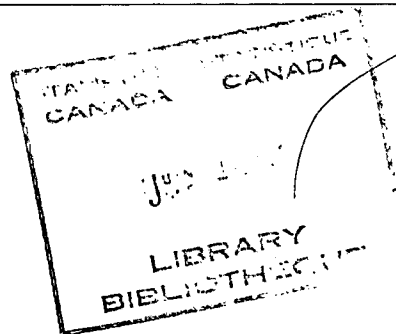


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Retirement and mortality

An examination of
mortality in a group
of retired Canadians

O.B. Adams, L.A. Lefebvre



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Preface

This exploratory study treats an issue which has been and will continue to be a major preoccupation for an increasing number of Canadians in the foreseeable future. The age of 65 is becoming more and more universally accepted as the age of retirement from the labour force. Every day a growing number of people will be faced with the question "should I retire?". For a variety of reasons others will not be given the choice and will be forced into retirement.

In the past, efforts have been made to evaluate the impact of retirement. This paper will focus on but one aspect of retirement behavior by examining post-retirement mortality in a group of Canadian pensioners.

This is done by comparing the subsequent four years' mortality experience of a cohort of Canadian men and women, retiring in 1970 at the age of 65, with the corresponding age-specific death rates observed in the Canadian population, over the same period, 1971-74.

When these rates are examined, it is seen that there are not only differences between the mortality patterns of the retirees and the Canadian population, but also that distinct mortality patterns emerge for male and female retirees. Among the males the first and third years of retirement are marked by a lower level of mortality while an upturn is observed in the second and fourth years. These fluctuations are significantly different than those observed in the corresponding age-specific Canadian male population. Among the females the greatest likelihood of dying occurs in the first year after retirement followed by two years of lowered mortality, showing a slight upturn in the fourth year after retirement. This pattern is unlike that shown by the age-specific death rates for females in the general population, which increase for each of the three years after age 66.

We conclude that these differential mortality patterns may be explained, in part, by "phases" that occur in the course of adjustment to retirement and that these phases differ significantly between male and female retirees.

Throughout the preparation of this study the authors were assisted by a number of individuals who reviewed and commented on the preliminary drafts.

Special thanks are owed to Mr. R. Prévost, Chief of the Statistical Section, Regional Operations Planning and Evaluation Division, Income Security Programs, Health and Welfare Canada, for making available unpublished tables on which the analyses in this paper are based.

The authors appreciate the time and thought devoted to assessing the study by Miss Lola Wilson of Health and Welfare Canada, Mr. Jac-André Boulet of the Economic Council of Canada, and Mr. Russell Wilkins of the Institute for Research on Public Policy.

The authors thank these people for their constructive suggestions, many of which have been incorporated in the final version. Nevertheless, we accept sole responsibility for the facts, opinions and any errors in the report.

Table of Contents

	Page
Introduction	7
Literature Review	9
Relevance of This Study	12
Data	13
Methods	15
Findings and Discussion	17
Summary	20
Appendix	
I. Percentage Distribution of the Canadian Population aged 65-69 by Labour Force Status, June 1971	21
II. Comparison Statistics of the CPP and the Canadian Population, 1971	23
III. Selected Tables of the Female Canadian Population, 1971	27
Bibliography	29



Introduction

In Canada, labour force participation either ends or has ended for most people at the age of 65. A spokesman for the Department of Manpower and Immigration said, in 1970, that: "Retirement in most cases is no longer a question of personal choice. It is no longer a luxury chosen by those who could afford it. Compulsory retirement (at 65) has become standard practice in business and industry", (Campbell: 1971, p. 258). While the extent of "mandatory" retirement *per se* is arguable, data from the Labour Force Survey indicate that 65 is continually increasing as the conventional retirement age. In January of 1972, 10.2% of the Canadian men and women aged 65 and over were employed in the labour force, and as of January 1979, this proportion had declined to 8.7% (Statistics Canada: 1972, 1979a). By comparison, the employment rate for all ages 15 years of age and over had increased from 50.8% to 55.9% during the same period of time.

If, in the past, there have been any undesirable consequences of a relatively inflexible schedule of retirement¹, they have received little attention. The principal factor has probably been the relatively low visibility of the elderly population in terms of representation. Assuming, however, that present demographic trends will continue in the next few decades, this situation will change markedly. A recent Census report summarizes this change. "The 65 + population in 1976 was seven times larger than it was in 1901, while the population in general was only four times larger. This trend is continuing, between 1971 and 1976, Canada's population as a whole rose by 6.6% while the 65+ population increased by 14.8%" (Statistics Canada: 1979b).

Although several factors account for this increased representation, for example, migration and lowered fertility, the one that bears most directly on the issue of retirement age is increased life expectancy. Between 1931 and 1976, life expectancy at birth has increased by 10 years for males and by 15 years for females. While life expectancy at age 65 has not increased so dramatically (one year for males and four years for females) the implication is that the retirement period will be significantly longer and will likely continue to be extended. People retiring at or before age 65 may expect more disability free² and potentially productive years than they could have a few decades ago.

¹ This inflexibility is generally implied by a reduction in pension benefits if earned income from paid employment exceeded specific minimum levels. This is no longer the case with the Canadian government pension plan.

² While there are no Canadian data that show the historical trends in the prevalence of chronic disability, results from the American Health Interview Survey support this point. From 1961-63 to 1974 the proportion of the male population aged 65 and over with activity limitation due to a chronic condition declined from 52.5% to 49.7%. This compares to an increase from 12.2% to 14.1% in the total male population (National Center for Health Statistics: 1965, Wilder: 1977).

As the elderly population continues to grow in size, its impact will be keenly felt by all sectors of society. As the authors of a report on the implications of population for social policy note: "This is a population whose dependency on ameliorative welfare policies covers a wide variety of aspects of social life (employment opportunity, health, housing, recreation, community services, education, etc.) and consume a large segment of the national budget" (Stone and Marceau: 1977, p. 51). All indications point to the enlargement of this segment. To take a case in point, the most recent actuarial report of the Canada Pension Plan (CPP) suggests that the current contribution rate of 3.6% of insurable³ earnings may have to more than double to 9% by the year 2030 in order to balance expenditures with contributions and accumulated interest (Department of Insurance: 1978). Stone and Marceau also suggest that retirement age is a likely candidate for reconsideration. "As the older population becomes a larger proportion of the electorate in Canada, governments may well be faced with a strong demand to reverse the popular practices and provide more widespread opportunities for older workers to continue working beyond the current mean age of retirement if they care to do so" (Stone and Marceau: 1977, p. 52). Most recently, the Special Senate Committee on Retirement Age Policies has published a comprehensive set of recommendations on how this might be achieved, in their report *Retirement Without Tears*.

Just as the post-War baby boom is now exerting pressure on the capacity of the Canadian labour market, so, eventually, will the emerging "geriatric boom" place strain on the various programs and policies designed to accommodate the elderly population.

This paper examines another aspect of aging, the issue of retirement and mortality. Its purpose is to establish whether fluctuations do exist in post-retirement mortality, and subsequently to determine if the observed levels of mortality in a cohort of Canada Pension Plan retirees differ from those in the corresponding age-sex-specific Canadian population.

The interpretation of the findings should be viewed in the context of certain limitations.

Limitations

Two major limitations should be recognized before interpreting the findings discussed in this study. Firstly, the cohort of Canada Pension Plan retirees for which the mortality pattern is calculated may not be representative of all retirees in Canada. It should be noted, however, that male CPP retirees accounted for more than 60% of all retirees aged 65 to 69 in Canada in 1971.

³ This means, for 1971, that CPP contributions were made on earnings ranging between \$600 and \$5,400 per year (Health and Welfare Canada: 1972a).

The second limitation concerns our comparison group. Throughout this paper, we have used the Canadian population, exclusive of the CPP retirees, to illustrate the differences between the mortality of the retirees and the corresponding age-sex-specific "general population". This should not be interpreted as a comparative study of the mortality of retirees and non-retirees.

Furthermore, the summary form in which the data were available also imposed some limitations on the analysis. These are discussed in the Data and Methods sections.

Layout

The report proper is divided into six sections:

Literature review. A review of previous research that has addressed the question of retirement and health.

Relevance of this study. Discussion of how the available Canadian data may be examined in relation to the existing research.

Data. A description of the data used in this study.

Methods. A description of the methods employed to calculate the results.

Findings and discussion. A presentation of the findings and accompanying discussion.

Summary. A discussion of findings in view of the need for future research.

LITERATURE REVIEW

Previous research that has addressed the issues of working, aging, and health has concentrated on two principal hypotheses. The first is that the experience of working after age 65, as opposed to the assumed alternative of relative idleness, is health promoting. The second is that the abrupt cessation of work at age 65, occasioned by involuntary⁴ retirement, results in psychological stress, which in turn produces negative health consequences.

Work As Health Promoting

Apart from consideration of the obvious health-promoting effect of income maintenance⁵ that results from working beyond the age 65, it appears that the first hypothesis has not been empirically supported. Indeed, this argument seems to be predicated almost purely on the basis of traditional assumptions and the tenacity of the Protestant Work Ethic, "the devil finds work for idle hands".

