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Socioeconomic Influence on the Health of Older People: Estimates Based on Two Longitudinal Surveys

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SEDAP Research Paper No. 112

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Abstract

There is a strong positive relationship between socioeconomic status (SES) and health, but identifying the direction of causation is difficult. This study exploits the longitudinal nature of two Canadian surveys, the Survey of Labour and Income Dynamics and the National Population Health Survey, to study the link from SES to health. For people aged 50 and older who are initially in good health we examine whether changes in health status over the next two to four years are related to prior SES, as represented by income and education. Although the two surveys were designed for quite different purposes the evidence they yield with respect to the probability of remaining in good health is strikingly similar. Both suggest that SES does play a role, that the differences across SES groups are quantitatively significant, that the differences increase with age, and that they are much same for men and women.

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1. INTRODUCTION

Much research has demonstrated that there is a strong positive relationship between socioeconomic status (SES) and health status. In the words of Nobel Laureate Robert Fogel and his coauthor Chulhee Lee (2003), "individuals from different socioeconomic backgrounds face distressingly different prospects of living a healthy life". Understanding that relationship, and identifying the causality behind it, remains a difficult task. Are people in poor health because they have low SES, or or do they have low SES because of their poor health?[1] Establishing the direction of influence in this case is not only of research interest but also of practical importance in the design of effective policies to improve population health. Not surprisingly, a considerable literature has developed[2].

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In earlier work we proposed a framework of analysis for identifying the influence of income on health while working with panel data (Buckley et al., 2003). We continue that work here, and extend it by analysing a second data file and comparing the results with those based on the first. Our concern continues to be with the socioeconomic determinants of health among older Canadians. We focus on income and education as indicators of SES, and ask whether the chances that older individuals would remain in good health were improved by having higher incomes and being better educated.

To answer this question within our analytical framework requires access to longitudinal data, such that the health status of the same individuals can be observed at different times and related to other personal and household characteristics. There are two Canadian surveys that have this feature – the National Population Health Survey (NPHS) and the Survey of Labour and Income Dynamics (SLID), both conducted by Statistics Canada[3]. In previous work we relied entirely on SLID; we now consider NPHS as well. Our purpose here is to compare the two surveys to learn what they can tell us about how one's SES affects the chances of remaining in good health as one ages. The comparison of the results is of particular interest since the data sets have very different strengths. SLID was designed to provide good information about income and asked a health question only 'in passing' while the reverse was true of NPHS. In fact, it turns out that the two data sets provide similar estimates of the effects of income and education on health, and that is good news for researchers using one or the other. We find evidence in both surveys of what appears to be a causal link between SES and changes in health status: the higher one's SES the better the chances of remaining in good health. That results based on the two surveys are similar is encouraging. Not

surprisingly, though, while there is strong evidence that SES has a quantitatively important effect, differences in SES account for only a small fraction of overall differences in the probabilities of remaining healthy: most of the differences are left to be explained by genetic and other risk factors.

2. COMPARISON OF THE TWO SURVEYS

Longitudinal surveys are designed to follow the same individuals through time. By comparing responses from one survey to the next one can learn how the circumstances of individual respondents changed, and try to gain an understanding of why. The names of the two surveys used here are suggestive of the matters with which they are most concerned. A major characteristic of NPHS is that it collects a large amount of information about specific health conditions, treatments sought and used, health care professionals seen, and so on, but only basic information about income. SLID, on the other hand, asks only a little about health but a great deal about income and labour force characteristics. However, for the present purpose a key feature is that both asked essentially the same general health question in each of several years, thus allowing us to observe changes in reported categories of health status from one survey to the next. Beyond that, both surveys asked similar questions relating to education and total household income, our two indicators of SES.

NPHS was first conducted in 1994. Insofar as possible, the same individuals have been contacted ever since, at approximately two-year intervals. At the time of writing, data were available for survey years 1996, 1998, and 2000, as well as 1994. In what follows we ignore data from the 1994 survey and focus attention on the other three years.[4] That permits stricter comparability with

the results of our earlier work with SLID, which was based on three survey years starting with 1996.

SLID provides a much larger sample than NPHS, and that was a major consideration in choosing to work initially with it. The earliest SLID survey was conducted in 1993. Those interviewed in that year formed the first panel, and they were followed year by year for six years. In 1996, year four for the first panel, a second panel was interviewed, and it too was followed for six years. Hence for the three-year period 1996-98[5] the data for the first two panels of respondents are available, which effectively doubles the sample size[6]. Another reason for working with SLID is the quality of the information on income that it provides. Seventy-one percent of those in the survey agreed to have Statistics Canada access the electronic administrative records of their personal tax returns rather than responding at the time of the survey interview to a detailed set of questions relating to income. In consequence, the quality of the SLID information on income is very high.

As would be expected of longitudinal surveys, there is some sample attrition. However, the attrition rates were quite low in these surveys: only 6.3 percent of respondents to the 1996 NPHS and 0.8 percent of respondents to the 1996 SLID were unaccounted for in the corresponding 1998 surveys.

The health question asked by SLID was the following: "Compared to other people your age, how would you describe your state of health? Would you say that it is excellent, very good, good, fair, or poor?". In NPHS the question was worded slightly differently: "In general, would you say [your] health is excellent, very good, good, fair, or poor?". We focus attention on the resulting

responses, which give a measure of what is usually referred to as 'self-reported health' (as distinct from an 'objective' measure, perhaps based on medical records or a physical examination). In fact, not all responses are literally 'self-reported', some reporting is by other household members – proxy reporting, as it is called. Table 1 compares the rates of proxy reporting for the survey years used here. There was relatively little proxy reporting in NPHS, and that was by design: it was thought that the large number of health-related questions asked in that survey would need to be answered by the person to whom the information pertained. As shown in Table 1, only 1.3 percent of the NPHS responses relating to overall health status in 1996 were by proxy. That proportion rises somewhat in later years for the original 1996 respondents, reflecting presumably the increased proportion of individuals unable to respond for themselves as they grew older. In contrast, more than one-third of all the 1996 responses in SLID were by proxy. We observe too that proxy reporting was much more prevalent for men than for women, no doubt reflecting differences in who was at home and willing to answer the questions when the survey was conducted. Proxy reporting raises some concern about the validity of the responses, but in our earlier work with SLID data we were able to conclude that proxy reporting makes little difference to the proportions in different health states (Buckley et al., 2003, p.10).

