE																
NEOPLASMS		-.122		-.006		-.978		-.080		.190		-.026		.112		-.012
CARDIOVASCULAR		.906		.118		-.022		.550		1.318		1.122		1.112		1.002
ACCIDENTS-VIOLENCE		-1.184		-.626		-.212		-.982		-1.668		-1.498		-1.180		-1.222
ALL OTHER		.400		.514		1.212		.512		.160		.402		.036		.232

TABLE K.4 LOGIT REGRESSION ANALYSIS OF THE ODDS OF DYING DUE TO AGE, SEX AND CAUSE OF DEATH, EIGHT SUBPOPULATIONS; ADDITIVE MAIN EFFECTS, 1971.

VARIABLES	FRENCH NB		BRITISH NB		NATIVE INDIANS		RESIDUAL NB		BRITISH FB		U. S. A.		OTHER EUROPE FB		OTHER FB	
	α	β	α	β	α	β	α	β	α	β	α	β	α	β	α	β
AGE	-6.502		-7.174		-6.298		-6.494		-7.078		-6.378		-6.946		-6.488	
0-4		-.430		-1.392		.192		-.686		-.808		-2.18		-.746		-1.152
5-9		-2.424		-2.241		-2.342		-3.140		-2.084		-2.000		-2.172		-2.256
10-14		-2.642		-2.373		-2.336		-3.050		-2.282		-1.848		-2.126		-2.314
15-19		-1.802		-1.384		-1.356		-2.044		-1.520		-1.106		-1.622		-1.898
20-24		-1.546		-1.580		-.916		-1.856		-1.736		-1.186		-1.520		-1.990
25-29		-1.718		-1.698		-.764		-1.954		-1.746		-1.470		-1.798		-2.174
30-34		-1.526		-1.544		-.798		-1.696		-1.826		-1.242		-1.682		-1.696
35-39		-1.236		-1.172		-.474		-1.376		-1.536		-1.190		-1.384		-1.234
40-44		-.722		-.680		-.296		-.868		-.858		-.734		-.940		-.820
45-49		-.290		-.270		-.126		-.402		-.276		-.320		-.466		-.078
50-54		.224		.236		.018		.064		.210		.900		-.010		.270
55-59		.678		.650		.198		.546		.722		.532		.506		.762
60-64		1.138		1.172		.516		1.064		1.168		.656		1.022		1.208
65-69		1.576		1.626		.940		1.520		1.608		1.152		1.558		1.764
70-74		1.986		2.042		1.284		2.344		1.008		1.524		2.064		2.178
75-79		2.438		2.434		1.742		3.202		2.474		1.892		2.566		2.600
80-84		2.870		2.868		2.000		4.146		2.916		2.404		3.062		3.124
85+		3.424		3.410		2.512		4.188		3.566		3.062		3.694		3.706
SEX																
MALE		.262		.310		.174		.120		.262		.270		.238		.072
FEMALE		-.262		-.310		-.174		-.120		-.262		-.270		-.238		-.072
CAUSE																
NEOPLASMS		.072		.048		-.770		-.190		.262		-.012		.076		.460
CARDIOVASCULAR		.838		.948		.046		.582		1.280		1.076		1.004		.740
ACCIDENTS-VIOLENCE		-1.228		-1.236		-.064		-.900		-1.594		-1.236		-1.308		-1.214
ALL OTHER		.318		.240		.788		.438		.052		.174		.228		.014

APPENDIX L

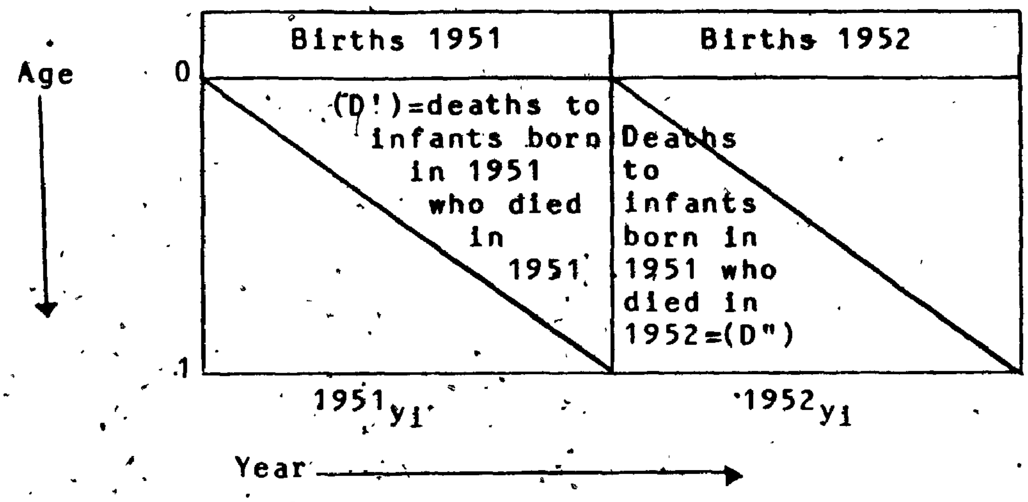
INFANT MORTALITY TO NATIVE AND FOREIGN-BORN WOMEN, 1951 AND 1975

Infant mortality data corresponding to mothers of native and foreign-born origin could only be utilized for 1951 and 1975. The main reasons for this are: (1) the coding of the mother's nativity was most complete during and around these years; (2) the data on births, the denominators, were also most complete with regards to the mother's nativity during the some periods. Only information on nativity was considered as the ethnic variable posed problems due to the extreme number of missing cases. Table K.1 displays the distribution of infant deaths by year of birth, year of death, length of life in months, sex of the infant, and nativity of the mother. The table was derived by utilizing available vital statistics data. Unfortunately, the degree of completeness as regards nativity has varied from province to province and from year to year. A perusal of the data revealed that the best periods of data completeness were 1951 and 1952, and 1974 to 1975. In other words, both birth and death statistics broken down by the origin of the mother tended to be most complete during these periods.

Many missing cases were present and subsequently were apportioned to the known distribution of infant deaths, for mortality (see Table L.1.), and to the distribution of known births, for the births missing cases (see Table L.2).

A major problem with this technique of apportioning missing cases is that it assumes the distribution of unknown cases is the same as the distribution of known cases. It may be that the missing cases are not randomly distributed at all. The absolute number of unclassified cases ranges from a low of three percent in 1[illegible]1, to a high of 71 percent in 1975. Thus the degree of possible error is increased significantly in the latter point of observation. All of these problems need to be considered in the evaluation of the data. It is felt that given the constraints, the methods adopted are adequate and appropriate. (Table L.2 displays assumptions introduced in the adjustments).

The infant mortality rates were calculated by the birth cohort method. Both year of birth and year of death of infants were taken into account. In other words, the rates are not period but cohort measures as depicted in the Lexis diagram example below.



Thus, the infant mortality rates is:

$$IMR_{yi} = \frac{(D'_{yi} + D''_{yj})}{B_{yi}} \times 1000 \qquad \ldots.(1)$$

where:

IMR_{yi} = Infant Mortality rate in year i;

D'_{yi} = Infant deaths in year i to infants born in year i;

D'_{yj} = Infant deaths in year j to infants born in year i;

B_{yi} = Births in year i.

TABLE L.1 DISTRIBUTION OF MALE AND FEMALE INFANT DEATHS BY YEAR OF BIRTH AND DEATH CLASSIFIED BY LENGTH OF LIFE IN MONTHS AND BY THE NATIVITY OF THE MOTHER, CANADA, 1951 AND 1975

LENGTH OF LIFE IN MONTHS BY YEAR OF DEATH	NATIVE-BORN MOTHER				FOREIGN-BORN MOTHER			
	1951		1975		1951		1975	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1951								
0	3594	3474	1522	1128	329	315	240	164
1	1109	458	224	197	120	56	28	27
2	561	213	167	93	73	43	16	12
3	325	143	92	66	49	29	10	7
4	207	90	59	53	34	21	6	5
5	144	64	37	22	27	13	3	5
6	89	56	29	18	19	10	3	2
7	54	26	14	13	18	13	1	0
8	52	23	6	11	16	8	0	0
9	33	17	8	2	14	7	0	0
10	18	9	3	1	12	4	0	0
11	10	3	2	1	7	2	0	0
TOTAL	6,196	4,576	2,162	1,605	718	521	307	222
1952								
0	88	76	17	15	27	12	6	5
1	99	88	37	30	41	30	10	3
2	146	125	35	23	34	26	8	7
3	109	10[illegible]	34	11	26	20	4	4
4	129	119	24	20	29	16	3	3
5	116	99	30	17	21	18	1	2
6	120	66	18	16	22	14	2	1
7	100	55	13	17	20	12	0	0
8	88	66	13	16	14	10	0	0
9	98	65	20	14	10	9	0	0
10	80	50	18	12	8	7	0	0
11	33	27	16	10	6	5	0	0
TOTAL	1,206	936	275	202	258	179	34	25
OVERALL TOTAL	7,402	5,512	2,437	1,807	976	700	341	247
TOTAL %	(88.3)	(88.7)	(87.7)	(87.9)	(11.7)	(11.3)	(12.3)	(12.1)

TABLE L.2 DISTRIBUTION OF MALE AND FEMALE BIRTHS BY NATIVITY OF THE MOTHER AND ADJUSTMENTS FOR MISSING CASES, CANADA, 1951 AND 1975

		MOTHER'S NATIVITY				MOTHER'S NATIVITY MISSING		TOTAL BIRTHS	
		NATIVE-BORN		FOREIGN-BORN					
YEAR		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1951	(N)	170,737	161,355	18,555	17,451	5,970	5,726	195,262	184,532
	(%)	(87.44)	(87.44)	(9.50)	(9.46)	(3.06)	(3.10)	(100.0)	(100.0)
ADJUSTMENT: ASSUMING ALL MISSING CASES BELONG TO THE FOREIGN-BORN									
	(N)	170,737	161,355	24,525	23,177	--	--	195,262	184,532
	(%)	(87.44)	(87.44)	(12.56)	(12.56)	--	--	(100.0)	(100.0)
1975	(N)	42,400	40,702	10,306	9,535	131,288	124,054	183,994	174,291
	(%)	(23.04)	(23.35)	(5.60)	(5.47)	(71.35)	(71.18)	(100.0)	(100.0)
ADJUSTMENT: ASSUMING SAME DISTRIBUTION AS 1951									
	(N)	160,884	152,400	23,110	21,891	--	--	183,994	174,291
	(%)	(87.44)	(87.44)	(12.56)	(12.56)	--	--	(100.0)	(100.0)

APPENDIX M.

NATIONAL POPULATIONS, DEATHS AND LIFE TABLES FROM PRESTON AND COLLEAGUES AND UPDATED 1971 FIGURES FROM THE UNITED NATIONS DEMOGRAPHIC YEARBOOK.

752 UNITED STATES 1950 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	1612971	59759	.03705	.00004	.00019	.00014	.00013	.00313	.00121	.00008	.00000	.02219	.00005	.00123	.00782	0
1	6678924	10075	.00151	.00002	.00023	.00014	.00003	.00023	.00005	.00003	.00000	.00000	.00013	.00030	.00038	1
5	6155887	4770	.00071	.00000	.00008	.00005	.00003	.00004	.00001	.00002	.00000	.00000	.00012	.00018	.00013	5
10	5656708	4010	.00070	.00001	.00006	.00007	.00005	.00003	.00000	.00003	.00000	.00000	.00011	.00024	.00011	10
15	5347165	7483	.00140	.00005	.00006	.00010	.00009	.00003	.00000	.00005	.00000	.00000	.00046	.00042	.00014	15
20	5644000	10879	.00193	.00010	.00006	.00011	.00012	.00004	.00001	.00007	.00003	.00000	.00066	.00061	.00015	20
25	6012159	11792	.00196	.00015	.00006	.00016	.00021	.00004	.00001	.00010	.00000	.00000	.00046	.00063	.00016	25
30	5662416	13356	.00236	.00020	.00006	.00022	.00042	.00005	.00001	.00014	.00000	.00000	.00035	.00068	.00023	30
35	5554502	18511	.00333	.00027	.00008	.00035	.00092	.00008	.00001	.00024	.00000	.00000	.00033	.00074	.00033	35
40	5104261	26946	.00528	.00037	.00011	.00061	.00202	.00015	.00001	.00041	.00000	.00000	.00032	.00081	.00046	40
45	4556718	38112	.00836	.00046	.00018	.00117	.00365	.00022	.00002	.00059	.00000	.00000	.00033	.00088	.00068	45
50	4156256	54339	.01307	.00060	.00024	.00206	.00678	.00031	.00003	.00083	.00000	.00000	.00034	.00096	.00091	50
55	3454211	72229	.01977	.00070	.00031	.00340	.01087	.00045	.00003	.00115	.00000	.00000	.00041	.00110	.00134	55
60	3058334	88345	.02889	.00076	.00018	.00515	.01668	.00066	.00006	.00160	.00000	.00000	.00046	.00119	.00195	60
65	2440735	99809	.04089	.00019	.00045	.00681	.02483	.00100	.00007	.00214	.00000	.00000	.00055	.00137	.00282	65
70	1639650	98807	.06026	.00019	.00050	.00953	.03799	.00167	.00011	.00257	.00000	.00000	.00064	.00170	.00430	70
75	1008435	89831	.08908	.00068	.00051	.01229	.05870	.00277	.00015	.00467	.00000	.00000	.00080	.00244	.00648	75
80	508318	67407	.13261	.00078	.00047	.01549	.09017	.00483	.00026	.00555	.00000	.00000	.00095	.00398	.01012	80
85+	238466	51289	.21513	.00069	.00048	.01674	.14849	.01093	.00047	.00746	.00000	.00000	.00078	.00802	.02112	85+
ALL	75335766	827749														
CRUDE DEATH RATE			.01099	.00028	.00017	.00145	.00559	.00037	.00005	.00053	.00000	.00048	.00035	.00075	.00097	
STANDARDIZED RATE (1)			.00717	.00019	.00015	.00082	.00287	.00029	.00007	.00031	.00000	.00078	.00032	.00060	.00077	
STANDARDIZED RATE (2)			.01221	.00028	.00017	.00161	.00645	.00041	.00005	.00058	.00000	.00046	.00036	.00077	.00106	
GEOMETRIC MEAN			.00929													