The view that work is essential for good health and well-being has been articulated in terms of "work" being both a biological and a social imperative. Concerning the former, Selye has written, "Man must work...We have to begin by clearly recognizing that work is a biological necessity. Just as our muscles become flabby and degenerate if not used, so our brain slips into chaos and confusion unless we constantly use it for some work that seems worthwhile to us" (Selye: 1974, p. 81).

Others have emphasized the importance of work in a more sociological context. In this case, work is a principal means of social role fulfillment. Taking the position that, "work is a primary determinant of status and is a source of meaningful social relationships and social recognition", Ellison has theorized that health declines in retirement due to the adoption of a "sick role...an acceptable cause for withdrawing from certain role obligations, social responsibilities and expectations" (Ellison: 1968, pp. 189 and 190).

Encouragement to adopt this role, as the work role is lost, accounts for much of the displacement of the aged in mainstream society, according to the authors of a United States task force report, *Work in America* (W.E. Upjohn Institute: 1973).

Contrasting the lifestyle of the elderly persons in America with that of those in the fabled Abkhazian region of the U.S.S.R. where centenarians are common, and "work" is a life-long phenomenon, they claim, "The opposite of the Abkhazian system is what we frequently find in the United

States; otherwise healthy elderly Americans adopt a sick role, a culturally sanctioned reason for admittance to a nursing home when the real reason is family rejection. Instead of a respected work role, we provide our older citizens with a sick role that encourages psychosomatic illnesses and excessive use of the medical care system - which might better be called in this instance, the 'tender loving care system'" (W.E. Upjohn Institute: 1973, p. 77).

Surely such maladjustment would not be as pervasive or permanent as the authors imply. Also rather than family rejection it is more often the case that the nuclear family cannot provide adequate care for the elderly.

The assertions made by Hans Selye, and by the proponents of the sick role would be quite difficult to verify, perhaps because the term "work" is highly culture specific.

Owing, in large part, to the complexity of measuring and monitoring both the intrinsic character of work,⁶ and also health status and general well-being, existing studies have tended towards a conceptual and methodological compromise.

Retirement As Unhealthy

Research that has adopted a line of compromise has focused on the timing of the decline in health after retirement rather than attempting an explicit working/retiring comparison. Furthermore, these inquiries are often constrained to measuring health only with reference to mortality, unarguably a severe criterion in view of present life expectancy. Thus the impact of retirement on health tends to be explained in terms of extrinsic conditions of work, factors such as income and social contacts, and how they gradually diminish after retirement, rather than as a direct result of the cessation of paid employment⁷.

Some of the most recent literature has postulated "stages" of retirement, some, if not all of which, may have implications for health. Viewed from this perspective, the termination of paid employment is inevitable, and the event of retirement is considered as the demarcation of a lengthy period of adjustment and coping.

The most detailed of these is presented by Atchley (1976), who has identified five phases in the post-retirement

⁶By this it is meant the aspect of work that captures the imperative quality of work as cited from Selye. See also the work of Herzberg (1966) for a treatment of this concept.

⁷In a 15-year prospective study of aging based on 268 persons between the ages of 60-94 at commencement, Palmore reported that the strongest predictor of longevity was "work satisfaction" followed by "overall happiness". These two socio-psychological measures predicted longevity better than a rating by an examining physician of physical functioning and a measure of tobacco use. (These two predictors accounted for 80% of the explained variance in longevity ($r^2 = .17$)). This study does not mention, however, whether or not the respondents were actually working (Palmore: 1971).

⁴ This is an implicit assumption; that is compulsory = unwanted. It is used to enhance the theoretical position of life-stress researchers, which is, that while many life-events may be stressful, it is the undesirable ones that are the most salient for stress outcomes.

⁵ As would be the case if paid employment were the only source of income.

period. These phases that are hypothesized to occur after the event of retirement are briefly summarized below:

The honeymoon phase. "Often followed by a rather euphoric period in which the individual wallows in his newfound freedom of time and space".

The disenchantment phase. "Some people experience a period of let-down, disenchantment or even depression."

The reorientation phase. "This process involves using one's experience as a retired person to develop a more realistic view of alternatives."

The stability phase. "In the stability phase of retirement, the individual has a well-developed set of criteria for choices, and these allow him to deal with life in a reasonably comfortable, orderly fashion."

The termination phase. "Most often, the retirement role is cancelled out by the illness and disability which sometimes accompany old age" (Atchley: 1976, pp. 68-71).

An empirical assessment of this model of retirement adjustment would require long periods of monitoring and extensive replication across numerous settings varying on the dimensions of both working conditions and worker characteristics. However, at least two studies to date have claimed support for the first two stages of Atchley's model on the basis of patterns observed in post-retirement mortality.

The first was a longitudinal study of rubber workers employed at two plants in the U.S., followed from compulsory retirement at age 65 for a period of 9-10 years. Hypothesizing a greater risk of mortality during the first five years, the authors observed elevated mortality during the third year of retirement for one plant, and during the fourth year for the other. They concluded that, "these observations might suggest a "disenchantment" phase in the retirement process." (Haynes et al: 1977, p. 108)

Having observed lower than expected mortality shortly after retirement, the authors also commented that, "since these rates preceded, rather than followed, the above-mentioned peaks in each company, they cannot be explained by selective survival and perhaps reflect a "honeymoon phase" in retirement." (Haynes et al: 1977, p. 108)

The second study consisted of a five-year follow-up of 402 Norwegian wage earners reaching retirement age in 1967. The mortality pattern observed in these data was similar to that reported by Haynes.

"Of those having died during the first year (7) only 2 have died during the first half year, which gives some additional support to the notion of an early honeymoon phase. The highest probability of dying found in the third year after retirement age, which allude to the disenchantment phase suggested in the paper of Haynes. After the third year the number of deaths are decreasing." (Solem: 1976, p. 62)

Retirement as Stressful

The researchers of life stress have attempted to relate sickness and, in a few cases, death, to antecedent events having great impact on accustomed lifestyle. Death of a

spouse usually ranks first on the list, and there are many others. This life event/health outcome relationship is generally viewed as an acute sequence⁸.

In the context of retirement, if it is a stressful event, then there should be a death rate peak shortly after retirement. This elevated mortality has not been substantiated.

Following a group of pensioners from one Canadian company, Tyhurst, *et. al.* (1955) found that, if anything, health improved slightly after retirement. They concluded by saying, "If retirement were a stress that precipitated death shortly after retirement, we should expect, just after retirement, a death rate higher than in later years. Our data do not bear this out" (Tyhurst, *et. al.*: 1955, p. 1435).

While Myers (1954) observed higher death rates shortly after retirement among a group of railroad pensioners, by comparing their experience with that of a group of compulsorily retired workers, he concluded that these higher death rates were due to persons under a non-mandatory retirement age scheme working until their health failed. We would add, however, that the examination of mortality patterns is a conservative test of the "stress hypothesis" since studies to date have not reliably extrapolated beyond the life-event/morbidity sequence. (Holmes and Masuda: 1972).

In addition to considering the factors that are likely to determine the amount of adjustment that retirement will require, one should not discount the stress-reducing function of retirement planning activity, although it is not likely that more than a minority of Canadian workers and their employers engage in systematic preparation for retirement. Many people look forward to retirement as an opportunity to expand, and devote more time to, the leisure and recreational pursuits that they have developed over the years. Such plans no doubt greatly facilitate the process of adjusting to retirement. Nonetheless, while it may be the case that more people are looking forward to retirement, as evidenced by the growing demand for "30 and out" employment policies, retirement is almost certain to require some adjustment.

Retirement and Health: An Outdated Hypothesis?

Looking at the growing exodus of the older worker from the labour force, at least in aspiration, if not in fact⁹, it is

⁸ See, for example, the work of Seligman (1975) on sudden death following development of the "helplessness" syndrome. The stress-death sequence is also supported by the observation of elevated death rates of surviving spouses within a year of bereavement (Brody: 1979).

⁹ Early retirement is not yet a marked trend at the aggregate level. As estimated from working life tables for males the mean years of working life at age 15 declined from 48 years in 1961 to 47.3 years in 1971. The median age at retirement declined from between 65 and 66 in 1961 to between 64 and 65 in 1971 (Denton and Ostry: 1969 and Gnanasekaran and Montigny: 1975). Summarizing the trends of the past 15 years Ciffin and Martin conclude that there has been, "a substantial shift towards retirement around age 65. In other words the observed trend has not been toward early retirement, in the sense of pre-65 retirement" (Ciffin and Martin: 1977, p. 16).

evident that the need remains to reconcile the "stressful event" and the "work as healthy" conceptions of retirement with what would appear to be in a majority of cases, positive attitudes toward retirement. While a recent *Time Magazine* article has observed that, "some people are battling for the right to work, others are stopping work as soon as they can", available evidence suggests that the former are few in number (Time: 1977, p. 12).

A recent Canadian study *Retirement in Canada*¹⁰ reported that fewer than one third of the retired men in the sample indicated "compulsory retirement" as the reason for their retirement (Ciffin and Martin: 1977).