3. HOW HEALTH VARIES WITH SOCIOECONOMIC STATUS

We turn now to some basic tabulations showing how the distribution across health states varies with income, education, and age. In all cases results are shown for both SLID and NPHS, for

persons aged 50 or older in 1996.

Table 2 compares the distribution of health states within each income quartile, based on the two surveys[7]. The top two health categories, 'excellent' and 'very good', have been combined, as have the bottom two, 'fair' and 'poor'. About half of all respondents reported being in excellent or very good health. That is true of both men and women, in both surveys. But what stands out are the differences across income categories: the proportions in excellent or very good health are almost *twice as high* in the top income quartile, Q4, as in the bottom one, Q1. Obversely, the proportions in fair or poor health are three to four times higher in the lowest income category than in the highest. The proportions derived from the two surveys are strikingly similar.

Similar comparisons across income quartiles are provided in Table 3. Of all people in excellent or good health, the evidence from both surveys tells us that about one third are in the highest income quartile. Obversely again, of all those in fair or poor health, more than one third are in the lowest income quartile. As before, the results from the two surveys are strikingly similar.

Table 4, 5 and 6 show how the distribution of health states varied from one survey year to the next for those interviewed in 1996 and then again one and two years later, in 1997 and 1998 in the case of SLID, or two and four years later, in 1998 and 2000 in the case of NPHS. Table 4 shows the distribution within income groups, where the groups are defined as 'below median' (i.e., first and second quartiles) and 'above median' (third and fourth), as well as for all income levels. Table 5 shows the distribution within education groups between 'low' (less than postsecondary) and 'high'

(postsecondary), as well as for all education levels. Finally, Table 6 shows it within age groups between 'old' (ages 70 and older) and 'young' (ages 50-69), as well as for all ages combined. A column labelled I/D has been added to allow for those who became institutionalized[8] or died[9] after the 1996 survey. (All respondents in our sample were 'in the community' and, of course, alive in 1996.)

We observe in every year and in both surveys that the proportions in the better health states (which we think of as E/VG) are about 50 percent greater for those with higher rather than lower incomes (Table 4), for those with higher rather than lower education (Table 5), and for those who are younger rather than older (Table 6). Conversely, the proportions in worse health states (which we think of as F/P and I/D combined) are considerably lower. As expected, the proportions in the better health states generally decline, the longer are people in the survey, while those in the worse health states increase. Thus, for example, the proportion of males in better health decreases by 3.5 percentage points over two years (from 50.2 to 46.7 percent), according to SLID, and by 5.6 percentage points over four years (from 48.9 to 42.3 percent), according to NPHS.

Of particular interest are the proportions that move into the worst health group – that is, the proportion of those living 'in the community' at the time of the first interview who, after one, two, or four years, had moved into an institution or had died. In all cases these proportions are much higher for the low income and low education groups than for the corresponding high groups. For example, about four and one-half percent of females aged 50 and older and living in the community in 1996 were either in institutions or dead two years later. (More precisely, 4.2 percent according

to SLID, 4.7 according to NPHS.) But those in the low income group were more than twice as likely as those in the high income group to have made this transition.

These tabulations are all suggestive of a relationship between health status and SES but an analytical framework and associated multivariate estimation approach is required to disentangle the separate effects of education, income, and other variables.

4. ANALYTICAL FRAMEWORK

The tabulations of health status cross-classified by income level, education, and age show systematic variations, but provide no evidence of *causation*. In what follows we attempt to isolate the separate influences of those factors. The basic problem is to ensure that causation runs from the variables classified as 'explanatory' to the one to be explained, and not in the opposite direction.

Our approach is to take advantage of the longitudinal nature of the two surveys by restricting analysis to those aged 50 and older in 1996 who were in what we define henceforth as good health & that is who were reported to be in 'good', 'very good', or 'excellent' health and dropping from the sample those whose health was 'poor' or 'fair' in that year[10]. The purpose of this restriction is to eliminate from further analysis those whose history of poor health might have affected their income position in 1996. We then focus attention on the probability of still being in good health one, two, and four years later, and ask whether that probability is affected by socioeconomic factors (represented most importantly by income and education) as well as age.

To the extent that command over resources has an effect on one's health, we would expect that household wealth or lifetime income would be more appropriate measures than the current income of the household. However, only current income is available from the two surveys, so we must make do with that. Our approach is as follows. For each respondent we express the 1996 household income as a ratio to Statistics Canada's low income cut-off (LICO), its measure of poverty for households with similar characteristics. The natural logarithm of the ratio is regressed on the natural logarithm of LICO and a set of dummy variables representing age, education, marital status, period of immigration or nonimmigrant status, province, and rural/urban category of respondent. (A separate equation is estimated for males and females. The results are shown in Appendix A.) Income is then standardized to the age group 50-54. That is, for each respondent, education, marital status, and all other variables except age (measured as of 1996), are 'plugged into' the income equation, while age is set at 50-54. Thus, the income equation is used to predict what each person's household income would have been when that person was in the age range 50-54. As a final adjustment, the residual terms are added to capture observation-specific characteristics, on the assumption that differences from predicted values of income in 1996 (given the respondent's age at that time) were likely to be similar (proportionally) to differences when the individual was in the age group 50-54.

5. ESTIMATION RESULTS

Estimation results are displayed in Table 7, based on probit regressions. The upper panel is based on all three survey years (1996, 1997, and 1998 for SLID; 1996, 1998, and 2000 for NPHS) while the lower panel is based on only two (1996 and 1998 for both surveys).

Consider first the upper panel. Here the dependent variable indicates whether the respondent remained in good health throughout the entire sample period (value 1) or moved into poor health in either of the middle or end years (value 0). The explanatory variables are all dummy variables. Income (age-standardized, as above) is expressed as a series of four dummies representing quartiles, education as four dummies representing highest level of education completed, and age as eight dummies representing five-year age groups from 50-54 through 80-84, together with an open-ended age category 85 and older. One dummy is omitted from each set in estimation to avoid a well known problem of singularity. The estimated coefficients are then interpreted relative to the omitted (or 'reference') categories[11].