260 ENGLAND AND WALES 1951 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T B	Other Infec. and Parat.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	339255	11773	.03481	.00004	.00101	.00014	.00006	.00524	.00134	.00006	.00000	.01904	.00000	.00134	.00652	0
1	1566686	2257	.00144	.00003	.00031	.00013	.00001	.00025	.00004	.00002	.00000	.00000	.00013	.00018	.00034	1
5	1617569	1072	.00066	.00001	.00009	.00005	.00002	.00004	.00001	.00002	.00000	.00000	.00012	.00014	.00013	5
10	1429640	812	.00057	.00001	.00005	.00008	.00004	.00002	.00000	.00002	.00000	.00000	.00009	.00010	.00015	10
15	1336270	1181	.00088	.00005	.00008	.00009	.00007	.00005	.00001	.00003	.00000	.00000	.00018	.00012	.00016	15
20	1428266	1931	.00135	.00017	.00006	.00012	.00011	.00005	.00000	.00007	.00000	.00000	.00031	.00030	.00017	20
25	1626982	2396	.00147	.00028	.00005	.00015	.00016	.00006	.00001	.00009	.00000	.00000	.00020	.00031	.00017	25
30	1515023	2662	.00176	.00031	.00008	.00024	.00026	.00009	.00001	.00012	.00000	.00000	.00015	.00029	.00021	30
35	1633733	3757	.00233	.00032	.00008	.00045	.00046	.00016	.00002	.00017	.00000	.00000	.00011	.00029	.00025	35
40	1659072	5956	.00359	.00040	.00008	.00079	.00094	.00032	.00002	.00024	.00000	.00000	.00012	.00034	.00035	40
45	1557543	9890	.00635	.00052	.00011	.00151	.00193	.00074	.00002	.00035	.00000	.00000	.00012	.00042	.00057	45
50	1318885	14909	.01130	.00077	.00015	.00226	.00385	.00151	.00004	.00058	.00000	.00000	.00011	.00053	.00088	50
55	1090086	20260	.01859	.00085	.00026	.00454	.00654	.00253	.00005	.00083	.00000	.00000	.00012	.00057	.00146	55
60	955456	29167	.03058	.00109	.00036	.00674	.01299	.00531	.00007	.00117	.00000	.00000	.00020	.00075	.00229	60
65	781268	37358	.04782	.00110	.00040	.00943	.02273	.00784	.00011	.00173	.00000	.00000	.00020	.00063	.00345	65
70	591637	43312	.07321	.00076	.00044	.01238	.03976	.01158	.00017	.00229	.00000	.00000	.00027	.00100	.00557	70
75	374772	43616	.11651	.00056	.00043	.01558	.05675	.01754	.00025	.00292	.00000	.00000	.00044	.00167	.00998	75
80	164933	30495	.18452	.00035	.00046	.01789	.11140	.02721	.00050	.00382	.00000	.00000	.00056	.00271	.02003	80
85+	60872	18776	.30845	.00021	.00071	.01738	.19083	.04537	.00062	.00465	.00000	.00000	.00079	.00460	.04329	85+
ALL	21030920	281724														
CRUDE DEATH RATE			.01340	.00028	.00017	.00216	.00603	.00158	.00006	.00044	.00000	.00031	.00016	.00043	.00127	
STANDARDIZED RATE (1)			.00725	.00024	.00016	.00105	.00251	.00103	.00007	.00023	.00000	.00067	.00015	.00033	.00081	
STANDARDIZED RATE (2)			.01343	.00013	.00017	.00204	.00623	.00202	.00006	.00042	.00000	.00039	.00016	.00043	.00134	
GEOMETRIC MEAN			.00851													

604 SCOTLAND 1951 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	45087	1969	.04367	[illegible]	.00151	.00002	.00018	.00552	.00259	.00005	.00000	.02233	.00000	.00208	.00887	0
1	194235	358	.00182	.00008	.00032	.00009	.00003	.00025	.00006	.00002	.00000	.00000	.00021	.00026	.00050	1
5	202758	187	.00092	.00002	.00014	.00009	.00002	.00003	.00002	.00002	.00000	.00000	.00025	.00018	[illegible]	5
10	155940	101	.00052	.00004	.00004	.00006	.00004	.00001	.00000	.00001	.00000	.00000	.00011	.00012	.00030	10
15	173406	209	.00115	.00016	.00009	.00014	.00009	.00003	.00002	.00004	.00000	.00000	.00016	.00022	.00020	15
20	172638	244	.00141	.00036	.00005	.00012	.00021	.00001	.00002	.00005	.00000	.00000	.00016	.00025	.00018	20
25	187486	353	.00188	.00045	.00004	.00028	.00025	.00005	.00001	.00008	.00000	.00000	.00014	.00040	.00018	25
30	166302	375	.00225	.00049	.00010	.00030	.00041	.00012	.00000	.00013	.00000	.00000	.00015	.00030	.00025	30
35	177906	497	.00279	.00048	.00008	.00056	.00060	.00012	.00001	.00023	.00000	.00000	.00009	.00026	.00038	35
40	180256	793	.00440	.00054	.00009	.00083	.00133	.00026	.00002	.00032	.00000	.00000	.00006	.00044	.00051	40
45	168910	1309	.00775	.00071	.00014	.00172	.00258	.00059	.00001	.00046	.00000	.00000	.00006	.00052	.00096	45
50	141554	1922	.01358	.00078	.00013	.00306	.00548	.00119	.00004	.00075	.00000	.00000	.00015	.00055	.00145	50
55	115926	2443	.02107	.00107	.00019	.00454	.00926	.00204	.00005	.00083	.00000	.00000	.00013	.00080	.00211	55
60	98043	3227	.03291	.00118	.00022	.00640	.01596	.00375	.00008	.00121	.00000	.00000	.00019	.00075	.00306	60
65	83341	4014	.04816	.00108	.00046	.00929	.02504	.00457	.00018	.00173	.00000	.00000	.00028	.00100	.00455	65
70	65803	4778	.07261	.00064	.00040	.01184	.04219	.00663	.00015	.00156	.00000	.00000	.00033	.00111	.00737	70
75	41644	4982	.11963	.00062	.00053	.01635	.07218	.01085	.00026	.00276	.00000	.00000	.00038	.00155	.01374	75
80	17849	3412	.19116	.00022	.00050	.01821	.11928	.01961	.00050	.00431	.00000	.00000	.00045	.00286	.02516	80
85+	6381	1952	.30591	.00047	.00031	.01653	.19166	.02680	.00063	.00282	.00000	.00000	.00063	.00643	.05924	85+
ALL	2437465	33114														
CRUDE DEATH RATE			.01359	.00045	.00018	.00205	.00640	.00127	.00009	.00043	.00000	.00041	.00016	.00049	.00165	
STANDARDIZED RATE (1)			.00809	.00023	.00019	.00107	.00252	.00078	.00012	.00024	.00000	.00079	.00016	.00041	.00109	
STANDARDIZED RATE (2)			.01453	.00043	.00018	.00208	.00700	.00137	.00010	.00043	.00000	.00046	.00016	.00050	.00181	
GEOMETRIC MEAN			.00912													

364 IRELAND 1951 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	32679	1679	.05138	.00009	.00226	.00006	.00034	.00759	.00282	.00003	.00000	.02604	.00000	.00107	.01108	0
1	127791	351	.00275	.00063	.00070	.00016	.00006	.00056	.00010	.00002	.00000	.00000	.00008	.00023	.00081	1
5	143704	133	.00093	.00000	.00017	.00006	.00005	.00011	.00001	.00003	.00000	.00000	.00007	.00010	.00031	5
10	132924	79	.00059	.00002	.00016	.00008	.00005	.00005	.00000	.00002	.00000	.00000	.00002	.00005	.00014	10
15	125930	167	.00133	.00030	.00020	.00007	.00011	.00010	.00001	.00009	.00000	.00000	.00005	.00014	.00026	15
20	105537	209	.00198	.00065	.00025	.00012	.00014	.00010	.00000	.00009	.00000	.00000	.00008	.00022	.00029	20
25	95744	252	.00263	.00081	.00017	.00026	.00028	.00015	.00000	.00011	.00000	.00000	.00012	.00032	.00030	25
30	96585	268	.00277	.00050	.00024	.00025	.00040	.00008	.00001	.00023	.00000	.00000	.00009	.00022	.00035	30
35	102421	370	.00361	.00102	.00021	.00036	.00064	.00021	.00001	.00027	.00000	.00000	.00011	.00034	.00045	35
40	94146	441	.00468	.00057	.00025	.00075	.00108	.00017	.00003	.00036	.00000	.00000	.00011	.00020	.00075	40
45	82457	614	.00744	.00125	.00018	.00125	.00221	.00062	.00000	.00055	.00000	.00000	.00013	.00030	.00096	45
50	83046	973	.01172	.00116	.00029	.00250	.00384	.00126	.00008	.00069	.00000	.00000	.00007	.00037	.00144	50
55	65125	1152	.01769	.00129	.00026	.00326	.00719	.00192	.00008	.00086	.00000	.00000	.00006	.00034	.00244	55
60	61437	1715	.02791	.00142	.00024	.00576	.01175	.00365	.00003	.00112	.00000	.00000	.00016	.00057	.00371	60
65	54226	2335	.04306	.00077	.00035	.00706	.02073	.00546	.00007	.00127	.00000	.00000	.00015	.00081	.00638	65
70	49194	3500	.07115	.00061	.00016	.00978	.03502	.00915	.00022	.00270	.00000	.00000	.00012	.00083	.01254	70
75	31689	3782	.11840	.00044	.00009	.01067	.05522	.01616	.00016	.00278	.00000	.00000	.00022	.00079	.03187	75
80	14671	2872	.19576	.00020	.00027	.01111	.07573	.02202	.00048	.00389	.00000	.00000	.00027	.00164	.08016	80
85+	5489	1614	.29404	.00000	.00055	.00929	.09164	.02733	.00055	.00474	.00000	.00000	.00000	.00273	.15722	85+
ALL	1508845	22476														
CRUDE DEATH RATE			.01490	.00042	.00030	.00165	.00543	.00176	.00010	.00048	.00000	.00056	.00009	.00033	.00356	
STANDARDIZED RATE (1)			.00830	.00051	.00034	.00083	.00224	.00099	.00013	.00026	.00000	.00092	.00008	.00027	.00173	
STANDARDIZED RATE (2)			.01428	.00043	.00030	.00156	.00512	.00167	.00010	.00046	.00000	.00054	.00009	.00032	.00349	
GEOMETRIC MEAN			.01042													