Additionally, some evidence from the United States questions the impact that the abolition of compulsory retirement would have on the size of the elderly labour force. Based on results from the Retirement History Study, Motley concludes, "If all the retirees who had been available had returned to work, the ranks of the recently retired, aged 62-67 would have been reduced by only 12%" (Motley: 1978, p. 20). Does this mean that it is somewhat naive to examine the retirement and health question any further?

Provided that we can expect the circumstances that influence present retirement behaviour to change, the answer is no. To date, one of the most frequently cited reasons for retirement has been failing health. The *Retirement in Canada* study, for example, reported that approximately 35% of the men and women in the sample indicated "poor health" as the reason for their retirement (Ciffin and Martin: 1977). As might be expected¹¹ this proportion varied greatly by occupation. Only 11% of the managerial, professional, and technical category indicated that they had retired because of poor health, compared to 42% of the primary blue-collar workers.

It would seem that a likely result of the continuation of two trends, namely the transition of the labour force to white-collar occupations (Krishnan and Sangadasa: 1975), and increasing concern with safety in the work place, will be that health status will become a less significant determinant of retirement than it has been in the past.

¹⁰ Representative of the civilian non-institutional population over age 55 in Canada 1975 (Health and Welfare Canada: 1977).

¹¹ Considering that work injuries and accidents would be a likely source of such variation we would note that in Ontario in 1974, managerial and professional occupations accounted for 5% of work injuries in comparison to 12% for machining and related occupations. Altogether, the traditional "white-collar" occupations accounted for only 12% of all work injuries in this year (Statistics Canada: 1974a).

Presently, however, the decision to take early retirement is most likely to be determined by health. Citing the *Retirement in Canada* study further, "Poor health was virtually the only reason men retired before age 57 and was the single most important reason for having retired at each age up to age 64. Over two thirds of those who retired because of "poor health" had done so by age 65" (Ciffin and Martin: 1977, p. 16).

Working conditions may also play a role in withdrawal from the labour force. In a study of early retirement in the United States, Quinn found that, "individuals whose jobs involve, repetitive work, work under specific instructions, stress, strength, other physical demands, or bad working conditions are more likely to have retired" (Quinn: 1978, p. 318). Further disaggregation of his findings showed that there was an interaction of job characteristics with both health status and availability of pension income, with respect to the likelihood of early retirement.

The Economic Council of Canada has asserted the significance of the occupational distribution for retirement policy. "There will always be some occupations where a retirement age earlier than the average is desirable because of their hazardous nature...protective services and mining are good examples. There are others where sheer boredom and lack of job satisfaction will remain valid causes for earlier retirement as well" (Economic Council of Canada: 1979, p. 70).

Considering that failing health and the prospects of unattractive jobs are likely to weigh heavily on the ability and willingness to work beyond the age of 65, we might further qualify the hypotheses that have been addressed in the literature to the effect that:

given reasonable health, and jobs that are not hazardous or exceedingly dull, working past the age of 65 will be health promoting, both in the sense that the experience of work is healthy and also in the sense that work past the age of 65 will sustain the continuity of role performance that has been conditioned over several decades.

While acknowledging that the impact of retirement on health most probably occurs along these two major dimensions, and is no doubt significantly moderated through factors such as; health status, marital status, occupation, and attitudes towards work and leisure, the available data, as outlined in the data and methods section, restricts the present analysis to an examination of mortality patterns of a group of Canadian men and women during the first four years after retirement.

RELEVANCE OF THIS STUDY

In this paper we will examine the mortality rates of a cohort of Canadian men and women who retired at age 65 under the provisions of the CPP legislation. The data base from which the data were drawn serves an administrative function, namely the payment of pension benefits, and the only measure of health status is the record of death which signals the termination of pension payments. While this record is at best an incomplete measure of health, as it takes no account of the debilitation and chronic disease that precede death, if certain assumptions are made, it remains possible to formulate expected findings with respect to the theoretical linkages between retirement and health, i.e., work as healthy/retirement as unhealthy, and retirement as stressful. The central assumption concerns the time frame within which: psychological stress occasions negative health outcomes, and the lapsed time necessary for maladjustment or "disenchantment" to result in negative health outcomes.

The secondary assumption is related to the direction and force of attitudes towards retirement, and the impact that they might have on health in retirement.

Returning to the central assumption, while the research on stress and its effects on health is far from conclusive, we assume for the present that psychological stress results in health outcomes within a period of a year or two.¹² Thus, if

¹²A general summary by T.H. Holmes who has carried out a great deal of research in the area of life change events concludes, "We found that illness follows a cluster of events that require life adjustment. In the pattern we found life events clustered in a two-year period before the onset of tuberculosis, heart disease, skin disease, and hernia" (Holmes and Masuda: 1972, p. 71).

In addition the results of a cohort study by Kasl and Cobb of workers employed at a factory that was going to close show that stress may occur in advance of a scheduled life event. Among several health consequences they reported "BP (blood pressure) levels during anticipation of job loss and unemployment or probationary re-employment were clearly higher than during later periods of stabilization on new jobs" (Kasl and Cobb: 1970, p. 36). This latter finding may be of particular relevance to the study of retirement.

retirement produces psychological stress, then we expect to find elevated mortality within a year or two of retirement followed by a decline, or stabilization, that would approximate population death rates.

If on the other hand, work is health-promoting, one should consider the factors that make it so, and how they tend to dwindle after retirement. Likely correlates of this health-promoting effect could include income, friendship of coworkers, and the challenge of the job. It could be generally assumed that income, social contacts and activity do not cease immediately upon retirement, but rather diminish over the course of several years. This being the case, we might expect to find elevated mortality at least three-four years after retirement.

While we have discussed two potential explanations for the impact of retirement and health, on what we could expect to find if either is operative, we have not yet considered the most frequent case - that is, what would be the implications for health of overwhelmingly favourable attitudes toward retirement? The most likely result would be that mortality will be exceptionally low, following retirement, until concerns with income, and factors such as social isolation and boredom begin to catch up. This would represent the "honeymoon" phase described by Atchley.

In summary, while mortality is at best the "tip of the iceberg" in terms of health status, it is nonetheless possible to use these data in preliminary exploration of the existence of these hypothesized linkages between retirement and health. Observation of these different mortality levels is, of course, insufficient evidence. It might be the case that the level of mortality might be almost completely a function of age. Therefore, we will compare the mortality pattern of the retirees with an estimate of the mortality patterns for the corresponding age-sex Canadian population (exclusive of the cohort of retirees).

DATA

The data on retirees were obtained from unpublished statistical summaries of the CPP for the years 1970-74 inclusive. This plan is administered by Health and Welfare Canada under the provisions of legislation that came into force in 1966. The data apply to all of Canada, with the exception of the province of Quebec, which maintains its own parallel plan. For the cohort followed in this paper it is possible to infer that age retirement beneficiaries¹³ of the CPP had "retired" or withdrawn from the labour force, as this was one of the requirements of the original legislation.¹⁴

The schedules from which the data are taken are as follows:

age retirement pensions emerging,¹⁵

age retirement pensions in payment,¹⁶ and

age retirement pension terminations¹⁷ by reason.

Each of these schedules is further disaggregated by age and sex. Age is reported in single years up to age 69 and grouped thereafter. Reasons for termination of CPP benefits include withdrawal¹⁸ from the CPP and death.

The data used to calculate the Canadian population death rates for ages 66-69, 1971-74, were obtained from the following sources:

Vital Statistics - Annual tabulations of death by single year of age by sex, for Canada and provinces, 1971-74;¹⁹

¹³By this it is meant the conventional notion of retirement from **paid employment**. This is used to distinguish **normal** retirement from retirement due to disability.

¹⁴This definition was effectively determined with an income test. In 1971, the earnings ceiling was \$960. As of 1975, such an inference would not be necessarily correct, as withdrawal from the labour force is not necessary to qualify for pension benefits.

¹⁵"Emerging" refers to new retirees during the year. For the period of our study this refers to those retiring at ages 66-69 from 1971-74 respectively.

¹⁶This refers to the total number of pensions in payment at December 31. For this paper, the only figures used are those of the number of retirees aged 65 on December 31, 1970.

¹⁷"Terminations" refers to the cessation of benefit payments.

¹⁸A withdrawal could take place in the event that someone had contributed to the Plan after its inception, but had not been in Canada long enough so if they left the country the benefits would have been discontinued.

¹⁹As reported in Statistics Canada *Vital Statistics, Volume III - Deaths Catalogue 84-206 - Deaths by Single Year of Age and Sex, Canada and Provinces* (Statistics Canada: 1974b, 1974c, 1975a, 1976).

unpublished tabulation of June 1 estimates of population²⁰ by single year of age by sex, for Canada and Quebec, 1971-74;

the previously mentioned tabulation of the CPP - Age Retirement Pension Terminations by Reason - disaggregated by age and sex, 1971-74; and

The June tabulation of CPP Retirement Pensions in Payment, by age and by sex, 1971-74.²¹

The death rate (d_x) is calculated for each sex in each of the years 1971-74, as:

$$d_x = \frac{\frac{D^C}{x} - \frac{D^Q}{x} - \frac{D^{CPP}}{x}}{\frac{P^C}{x} - \frac{P^Q}{x} - \frac{P^{CPP}}{x}}$$

Where D^C_x refers to total deaths in Canada at age x,
 D^Q_x refers to total deaths in Quebec at age x,
 D^{CPP}_x refers to total deaths among CPP retirees at age x,
 P^C_x refers to the June 1st Canadian population at age x,
 P^Q_x refers to the June 1st Quebec population at age x,
 P^{CPP}_x refers to the June CPP population at age x.