The first point to observe is that relatively little of the variance in the dependent variable – at most about 12 percent – is accounted for by the estimated equations. Thus much is left unexplained, as one would expect. The probability that one's health status will remain good or worsen is influenced much more by factors that are unobservable (at least in these surveys) and by genuine individual heterogeneity than by age and our two indicators of SES. Even so, Wald tests suggest that both age and the SES indicators have significant explanatory power.

For the age coefficients we observe a generally steady progression from the youngest (age group 50-54) to the oldest (85+) for both men and women, which is consistent with the (obvious) expectation that (other things equal) people are less likely to remain in good health as they age. The effects of age alone appear quite large. For example, the estimate based on SLID suggests that (after taking account of income and education), a male aged 75-79 is about 23 percent less likely to remain

in good health for the next two years than one aged 50-54, and the estimate based on NPHS suggests a difference of 41 percent in that probability, calculated over four years. The corresponding values are 20 and 26 percent for women.

What about income and education? It appears that income matters. Look first at the estimates based on SLID. As compared to those in the lowest income quartile, those in the highest one have an estimated probability of remaining in good health over the next two years that is 8 percent higher for males and 7 percent higher for females. The estimates based on NPHS suggest that those probabilities are approximately doubled when the period is four years rather than two.

It appears that education matters also, although the evidence is somewhat more difficult to interpret. Based on SLID there is a steady progression from the lowest education category to the highest, indicating that one's chances of remaining in good health over the next two years (again, other things equal) are enhanced if one is better educated. The differences are about 10 percent for men, 14 percent for women. The pattern is less clear and the level of significance lower with NPHS. (The smaller sample size in the NPHS may account for this difference.)

Figure 1 is based on the equations just discussed. It shows, for each age group, a plot of the implied probabilities of remaining in good health for a further *two* years, based on SLID (left panel), and *four* years, based on NPHS (right panel). The implied probabilities are shown separately for the highest socioeconomic group (income quartile 4, university degree) and the lowest (income quartile 1, less than grade 11); males are in the upper panel, females in the lower one. The probabilities

decline with age, as expected, are similar for males and females, and are considerably higher for those in the highest SES group than for those in the lowest. It is somewhat surprising that the probabilities of remaining in good health are not notably lower when they relate to four years (based on NPHS) rather than two (based on SLID), but that may reflect differences between the two surveys, in particular the differing questions relating to health noted earlier.

A direct comparison of male-female probabilities is provided in Figure 2. The most striking feature of this figure is the similarity of the age profiles for the two sexes. While the male probabilities are generally lower, whether for high SES (upper panel) or lower SES (lower panel), the differences are small for most age groups.

The results reported so far are based on two survey-to-survey transitions, those for SLID being derived from surveys conducted over three years and those for NPHS from surveys conducted over five. A further comparison based only on the 1996 and 1998 survey years (the two years common to SLID and NPHS) is informative. The lower panel of Table 7 provides estimates that relate to the probability of reporting good health in 1998 conditional on having done so in 1996. If the estimates in the lower panel were based on precisely the same individuals as those in the upper panel it is evident that a *lower* proportion would make the transition to poor health. That is because the health information from one survey year is ignored in this case[12]. However, some additional observations now become available – namely those for which health information was missing for the year dropped – and those observations could affect the proportion in either direction[13].

The change in definition reduces somewhat the magnitudes of the estimated coefficients based on SLID but has no impact on the qualitative results. It has rather more effect on the NPHS results, reducing the levels of significance of both the income and education variables. Again, though, the qualitative results are unaffected. Figure 3 depicts the results in the same way as Figure 1 and Figure 4 in the same way as Figure 2, but for two-year transitions in both cases. While the estimated coefficients are less well determined, the implied age patterns based on NPHS are generally similar to those based on SLID, as before. Two other points to note are (1) that the implied probabilities of remaining in good health based on only one transition are somewhat higher than those based on two, suggesting some recovery among those who experienced poor health in the now-omitted middle year and (2) that the implied probabilities are notably higher when based on a two-year transition using NPHS survey data rather than a four-year transition, as one would expect.

6. CONCLUSION

The purpose of this paper has been to report and compare estimates of the socioeconomic determinants of health among older Canadians based on two longitudinal surveys, the Survey of Labour and Income Dynamics (SLID) and the National Population Health Survey (NPHS). The surveys have allowed us to work with similar definitions of self-reported health and both provide information about household income and respondent education, the two socioeconomic variables on which we focus. Each survey has its advantages but the much larger sample size and more reliable measure of household income associated with SLID are of particular benefit. (NPHS

provides, in considerable detail, information about specific matters relating to health state but that information is not useful to us for present purposes.)

Our approach with both surveys has been to restrict the analysis to those who were reported in good health as of the interview date in 1996. While their health may change in later years their socioeconomic status (as we define it) does not: it is determined as of 1996, based on educational attainment and estimated "lifetime" income. Our question is whether the probability that an individual will remain in good health over the two or four years after 1996 is explained, in part, by his/her predetermined socioeconomic status.

The evidence from both surveys suggests that SES does play a role, and that the differences across SES groups are quantitatively significant. While the estimated probabilities of remaining in good health decline with age for both men and women, as one would expect, our findings indicate that the probabilities are notably higher for those with high SES than those with low SES (other things equal), that the gap approximately doubles between age groups 50-54 and 80-84, and that the results are similar for men and women. That two large household surveys should yield such similar results provides additional support for the view that socioeconomic status matters.

ENDNOTES

1. Yet another possibility is that both low SES and poor health can be attributed to a common cause - low intelligence or a bad environment, for example.

2. Recent selections from this literature are Adams et al. (2003), Buckley et al. (2003), Evans (2002), Meer et al. (2003), Smith (1999), and Van Ourti (2003).

3. For further information about the surveys, see http://socserv.mcmaster.ca/rdc/survfile.htm.

4. We follow the convention developed by Statistics Canada in referring to the survey. What we term the '1996' NPHS, for example, was conducted over a twelve-month period from June 1996 through May 1997, with about one-twelfth of respondents surveyed in each month. The health, age, and education questions on which we rely relate to the dates when the interviews were carried out, and are thus centred roughly around the beginning of December 1996. Income relates to the twelve-month periods prior to the interviews, and hence is centred roughly around the beginning of June 1996.

5. As in the case of the NPHS, we follow the Statistics Canada convention in referring to SLID. It was not until January 1997 that respondents in what we refer to as the '1996' survey were asked questions relating to their health, age, and education. Questions relating to income were asked in May 1997 but (in order to be consistent with tax reporting) pertain to the calendar year 1996.