754 UNITED STATES 1950 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	1556354	44121	.02835	.00003	.00080	.00012	.00008	.00256	.00105	.00004	.00000	.01618	.00008	.00055	.00646	0
1	6430130	8092	.00126	.00002	.00018	.00012	.00003	.00020	.00005	.00003	.00000	.00000	.00010	.00021	.00032	1
5	6133451	3387	.00055	.00001	.00007	.00007	.00004	.00004	.00000	.00002	.00000	.00000	.00007	.00009	.00011	5
10	5455609	2453	.00045	.00002	.00005	.00006	.00006	.00002	.00000	.00003	.00000	.00000	.00005	.00007	.00009	10
15	5344792	4061	.00076	.00008	.00004	.00007	.00005	.00003	.00000	.00004	.00005	.00000	.00013	.00010	.00012	15
20	5515257	5916	.00100	.00016	.00004	.00009	.00013	.00003	.00001	.00005	.00009	.00000	.00012	.00013	.00014	20
25	6316739	7738	.00122	.00017	.00005	.00017	.00019	.00004	.00001	.00007	.00010	.00000	.00010	.00015	.00018	25
30	5535962	5632	.00102	.00015	.00005	.00032	.00031	.00005	.00001	.00012	.00011	.00000	.00008	.00016	.00022	30
35	5771361	13432	.00233	.00015	.00006	.00062	.00058	.00007	.00001	.00017	.00010	.00000	.00008	.00019	.00027	35
40	5171718	18126	.00350	.00017	.00007	.00110	.00111	.00008	.00001	.00026	.00005	.00000	.00009	.00021	.00037	40
45	4577742	23826	.00520	.00015	.00008	.00167	.00198	.00011	.00002	.00039	.00001	.00000	.00010	.00023	.00049	45
50	4174116	31947	.00765	.00014	.00009	.00237	.00331	.00017	.00002	.00056	.00000	.00000	.00012	.00024	.00063	50
55	3631564	40908	.01126	.00015	.00011	.00330	.00539	.00022	.00003	.00085	.00000	.00000	.00013	.00027	.00082	55
60	3043800	52991	.01738	.00015	.00012	.00433	.00936	.00033	.00004	.00131	.00000	.00000	.00017	.00036	.00117	60
65	2597380	66848	.02574	.00022	.00016	.00522	.01525	.00056	.00007	.00187	.00000	.00000	.00020	.00050	.00160	65
70	1796154	77131	.04294	.00030	.00019	.00727	.02752	.00111	.00011	.00265	.00000	.00000	.00021	.00100	.00254	70
75	1159031	80111	.06912	.00038	.00024	.00932	.04764	.00208	.00019	.00361	.00000	.00000	.00025	.00214	.00385	75
80	624927	68758	.11003	.00035	.00028	.01152	.07754	.00413	.00027	.00466	.00000	.00000	.00025	.00444	.00614	80
85+	342575	65327	.19069	.00030	.00038	.01317	.13623	.00947	.00050	.00610	.00000	.00000	.00022	.01358	.01374	85+
ALL	76426702	624705														
CRUDE DEATH RATE			.00817	.00013	.00010	.00140	.00424	.00029	.00005	.00045	.00004	.00033	.00011	.00033	.00070	
STANDARDIZED RATE (1)			.00491	.00010	.00011	.00079	.00189	.00022	.00005	.00024	.00004	.00057	.00010	.00023	.00057	
STANDARDIZED RATE (2)			.00557	.00013	.00010	.00144	.00454	.00030	.00005	.00047	.00004	.00033	.00011	.00034	.00072	
GEOMETRIC MEAN			.00625													

262 ENGLAND AND WALES 1951 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	321154	8450	.02631	.00005	.00057	.00012	.00004	.00425	.00095	.00007	.00000	.01332	.00000	.00058	.00558	0
1	1454010	1876	.00126	.00002	.00031	.00012	.00001	.00025	.00003	.00002	.00000	.00000	.00008	.00014	.00028	1
5	1546494	699	.00045	.00001	.00008	.00007	.00003	.00004	.00000	.00002	.00000	.00000	.00005	.00005	.00012	5
10	1384165	516	.00037	.00001	.00006	.00005	.00035	.00003	.00000	.00003	.00000	.00000	.00002	.00002	.00005	10
15	1370018	880	.00064	.00011	.00008	.00006	.00008	.00004	.00001	.00004	.00001	.00000	.00005	.00004	.00012	15
20	1501155	1332	.00089	.00028	.00005	.00009	.00011	.00004	.00001	.00005	.00006	.00000	.00004	.00005	.00012	20
25	1455103	1504	.00115	.00035	.00005	.00014	.00015	.00007	.00002	.00004	.00008	.00000	.00002	.00006	.00017	25
30	1565546	2294	.00147	.00035	.00004	.00027	.00025	.00009	.00001	.00007	.00007	.00000	.00002	.00007	.00022	30
35	1651714	3237	.00191	.00026	.00005	.00055	.00037	.00013	.00001	.00009	.00008	.00000	.00002	.00010	.00024	35
40	1708391	4601	.00269	.00021	.00005	.00094	.00063	.00017	.00002	.00013	.00003	.00000	.00003	.00011	.00038	40
45	1616760	6516	.00428	.00020	.00008	.00153	.00122	.00029	.00002	.00018	.00001	.00000	.00003	.00018	.00053	45
50	1507818	9729	.00645	.00015	.00010	.00227	.00215	.00049	.00003	.00028	.00000	.00000	.00004	.00021	.00070	50
55	1334522	13548	.01015	.00018	.00011	.00321	.00394	.00099	.00005	.00039	.00000	.00000	.00005	.00029	.00099	55
60	1204768	19732	.01638	.00018	.00013	.00425	.00754	.00180	.00008	.00069	.00000	.00000	.00006	.00030	.00134	60
65	1049433	25335	.02755	.00020	.00016	.00574	.01465	.00340	.00012	.00109	.00000	.00000	.00009	.00042	.00207	65
70	837145	40336	.04818	.00020	.00018	.00761	.02816	.00635	.00020	.00155	.00000	.00000	.00011	.00070	.00312	70
75	549528	46835	.08523	.00018	.00019	.01022	.05288	.01185	.00028	.00216	.00000	.00000	.00019	.00139	.00591	75
80	281413	40563	.14414	.00011	.00021	.01231	.09295	.02012	.00045	.00258	.00000	.00000	.00023	.00306	.01207	80
85+	137054	34869	.25442	.00004	.00059	.01361	.14255	.03731	.00074	.00277	.00001	.00000	.00015	.00674	.02996	85+
ALL	22756258	267656														
CRUDE DEATH RATE			.01176	.00018	.00011	.00166	.00610	.00148	.00006	.00033	.00002	.00019	.00005	.00027	.00110	
STANDARDIZED RATE (1)			.00483	.00015	.00013	.00077	.00178	.00060	.00006	.00014	.00002	.00047	.00004	.00015	.00061	
STANDARDIZED RATE (2)			.00532	.00017	.00012	.00145	.00461	.00117	.00006	.00026	.00002	.00028	.00005	.00023	.00091	
GEOMETRIC MEAN			.00556													

366 IRELAND 1951 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	30979	1197	.03864	.00010	.00229	.00000	.00013	.00571	.00194	.00006	.00000	.01846	.00000	.00074	.00920	0
1	121978	293	.00240	.00003	.00070	.00007	.00005	.00065	.00013	.00001	.00000	.00000	.00002	.00012	.00062	1
5	137784	55	.00065	.00001	.00012	.00002	.00008	.00007	.00002	.00001	.00000	.00000	.00005	.00007	.00022	5
10	128424	51	.00071	.00008	.00018	.00006	.00013	.00004	.00001	.00001	.00000	.00000	.00001	.00005	.00014	10
15	115634	144	.00125	.00045	.00022	.00006	.00010	.00006	.00002	.00002	.00002	.00000	.00004	.00009	.00017	15
20	94954	204	.00210	.00058	.00031	.00010	.00018	.00007	.00000	.00007	.00007	.00000	.00004	.00000	.00028	20
25	98992	240	.00242	.00115	.00021	.00017	.00036	.00011	.00000	.00004	.00011	.00000	.00002	.00005	.00019	25
30	95265	246	.00258	.00094	.00005	.00020	.00046	.00015	.00000	.00007	.00021	.00000	.00001	.00007	.00037	30
35	98804	376	.00381	.00100	.00015	.00048	.00079	.00026	.00002	.00022	.00036	.00000	.00001	.00011	.00039	35
40	86465	364	.00421	.00065	.00017	.00051	.00053	.00038	.00001	.00021	.00028	.00000	.00001	.00002	.00059	40
45	78673	423	.00538	.00064	.00020	.00145	.00154	.00033	.00005	.00022	.00004	.00000	.00001	.00009	.00081	45
50	80158	764	.00953	.00070	.00010	.00226	.00379	.00061	.00006	.00057	.00000	.00000	.00002	.00004	.00137	50
55	63927	874	.01367	.00053	.00014	.00344	.00541	.00138	.00002	.00056	.00000	.00000	.00000	.00013	.00206	55
60	60816	1354	.02226	.00054	.00008	.00439	.01065	.00276	.00007	.00077	.00000	.00000	.00003	.00033	.00243	60
65	53493	1927	.03602	.00071	.00019	.00581	.01735	.00520	.00007	.00151	.00000	.00000	.00004	.00036	.00479	65
70	51081	3076	.06022	.00037	.00020	.00650	.03032	.00932	.00025	.00178	.00000	.00000	.00004	.00084	.01059	70
75	32968	3442	.10440	.00027	.00006	.00761	.04984	.01686	.00024	.00297	.00000	.00000	.00006	.00136	.02572	75
80	16265	2788	.17141	.00012	.00018	.00861	.06837	.02275	.00043	.00203	.00000	.00000	.00000	.00350	.06542	80
85+	7817	2008	.25688	.00000	.00013	.00588	.08789	.02942	.00013	.00230	.00000	.00000	.00000	.00486	.12626	85+
ALL	1454437	15506														
CRUDE DEATH RATE			.01367	.00053	.00026	.00142	.00526	.00179	.00009	.00035	.00007	.00039	.00002	.00023	.00326	
STANDARDIZED RATE (1)			.00694	.00049	.00031	.00071	.00199	.00087	.00010	.00017	.00007	.00065	.00003	.00013	.00140	
STANDARDIZED RATE (2)			.01211	.00054	.00026	.00130	.00455	.00156	.00008	.00032	.00007	.00038	.00002	.00020	.00282	
GEOMETRIC MEAN			.00516													

606 SCOTLAND 1951 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	42657	1422	.03334	.00014	.00131	.00002	.00007	.00469	.00176	.00005	.00000	.01674	.00000	.00150	.00706	0
1	187412	306	.00163	.00005	.00045	.00011	.00000	.00029	.00005	.00002	.00000	.00000	.00010	.00015	.00037	1
5	195552	122	.00062	.00003	.00010	.00004	.00003	.00004	.00001	.00002	.00000	.00000	.00014	.00007	.00016	5
10	191067	99	.00052	.00003	.00007	.00004	.00008	.00003	.00002	.00006	.00000	.00000	.00003	.00002	.00014	10
15	188902	177	.00094	.00028	.00010	.00007	.00013	.00005	.00001	.00005	.00001	.00000	.00004	.00005	.00016	15
20	191934	274	.00143	.00072	.00006	.00010	.00015	.00005	.00001	.00007	.00005	.00000	.00003	.00004	.00015	20
25	194190	343	.00177	.00069	.00006	.00017	.00026	.00004	.00003	.00007	.00018	.00000	.00001	.00006	.00022	25
30	179036	361	.00202	.00051	.00005	.00035	.00037	.00008	.00004	.00009	.00015	.00000	.00002	.00010	.00026	30
35	191064	476	.00249	.00016	.00009	.00055	.00057	.00014	.00002	.00013	.00007	.00000	.00005	.00009	.00038	35
40	190364	660	.00347	.00037	.00007	.00110	.00097	.00014	.00001	.00014	.00005	.00000	.00000	.00015	.00047	40
45	181091	906	.00500	.00015	.00008	.00172	.00152	.00029	.00003	.00028	.00001	.00000	.00003	.00018	.00066	45
50	166805	1307	.00784	.00019	.00010	.00230	.00250	.00053	.00007	.00032	.00000	.00000	.00002	.00026	.00116	50
55	145074	1791	.01235	.00026	.00019	.00328	.00571	.00074	.00005	.00055	.00000	.00000	.00003	.00032	.00121	55
60	126946	2481	.01954	.00024	.00014	.00471	.00978	.00108	.00005	.00085	.00000	.00000	.00007	.00028	.00228	60
65	109063	3665	.03360	.00020	.00009	.00647	.01901	.00254	.00027	.00145	.00000	.00000	.00008	.00047	.00303	65
70	85722	4825	.05629	.00015	.00029	.00544	.03381	.00426	.00023	.00205	.00000	.00000	.00009	.00051	.00502	70
75	56230	5355	.09523	.00016	.00032	.01161	.06168	.00759	.00037	.00205	.00000	.00000	.00018	.00157	.00891	75
80	28059	4447	.15849	.00014	.00018	.01433	.10193	.01572	.00071	.00185	.00000	.00000	.00007	.00463	.01892	80
85+	13467	3645	.27066	.00015	.00045	.01448	.17183	.02770	.00126	.00230	.00000	.00000	.00022	.01025	.04203	85+
ALL	2444635	32682														
CRUDE DEATH RATE			.01226	.00025	.00015	.00188	.00635	.00099	.00009	.00036	.00004	.00027	.00005	.00033	.00145	
STANDARDIZED RATE (1)			.00600	.00027	.00018	.00085	.00220	.00052	.00010	.00017	.00004	.00059	.00005	.00020	.00084	
STANDARDIZED RATE (2)			.01091	.00025	.00015	.00162	.00545	.00090	.00010	.00031	.00004	.00035	.00005	.00030	.00132	
GEOMETRIC MEAN			.00740													