It is necessary to make a further adjustment to the death rate (d_x), since the population estimates in the denominator refer to mid-year values. Assuming that deaths are evenly

²⁰The methodology for the calculation of these estimates is discussed in Statistics Canada - *Estimates of Population by Sex and Age for Canada and the Provinces* (Statistics Canada: 1978a).

²¹As reported in Table 12. Canada Pension Plan Retirement Pensions: Number Gross Amount and Average Monthly Amount of Pensions Put into Pay in Month, and of Pensions Paid in Month, by Age and by Sex. *Canada Pension Plan Statistical Bulletin*, June issues for 1971-74. (Department of National Health and Welfare Canada: 1971, Health and Welfare Canada: 1972b, 1973, 1974).

distributed throughout the year, the probability of dying during the age interval (q_x) is calculated from the age-specific death rate as:

$$q_x = \frac{2d_x}{2 + d_x}$$

This death rate (probability of dying during age interval x) provides an estimate of mortality for the population excluding those retirees receiving benefits from the CPP, as they have been subtracted from both the numerator and denominator of the death rate calculation. These rates are shown in Text-Table I.

TEXT TABLE I. Death Rates: Canadian Population Excluding Quebec and Canada Pension Plan Retired Population

Sex	Year and age			
	1971	1972	1973	1974
	66	67	68	69
Male	.03088	.03179	.03535	.03747
Female	.01433	.01646	.01823	.02027

METHODS

The mortality experience of the retirees was observed by calculating the death rates for a cohort of emerging retirement pensioners aged 65 in 1970, for the years 1971-74. These rates were then compared with the corresponding age specific death rates observed in the total Canadian population as described above.

This initial cohort was comprised of the age retirement pensions in payment to males and females aged 65 as of December 31, 1970. These totals are adjusted for deaths and withdrawals occurring among these new pensioners within the same year.²²

The calculation of the death rates for this initial cohort in the four subsequent years of retirement is indirect. This owes to the aggregation in the schedule of terminations. In this schedule, terminations are tabulated only by age, and not by duration of retirement. This is problematic in that, while most people retiring under the provisions of the legislation withdrew from the labour force at age 65, some continued to work. Thus, in each year of the follow-up, the total number of retirees at age x is comprised of not only those who were retired at age $x - 1$ and survived to age x but also those who retired at age x .

To illustrate this point, the deaths in 1971 at age 66 could be attributed to either those who retired in 1970 at age 65 or those who retired in 1971 at age 66 and died in the same year. Extending this one more year, those who died in 1972 at age 67 could have been those who retired in 1970 at age 65 and died in 1972 at age 67, during the second year of retirement; those who retired in 1971 at age 66 and died in 1972, during the first year of retirement; or, those who retired in 1972 at age 67 and died in the same year.

In order to estimate the deaths in each year attributable to the initial group who retired at age 65, we have assumed that because of the small size of the groups retiring at subsequent ages the mortality rates calculated for this large initial cohort would not be markedly biased.

For these smaller groups retiring at ages 66 to 69, we have estimated their mortality rate to be similar to that of the corresponding age-sex-specific Canadian population. Results obtained from calculations employing several other assumptions had the effect of altering the overall level of mortality among CPP retirees, however the pattern of fluctuations in mortality remained basically unchanged. Withdrawals from the CPP were few in number and these were distributed in proportion to the size of the initial cohort relative to the total retired population alive in each year.

²²Deaths and withdrawals in this first year were few in number. Of the 15,265 emerging persons (age 65) in 1970, 15,260 were in payment on December 31st.

The equation for the calculation of the proportion of the initial cohort retiring in 1970 at age 65, dying during subsequent age intervals is as follows (values calculated for this group are denoted by superscript - cpp):

$$q_x^{cpp} = \frac{D_x^{cpp}}{P_x} - \frac{.5(W_x^{cpp})}{P_x}$$

Where D_x^{cpp} refers to deaths among the initial cohort at subsequent age x , calculated as:

$$D_x^{cpp} = D_x - q_x^{can} (P_x - CPP_x)$$

D_x = deaths among the total retired population at age x

q_x^{can} = Canadian population death rate at age x

P_x = total retired population alive at age x

$$P_x = P_{x-1} - D_{x-1} - W_{x-1} + E_x$$

W_x = withdrawals at age x

E_x = emerging age retirement pensions at age x

Where CPP_x = refers to the members of the initial retiring cohort alive at age x

$$CPP_x = CPP_{x-1} - D_{x-1}^{cpp} - W_{x-1}^{cpp}$$

where W_x^{cpp} = withdrawals attributed to the initial cohort at age x

$$W_x^{cpp} = CPP_x / P_x (W_x)$$

It should be noted that CPP_{65} and P_{65} are initialized to the age retirement pensions in payment for those aged 65, as of December 31, 1970. These values, along with those required for the calculations depicted above, are presented in Text-Table II.

TEXT TABLE II. Summary Data from Age Retirement Tabulations of the CPP, 1970 to 1974

	Year and age				
	1970	1971	1972	1973	1974
	65	66	67	68	69
	Male				
New pensions in payment(Ex) December 31	15,260	6,386	2,576	2,754	2,161
Number Dead(Dx)	—	583	783	841	998
Number withdrawing(Wx)	—	21	7	2	2
	Female				
New pensions in payment(Ex) December 31	5,632	2,400	983	969	625
Number dead(Dx)	—	96	98	119	146
Number withdrawing(Wx)	—	41	82	1	1

FINDINGS AND DISCUSSION

When the death rates are plotted it is seen that the mortality patterns of the male and female retirees are clearly distinct, both in comparison to each other, and also with regard to their respective age-specific population death rates (Figure I and Text-Table III). Accordingly they are discussed separately below.

Males

In the general population - that is, the group comprising males at age x who were not receiving CPP benefits, the probability of dying increases at each age over the period of observation. The order of magnitude of the increases follows that shown in the life tables for Canada 1970-72, with the greatest increase between ages 67 and 68²³ (Statistics Canada: 1974d).

²³While the order of the increases is similar, the q_x 's that we have calculated following the discussion in the Data section, are lower than those calculated for the total population. Two factors that contribute to the lower q_x 's are higher mortality in Quebec and declining mortality over the period, as reflected in a comparison of the 1970-72 with the 1975-77 life tables (see Statistics Canada: 1974d, 1979c).

The trend in mortality of the CPP cohort is irregular. The largest increase in the probability of dying occurs between ages 66 and 67. The difference between the population and CPP mortality is greatest at age 66, and is statistically significant.²⁴

²⁴ At the .05 level of probability using a two-tailed test. Where $Z > 1.96$

$$Z = \frac{q_x^{cpp} - q_x^{can}}{\sqrt{\frac{S^2_{cpp}}{q_x} + \frac{S^2_{can}}{q_x}}}$$

$$S^2_{cpp} = \frac{1}{CPP_x} (1 - q_x^{cpp})(q_x^{cpp})$$

$$S^2_{can} = \frac{d_x^{can}(1 - .5d_x^{can})}{p_x^{can}(1 + .5d_x^{can})^3}$$

p_x^{can} refers to the June 1 estimate of the Canadian population aged x , after subtracting out the June 1 Quebec population and the June CPP population. Other terms appear as defined earlier in the paper Calculation of S^2_{can} follows Chiang (1967).

TEXT TABLE III. Probability of Dying at Ages 66-69, Canada Pension Plan Retirees and the General Canadian Population(1), 1971 to 1974

	Year and age			
	1971	1972	1973	1974
	66	67	68	69
	Male			
CPP retirees	.02529	.03396	.03094	.03676
General Canadian population	.03088(2)	.03179	.03535(2)	.03747
	Female			
CPP retirees	.01097	.00781	.00772	.00913
General Canadian population	.01433(2)	.01646(2)	.01823(2)	.02027(2)

(1) Excluding Quebec and CPP retirees.

(2) Denotes that the difference between the CPP retirees and the general population is significant at or beyond the .05 level of probability.

While the low mortality of the CPP cohort at age 66 strongly suggests the "honeymoon phase" of retirement adjustment, the observation that mortality declines somewhat between ages 67 and 68 should be considered as well. The decline in mortality observed in the third year of retirement implies that mortality at age 67 was somewhat above trend. This would be reinforced by the fact that the greatest increase in the general population occurs between ages 67 and 68. Thus the difference observed between ages 66 and 67 reflects both; low mortality in the first year of retirement, and elevated mortality during the second year. This higher mortality during the second year could be accounted for by a deferred stress impact, or by the onset of boredom and other correlates of "disenchantment" relatively soon after the "honeymoon" phase. Between ages 68 and 69 mortality in the retiree cohort increases at a greater rate than that for the general population. This increase is most likely to represent the beginning of the disenchantment phase discussed by Atchley, although it would be necessary to disaggregate the data for several additional single years of age to be more certain about the timing and duration of this phase. These findings are in agreement with the "honeymoon" and "disenchantment" phases as reported in the previously-cited studies carried out in the U.S. and Norway (Haynes *et al.*: 1977, and Solem: 1976).