6. It happens also that 1996 was the first year in which the health status question was asked in SLID.

7. Throughout this paper reported income is expressed relative to the Statistics Canada low-income cutoff (LICO) level for the household before being assigned to quartiles; see Statistics Canada (various years). LICO values are included in the SLID but not the NPHS master files. For comparability, we assigned LICO values for NPHS respondents using the Statistics Canada Postal Code Conversion File and Geographic Attribute File as described in Cunningham et al. (1997).

8. The category 'institutionalized' includes in jail as well as in a long-term care facility; for the population groups analysed here the second category obviously dominates.

9. In some cases the numbers institutionalized were too small to allow them to be reported separately; most persons classified as I/D had died.

10. This restriction reduced the size of the sample by about 20 percent. We note that the male-female ratio in the NPHS sample, thus restricted, is only 0.74, as compared to 0.85 in SLID (and 0.86 for the unrestricted SLID sample aged 50 and older in 1996). However, after taking account of the survey weights the ratios are similar – 0.89 in NPHS, 0.87 in SLID.

11. The standard errors for the estimated coefficients have been calculated by a bootstrap procedure using the 1000 bootstrap weights for SLID and 500 for NPHS supplied by Statistics Canada. The weights are designed to account for the multistage sampling nature of the surveys. See Yeo, Mantel, and Liu (1999, 2001).

12. In the upper panel, any SLID respondent who reported poor health in either 1997 or 1998 is deemed to have made a transition to poor health whereas in the lower panel the 1997 response is ignored. For NPHS, any respondent who reported poor health in either 1998 or 2000 is deemed to have made such a transition (upper panel), but only those who reported poor health in 1998 (lower panel) are so deemed.

13. As it turns out, that increases the number of observations by more than one and one-half percent in SLID but has virtually no effect on the number in NPHS.

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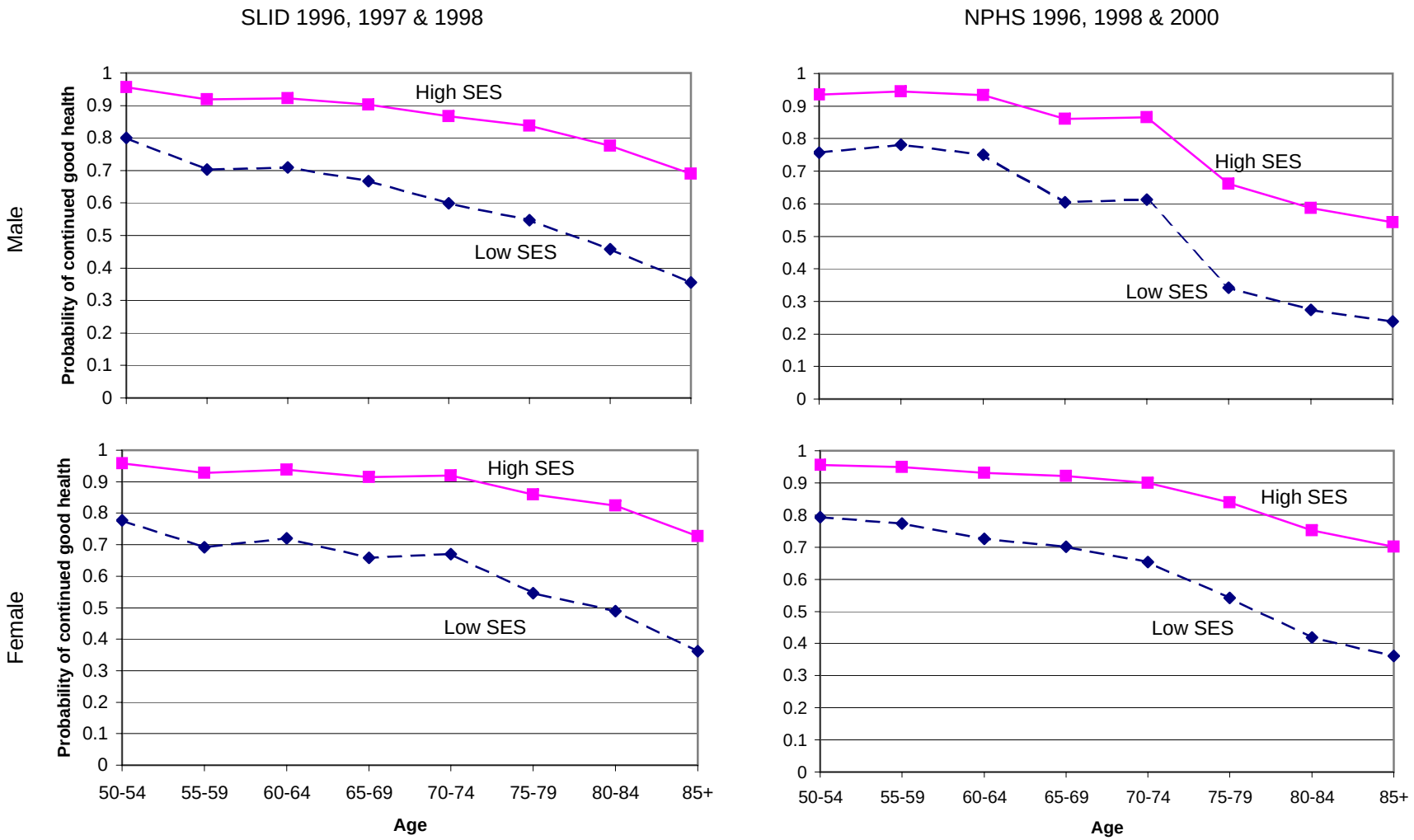
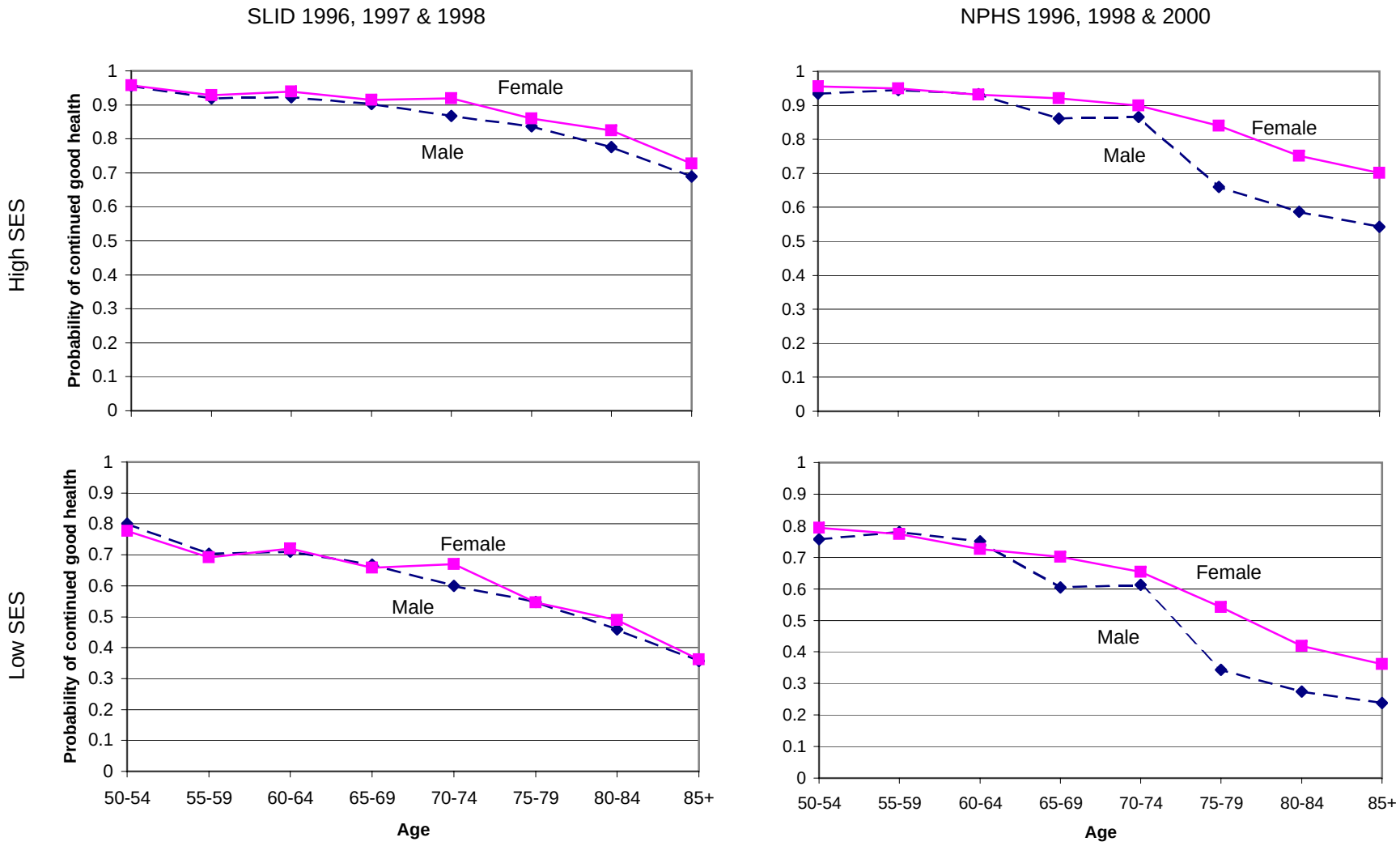
Figure 1. The Probabilities of Continued Good Health -- Implied Age Profiles for Selected Socioeconomic Groups based on Estimates from Two Transitions from the Two Surveys