768 UNITED STATES 1964 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	2061000	51325	.02783	.00000	.00027	.00009	.00015	.00244	.00054	.00005	.00000	.01713	.00009	.00089	.00608	0
1	8470000	8883	.00105	.00000	.00007	.00011	.00003	.00015	.00003	.00001	.00000	.00000	.00012	.00025	.00029	1
5	10304000	5315	.00052	.00000	.00002	.00008	.00001	.00003	.00000	.00001	.00000	.00000	.00012	.00013	.00011	5
10	9251000	4927	.00053	.00000	.00001	.00007	.00002	.00002	.00000	.00001	.00000	.00000	.00011	.00018	.00010	10
15	8133000	10794	.00133	.00000	.00002	.00010	.00005	.00002	.00000	.00002	.00000	.00000	.00055	.00042	.00015	15
20	6303000	11619	.00184	.00000	.00001	.00011	.00008	.00003	.00001	.00004	.00000	.00000	.00080	.00058	.00017	20
25	5441000	9802	.00180	.00001	.00002	.00016	.00016	.00003	.00000	.00007	.00000	.00000	.00053	.00064	.00018	25
30	5441000	11757	.00216	.00002	.00002	.00023	.00036	.00005	.00001	.00014	.00000	.00000	.00042	.00067	.00025	30
35	5530000	17807	.00320	.00003	.00002	.00038	.00086	.00007	.00001	.00025	.00000	.00000	.00037	.00070	.00032	35
40	6012000	28028	.00466	.00004	.00003	.00070	.00186	.00011	.00002	.00036	.00000	.00000	.00034	.00074	.00046	40
45	5526000	41098	.00744	.00007	.00004	.00126	.00347	.00018	.00002	.00056	.00000	.00000	.00035	.00081	.00067	45
50	5093000	61325	.01204	.00011	.00007	.00234	.00610	.00028	.00003	.00081	.00000	.00000	.00037	.00050	.00103	50
55	4364000	81833	.01874	.00016	.00011	.00388	.01013	.00042	.00006	.00110	.00000	.00000	.00039	.00095	.00155	55
60	3654000	102082	.02794	.00021	.00016	.00594	.01564	.00069	.00006	.00145	.00000	.00000	.00040	.00101	.00239	60
65	2855000	121222	.04246	.00027	.00022	.00862	.02485	.00125	.00012	.00187	.00000	.00000	.00049	.00105	.00368	65
70	2294000	135639	.05913	.00032	.00025	.01085	.03647	.00190	.00016	.00226	.00000	.00000	.00056	.00126	.00505	70
75	1518000	126794	.08353	.00041	.00032	.01325	.05413	.00320	.00021	.00254	.00000	.00000	.00065	.00177	.00666	75
80	786000	97704	.12431	.00043	.00035	.01541	.08525	.00561	.00034	.00390	.00000	.00000	.00078	.00283	.00946	80
85+	395000	83778	.21210	.00051	.00051	.01824	.15315	.01252	.00055	.00493	.00000	.00000	.00062	.00544	.01565	85+
ALL	95533000	1017778														
CRUDE DEATH RATE			.01064	.00006	.00007	.00170	.00572	.00040	.00004	.00046	.00000	.00038	.00036	.00064	.00103	
STANDARDIZED RATE (1)			.00648	.00003	.00005	.00092	.00270	.00026	.00004	.00026	.00000	.00060	.00035	.00053	.00073	
STANDARDIZED RATE (2)			.01148	.00006	.00007	.00180	.00613	.00042	.00004	.00048	.00000	.00035	.00038	.00066	.00107	
GEOMETRIC MEAN			.00828													

268 ENGLAND AND WALES 1964 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	433000	10011	.02312	.00000	.00022	.00009	.00008	.00254	.00048	.00004	.00000	.01244	.00002	.00087	.00594	0
1	1624000	1414	.00087	.00000	.00004	.00011	.00001	.00013	.00004	.00001	.00000	.00000	.00009	.00016	.00026	1
5	1764000	808	.00346	.00000	.00001	.00010	.00001	.00003	.00000	.00001	.00000	.00000	.00010	.00009	.00011	5
10	1659000	687	.00041	.00000	.00000	.00007	.00002	.00002	.00000	.00001	.00000	.00000	.00008	.00011	.00010	10
15	1895000	1859	.00098	.00000	.00001	.00009	.00004	.00004	.00000	.00002	.00000	.00000	.00049	.00017	.00012	15
20	1543000	1651	.00110	.00000	.00001	.00011	.00007	.00003	.00001	.00003	.00000	.00000	.00043	.00028	.00012	20
25	1516000	1509	.00100	.00000	.00001	.00016	.00013	.00003	.00000	.00004	.00000	.00000	.00023	.00027	.00011	25
30	1512000	1800	.00119	.00001	.00001	.00023	.00024	.00004	.00001	.00005	.00000	.00000	.00017	.00027	.00015	30
35	1542000	2859	.00185	.00003	.00001	.00039	.00061	.00008	.00001	.00008	.00000	.00000	.00015	.00033	.00017	35
40	1707000	5168	.00303	.00004	.00003	.00074	.00122	.00014	.00002	.00013	.00000	.00000	.00016	.00032	.00023	40
45	1416000	7452	.00526	.00007	.00004	.00133	.00239	.00032	.00002	.00017	.00000	.00000	.00016	.00040	.00037	45
50	1553000	14311	.00922	.00010	.00005	.00266	.00429	.00070	.00002	.00023	.00000	.00000	.00020	.00042	.00055	50
55	1456000	23656	.01625	.00014	.00008	.00477	.00745	.00157	.00004	.00042	.00000	.00000	.00020	.00053	.00086	55
60	1231000	33677	.02736	.00023	.00011	.00766	.01302	.00334	.00008	.00064	.00000	.00000	.00025	.00063	.00141	60
65	853000	36448	.04273	.00032	.00016	.01115	.02059	.00579	.00012	.00094	.00000	.00000	.00024	.00065	.00237	65
70	614000	39808	.06483	.00042	.00023	.01429	.03384	.00920	.00017	.00146	.00000	.00000	.00039	.00085	.00398	70
75	390000	38557	.09887	.00045	.00027	.01743	.05407	.01536	.00024	.00228	.00000	.00000	.00061	.00143	.00682	75
80	204000	30203	.14805	.00025	.00036	.02036	.08488	.02325	.00042	.00278	.00000	.00000	.00087	.00253	.01224	80
85+	98000	22815	.23281	.00035	.00031	.02069	.13893	.03757	.00076	.00383	.00000	.00000	.00096	.00500	.02438	85+
ALL	23846000	274773														
CRUDE DEATH RATE			.01152	.00007	.00005	.00247	.00572	.00152	.00005	.00027	.00000	.00023	.00023	.00039	.00092	
STANDARDIZED RATE (1)			.00587	.00004	.00004	.00112	.00230	.00069	.00004	.00012	.00000	.00044	.00021	.00029	.00060	
STANDARDIZED RATE (2)			.01123	.00007	.00005	.00225	.00543	.00148	.00004	.00025	.00000	.00026	.00023	.00038	.00091	
GEOMETRIC MEAN			.00674													

368 IRELAND 1961 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	32158	1029	.03156	.00000	.00071	.00012	.00000	.00358	.00056	.00006	.00000	.01736	.00000	.00040	.00835	0
1	121524	166	.00137	.00000	.00012	.00015	.00002	.00035	.00007	.00002	.00000	.00000	.00009	.00010	.00046	1
5	147271	77	.00052	.00000	.00006	.00006	.00001	.00003	.00001	.00001	.00000	.00000	.00009	.00008	.00018	5
10	148601	61	.00041	.00000	.00003	.00008	.00003	.00001	.00001	.00001	.00000	.00000	.00007	.00009	.00010	10
15	120576	76	.00063	.00001	.00002	.00010	.00008	.00000	.00000	.00007	.00000	.00000	.00012	.00012	.00011	15
20	80573	84	.00104	.00001	.00001	.00006	.00012	.00006	.00001	.00001	.00000	.00000	.00030	.00024	.00021	20
25	72427	85	.00117	.00006	.00004	.00019	.00015	.00008	.00000	.00007	.00000	.00000	.00018	.00022	.00018	25
30	75384	119	.00158	.00008	.00001	.00021	.00033	.00008	.00000	.00016	.00000	.00000	.00027	.00017	.00027	30
35	81781	185	.00226	.00017	.00004	.00033	.00068	.00017	.00001	.00022	.00000	.00000	.00012	.00027	.00024	35
40	84957	286	.00337	.00014	.00005	.00073	.00121	.00022	.00001	.00011	.00000	.00000	.00026	.00026	.00038	40
45	89206	477	.00535	.00015	.00004	.00121	.00222	.00040	.00002	.00029	.00000	.00000	.00016	.00030	.00055	45
50	81844	784	.00958	.00033	.00010	.00219	.00456	.00079	.00002	.00028	.00000	.00000	.00012	.00037	.00082	50
55	68750	1033	.01503	.00054	.00009	.00361	.00666	.00161	.00006	.00071	.00000	.00000	.00013	.00045	.00116	55
60	64558	1604	.02485	.00068	.00011	.00520	.01204	.00301	.00006	.00101	.00000	.00000	.00019	.00048	.00208	60
65	51238	2047	.03995	.00082	.00008	.00751	.02077	.00521	.00006	.00139	.00000	.00000	.00027	.00059	.00326	65
70	44194	2714	.06141	.00061	.00007	.01016	.03367	.00655	.00014	.00205	.00000	.00000	.00027	.00104	.00643	70
75	29751	2888	.09707	.00024	.00013	.01277	.05469	.01146	.00017	.00269	.00000	.00000	.00044	.00097	.01351	75
80	16706	2754	.16725	.00048	.00018	.01538	.09488	.01868	.00054	.00353	.00000	.00000	.00018	.00120	.03220	80
85+	7709	2241	.29070	.00013	.00013	.01492	.15203	.03009	.00052	.00441	.00000	.00000	.00013	.00258	.08535	85+
ALL	1419248	18750														
CRUDE DEATH RATE			.01321	.00017	.00007	.00184	.00632	.00147	.00006	.00039	.00000	.00039	.00016	.00030	.00202	
STANDARDIZED RATE (1)			.00422	.00010	.00007	.00065	.00230	.00069	.00006	.00019	.00000	.00061	.00018	.00022	.00097	
STANDARDIZED RATE (2)			.01165	.00016	.00007	.00167	.00552	.00130	.00005	.00036	.00000	.00036	.00017	.00025	.00174	
GEOMETRIC MEAN			.00720													

612 SCOTLAND 1964 MALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	51000	1440	.02824	.00000	.00027	.00012	.00014	.00288	.00043	.00002	.00000	.01557	.00002	.00274	.00665	0
1	198000	179	.00090	.00000	.00006	.00010	.00001	.00012	.00002	.00001	.00000	.00000	.00014	.00021	.00027	1
5	226000	117	.00052	.00000	.00000	.00008	.00001	.00001	.00000	.00000	.00000	.00000	.00019	.00013	.00010	5
10	208000	91	.00044	.00000	.00001	.00008	.00001	.00004	.00000	.00000	.00000	.00000	.00011	.00008	.00020	10
15	211000	177	.00084	.00000	.00000	.00006	.00005	.00002	.00000	.00003	.00000	.00000	.00030	.00022	[illegible]	15
20	170000	177	.00104	.00000	.00001	.00014	.00005	.00002	.00001	.00007	.00000	.00000	.00035	.00031	.00009	20
25	156000	175	.00112	.00002	.00001	.00018	.00013	.00003	.00001	.00006	.00000	.00000	.00018	.00035	.00014	25
30	157000	208	.00132	.00003	.00001	.00024	.00029	.00005	.00000	.00005	.00000	.00000	.00022	.00032	.00012	30
35	159000	392	.00247	.00005	.00001	.00045	.00086	.00006	.00001	.00008	.00000	.00000	.00023	.00042	.00029	35
40	172000	682	.00397	.00004	.00001	.00087	.00177	.00020	.00002	.00015	.00000	.00000	.00019	.00042	.00030	40
45	140000	960	.00686	.00011	.00002	.00168	.00323	.00041	.00001	.00021	.00000	.00000	.00016	.00055	.00049	45
50	161000	1846	.01147	.00012	.00007	.00300	.00577	.00076	.00004	.00029	.00000	.00000	.00023	.00057	.00062	50
55	151000	2951	.01954	.00021	.00004	.00528	.01010	.00156	.00006	.00042	.00000	.00000	.00027	.00068	.00093	55
60	126000	4165	.03306	.00035	.00008	.00864	.01650	.00300	.00006	.00083	.00000	.00000	.00036	.00054	.00190	60
65	86000	4181	.04862	.00045	.00013	.01209	.02612	.00453	.00005	.00121	.00000	.00000	.00026	.00073	.00301	65
70	60000	4343	.07238	.00060	.00022	.01568	.04110	.00758	.00012	.00157	.00000	.00000	.00040	.00090	.00422	70
75	39000	4082	.10467	.00054	.00013	.01872	.06103	.01049	.00005	.00310	.00000	.00000	.00041	.00192	.00828	75
80	21000	3182	.15152	.00052	.00019	.02114	.09386	.01390	.00062	.00329	.00000	.00000	.00095	.00348	.01357	80
85+	10000	2415	.24150	.00020	.00000	.02230	.16120	.02480	.00050	.00420	.00000	.00000	.00070	.00550	.02170	85+
ALL	2583000	31183														
CRUDE DEATH RATE			.01270	.00010	.00004	.00254	.00649	.00113	.00003	.00030	.00000	.00032	.00023	.00050	.00100	
STANDARDIZED RATE (1)			.00675	.00005	.00003	.00124	.00284	.00058	.00003	.00015	.00000	.00055	.00021	.00040	.00068	
STANDARDIZED RATE (2)			.01271	.00009	.00004	.00247	.00655	.00114	.00003	.00030	.00000	.00032	.00023	.00350	.00103	
GEOMETRIC MEAN			.00757													