While emphasis has been placed on the fluctuations in the mortality of the CPP cohort, relative to those observed in the general population one should consider as well the differences in overall mortality of each group and how these might affect the interpretation of the fluctuations. As noted above, mortality in the CPP cohort is at its lowest, with respect to the general population, at age 66. It could be argued, however, that the higher mortality observed in the general population could be attributed to sick and disabled people who were unable to remain in the labour force until age 65 and may not have contributed significantly to the CPP. If this were the case the interpretation of the honeymoon phase would be weakened. An examination of labour force participation rates by single year of age as of the June Census of 1971, indicates that the general male population aged 66, not in receipt of either a Canada or Quebec retirement pension was more than twice as likely to be in the labour force than out. The males were also more likely to be in the labour force at ages 67 and 68, and it is only at age 69 that the general population is clearly comprised of more non-working than working males (see Appendix I). Another alternative explanation for the low mortality rate of the CPP cohort could be that health improves after retirement.²⁵ This seems unlikely, as during the second year, CPP mortality increases to the level slightly above that of the general population at age 67.

²⁵ See Martin and Doran: 1966, and Streib and Schneider: 1971, Chapter 5 for a discussion of this point. This health improvement would be distinguished from the honeymoon phase by the length of the effect. The effect of health improvement would likely be more prolonged. A better assessment could be made of the validity of such an hypothesis if levels of mortality between the CPP cohort and the general population could be compared to a point approaching life expectancy at age 65 (approximately 14 years for males, 1970-72).

One further possibility that has been considered is that CPP retirees were a select group with regard to some occupational or income factor that could be related to mortality. An examination of these characteristics in the population participating in the CPP at the beginning of the decade does not indicate that this is the case (see Appendix II), although we are unable to determine the distribution of these characteristics in the beneficiary population.

Females

The mortality pattern shown by female retirees is markedly different from that of the males. The probability of dying for this group is highest during the first year after retirement, followed by a decline in the second and third years. At the end of the follow-up, a slight upturn is observed during the fourth year. In comparison, the probability of dying in the general female population increases at an even rate for the three years after age 66. The lower probability of dying for the retirees relative to the female population is statistically significant at all four ages. The pattern observed for the female CPP cohort does not suggest the phases of retirement that have been discussed for the male cohort and we can only conclude that the female retirees experience a protracted honeymoon phase.

An attempt to account for the different mortality patterns observed between the male and female cohorts of retirees must be speculative. One possible explanation may be that labour force participation was not the predominant lifetime activity of this cohort of females. Some evidence that this may be the case is seen in the labour force participation rates for men and women aged 25-44 in 1950. The Labour Force Survey for this period indicates that, as of March 1950, virtually all males aged 25-44 were active in the labour force (96%), compared to only one-fifth of the females of the same age group (22%) (Dominion Bureau of Statistics: 1955).

Such a low rate would probably have implications for work attitudes and values of this particular cohort,²⁶ with the result that retirement may have posed no adjustment crises for this group. Obviously, further exploration of this dimension would require a more comprehensive body of data.

While the possible dissonance between labour force participation and social role orientation of this cohort of retired females might explain the lack of an observed mortality pattern similar to that found for males, it would not account for the significantly lower mortality rates of female retirees relative to the general female population for ages 66-69.

²⁶ Recent studies, for example, still find differences in the perception of work between men and women. The authors of a report on the Canadian Work Ethic Survey, conducted in the early 1970's note, "because young people in or entering the labour force are less traditional in their attitudes towards working women, the future labour force should find more women who have a strong commitment of work and career. However, if this transition takes place, it will undoubtedly be a slow process" (Burststein, *et al.*: 1975, p. 35). See Cook (1976) for further discussion of work role attitudes and the implications for female labour force participation.

This social psychological interpretation would predict a smaller gap between the female CPP cohort and the general population mortality rates than for the respective male mortality rates. It is evident from Figure I that this is not the case.

The significantly lower CPP cohort mortality at all four ages invites further speculation. It may be that labour force participation for this cohort was related to some other variable with a mortality gradient. One of the most often cited demographic variables with respect to mortality is marital status.

The relationship between working and marital status and between marital status and mortality is shown in Appendix III. This does not seem to clarify the results any further, in that mortality fluctuations predicted from the marital status distribution would be ambiguous.²⁷ In any case, the mortality gradient across marital status from married to widowed and divorced is approximately one third of the difference between the CPP cohort and general population rates.

²⁷ By this it is meant that the differences would tend to cancel each other.

One might further suppose that there could be an interaction between marital status and occupation,²⁸ or that females remaining in the labour force until age 65 would possess some advantage of occupation and or income.²⁹ However the differences shown in Appendix III for these characteristics do not appear sufficient to explain the difference between the two curves shown in Figure I.

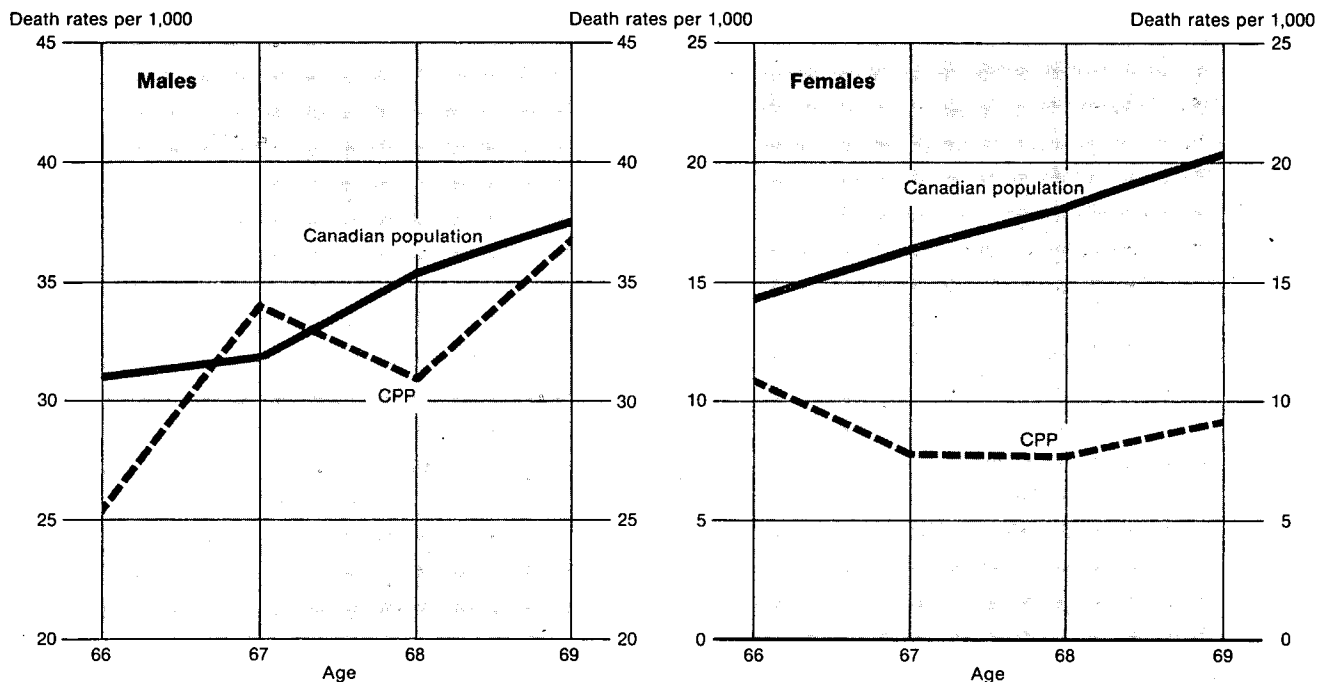
In summary, the number of females reaching "conventional" retirement age of 65 in 1970 was so low, relative to the size of the total population that they must almost certainly constitute a "special" group. This group would have some advantage with respect to mortality, the identification of which lies beyond the scope of this paper.

²⁸This would assume that the occupational gradient in mortality that has been observed elsewhere for males would apply to females as well. See for example; Table 5C Mortality Rates by Occupation Order and Age: Men Aged 15-74 in 10-year Age-groups (Registrar General: 1978, p. 107).

²⁹One might anticipate some advantage in view of the lower median age of retirement for females, calculated by Ciffin and Martin (1977, p. 13) as falling between 60 and 61 for those having been in the labour force since the age of 45. Data apply to 1975.

Chart — 1

Death Rates Following Retirement in CPP* Cohort Retiring at Age 65 in 1970 Compared to the Corresponding Age Specific Death Rates in the Canadian Population



*Canada Pension Plan

SUMMARY

In conclusion, we have discussed mortality fluctuations in cohorts of male and female retirees, in the context of adjustment to retirement. Overall mortality rates of the retirees in the first four years of retirement were observed to be lower than those in the corresponding age-sex Canadian populations.