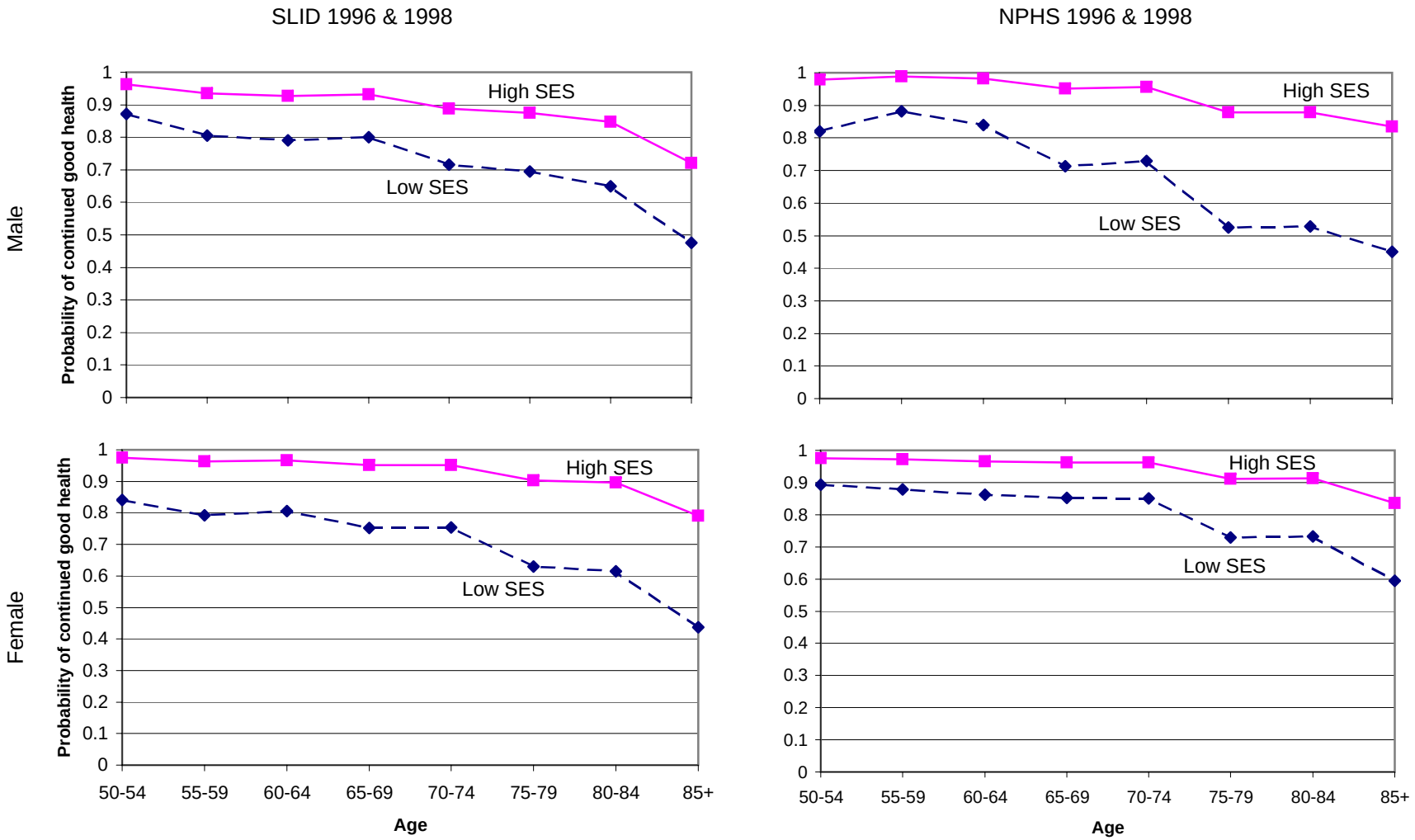
Note: All calculations are based on three years of survey data (successive years in the case of SLID and alternate years in the case of NPHS), and indicate the probability of remaining in good health for a further two years (SLID) or four years (NPHS). 'High SES' refers to those in the highest income and education categories, 'Low SES' to those in the lowest.