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770 UNITED STATES 1964 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl. Pneu. Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	1577003	42446	.02147	.00000	.00029	.00008	.00012	.00152	.00046	.00004	.00000	.01264	.00009	.00072	.00512	0
1	8149000	7100	.00087	.00000	.00006	.00008	.00002	.00013	.00003	.00001	.00000	.00000	.00009	.00019	.00026	1
5	9973000	3722	.00037	.00000	.00002	.00007	.00001	.00003	.00000	.00001	.00000	.00000	.00007	.00007	.00010	5
10	9043000	2753	.00031	.00000	.00001	.00006	.00002	.00002	.00000	.00001	.00000	.00000	.00005	.00005	.00008	10
15	8030000	4396	.00055	.00000	.00001	.00007	.00004	.00002	.00000	.00002	.00001	.00000	.00018	.00008	.00010	15
20	6550000	4692	.00072	.00000	.00001	.00005	.00009	.00002	.00000	.00003	.00004	.00000	.00019	.00012	.00012	20
25	5633000	4936	.00088	.00001	.00002	.00014	.00013	.00003	.00001	.00006	.00005	.00000	.00012	.00017	.00015	25
30	5654000	7169	.00127	.00001	.00002	.00028	.00023	.00004	.00001	.00010	.00005	.00000	.00012	.00020	.00021	30
35	6206003	11562	.00186	.00002	.00003	.00052	.00042	.00005	.00001	.00016	.00005	.00000	.00012	.00022	.00027	35
40	6352000	17516	.00276	.00002	.00002	.00051	.00074	.00007	.00001	.00024	.00002	.00000	.00013	.00023	.00036	40
45	5802009	24204	.00417	.00003	.00004	.00145	.00128	.00010	.00002	.00035	.00000	.00000	.00013	.00025	.00049	45
50	5344000	34073	.00638	.00003	.00005	.00225	.00236	.00012	.00002	.00046	.00000	.00000	.00014	.00027	.00064	50
55	4647009	42642	.00919	.00003	.00006	.00257	.00394	.00018	.00003	.00067	.00000	.00000	.00017	.00028	.00084	55
60	4025003	56582	.01406	.00004	.00008	.00384	.00722	.00028	.00006	.00092	.00000	.00000	.00018	.00031	.00113	60
65	3391000	75562	.02228	.00005	.00010	.00516	.01288	.00045	.00009	.00131	.00000	.00000	.00022	.00041	.00161	65
70	2868000	98612	.03438	.00007	.00011	.00629	.02197	.00085	.00015	.00180	.00000	.00000	.00023	.00062	.00225	70
75	1588000	111268	.05557	.00010	.00017	.00785	.03873	.00167	.00025	.00241	.00000	.00000	.00027	.00105	.00349	75
80	1123000	107501	.09573	.00014	.00025	.01013	.07032	.00363	.00038	.00301	.00000	.00000	.00028	.00233	.00525	80
85+	642000	123506	.19238	.00022	.00031	.01281	.14830	.00554	.00075	.00397	.00000	.00000	.00025	.00568	.01035	85+
ALL	97357000	780273														
CRUDE DEATH RATE			.00801	.00002	.00005	.00139	.00448	.00028	.00004	.00027	.00001	.00026	.00013	.00028	.00069	
STANDARDIZED RATE (1)			.00354	.00001	.00004	.00070	.00153	.00017	.00003	.00018	.00002	.00045	.00012	.00020	.00050	
STANDARDIZED RATE (2)			.00713	.00002	.00004	.00129	.00383	.00024	.00004	.00034	.00002	.00026	.00014	.00026	.00064	
GEOMETRIC MEAN			.00451													

270 ENGLAND AND WALES 1964 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl. Pneu. Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	411009	7434	.01809	.00000	.00018	.00010	.00008	.00220	.00038	.00003	.00000	.00913	.00002	.00068	.00527	0
1	1542000	1138	.00074	.00000	.00005	.00009	.00001	.00014	.00003	.00001	.00000	.00000	.00006	.00011	.00024	1
5	1676000	537	.00032	.00000	.00001	.00007	.00001	.00003	.00000	.00001	.00000	.00000	.00005	.00004	.00009	5
10	1617000	402	.00025	.00000	.00000	.00005	.00002	.00002	.00000	.00001	.00000	.00000	.00006	.00002	.00008	10
15	1813000	723	.00040	.00000	.00001	.00006	.00003	.00003	.00000	.00002	.00001	.00003	.00010	.00005	.00008	15
20	1537000	705	.00046	.00000	.00001	.00008	.00004	.00002	.00000	.00002	.00003	.00000	.00007	.00008	.00010	20
25	1462000	864	.00059	.00000	.00001	.00013	.00009	.00003	.00001	.00002	.00003	.00000	.00004	.00010	.00013	25
30	1433000	1174	.00082	.00001	.00002	.00024	.00015	.00002	.00001	.00003	.00004	.00000	.00004	.00011	.00015	30
35	1507000	1857	.00126	.00002	.00001	.00050	.00025	.00005	.00001	.00003	.00003	.00000	.00004	.00013	.00019	35
40	1706000	3816	.00224	.00003	.00001	.00100	.00053	.00010	.00001	.00006	.00001	.00000	.00004	.00018	.00027	40
45	1455000	5032	.00345	.00002	.00003	.00158	.00094	.00015	.00002	.00010	.00000	.00000	.00004	.00019	.00036	45
50	1642000	8557	.00521	.00003	.00003	.00238	.00161	.00024	.00003	.00013	.00000	.00000	.00007	.00024	.00045	50
55	1574000	12408	.00788	.00003	.00005	.00312	.00251	.00043	.00004	.00023	.00000	.00000	.00007	.00032	.00069	55
60	1415000	18370	.01295	.00003	.00006	.00426	.00585	.00085	.00007	.00036	.00000	.00000	.00010	.00040	.00097	60
65	1207000	25735	.02132	.00004	.00007	.00555	.01117	.00157	.00014	.00043	.00000	.00000	.00015	.00048	.00150	65
70	975000	35782	.03670	.00005	.00009	.00707	.02156	.00218	.00022	.00110	.00000	.00000	.00021	.00076	.00247	70
75	714600	44339	.06168	.00006	.00016	.00912	.03867	.00557	.00035	.00153	.00000	.00000	.00032	.00134	.00416	75
80	421000	45433	.10792	.00010	.00025	.01154	.07003	.01194	.00062	.00207	.00000	.00000	.00034	.00305	.00758	80
85+	241000	45908	.19049	.00006	.00025	.01381	.12490	.02413	.00051	.00240	.00000	.00000	.00027	.00575	.01796	85+
ALL	24355000	255564														
CRUDE DEATH RATE			.01047	.00002	.00004	.00202	.00577	.00099	.00007	.00024	.00001	.00015	.00008	.00034	.00093	
STANDARDIZED RATE (1)			.00359	.00001	.00003	.00075	.00133	.00031	.00003	.00008	.00001	.00032	.00006	.00016	.00048	
STANDARDIZED RATE (2)			.00653	.00002	.00003	.00140	.00347	.00062	.00005	.00016	.00001	.00019	.00007	.00024	.00067	
GEOMETRIC MEAN			.00412													

370 IRELAND 1961 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	30700	798	.02599	.00000	.00036	.00007	.00003	.00336	.00094	.00003	.00000	.01290	.00000	.00059	.00772	0
1	114972	148	.00127	.00000	.00016	.00005	.00001	.00027	.00007	.00003	.00000	.00000	.00003	.00014	.00051	1
5	140975	56	.00040	.00001	.00008	.00006	.00003	.00002	.00001	.00000	.00000	.00000	.00004	.00003	.00013	5
10	140779	53	.00038	.00000	.00004	.00005	.00003	.00006	.00000	.00001	.00000	.00000	.00001	.00003	.00014	10
15	113725	36	.00032	.00001	.00001	.00003	.00003	.00003	.00000	.00002	.00000	.00000	.00003	.00004	.00011	15
20	77751	50	.00064	.00004	.00000	.00010	.00013	.00008	.00004	.00006	.00001	.00000	.00004	.00005	.00009	20
25	73243	68	.00093	.00004	.00008	.00023	.00018	.00010	.00003	.00001	.00001	.00000	.00004	.00004	.00016	25
30	77710	106	.00136	.00012	.00001	.00031	.00026	.00005	.00000	.00008	.00012	.00000	.00003	.00010	.00030	30
35	85347	169	.00198	.00018	.00002	.00057	.00045	.00013	.00002	.00007	.00014	.00000	.00004	.00005	.00032	35
40	85679	204	.00238	.00015	.00004	.00079	.00077	.00014	.00002	.00007	.00005	.00000	.00005	.00004	.00023	40
45	85770	348	.00406	.00017	.00008	.00140	.00125	.00029	.00007	.00023	.00000	.00000	.00001	.00007	.00048	45
50	75594	514	.00680	.00020	.00001	.00231	.00279	.00046	.00004	.00019	.00000	.00000	.00007	.00007	.00066	50
55	67647	638	.00943	.00021	.00003	.00268	.00418	.00075	.00001	.00030	.00000	.00000	.00010	.00010	.00106	55
60	66766	1067	.01598	.00012	.00007	.00424	.00804	.00117	.00006	.00064	.00000	.00000	.00006	.00013	.00138	60
65	52458	1409	.02686	.00025	.00006	.00536	.01485	.00248	.00013	.00086	.00000	.00000	.00004	.00031	.00254	65
70	48783	2247	.04606	.00014	.00006	.00685	.02712	.00457	.00023	.00166	.00000	.00000	.00010	.00066	.00465	70
75	33587	2626	.07819	.00030	.00015	.00741	.04725	.00819	.00027	.00226	.00000	.00000	.00012	.00143	.01081	75
80	20409	2811	.13773	.00005	.00015	.01049	.08124	.01578	.00024	.00240	.00000	.00000	.00015	.00220	.02504	80
85+	10864	2665	.24531	.00009	.00055	.01197	.13609	.02522	.00055	.00322	.00000	.00000	.00009	.00479	.06213	85+
ALL	1404759	16013														
CRUDE DEATH RATE			.01140	.00010	.00007	.00154	.00579	.00114	.00007	.00030	.00002	.00028	.00004	.00021	.00185	
STANDARDIZED RATE (1)			.00468	.00007	.00007	.00070	.00174	.00048	.00006	.00012	.00002	.00045	.00004	.00011	.00083	
STANDARDIZED RATE (2)			.00886	.00009	.00006	.00130	.00434	.00088	.00006	.00024	.00002	.00027	.00004	.00016	.00139	
GEOMETRIC MEAN			.00540													