The stable mortality rates observed for the female CPP cohort during the first four years of retirement do not indicate phases of adjustment as reflected in mortality, other than a prolonged "honeymoon" phase. The irregular mortality pattern observed for males suggests that health is at risk during the second and fourth years of retirement. These two periods of elevated mortality have been interpreted as being indicative of deferred stress and the "disenchantment" phase of adjustment.

The analysis has raised some questions for further research. How long does the advantage of retirement, with

respect to lowered mortality, last? How would the mortality of the retirees compare with that of a population clearly identified as remaining in the labour force beyond age 65?

One further question would address the fluctuations in mortality among male retirees. For the purposes of this paper we have assumed that retirement is a discrete event. While this may correctly describe present and past retirement behaviour, what would be the effect on mortality of partial retirement? In a recent study of pensions and income security, the Economic Council of Canada has advocated that; "From a medical and psychological point of view, a gradual reduction in work over a period of years is a sound approach to the problem of retirement" (Economic Council of Canada: 1979, p. 72).

It may be that, if retirement is made more gradual, stress and discontentment would be minimized, thus prolonging the low mortality observed during the first year of retirement.

Appendix I

TEXT TABLE IV. Percentage Distribution of the Canadian Population, Aged 65 to 69 by Labour Force Status(1), June 1971

Age	In labour(2) force	CPP/QPP(3) retired	Non labour force,(4) non CPP/QPP retired	Total		
	per cent				number	
	Male					
65	47.5	31.1	21.4	100	(65,735)	
66	40.9	40.8	18.3	100	(62,025)	
67	36.8	40.8	22.4	100	(60,300)	
68	32.3	42.6	25.1	100	(55,840)	
69	29.9	38.8	31.3	100	(52,530)	
	Female					
65	17.2	9.9	72.9	100	(71,290)	
66	14.2	12.1	73.7	100	(68,275)	
67	12.8	11.6	75.6	100	(64,775)	
68	10.9	10.9	78.2	100	(61,665)	
69	10.5	10.0	79.5	100	(57,505)	

(1) For discussion of definitions see Statistics Canada: Population and Housing Research Memorandum No. 71-EC-4 Background Information on the 1971 Census Labour Force Data (Statistics Canada: 1973a).

(2) Either employed or unemployed.

(3) Total number in Receipt of Age Retirement Pension Benefits, June 1971, calculated by adding CPP and QPP beneficiary totals.

(4) Calculated as sum of first two columns subtracted from the total.

Source: Special tabulation Census of Canada 1971 "Population age 60 or over showing labour force status by single years of age by sex for Canada, 1971". CPP/QPP retired column taken from: Table 12. Canada Pension Plan Retirement Pensions: Number, Gross Amount and Average Monthly Amount of Pensions put into Pay in Month, and of Pensions Paid in Month, by Age and by Sex. *Canada Pension Plan Statistical Bulletin* (Department of National Health and Welfare Canada: 1971); and Table 10. Retirement Pensions: Number of Beneficiaries, Gross Amount Paid and Average Monthly Pension by Age and by Sex June 1971 (Quebec Pension Board: 1971).

Appendix II

COMPARISON STATISTICS OF THE CPP AND THE CANADIAN POPULATION, 1971

The use of statistical summaries of the CPP for the purposes described in the text would be inappropriate, if the participants in the CPP were a relatively unknown group, or a highly selected group with respect to one or more socio-demographic attributes. In either of these events, there would be a strong likelihood that some competing explanatory variable could account for any differential mortality that might be observed when comparing the mortality experience of this group to that observed in the general population.

As stated in the objectives of the CPP, and its parallel plan, the QPP, the Plan should involve all those active in the labour force since January, 1966... "Superimposed on this universal system (old age pension), and an integral part of it, is the mandatory wage-related program... a contributory plan, mandatory for all paid workers and self-employed in the work force between the ages of 18 and 70" (Weitz: 1976, p. 138).

Focusing on two age groups, those of age 60-64, and those aged 65-69, it may be seen that the participation rates in the CPP correspond closely to the intent of the legislation, at least in the Census year 1971 (Text Table VI).

For males in the 60-64 age range, the contribution rate slightly exceeds the labour force participation rate, thus there is virtually 100% coverage. (While the rate as shown exceeds the labour force rate, this occurs because the CPP participation is calculated using the annual number of contributors, while the labour force estimate is the census total applying to one point in time).

Females in this age range are much less likely to participate in the plan, reflecting their lower labour force participation rate (Text Table VI).

Considering the population age group that is relevant to this paper (65-69), the total participation rate in the CPP is similar (Text Table VI). The contribution rate corresponds closely to the labour force participation rate for both males and females. Approximately 40% of the male population aged 65-69 is receiving an age retirement pension (Text Table VI). Since 45% of the population is contributing to the CPP, this leaves approximately 16% of the population uncovered by the CPP. This minority would be comprised of those not working who had not contributed to the Plan, and those working who had very low earnings.

Other dimensions have been considered as well. Socio-economic status has long been known to be an important determinant of health and life expectancy. While it has been

shown that, for 1971, most of the senior population was covered by the CPP, could it be that these participants were greatly advantaged by virtue of income and occupation?

Available statistics only permit examination of socio-economic characteristics in the group contributing to the CPP.

TEXT TABLE V. Labour Force Activity and Participation in the CPP(1), June 1971

Age	Male	Female
Canadian population — June, 1971:(2)		
60-64	282,500	286,900
65-69	222,420	237,010
CPP contributors — 1971 (annual):(3)		
60-64	226,857	86,221
65-69	101,108	32,276
CPP age retirement pensions in payment — June, 1971:(4)		
65-69	86,527	28,644
Canadian labour force activity — June, 1971:(5)		
60-64	216,395	91,010
65-69	87,695	32,840

- (1) Canadian population and labour force activity are calculated for Canada, excluding Quebec, as the CPP has only a minor presence in Quebec.
- (2) As calculated from Table 1. Population by Single Years of Age and Sex, for Canada and Provinces, 1971 (Statistics Canada: 1973b).
- (3) As reported in Tables 1 and 2. Canada Pension Plan Contributors: Number of Male (Female) Contributors, Age and by Province, 1971 (Health and Welfare Canada: 1971).
- (4) As reported in Table 12. Canada Pension Plan Retirement Pensions: Number, Gross Amount and Average Monthly Amount of Pensions put into Pay in Month, and of Pensions Paid in Month, by Age and by Sex (Department of National Health and Welfare Canada: 1971).
- (5) As calculated from Table 9. Population 15 Years and Over, by Sex, Showing Number and Percentage in the Labour Force by Age Groups, for Canada and Provinces, Urban Size Groups, Rural Non-farm and Rural Farm, 1971 (Statistics Canada: 1974e).

The incomes of the CPP contributors, compared to the individual incomes tabulated in the Survey of Consumer Finances for the year 1971 do not appear to be greatly different for males. Incomes of male CPP contributors

average approximately \$500 lower than those in the Survey of Consumer Finances while those of the female CPP contributors average approximately \$700 more (Text Table VII).

TEXT TABLE VI. Participation Rates of Canadian Population in the CPP, 1971(1)

Age	Male	Female
per cent		
Percentage of population contributing to the CPP (annual):		
60-64	80	30
Labour force participation rates (Census):		
60-64	77	32
65-69	39	14
Percentage of population contributing to the CPP (annual):		
65-69	45	14
Percentage of population receiving retirement pensions, June 1971:		
65-69	39	12
Total participation rates of population in CPP 1971:		
65-69	84	26

(1) Computed excluding Quebec.

Note: All rates are computed using the counts presented in Table v.

The calculation of participation rates in the CPP by occupation also reflects small differences between various types of employment (Text Table VIII). There is only a 4% difference between total employees and total proprietors. These differences most probably reflect distinctions between wage and salaried employment incomes, and incomes from other sources, such as profits. This is indicated more clearly by the low participation rates for investors and property owners. The lower rate observed for farmers (73%) may be due to low contributory earnings. One indication that this may be the case is that only 42% of all farmers returns are taxable, compared to 82% of all returns for total employees.

As would be expected from the provisions of the legislation, the participation rate is related to income at low levels of earnings. It is shown in Text Table IX that only 30% of those with income of less than \$1,000 made contributions to the CPP/QPP in 1971, compared to 96% of those with incomes in the range of \$15,000-\$16,000.

TEXT TABLE VII. Comparison of Mean Earnings: CPP Contributors 1971 and Individual Incomes, by Sex and Age, 1971.

Age	CPP contributors(1)		Individual incomes 1971-SCF(2)	
	Male	Female	Male	Female
	dollars			
55-64	7,515	3,983	8,033	3,235
65-69	4,662	2,827	5,159	2,061

(1) Recomputed from Tables 13 and 14; Canada Pension Plan Contributors: Number of Male (Female) Contributors, by Earnings Level and by Age (Health and Welfare Canada: 1971).

(2) As reported in Table 59; Percentage Distribution of Individuals by Income Groups, Regions, Age and Sex, 1971 (Statistics Canada: 1973c).