Figure 2. The Probabilities of Continued Good Health -- Implied Age Profiles for Males and Females based on Estimates from Two Transitions from the Two Surveys



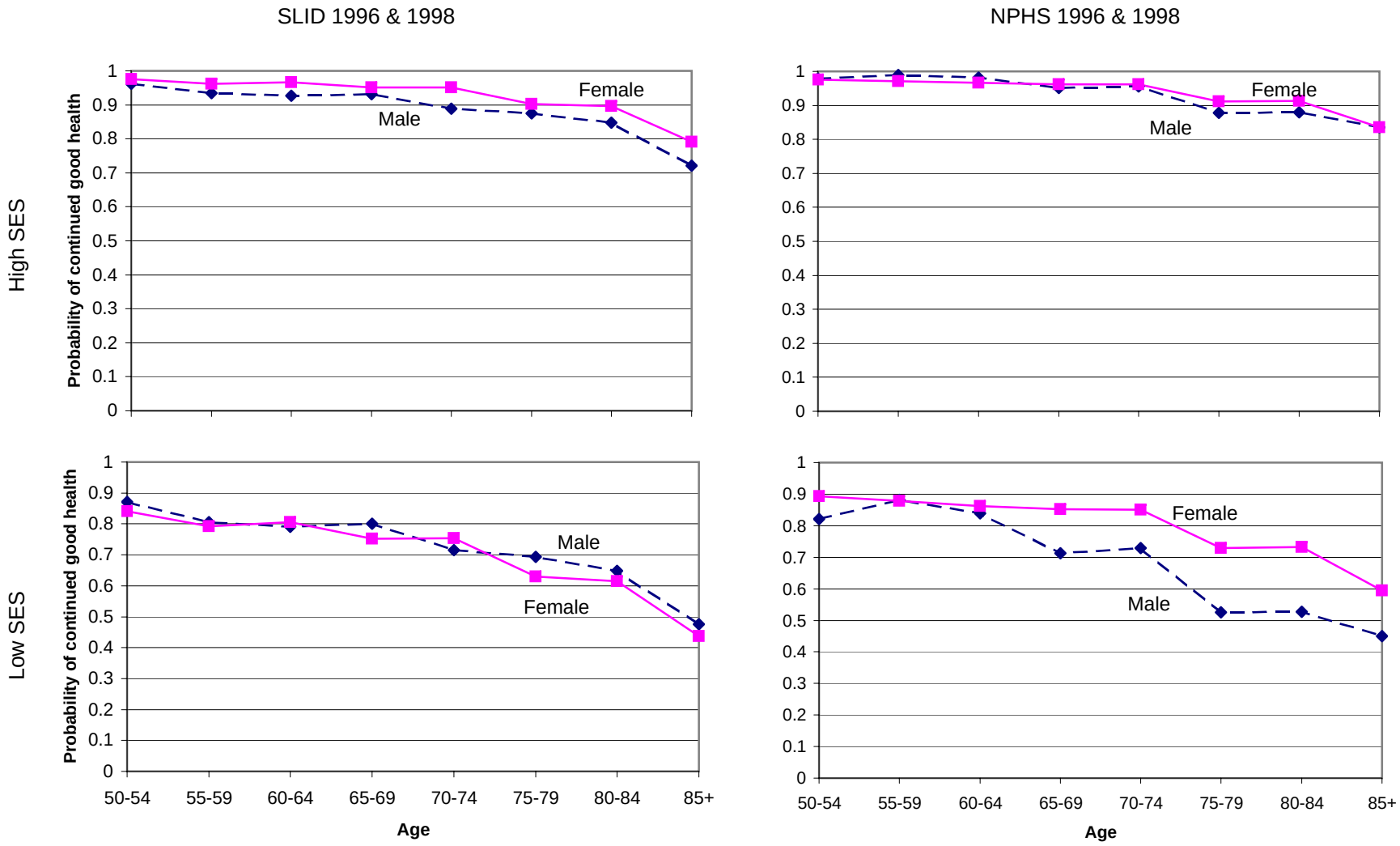
Note: See note to figure 1.

Figure 3. The Probabilities of Continued Good Health -- Implied Age Profiles for Selected Socioeconomic Groups based on Estimates from One Transition from the Two Surveys



Note: All calculations for both SLID and NPHS are based on only two years of survey data, 1996 and 1998, and indicate the probability of remaining in good health for a further two years. 'High SES' refers to those in the highest income and education categories, 'Low SES' to those in the lowest.

Figure 4. The Probabilities of Continued Good Health -- Implied Age Profiles for Males and Females based on Estimates from One Transition from the Two Surveys



Note: See note to figure 3.

Table 1. Proportion of Respondents whose Health Status was Reported by Proxy

Year	SLID			NPHS		
	Male	Female	Total	Male	Female	Total
			percent			
1996	46.3	23.3	34.0	1.5	1.2	1.3
1997	47.3	25.9	35.9	--	--	--
1998	--	--	--	3.8	1.5	2.6
2000	47.9	25.3	35.8	7.4	4.0	5.5

Note: Sample weights are used to derive population proportions.