614 SCOTLAND 1964 FEMALES

POPULATION, DEATHS, DEATH RATES FOR ALL CAUSES COMBINED, AND SPECIFIED CAUSES

Age Start of Interval	Midyear Population	Deaths During Year	All Causes	Respiratory T.B.	Other Infec. and Paras.	Neoplasms	Cardiovascular	Infl., Pneu., Bronch.	Diarrheal	Certain Degenerative	Maternal	Cert. Dis. of Infancy	Motor Vehicle	Other Violence	Other and Unknown	Age Start of Interval
0	49000	1068	.02180	.00002	.00027	.00004	.00008	.00222	.00073	.00002	.00080	.01090	.00000	.00137	.00614	0
1	187000	168	.00090	.00000	.00004	.00009	.00002	.00013	.00005	.00001	.00000	.00000	.00010	.00016	.00030	1
5	216000	56	.00026	.00000	.00002	.00004	.00000	.00002	.00001	.00001	.00000	.00000	.00006	.00003	.00006	5
10	199000	68	.00034	.00000	.00000	.00004	.00004	[illegible]	.00001	.00002	.00000	.00000	.00006	.00005	.00010	10
15	208000	80	.00038	.00000	.00000	.00006	.00004	.00002	.00001	.00003	.00000	.00000	.00008	.00003	.00011	15
20	175000	86	.00049	.00000	.00002	.00005	.00007	.00002	.00001	.00001	.00002	.00000	.00009	.00011	.00009	20
25	163000	115	.00071	.00002	.00002	.00010	.00015	.00004	.00002	.00002	.00006	.00000	.00002	.00012	.00013	25
30	162000	153	.00094	.00004	.00002	.00022	.00023	.00006	.00001	.00004	.00004	.00000	.00003	.00010	.00015	30
35	166000	238	.00143	.00005	.00000	.00049	.00032	.00003	.00001	.00006	.00002	.00000	.00002	.00023	.00020	35
40	181000	464	.00257	.00007	.00002	.00102	.00077	.00012	.00003	.00003	.00001	.00000	.00003	.00017	.00030	40
45	155000	654	.00422	.00005	.00003	.00182	.00132	.00017	.00002	.00007	.00000	.00000	.00009	.00023	.00041	45
50	175000	1152	.00658	.00006	.00002	.00254	.00252	.00026	.00001	.00019	.00000	.00000	.00007	.00034	.00057	50
55	168000	1682	.01001	.00005	.00004	.00352	.00444	.00046	.00004	.00027	.00000	.00000	.00007	.00025	.00097	55
60	152000	2393	.01574	.00005	.00009	.00453	.00841	.00057	.00008	.00040	.00000	.00000	.00015	.00038	.00109	60
65	126000	3337	.02648	.00009	.00006	.00636	.01540	.00115	.00011	.00069	.00000	.00000	.00016	.00053	.00193	65
70	98000	4240	.04327	.00004	.00007	.00813	.02778	.00223	.00020	.00105	.00000	.00000	.00018	.00083	.00274	70
75	69000	4738	.06867	.00009	.00017	.00956	.04622	.00410	.00042	.00164	.00000	.00000	.00029	.00159	.00419	75
80	38000	4443	.11692	.00008	.00013	.01363	.08197	.00745	.00066	.00205	.00000	.00000	.00029	.00368	.00697	80
85+	20000	4139	.20695	.00005	.00025	.01655	.15040	.01425	.00065	.00170	.00000	.00000	.00025	.00840	.01445	85+
ALL	2707000	29276														
CRUDE DEATH RATE			.01081	.00003	.00004	.00204	.00626	.00061	.00007	.00022	.00001	.00020	.00008	.00037	.00088	
STANDARDIZED RATE (1)			.00422	.00002	.00003	.00081	.00175	.00026	.00005	.00009	.00001	.00038	.00007	.00021	.00054	
STANDARDIZED RATE (2)			.00803	.00003	.00003	.00154	.00442	.00046	.00006	.00017	.00001	.00023	.00008	.00030	.00072	
GEOMETRIC MEAN			.00674													

TABLE M1. DEATHS AND POPULATIONS FOR THE UNITED STATES AND BRITISH ISLES, BY AGE AND SEX, 1971.

UNITED STATES

AGE	DEATHS MALES	DEATHS FEMALES	POPULATION MALES	POPULATION FEMALES
0-4	45395	33817	8745499	8408838
5-9	4851	3304	10168496	9787751
10-14	5317	3108	10590737	10198731
15-19	15696	6084	9633847	9436501
20-24	18889	6563	7917269	8453752
25-29	14000	6124	6621567	6855426
30-34	12991	7017	5595790	5834646
35-39	16819	10005	5412423	5694428
40-44	26895	16604	5818813	6162141
45-49	43065	25830	5851334	6264605
50-54	62493	35511	5347916	5756102
55-59	86874	46562	4765821	5207207
60-64	111902	61331	4026972	4589812
65-69	127629	77321	3122084	3689541
70-74	135866	100957	2315000	3128831
75-79	136829	123556	1560661	2274173
80-84	109858	126535	875584	1408727
85+	101497	159725	542379	968522
TOTAL	1076866	849918	98912192	104299000

BRITISH ISLES*

AGE	DEATHS MALES	DEATHS FEMALES	POPULATION MALES	POPULATION FEMALES
0-4	11624	8524	3274976	2348529
5-9	1137	690	2557978	2429512
10-14	894	520	2317822	2193815
15-19	1907	775	2098898	2003429
20-24	2221	923	2242961	1870877
25-29	1765	965	1906066	1690378
30-34	1953	1272	1727343	1644944
35-39	2815	1928	1673758	1747350
40-44	5276	3553	1735064	1874101
45-49	10012	6623	1829893	1762023
50-54	15420	9520	1670704	1822698
55-59	26025	14910	1693094	1774140
60-64	40482	22397	1565226	1568228
65-69	52844	31987	1250838	1279828
70-74	54024	44930	823723	904456
75-79	48253	54868	488829	567927
80-84	37789	56911	259593	361333
85+	31453	69778	131599	
TOTAL	345894	331074	29248365	30042448

* Includes England and Wales, North and South Ireland and Scotland.

APPENDIX N

DISTRIBUTION OF ADJUSTED DEATHS BROKEN DOWN BY SUBPOPULATION, CAUSE OF DEATH, AGE, SEX AND PERIOD, 1950-52 TO 1970-72

NEOPLASM DEATHS

	AGE	FRENCH NATIVE-BORN 1950-52	FRENCH NATIVE-BORN 1963-65	FRENCH NATIVE-BORN 1970-72	BRITISH NATIVE-BORN 1950-52	BRITISH NATIVE-BORN 1963-65	BRITISH NATIVE-BORN 1970-72
MALES	0-4	132	163	104	124	137	79
	5-9	62	114	112	66	124	72
	10-14	48	76	96	47	80	66
	15-19	47	102	115	57	63	86
	20-24	51	90	121	72	58	89
	25-29	62	89	114	94	85	79
	30-34	84	129	123	135	113	83
	35-39	120	204	208	175	172	170
	40-44	192	286	451	232	259	322
	45-49	296	604	804	339	511	552
	50-54	496	982	1190	527	836	1044
	55-59	648	1260	1829	740	1091	1641
	60-64	842	1526	2347	1104	1302	2093
	65-69	1008	1691	2701	1254	1494	2307
	70-74	1059	1656	2481	1391	1708	2151
	75-79	898	1482	1990	1238	1594	2057
	80-84	481	1037	1428	799	1136	1597
	85+	294	682	881	483	817	1207
	TOTAL	6820	12173	17095	8677	11560	15695
FEMALES	0-4	98	109	77	133	97	43
	5-9	45	107	90	57	75	64
	10-14	28	43	67	46	35	37
	15-19	36	77	60	42	52	56
	20-24	44	51	92	44	57	47
	25-29	77	97	111	81	63	74
	30-34	169	172	164	190	130	102
	35-39	273	322	313	344	264	205
	40-44	405	600	541	452	475	380
	45-49	519	845	879	631	773	702
	50-54	581	1028	1217	697	939	1059
	55-59	683	1033	1533	905	891	1307
	60-64	711	1165	1641	1117	958	1355
	65-69	762	1251	1684	1201	1082	1324
	70-74	756	1176	1730	1331	1237	1575
	75-79	647	1093	1429	1163	1229	1414
	80-84	397	836	1149	782	967	1219
	85+	254	626	813	576	813	1034
	TOTAL	6485	10631	13590	9792	10137	11997

NEOPLASMS DEATHS

	AGE	Native Indians 1950-52	Native Indians 1963-65	Native Indians 1970-72	Residual Native-Born 1950-52	Residual Native-Born 1963-65	Residual Native-Born 1970-72
MALES	0-4	9	10	6	53	61	47
	5-9	8	13	9	40	34	56
	10-14	5	6	4	16	23	35
	15-19	3	7	4	32	30	39
	20-24	5	6	6	38	32	34
	25-29	6	4	6	47	32	34
	30-34	5	5	5	53	47	47
	35-39	3	6	6	54	71	76
	40-44	5	5	6	74	121	118
	45-49	15	13	10	89	161	209
	50-54	12	15	22	99	321	358
	55-59	10	21	21	129	407	567
	60-64	21	21	36	158	444	533
	65-69	26	36	42	196	478	314
	70-74	35	32	44	214	478	253
	75-79	18	30	41	190	416	286
	80-84	10	21	17	113	304	208
	85+	9	18	20	56	176	216
	TOTAL	205	269	305	1651	3636	3430
FEMALES	0-4	9	8	6	50	76	63
	5-9	5	5	5	28	41	31
	10-14	3	3	4	27	32	42
	15-19	3	6	5	15	29	28
	20-24	3	3	3	32	30	25
	25-29	6	4	5	48	40	29
	30-34	4	8	10	62	68	61
	35-39	10	20	15	116	125	119
	40-44	9	20	15	124	230	225
	45-49	16	18	23	112	321	379
	50-54	19	27	19	120	451	531
	55-59	15	26	23	150	463	652
	60-64	16	32	30	123	510	517
	65-69	23	40	35	142	468	371
	70-74	21	24	28	176	547	265
	75-79	17	27	17	127	475	400
	80-84	7	22	24	112	330	274
	85+	7	18	18	50	206	331
	TOTAL	193	311	285	1614	4442	4342

NEOPLASMS DEATHS

	AGE	BRITISH FOREIGH-BORN 1950-52	BRITISH FOREIGH-BORN 1963-65	BRITISH FOREIGH-BORN 1970-72	USA FOREIGN-BORN 1950-52	USA FOREIGN-BORN 1963-65	USA FOREIGN-BORN 1970-72
MALES	0-4	2	5	5	3	4	3
	5-9	2	2	2	0	1	4
	10-14	1	3	5	0	0	4
	15-19	0	11	5	0	0	2
	20-24	3	0	4	0	1	0
	25-29	8	4	13	3	5	8
	30-34	11	7	11	3	2	4
	35-39	35	32	23	13	14	5
	40-44	80	60	49	27	4	19
	45-49	206	74	128	39	21	54
	50-54	318	187	206	68	61	55
	55-59	528	428	356	110	136	120
	60-64	862	694	829	156	167	211
	65-69	1215	846	1212	187	216	288
	70-74	1139	1129	1290	119	268	321
	75-79	840	1288	1225	130	235	340
	80-84	481	956	1092	56	162	230
	85+	250	587	972	34	93	169
	TOTAL	5981	6333	7427	948	1392	1837
FEMALES	0-4	2	3	1	0	2	3
	5-9	4	2	4	0	2	4
	10-14	0	0	4	0	[illegible]	2
	15-19	0	2	1	0	[illegible]	0
	20-24	4	2	5	2	[illegible]	3
	25-29	16	3	10	1	3	0
	30-34	25	9	14	4	4	5
	35-39	55	45	43	22	13	7
	40-44	147	96	79	41	31	39
	45-49	247	113	206	71	30	53
	50-54	381	192	265	122	88	68
	55-59	444	324	272	140	142	126
	60-64	633	476	489	161	187	191
	65-69	778	560	685	163	249	285
	70-74	753	657	883	112	234	262
	75-79	548	856	937	122	201	279
	80-84	357	709	891	61	131	229
	85+	202	498	890	44	77	150
	TOTAL	4596	4547	5679	1066	1397	1707

NEOPLASMS DEATHS

	AGE	OTHER EUROPE FOREIGN-BORN 1950-52	OTHER EUROPE FOREIGN-BORN 1963-65	OTHER EUROPE FOREIGN-BORN 1970-72	OTHER FOREIGN-BORN 1950-52	OTHER FOREIGN-BORN 1963-65	OTHER FOREIGN-BORN 1970-72
MALES	0-4	3	8	5	1	5	1
	5-9	4	18	10	0	0	10
	10-14	1	9	11	1	2	6
	15-19	3	17	10	0	2	6
	20-24	5	14	21	1	3	6
	25-29	10	26	27	2	6	10
	30-34	12	37	37	0	5	16
	35-39	36	69	82	5	9	24
	40-44	76	99	164	14	12	20
	45-49	197	106	271	22	20	35
	50-54	363	249	292	35	31	48
	55-59	477	502	497	79	57	51
	60-64	636	936	838	107	91	108
	65-69	769	985	1503	117	124	159
	70-74	548	1077	1577	83	148	165
	75-79	412	948	1243	55	147	199
	80-84	212	567	897	35	73	141
	85+	111	260	583	11	54	100
	TOTAL	3875	5929	8067	568	789	1105
FEMALES	0-4	1	6	2	2	0	2
	5-9	4	3	3	0	3	4
	10-14	1	11	4	0	3	4
	15-19	1	10	6	1	0	4
	20-24	5	7	11	0	0	8
	25-29	12	16	16	2	1	14
	30-34	16	30	33	3	6	19
	35-39	40	97	68	2	3	41
	40-44	100	103	101	10	15	69
	45-49	175	122	188	20	15	116
	50-54	225	231	163	28	22	113
	55-59	271	323	236	23	48	151
	60-64	302	456	372	28	37	214
	65-69	296	457	493	32	50	297
	70-74	274	466	494	27	42	271
	75-79	185	413	451	30	59	266
	80-84	118	274	334	9	25	207
	85+	98	168	234	5	13	142
	TOTAL	2124	3193	3211	222	342	1942