TEXT TABLE VIII. Participation Rates in the CPP/QPP by Selected Occupations 1971(1,2)

Occupation	Participation rate
	per cent
Total employees	92
Farmers	73
Fishermen	90
Professionals	92
Salesmen	88
Forestry operators	90
Manufacturers	88
Total proprietors	88
Investors	9
Property owners	30
Grand total	82

(1) Calculated as the proportion of all tax returns in 1971 that claimed deduction for CPP or QPP contributions.

(2) As calculated from Table 3. All Returns by Occupation 1973 Taxation Statistics (Department of National Revenue: 1973).

**TEXT TABLE IX. Participation Rates in the
CPP/QPP by Selected Income
Classes 1971(1,2)**

Income class	Participation rate
	per cent
\$ 1-\$ 1,000	30
1,900- 2,000	73
4,900- 5,000	91
15,000- 16,000	96
All returns	82

(1) Calculated as the proportion of all tax returns in 1971 that claimed deduction for CPP or QPP contributions.

(2) As calculated from Table 2. All Returns by Income Classes 1973 *Taxation Statistics* (Department of National Revenue: 1973).

It is also unlikely that the calculation of the rates, excluding Quebec, seriously biases the findings. The essential features of the QPP are quite similar to those of the CPP, at least for the time period used in the analyses of this paper. As described in *Social Security, 1978*, "Quebec is the only province which has created its own plan, but together the two plans constitute a nationwide social insurance scheme, since credits earned under one jurisdiction are recognized together with those earned under the other...Until the end of 1972 the two plans were virtually identical" (Statistics Canada: 1978b, p. 161).

Appendix III

Selected Tables of the Female Canadian Population, 1971

TEXT TABLE X. Marital Status Distributions: Total Female Population 65+ and Total Female Labour Force 65+, Canada, 1971.

Marital status	Total population	Total in the labour force
	per cent	
Single	10.7	27.2
Married	38.3	32.1
Widowed and divorced	51.0	40.7
Total	100	100
Total number	(961,370)	(79,080)

Source: 1971 Census of Canada Labour Force Activity Work Experience. (Statistics Canada: 1975b)

TEXT TABLE XI. Death Rates (Per 1,000 Population) by Marital Status: Females Aged 65-69, 1971

Marital Status	Death rate
Single	17.9
Married	16.3
Widowed and divorced	18.7
All marital statuses	17.3

Source: Vital Statistics Volume III, Deaths 1971, Table 19 (Statistics Canada: 1974b) and 1971 Census of Canada Population Marital Status by Age Group (Statistics Canada: 1973d).

TEXT TABLE XII. Occupational Distribution(1) by Marital Status for Females Ages 55-64, 1971

Occupation	Marital status			
	Single	Married	Widowed and Divorced	Total
	per cent			
Managerial	5.6	2.2	2.2	2.8
Professional and technical	22.2	13.7	14.1	15.3
Clerical	29.4	21.1	23.8	23.2
Sales	5.9	13.1	11.6	11.5
Service	13.8	20.2	25.4	20.4
Primary blue collar	1.4	7.3	2.2	5.0
Blue collar	8.3	9.1	8.9	8.9
Other	13.6	13.5	12.2	13.2
Total	100	100	100	100
Total numbers	(51,030)	(174,415)	(73,075)	(298,520)

(1) Occupational categories shown below are taken from Cook (1976:121).

Source: 1971 Census of Canada Labour Force: Occupations of Females by Marital Status (Statistics Canada: 1975c).

Bibliography

- Atchley, Robert C. *The Sociology of Retirement*. New York: Schenkman Publishing Company Inc., 1976.
- Brody, Jane E. "Marriage is Good for Health and Longevity, Studies Say". *New York Times* (May 8, 1979) p. 1.
- Burstein, M., N. Tienhaara, P. Hewson and B. Warrander. *Canadian Work Values: Findings of a Work Ethic Survey and Job Satisfaction Survey*. Ottawa: Information Canada, 1975.
- Campbell, Ian. Cited in "Employment Training and Pensions for Older Workers". *Labour Gazette* 71 (1971) p. 258.
- Chiang, C.L. *Variance and Covariance of Life Table Functions Estimated From a Sample of Deaths*. Washington, D.C.: National Center for Health Statistics. U.S. Department of Health, Education and Welfare, 1967.
- Ciffin, S. and J. Martin. *Retirement in Canada: Volume I When and Why People Retire*. Ottawa: Department of National Health and Welfare, 1977.
- Cook, Gail, C.A. "Opportunity for Choice: An Assessment." in Gail C.A. Cook, ed. *Opportunity for Choice, A Goal for Women in Canada*. Ottawa: Information Canada, 1976.
- Denton, Frank T. and Sylvia Ostry. *Working-Life Tables for Canadian Males*. 1961 Census Monograph. Dominion Bureau of Statistics. Ottawa: Queen's Printer, 1969.
- Department of Insurance. *Canada Pension Plan. Statutory Actuarial Report No. 6 as at December 31, 1977*. Mimeo. Ottawa: Department of Insurance Canada, 1978.
- Department of National Health and Welfare Canada. Division of Planning and Development. Canada Pension Plan. *Canada Pension Plan Statistical Bulletin, Volume 3, No. 2*. Ottawa: Department of National Health and Welfare, 1971.
- Department of National Revenue. Taxation. *Taxation Statistics 1973 Edition*. Ottawa: Information Canada, 1973.
- Dominion Bureau of Statistics. Special Surveys Division. *The Labour Force November 1945 - January 1955*. Reference Paper, No. 58. Ottawa: Queen's Printer.
- Economic Council of Canada. *One in Three: Pensions for Canadians to 2030*. Ottawa: Minister of Supply and Services Canada, 1979.
- Ellison, David L. "Work, Retirement and the Sick Role". *Gerontologist* 8 (1968) pp. 189-192.
- Gnanasekaran, K.S. and G. Montigny. *Working Life Tables for Males in Canada and Provinces, 1971*. Statistics Canada. Census Field. Catalogue 71-524E. Occasional. Ottawa: Information Canada, 1975.
- Haynes, Suzanne G., Anthony J. McMichael, and H.A. Tyroler. "The Relationship of Normal Involuntary Retirement to Early Mortality among U.S. Rubber Workers." *Social Science and Medicine* 11 (1977) pp. 105-114.
- Health and Welfare Canada. Division of Planning and Development. Canada Pension Plan. *Canadian Pension Plan Contributors 1971: Earnings and Contributions*. Ottawa: Department of National Health and Welfare Canada, 1971.
- Health and Welfare Canada. *Canada Pension Plan Report for Year Ended March 31, 1971*. Ottawa: Information Canada, 1972a.

- Health and Welfare Canada. Division of Planning and Development. Canada Pension Plan. *Canada Pension Plan Statistical Bulletin, Volume 4, No. 2*. Ottawa: Department of National Health and Welfare, 1972b.
- Health and Welfare Canada. Division of Planning and Development. Canada Pension Plan. *Canada Pension Plan Statistical Bulletin, Volume 5, No. 2*. Ottawa: Department of National Health and Welfare, 1973.
- Health and Welfare Canada. Division of Planning and Development. Canada Pension Plan. *Canada Pension Plan Statistical Bulletin, Volume 6, No. 2*. Ottawa: Department of National Health and Welfare, 1974.
- Health and Welfare Canada. *Social Security Research Reports, Research Report No. 03 Retirement in Canada: Summary Report*. Ottawa: Health and Welfare Canada, 1977.
- Herzberg, F. *Work and the Nature of Man*. New York: New American Library, 1966.
- Holmes, Thomas H. and Minoru Masuda. "Psychosomatic Syndrome" *Psychology Today* (April 1972) p. 71.
- Kasl, Stanislav V. and Sidney Cobb. "Blood Pressure Changes in Men Undergoing Job Loss: A Preliminary Report" *Psychosomatic Medicine* XXXII (1970) pp. 19-37.
- Krishnan, P. and A. Sangadasa. "Stochastic Indicators of Occupational Mobility, Canada: 1951-1961." *Social Indicators Research* 1 (1975) pp. 485-493.
- Martin, John, and Ann Doran. "Evidence Concerning the Relationship Between Health and Retirement." *Sociological Review* 14 (1966) pp. 329-343.
- Motley, Dena K. "Availability of Retired Persons for Work: Findings from the Retirement History Study." *Social Security Bulletin* 41 (1978) pp. 18-29.
- Myers, Robert J. "Factors in Interpreting Mortality After Retirement." *Journal of the American Statistical Association* 49 (1954) pp. 499-507.
- National Center for Health Statistics. *Chronic Conditions and Activity Limitation: United States July 1961 - June 1963*. Washington D.C.: U.S. Department of Health, Education and Welfare, 1965.
- Palmore, Erdman. "The Relative Importance of Social Factors in Predicting Longevity." In Erdman Palmore and F. Jeffers, eds. *Prediction of Life Span*. Lexington, Mass.: D.C. Heath, 1971.
- Quebec Pension Board. Research and Statistics Branch. *Statistical Bulletin, Second Quarter, 1971*. Quebec: Quebec Pension Board, 1971.
- Quinn, Joseph F. "Job Characteristics and Early Retirement." *Industrial Relations* 17 (1978) pp. 315-322.
- Registrar General. *Occupational Mortality. Decennial Supplement for England and Wales 1970-72*. London: Her Majesty's Stationery Office, 1978.
- Seligman, Martin E.P. *Helplessness on Depression, Development and Death*. San Francisco: W.H. Freeman, 1975.
- Selye, Hans. *Stress Without Distress*. Toronto: Hodder and Stoughton, 1974.
- Solem, Per Erik, "Paid Work After Retirement Age, and Mortality" in *Retirement: Norwegian Experiences*. Oslo: Norwegian Institute of Gerontology, 1976.
- Special Senate Committee on Retirement Age Policies. *Retirement Without Tears*. Ottawa: Minister of Supply and Services, 1979.
- Statistics Canada. Labour Division. *The Labour Force January - 1972*. Catalogue 71-001. Monthly. Ottawa: Information Canada, 1972.
- Statistics Canada. Census Field. *Background Information on the 1971 Census Labour Force Data*. Population and Housing Research Memorandum No. 71-EC-4. Ottawa: Statistics Canada, 1973a.
- Statistics Canada. 1971 Census of Canada. *Population Single Years of Age*. Catalogue 92-716. Ottawa: Information Canada. 1973b.