Table 2. 1996 Distribution of Health Status Categories Within Income Quartiles: Population Aged 50 and Older

Sex	Income Quartile	SLID E/VG	SLID G	SLID F/P	SLID Total	NPHS E/VG	NPHS G	NPHS F/P	NPHS Total
					percent				
Male	Q1	36.1	28.8	35.1	100.0	33.4	39.8	26.8	100.0
	Q2	44.5	31.3	24.2	100.0	42.1	38.2	19.7	100.0
	Q3	53.3	29.8	16.9	100.0	56.3	29.8	14.0	100.0
	Q4	66.7	21.4	11.9	100.0	64.3	28.3	7.4	100.0
	All Males	50.2	27.8	22.0	100.0	48.9	34.0	17.0	100.0
Female	Q1	35.5	32.3	32.2	100.0	33.1	35.0	31.9	100.0
	Q2	40.6	32.2	27.3	100.0	47.7	37.0	15.3	100.0
	Q3	49.3	31.9	18.8	100.0	48.2	36.7	15.1	100.0
	Q4	61.7	26.6	11.7	100.0	66.2	27.2	6.7	100.0
	All Females	46.8	30.7	22.5	100.0	48.4	34.1	17.5	100.0

Note: Sample weights are used to derive population proportions. The SLID sample consists of 7812 males and 9212 females; the NPHS sample consists of 1762 males and 2374 females. The symbols E, VG, G, F, and P refer to 'excellent', 'very good', 'good', 'fair', and 'poor' health states, respectively.

Table 3. 1996 Distribution of Health Status Categories Across Income Quartiles: Population Aged 50 and Older

Sex	Income Quartile	SLID E/VG	SLID G	SLID F/P	SLID Total	NPHS E/VG	NPHS G	NPHS F/P	NPHS Total
					percent				
Male	Q1	18.0	25.9	39.9	25.0	17.6	30.2	40.6	25.0
	Q2	22.2	28.1	27.5	25.0	21.0	27.4	28.2	25.0
	Q3	26.6	26.8	19.2	25.0	28.6	21.7	20.4	25.0
	Q4	33.2	19.2	13.5	25.0	32.9	20.8	10.9	25.0
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Female	Q1	19.0	26.3	35.9	25.0	17.9	26.9	47.5	25.0
	Q2	21.7	26.1	30.2	25.0	24.1	26.5	21.3	25.0
	Q3	26.4	25.9	20.9	25.0	25.5	27.6	22.1	25.0
	Q4	33.0	21.6	13.0	25.0	32.6	19.0	9.1	25.0
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: See note to Table 2.

Table 4. 1996-2000 Distribution of Health Status Categories Within Income Groups Below and Above the Median Income: Population Aged 50 and Older in 1996

Sex	Income Position	SLID E/VG	SLID G	SLID F/P	SLID I/D	SLID Total	NPHS E/VG	NPHS G	NPHS F/P	NPHS I/D	NPHS Total
						percent					
Male	Below Median Income										
	1996	40.3	30.0	29.7		100.0	37.6	39.0	23.4		100.0
	1997	38.8	28.3	29.7	3.2	100.0	--	--	--	--	
	1998	37.5	29.2	26.9	6.5	100.0	40.1	27.7	24.1	8.1	100.0
	2000	--	--	--	--		31.0	24.8	24.5	19.8	100.0
	Above Median Income										
	1996	60.0	25.6	14.4		100.0	60.3	29.0	10.7		100.0
	1997	57.4	26.8	14.5	1.4	100.0	--	--	--	--	
	1998	55.8	25.1	15.4	3.7	100.0	56.7	29.9	11.3	2.1	100.0
	2000	--	--	--	--		53.7	26.6	14.3	5.4	100.0
	All Income Levels										
	1996	50.2	27.8	22.0		100.0	48.9	34.0	17.0		100.0
	1997	48.1	27.6	22.1	2.3	100.0	--	--	--	--	
	1998	46.7	27.1	21.1	5.1	100.0	48.4	28.8	17.7	5.1	100.0
	2000	--	--	--	--		42.3	25.7	19.4	12.6	100.0
Female	Below Median Income										
	1996	38.0	32.2	29.7		100.0	40.2	36.0	23.9		100.0
	1997	34.8	31.7	30.9	2.6	100.0	--	--	--	--	
	1998	35.4	30.5	28.3	5.8	100.0	38.9	34.1	20.6	6.5	100.0
	2000	--	--	--	--		28.4	34.1	25.4	12.1	100.0
	Above Median Income										
	1996	55.5	29.2	15.3		100.0	56.9	32.1	11.0		100.0
	1997	52.6	29.9	16.1	1.3	100.0	--	--	--	--	
	1998	52.5	29.4	15.4	2.7	100.0	55.0	32.4	9.7	2.9	100.0
	2000	--	--	--	--		46.2	33.9	13.7	6.2	100.0
	All Income Levels										
	1996	46.8	30.7	22.5		100.0	48.4	34.1	17.5		100.0
	1997	43.7	30.8	23.5	2.0	100.0	--	--	--	--	
	1998	44.0	30.0	21.9	4.2	100.0	46.9	33.3	15.2	4.7	100.0
	2000	--	--	--	--		37.2	34.0	19.6	9.2	100.0

Note: For survey years after 1996 the symbol I refers to those who became resident in an institution and the symbol D refers to those who became deceased. See also note to Table 2.

Table 5. 1996-2000 Distribution of Health Status Categories Within 'Low' and 'High' Education Groups: Population Aged 50 and Older in 1996