CARDIOVASCULAR DEATHS,

	AGE	FRENCH NATIVE-BORN 1950-52	FRENCH NATIVE-BORN 1963-65	FRENCH NATIVE-BORN 1970-72	BRITISH NATIVE-BORN 1950-52	BRITISH NATIVE-BORN 1963-65	BRITISH NATIVE-BORN 1970-72
MALES	0-4	54	43	65	34	16	77
	5-9	44	18	10	16	11	15
	10-14	48	19	22	21	14	20
	15-19	53	31	74	42	21	69
	20-24	63	47	58	67	40	48
	25-29	129	86	86	95	63	54
	30-34	194	197	158	185	135	103
	35-39	318	424	351	398	366	285
	40-44	528	977	898	776	835	669
	45-49	908	1587	1456	1151	1447	1211
	50-54	1266	2499	2495	1869	2512	2154
	55-59	1645	3357	3655	2797	2965	3317
	60-64	2122	4053	4700	3885	3785	4347
	65-69	2462	4560	5385	4846	4889	4952
	70-74	2780	5154	5279	5859	6062	5300
	75-79	2730	5451	5159	6070	6876	5817
	80-84	2139	4385	4561	4987	6080	5626
	85+	1832	4170	4319	4440	5993	6434
	TOTAL	19315	37003	38731	37558	42110	40498
FEMALES	0-4	43	28	69	39	23	57
	5-9	39	8	11	11	8	14
	10-14	49	20	10	31	12	11
	15-19	51	34	26	29	23	20
	20-24	77	48	52	43	37	25
	25-29	102	59	68	77	40	39
	30-34	140	102	82	129	63	65
	35-39	209	152	153	234	111	115
	40-44	308	291	310	374	184	225
	45-49	489	530	459	516	397	302
	50-54	616	908	784	890	674	564
	55-59	881	1311	1345	1327	935	1045
	60-64	1256	1960	2094	2214	1454	1527
	65-69	1743	2865	3204	3289	2511	2400
	70-74	2243	3939	3880	4787	4158	3464
	75-79	2374	4861	4914	5633	5923	4703
	80-84	2190	4829	4989	5409	6380	5531
	85+	2195	5552	5596	6013	9091	8064
	TOTAL	15005	27517	28046	31045	32024	28171

CARDIOVASCULAR DEATHS

	AGE	NATIVE INDIANS 1950-52	NATIVE INDIANS 1963-65	NATIVE INDIANS 1970-72	RESIDUAL NATIVE-BORN 1950-52	RESIDUAL NATIVE-BORN 1963-65	RESIDUAL NATIVE-BORN 1970-72
MALES	0-4	14	5	30	25	13	55
	5-9	3	3	3	11	3	7
	10-14	3	5	3	11	3	8
	15-19	[illegible]	8	4	31	10	22
	20-24	[illegible]	8	3	24	13	17
	25-29	8	8	6	42	18	16
	30-34	9	6	7	93	64	42
	35-39	14	13	13	147	133	100
	40-44	23	17	21	197	340	228
	45-49	28	23	29	205	608	465
	50-54	26	52	39	259	792	907
	55-59	39	62	59	339	934	1268
	60-64	60	91	79	465	988	1255
	65-69	70	91	96	596	1091	1061
	70-74	100	116	99	698	1242	1231
	75-79	100	133	114	719	1235	1324
	80-84	72	91	83	629	759	825
	85+	20	132	91	575	691	653
	TOTAL	661	864	779	5066	8937	9504
FEMALES	0-4	9	7	30	16	9	32
	5-9	3	5	4	18	2	9
	10-14	5	4	3	12	5	6
	15-19	8	6	5	15	12	11
	20-24	6	4	5	31	15	8
	25-29	6	3	7	25	22	14
	30-34	16	9	6	47	39	26
	35-39	18	11	16	84	82	47
	40-44	19	15	17	114	137	73
	45-49	21	20	20	107	224	156
	50-54	16	18	23	140	326	254
	55-59	38	29	23	206	376	421
	60-64	28	58	35	302	568	453
	65-69	47	63	59	455	771	458
	70-74	77	64	60	542	1043	864
	75-79	55	95	104	647	1248	1434
	80-84	56	109	76	573	762	1957
	85+	71	161	90	627	859	1511
	TOTAL	499	681	583	3961	6500	7754

CARDIOVASCULAR DEATHS

	AGE	BRITISH FOREIGN-BORN 1950-52	BRITISH FOREIGN-BORN 1963-65	BRITISH FOREIGN-BORN 1970-72	USA FOREIGN-BORN 1950-52	USA FOREIGN-BORN 1963-65	USA FOREIGN-BORN 1970-72
MALES	0-4	0	0	0	0	0	2
	5-9	2	0	2	0	0	1
	10-14	1	1	0	0	3	1
	15-19	3	2	4	4	0	1
	20-24	2	6	2	1	1	2
	25-29	11	3	14	2	1	1
	30-34	23	12	10	7	6	7
	35-39	49	36	24	27	19	17
	40-44	175	96	103	66	31	57
	45-49	421	144	219	134	62	106
	50-54	728	496	385	205	177	168
	55-59	1166	908	649	376	314	317
	60-64	2122	1531	1424	501	495	510
	65-69	3052	1799	2224	681	649	760
	70-74	3375	2765	2461	589	891	892
	75-79	2946	4138	2892	548	1020	1107
	80-84	2296	3820	3685	423	724	978
	85+	1778	3236	4603	285	591	872
	TOTAL	18150	18925	18901	3849	4984	5799
FEMALES	0-4	0	0	3	0	1	1
	5-9	1	0	2	1	0	0
	10-14	4	3	0	0	0	0
	15-19	0	0	0	0	0	0
	20-24	5	2	2	2	0	2
	25-29	12	2	9	7	0	1
	30-34	18	6	11	7	6	6
	35-39	33	18	9	13	6	3
	40-44	105	47	31	38	10	19
	45-49	189	75	81	70	19	30
	50-54	338	132	131	136	47	42
	55-59	578	296	188	218	136	132
	60-64	1066	577	488	284	271	171
	65-69	1635	1081	1067	395	437	455
	70-74	2359	1930	1861	442	673	688
	75-79	2510	2995	2861	458	772	965
	80-84	2235	3571	4002	390	780	1062
	85+	2144	4131	7007	414	750	1249
	TOTAL	13232	14866	17753	2875	3908	4826

POOR COPY

CARDIOVASCULAR DEATHS

	AGE	OTHER EUROPE FOREIGN-BORN 1950-52	OTHER EUROPE FOREIGN-BORN 1963-65	OTHER EUROPE FOREIGN-BORN 1970-72	OTHER FOREIGN-BORN 1950-52	OTHER FOREIGN-BORN 1963-65	OTHER FOREIGN-BORN 1970-72
MALES	0-4	0	1	4	0	0	2
	5-9	1	1	0	0	0	0
	10-14	2	1	1	1	0	1
	15-19	2	4	4	1	0	1
	20-24	3	5	8	2	2	4
	25-29	20	16	11	1	1	6
	30-34	17	24	32	7	3	7
	35-39	42	77	69	2	10	28
	40-44	159	146	231	22	18	43
	45-49	420	219	445	47	26	56
	50-54	728	443	433	94	54	64
	55-59	1062	943	818	190	101	126
	60-64	1407	1741	1539	312	209	203
	65-69	1836	2024	2796	374	301	309
	70-74	1786	2504	3124	346	467	393
	75-79	1445	2941	3098	256	451	481
	80-84	964	2157	2805	162	346	514
	85+	905	1594	2729	105	276	446
	TOTAL	10799	14841	18147	1922	2265	2684
FEMALES	0-4	1	0	1	0	0	0
	5-9	1	1	0	0	0	0
	10-14	1	2	0	0	0	0
	15-19	1	0	2	0	0	0
	20-24	4	6	5	0	0	4
	25-29	9	10	6	0	2	1
	30-34	12	15	7	0	0	5
	35-39	19	28	21	2	5	4
	40-44	76	46	56	7	4	8
	45-49	145	54	102	15	6	16
	50-54	282	142	98	24	20	26
	55-59	428	299	197	44	35	34
	60-64	614	552	504	82	63	84
	65-69	904	895	1119	104	93	145
	70-74	1068	1430	1731	139	152	202
	75-79	950	1758	2085	112	202	255
	80-84	767	1546	2238	99	164	291
	85+	801	1455	2488	96	172	360
	TOTAL	6083	8239	10660	724	918	1435

DEATHS DUE TO ACCIDENTS-VIOLENCE

	AGE	FRENCH NATIVE-BORN 1950-52	FRENCH NATIVE-BORN 1963-65	FRENCH NATIVE-BORN 1970-72	BRITISH NATIVE-BORN 1950-52	BRITISH NATIVE-BORN 1963-65	BRITISH NATIVE-BORN 1970-72
MALES	0-4	645	661	303	833	634	315
	5-9	232	305	185	215	185	136
	10-14	211	277	219	221	204	171
	15-19	340	540	551	366	481	462
	20-24	444	668	633	571	612	544
	25-29	375	477	484	420	432	406
	30-34	262	428	421	437	410	279
	35-39	276	457	407	410	393	312
	40-44	274	383	458	364	439	407
	45-49	182	346	44[illegible]	270	419	444
	50-54	176	344	398	292	430	403
	55-59	156	291	340	275	320	417
	60-64	136	223	269	260	236	285
	65-69	138	149	178	248	218	162
	70-74	109	116	121	207	191	150
	75-79	85	125	120	204	174	129
	80-84	63	143	114	189	188	84
	85+	60	145	135	247	194	215
	TOTAL	4164	6038	5861	6024	6160	5321
FEMALES	0-4	350	398	232	489	358	198
	5-9	88	105	74	75	71	67
	10-14	44	75	79	44	56	64
	15-19	52	112	152	57	116	99
	20-24	50	95	135	85	83	110
	25-29	41	68	142	79	51	93
	30-34	43	84	139	58	56	107
	35-39	25	72	135	106	77	84
	40-44	30	61	165	66	92	136
	45-49	43	74	161	64	106	172
	50-54	43	84	149	62	100	180
	55-59	26	54	128	70	77	161
	60-64	27	48	103	86	61	127
	65-69	20	45	84	93	63	51
	70-74	54	56	90	144	85	82
	75-79	81	94	129	215	131	101
	80-84	85	119	131	267	216	136
	85+	123	193	254	454	350	366
	TOTAL	1225	1837	2482	2514	2149	2334

DEATHS DUE TO ACCIDENTS-VIOLENCE

	AGE	NATIVE INDIANS 1950-52	NATIVE INDIANS 1963-65	NATIVE INDIANS 1970-72	RESIDUAL NATIVE-BORN 1950-52	RESIDUAL NATIVE-BORN 1963-65	RESIDUAL NATIVE-BORN 1970-72
MALES	0-4	136	151	141	407	232	199
	5-9	23	60	29	106	86	84
	10-14	41	37	33	88	71	104
	15-19	55	70	108	144	182	253
	20-24	73	95	106	236	265	295
	25-29	60	77	78	162	189	216
	30-34	55	74	57	155	174	189
	35-39	44	47	48	173	184	187
	40-44	23	49	47	89	187	216
	45-49	32	37	44	80	180	206
	50-54	23	34	28	40	156	188
	55-59	14	24	21	39	106	175
	60-64	18	26	17	30	79	125
	65-69	11	20	15	39	59	79
	70-74	10	18	9	20	46	55
	75-79	9	14	9	23	42	54
	80-84	6	16	4	14	36	51
	85+	7	6	9	31	52	60
	TOTAL	640	855	803	1876	2326	2736
FEMALES	0-4	81	132	92	228	162	138
	5-9	19	23	18	42	31	45
	10-14	12	11	13	18	24	46
	15-19	15	31	22	32	47	83
	20-24	9	31	31	36	42	70
	25-29	10	24	40	26	40	75
	30-34	14	24	34	34	47	72
	35-39	9	30	31	28	58	74
	40-44	10	16	31	15	56	87
	45-49	6	22	22	19	55	85
	50-54	10	8	19	9	60	87
	55-59	4	9	9	17	45	68
	60-64	6	10	12	10	30	54
	65-69	4	10	5	12	30	46
	70-74	5	5	7	10	28	48
	75-79	4	6	6	20	49	68
	80-84	8	5	6	32	50	70
	85+	5	11	10	37	69	129
	TOTAL	231	408	408	625	923	1345