Statistics Canada. Consumer Income and Expenditure Division. *Income Distributions by Size in Canada, 1971*. Catalogue 13-207. Annual. Ottawa: Information Canada, 1973c.

Statistics Canada. 1971 Census of Canada. *Population Marital Status by Age Groups*. Catalogue 92-730. Ottawa: Information Canada, 1973d.

Statistics Canada. Labour Division. Unemployment Insurance and Manpower Section. *Statistical Report of work Injuries 1974*. Mimeo. Ottawa: Statistics Canada, 1974a.

Statistics Canada. Health and Welfare Division. Vital Statistics Section. *Vital Statistics, Volume III - Deaths, 1971*. Catalogue 84-206. Annual. Ottawa: Information Canada, 1974b.

Statistics Canada. Health Division. Vital Statistics Section. *Vital Statistics, Volume III - Deaths, 1972*. Catalogue 84-206. Annual. Ottawa: Information Canada, 1974c.

Statistics Canada. Health Division. Vital Statistics Section. *Life Tables, Canada and Provinces, 1970-1972*. Catalogue 84-532. Occasional. Ottawa: Information Canada, 1974d.

Statistics Canada. 1971 Census of Canada. *Labour Force and Individual Income*. Catalogue 94-704. Ottawa: Information Canada, 1974e.

Statistics Canada. Health Division. Vital Statistics Section. *Vital Statistics, Volume III - Deaths, 1973*. Catalogue 84-206. Annual. Ottawa: Information Canada, 1975a.

Statistics Canada. 1971 Census of Canada. *Labour Force Activity-Work Experience*. Catalogue 94-773. Ottawa: Information Canada, 1975b.

Statistics Canada. 1971 Census of Canada. *Occupations: Occupations of Females by Marital Status by age, for Canada*. Catalogue 94-733. Ottawa: Information Canada, 1975c.

Statistics Canada. Health Division. Vital Statistics Section. *Vital Statistics, Volume III - Deaths, 1974*. Catalogue 84-206. Annual. Ottawa: Statistics Canada, 1976.

Statistics Canada. Census and Household Surveys Field. Population Estimates and Projections Division. *Estimates of Population by Sex and Age for Canada and the Provinces June 1, 1977*. Catalogue 91-202. Annual. Ottawa: Statistics Canada, 1978a.

Statistics Canada. Institutions and Public Finance Branch. *Social Security - National Programs - 1978*. Catalogue 86-201. Annual. Ottawa: Supply and Services Canada, 1978b.

Statistics Canada. Labour Force Survey Division. *The Labour Force January 1979*. Catalogue 71-001. Monthly. Ottawa: Statistics Canada, 1979a.

Statistics Canada. Census Characteristics Division. *Canada's Elderly*. Catalogue 98-800E. Ottawa: Minister of Supply and Services Canada, 1979b.

Statistics Canada. Health Division. Vital Statistics and Disease Registries Section. *Life Tables, Canada and Provinces, 1975-1977*. Catalogue 84-532. Occasional. Ottawa: Minister of Supply and Services Canada, 1979c.

Stone, Leroy O. and Claude Marceau. *Canadian Population Trends and Public Policy through the 1980s*. Montréal: McGill-Queen's University Press, 1977.

Streib, G. and C. Schneider. *Retirement in American Society*. Ithaca, N.Y.: Cornell University Press, 1971.

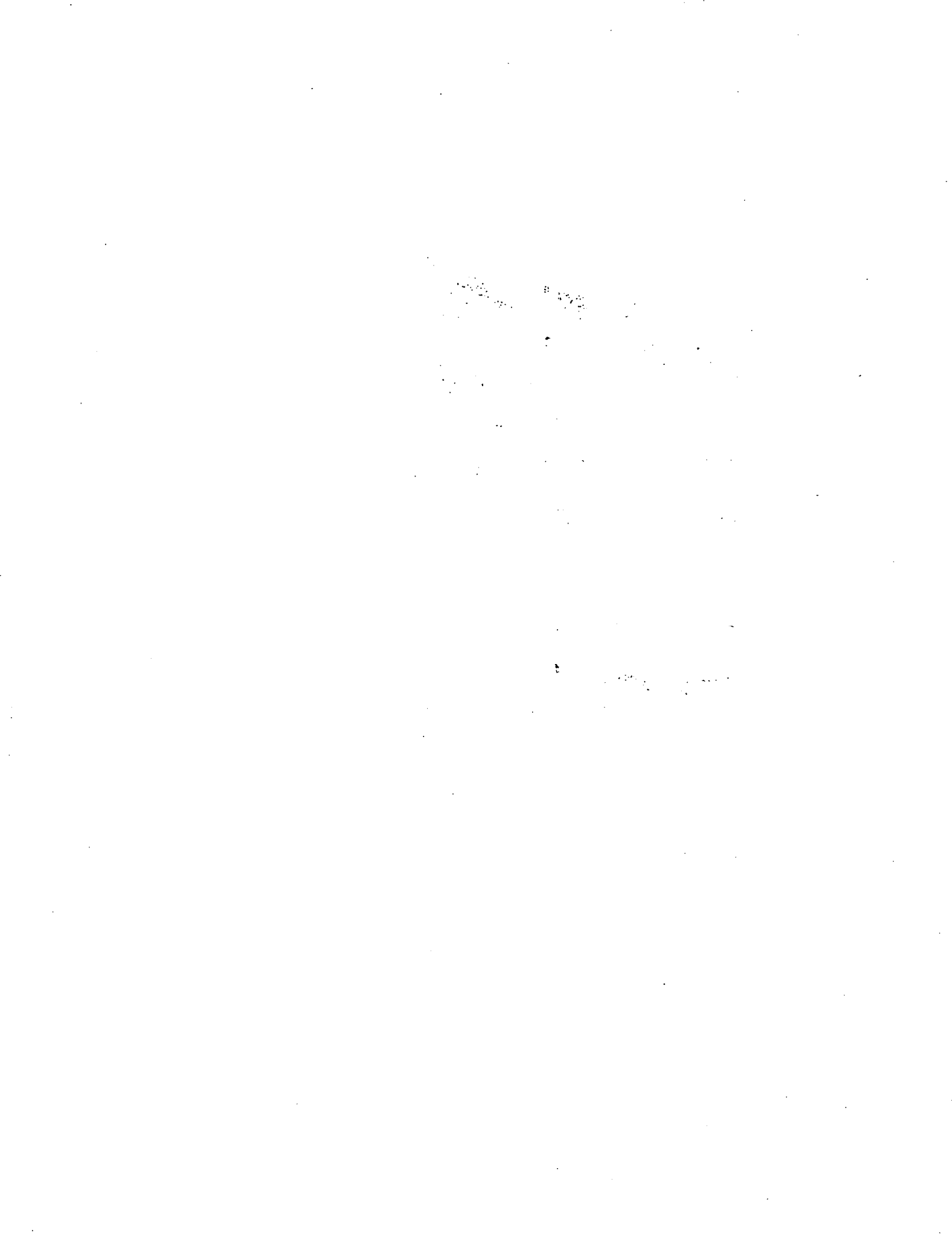
Time Magazine. "Now, the Revolt of the Old." *Time Magazine* (October, 1977) p. 11.

Tyhurst, James S., Lee Salk, and Miriam Kennedy. "Mortality, Morbidity and Retirement." *American Journal of Public Health* 47 (1957) pp.1434-1445.

W.E. Upjohn Institute. *Work in America*. Cambridge, Mass.: The MIT Press, 1973.

Weitz, Harry. "Income Maintenance for the Elderly in Canada." in *The Economics of Aging: Toward 2001*. Institute of Gerontology. Ann Arbor, Michigan: University of Michigan, 1976.

Wilder, Charles S. *Limitation of Activity Due to Chronic Conditions United States, 1974*. Vital and Health Statistics: Series 10. Data From the National Health Survey No. 111. Washington D.C.: U.S. Department of Health, Education and Welfare, 1977.



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