DEATHS DUE TO ACCIDENTS-VIOLENCE

	AGE	BRITISH FOREIGN-BORN 1950-52	BRITISH FOREIGN-BORN 1963-65	BRITISH FOREIGN-BORN 1970-72	USA FOREIGN-BORN 1950-52	USA FOREIGN-BORN 1963-65	USA FOREIGN-BORN 1970-72
MALES	0-4	15	8	8	6	11	24
	5-9	17	10	18	3	10	17
	10-14	7	13	12	1	5	23
	15-19	8	45	25	4	11	50
	20-24	20	49	45	28	12	62
	25-29	37	26	57	25	0	37
	30-34	52	31	36	17	15	36
	35-39	49	55	34	20	30	29
	40-44	81	61	49	46	15	44
	45-49	108	46	78	40	24	51
	50-54	135	71	63	36	25	48
	55-59	129	89	58	66	34	40
	60-64	134	97	117	65	41	50
	65-69	164	75	93	37	34	45
	70-74	136	65	78	30	33	39
	75-79	123	105	73	21	43	31
	80-84	97	109	100	15	29	28
	85+	102	117	191	21	28	39
	TOTAL	1414	1072	1135	481	400	693
FEMALES	0-4	7	3	7	2	10	23
	5-9	1	3	3	1	2	10
	10-14	1	1	1	0	4	5
	15-19	0	10	10	1	1	13
	20-24	4	9	9	1	3	9
	25-29	8	9	16	1	3	11
	30-34	12	3	15	2	4	10
	35-39	16	8	14	7	10	9
	40-44	24	20	27	10	6	22
	45-49	29	11	52	8	11	17
	50-54	27	26	42	19	17	16
	55-59	32	39	43	11	19	15
	60-64	41	35	42	13	25	19
	65-69	63	45	64	11	12	19
	70-74	87	46	61	11	23	21
	75-79	87	81	87	16	16	32
	80-84	109	102	119	29	25	30
	85+	147	164	295	21	37	56
	TOTAL	695	615	907	164	228	337

DEATHS DUE TO ACCIDENTS-VIOLENCE

	AGE	OTHER EUROPE FOREIGN-BORN 1950-52	OTHER EUROPE FOREIGN-BORN 1963-65	OTHER EUROPE FOREIGN-BORN 1970-72	OTHER FOREIGN-BORN 1950-52	OTHER FOREIGN-BORN 1963-65	OTHER FOREIGN-BORN 1970-72
MALES	0-4	31	39	13	3	16	8
	5-9	11	20	10	1	4	8
	10-14	16	30	29	0	6	8
	15-19	31	69	58	3	11	20
	20-24	68	119	145	6	19	29
	25-29	114	130	131	9	14	45
	30-34	84	149	143	7	20	37
	35-39	80	185	166	6	14	35
	40-44	130	150	202	16	15	24
	45-49	215	79	208	13	6	26
	50-54	258	124	135	19	4	16
	55-59	171	148	114	23	17	16
	60-64	196	202	154	30	13	21
	65-69	163	131	157	22	12	22
	70-74	101	107	130	15	22	15
	75-79	69	102	112	13	15	21
	80-84	49	91	88	11	17	21
	85+	62	77	116	8	13	32
	TOTAL	1869	1952	2111	205	238	399
FEMALES	0-4	15	9	9	0	5	3
	5-9	4	7	6	0	3	5
	10-14	2	5	7	0	0	2
	15-19	4	18	16	1	1	7
	20-24	12	19	25	3	6	13
	25-29	16	17	29	2	2	9
	30-34	8	15	35	1	7	18
	35-39	18	33	39	1	1	16
	40-44	32	34	48	1	3	9
	45-49	40	24	56	5	7	5
	50-54	22	35	50	2	1	5
	55-59	26	35	33	2	7	6
	60-64	17	30	34	1	8	8
	65-69	36	30	55	3	2	10
	70-74	36	39	64	3	5	5
	75-79	36	55	38	5	12	10
	80-84	40	50	60	6	8	11
	85+	55	86	103	4	9	19
	TOTAL	419	541	707	40	87	161

ALL OTHER CAUSES OF DEATH

	AGE	FRENCH NATIVE-BORN 1950-52	FRENCH NATIVE-BORN 1963-65	FRENCH NATIVE-BORN 1970-72	BRITISH NATIVE-BORN 1950-52	BRITISH NATIVE-BORN 1963-65	BRITISH NATIVE-BORN 1970-72
MALES	0-4	13493	7286	3069	6445	6716	3466
	5-9	569	558	505	386	265	274
	10-14	264	276	404	208	174	225
	15-19	367	558	1071	346	369	816
	20-24	492	525	1266	388	392	893
	25-29	497	345	701	362	248	426
	30-34	495	363	541	406	296	364
	35-39	530	462	491	491	353	368
	40-44	601	535	698	555	456	510
	45-49	688	664	967	590	605	743
	50-54	809	952	1192	746	762	997
	55-59	880	1133	1508	943	926	1274
	60-64	1072	1267	1833	1025	1003	1531
	65-69	1163	1386	1842	1306	1314	1467
	70-74	1342	1576	1854	1504	1626	1574
	75-79	1474	1641	1665	1617	1850	1819
	80-84	1250	1340	1346	1421	1564	1474
	85+	1217	1336	1266	1468	1819	1846
	TOTAL	27203	22208	23039	20209	20729	20067
FEMALES	0-4	9904	5274	2996	6225	4451	2392
	5-9	419	339	420	272	208	245
	10-14	217	226	305	157	115	194
	15-19	350	264	509	221	167	338
	20-24	437	220	466	288	144	265
	25-29	533	216	311	338	120	180
	30-34	506	274	267	386	155	152
	35-39	529	314	332	442	192	197
	40-44	480	372	384	370	305	268
	45-49	465	415	500	352	354	366
	50-54	541	526	625	405	447	495
	55-59	611	624	771	523	465	657
	60-64	796	808	1084	676	529	842
	65-69	1032	955	1338	836	625	944
	70-74	1213	1199	1469	1144	985	1188
	75-79	1257	1410	1544	1205	1163	1425
	80-84	1122	1207	1339	1212	1242	1383
	85+	1272	1416	1455	1596	1770	1937
	TOTAL	21684	16059	16116	16698	13437	13488

ALL OTHER CAUSES OF DEATH

	AGE	NATIVE INDIANS 1950-52	NATIVE INDIANS 1963-65	NATIVE INDIANS 1970-72	RESIDUAL NATIVE-BORN 1950-52	RESIDUAL NATIVE-BORN 1963-65	RESIDUAL NATIVE-BORN 1970-72
MALES	0-4	2221	2077	691	4974	3129	2157
	5-9	155	46	33	176	153	132
	10-14	88	12	24	108	100	125
	15-19	129	26	40	167	161	388
	20-24	119	40	81	189	153	327
	25-29	88	26	69	165	119	162
	30-34	65	27	33	230	126	148
	35-39	61	36	46	239	145	218
	40-44	46	48	50	198	200	290
	45-49	62	43	45	145	300	329
	50-54	56	45	47	166	366	437
	55-59	47	55	45	159	358	548
	60-64	83	65	37	186	365	487
	65-69	93	73	62	207	399	564
	70-74	145	71	68	335	436	490
	75-79	99	73	54	329	441	499
	80-84	107	73	61	295	433	480
	85+	78	83	46	311	485	572
	TOTAL	3741	2919	1532	8599	7873	8353
FEMALES	0-4	1671	1605	551	3955	2676	1894
	5-9	135	31	18	151	149	68
	10-14	90	13	19	127	88	81
	15-19	128	22	36	159	129	153
	20-24	134	23	42	206	116	78
	25-29	100	33	50	212	94	74
	30-34	75	52	43	199	102	101
	35-39	73	55	69	193	127	129
	40-44	87	36	55	127	159	204
	45-49	79	40	40	129	201	240
	50-54	66	42	35	104	222	314
	55-59	71	47	46	118	241	578
	60-64	64	58	43	152	287	351
	65-69	74	54	57	189	305	214
	70-74	98	48	62	233	327	264
	75-79	99	71	50	272	388	312
	80-84	75	49	35	266	420	384
	85+	103	102	79	353	559	722
	TOTAL	3222	2381	1330	7147	6598	6161

ALL OTHER CAUSES OF DEATH

	AGE	BRITISH FOREIGN-BORN 1950-52	BRITISH FOREIGN-BORN 1963-65	BRITISH FOREIGN-BORN 1970-72	USA FOREIGN-BORN 1950-52	USA FOREIGN-BORN 1963-65	USA FOREIGN-BORN 1970-72
MALES	0-4	47	70	33	110	112	90
	5-9	18	10	19	4	34	20
	10-14	8	6	13	5	15	20
	15-19	13	27	53	13	32	52
	20-24	9	23	61	30	39	60
	25-29	36	12	66	28	36	33
	30-34	36	17	29	15	40	20
	35-39	66	36	30	41	52	21
	40-44	120	52	58	72	61	54
	45-49	196	68	106	124	92	55
	50-54	331	155	150	140	142	64
	55-59	389	279	221	166	200	112
	60-64	735	489	451	221	264	182
	65-69	1029	565	825	269	313	258
	70-74	1099	901	959	247	373	331
	75-79	932	1266	1092	241	339	384
	80-84	735	1246	1333	200	271	308
	85+	715	1151	1742	170	222	340
	TOTAL	6514	6393	7241	2116	2636	2404
FEMALES	0-4	32	41	14	75	85	73
	5-9	21	10	9	4	16	7
	10-14	3	12	6	3	9	20
	15-19	5	23	20	17	11	24
	20-24	13	13	17	23	15	18
	25-29	44	12	23	22	13	17
	30-34	62	15	12	15	15	10
	35-39	42	25	19	43	21	14
	40-44	93	34	31	85	21	32
	45-49	151	59	60	77	44	32
	50-54	166	78	93	97	66	41
	55-59	250	134	111	94	95	90
	60-64	338	289	181	128	168	124
	65-69	525	392	296	154	173	185
	70-74	639	542	379	151	242	236
	75-79	597	710	498	165	238	280
	80-84	533	838	628	168	221	308
	85+	543	989	1040	143	203	362
	TOTAL	4057	4216	3439	1444	1656	1873

ALL OTHER CAUSES OF DEATH

	AGE	OTHER EUROPE FOREIGN-BORN 1950-52	OTHER EUROPE FOREIGN-BORN 1963-65	OTHER EUROPE FOREIGN-BORN 1970-72	OTHER FOREIGN-BORN 1950-52	OTHER FOREIGN-BORN 1963-65	OTHER FOREIGN-BORN 1970-72
MALES	0-4	97	102	71	10	30	28
	5-9	20	24	24	1	5	12
	10-14	9	15	28	0	0	13
	15-19	19	47	103	4	6	31
	20-24	49	85	191	12	18	40
	25-29	69	79	101	5	18	31
	30-34	50	78	120	7	25	52
	35-39	56	78	164	12	15	48
	40-44	133	112	189	12	12	34
	45-49	301	103	268	30	16	28
	50-54	345	183	199	52	26	25
	55-59	444	350	254	102	40	36
	60-64	552	570	507	187	77	82
	65-69	637	681	911	200	123	112
	70-74	601	829	1041	173	193	147
	75-79	546	905	1002	99	226	195
	80-84	392	699	988	57	128	222
	85+	449	599	1028	56	124	181
	TOTAL	4771	5539	7189	1019	1082	1317
FEMALES	0-4	71	79	41	8	31	26
	5-9	13	21	20	1	10	8
	10-14	6	10	16	0	5	12
	15-19	12	24	46	2	1	13
	20-24	28	38	65	3	8	24
	25-29	43	40	43	6	9	18
	30-34	37	34	64	7	8	27
	35-39	49	58	62	6	7	26
	40-44	87	67	90	6	2	16
	45-49	111	61	164	10	6	19
	50-54	146	78	172	12	14	16
	55-59	167	174	223	17	18	36
	60-64	268	263	387	23	23	43
	65-69	289	301	636	26	35	50
	70-74	310	410	773	26	51	66
	75-79	284	463	922	27	54	76
	80-84	236	391	942	22	41	73
	85+	343	426	1337	55	49	91
	TOTAL	2503	2938	6003	257	372	640

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