Sex	Education Position	SLID E/VG	SLID G	SLID F/P	SLID I/D	SLID Total	NPHS E/VG	NPHS G	NPHS F/P	NPHS I/D	NPHS Total
						percent					
Male	'Low' Education										
	1996	44.2	29.3	26.5		100.0	41.8	35.7	22.5		100.0
	1997	41.0	28.9	27.2	2.9	100.0	--	--	--	--	
	1998	41.1	27.6	25.0	6.3	100.0	41.7	27.5	24.2	6.6	100.0
	2000	--	--	--	--		34.5	26.0	22.5	17.0	100.0
	'High' Education										
	1996	58.1	25.8	16.1		100.0	56.3	32.3	11.4		100.0
	1997	57.4	25.8	15.4	1.5	100.0	--	--	--	--	
	1998	54.0	26.5	16.0	3.5	100.0	55.2	30.2	11.1	3.6	100.0
	2000	--	--	--	--		50.3	25.4	16.2	8.1	100.0
	All Education Levels										
	1996	50.2	27.8	22.0		100.0	48.9	34.0	17.0		100.0
	1997	48.1	27.6	22.1	2.3	100.0	--	--	--	--	
	1998	46.7	27.1	21.1	5.1	100.0	48.4	28.8	17.7	5.1	100.0
	2000	--	--	--	--		42.3	25.7	19.4	12.6	100.0
Female	'Low' Education										
	1996	40.4	33.0	26.6		100.0	40.1	37.3	22.5		100.0
	1997	37.6	32.5	27.5	2.4	100.0	--	--	--	--	
	1998	38.1	31.4	25.6	5.0	100.0	40.2	35.7	17.9	6.3	100.0
	2000	--	--	--	--		29.1	35.8	23.8	11.4	100.0
	'High' Education										
	1996	58.1	26.6	15.3		100.0	58.6	30.0	11.4		100.0
	1997	54.7	27.7	16.4	1.3	100.0	--	--	--	--	
	1998	54.4	27.4	15.3	2.9	100.0	55.1	30.3	11.9	2.8	100.0
	2000	--	--	--	--		47.2	31.9	14.5	6.5	100.0
	All Education Levels										
	1996	46.8	30.7	22.5		100.0	48.4	34.1	17.5		100.0
	1997	43.7	30.8	23.5	2.0	100.0	--	--	--	--	
	1998	44.0	30.0	21.9	4.2	100.0	46.9	33.3	15.2	4.7	100.0
	2000	--	--	--	--		37.2	34.0	19.6	9.2	100.0

Note: See note to Table 4.

Table 6. 1996-2000 Distribution of Health Status Categories Within 'Young' and 'Old' Age Groups: Population Aged 50 and Older in 1996

Sex	Age Group	SLID E/VG	SLID G	SLID F/P	SLID I/D	SLID Total	NPHS E/VG	NPHS G	NPHS F/P	NPHS I/D	NPHS Total
						percent					
Male	'Old' (Ages 70+)										
	1996	37.9	31.3	30.8		100.0	38.6	39.0	22.5		100.0
	1997	34.2	30.9	29.4	5.5	100.0	--	--	--	--	
	1998	30.6	30.5	26.4	12.6	100.0	35.8	25.8	24.8	13.6	100.0
	2000	--	--	--	--		24.4	20.6	23.2	31.8	100.0
	'Young' (Ages 50-69)										
	1996	54.8	26.5	18.7		100.0	52.7	32.3	15.1		100.0
	1997	53.3	26.3	19.3	1.1	100.0	--	--	--	--	
	1998	52.7	25.9	19.2	2.2	100.0	52.9	29.9	15.2	2.1	100.0
	2000	--	--	--	--		48.8	27.5	18.0	5.7	100.0
	All Ages										
	1996	50.2	27.8	22.0		100.0	48.9	34.0	17.0		100.0
	1997	48.1	27.6	22.1	2.3	100.0	--	--	--	--	
	1998	46.7	27.1	21.1	5.1	100.0	48.4	28.8	17.7	5.1	100.0
	2000	--	--	--	--		42.3	25.7	19.4	12.6	100.0
Female	'Old' (Ages 70+)										
	1996	38.0	35.3	26.8		100.0	39.1	37.4	23.5		100.0
	1997	34.3	33.6	27.8	4.4	100.0	--	--	--	--	
	1998	32.3	32.2	26.1	9.5	100.0	35.2	36.1	18.2	10.5	100.0
	2000	--	--	--	--		22.8	32.5	24.3	20.5	100.0
	'Young' (Ages 50-69)										
	1996	51.6	28.3	20.2		100.0	53.0	32.4	14.6		100.0
	1997	48.9	29.3	21.2	0.7	100.0	--	--	--	--	
	1998	50.3	28.7	19.6	1.4	100.0	52.5	31.9	13.7	1.9	100.0
	2000	--	--	--	--		44.2	34.8	17.4	3.7	100.0
	All Ages										
	1996	46.8	30.7	22.5		100.0	48.4	34.1	17.5		100.0
	1997	43.7	30.8	23.5	2.0	100.0	--	--	--	--	
	1998	44.0	30.0	21.9	4.2	100.0	46.9	33.3	15.2	4.7	100.0
	2000	--	--	--	--		37.2	34.0	19.6	9.2	100.0

Note: See note to Table 4.

Table 7. Probit Regression Models of Health Transition Probabilities and Associated p-values

	SLID 1996, 1997 & 1998				NPHS 1996, 1998 & 2000			
	Male		Female		Male		Female	
Independent Variable	ΔP	p-value	ΔP	p-value	ΔP	p-value	ΔP	p-value
Income quartile: 1	--	--	--	--	--	--	--	--
2	0.0303	*0.060*	0.0207	*0.222*	0.0289	*0.602*	0.0692	*0.054*
3	0.0414	*0.009*	0.0488	*0.004*	0.1156	*0.022*	0.0334	*0.368*
4	0.0770	*0.000*	0.0708	*0.000*	0.1609	*0.002*	0.1386	*0.000*
All income categories (Wald test)		*0.000*		*0.000*		*0.006*		*0.002*
Education: Less than grade 11	-0.0499	*0.016*	-0.0655	*0.000*	0.1120	*0.119*	0.0413	*0.335*
High school 11+	--	--	--	--	--	--	--	--
Some postsecondary	0.0070	*0.721*	0.0186	*0.255*	0.1078	*0.137*	0.0643	*0.120*
University degree	0.0507	*0.025*	0.0721	*0.008*	0.2026	*0.007*	0.1236	*0.018*
All education categories (Wald test)		*0.000*		*0.000*		*0.047*		*0.081*
Age group: 50-54	--	--	--	--	--	--	--	--
55-59	-0.0839	*0.001*	-0.0700	*0.004*	0.0291	*0.678*	-0.0218	*0.684*
60-64	-0.0776	*0.002*	-0.0465	*0.070*	-0.0064	*0.924*	-0.0746	*0.177*
65-69	-0.1150	*0.000*	-0.0993	*0.000*	-0.1677	*0.015*	-0.1005	*0.061*
70-74	-0.1781	*0.000*	-0.0899	*0.001*	-0.1596	*0.022*	-0.1504	*0.010*
75-79	-0.2269	*0.000*	-0.2020	*0.000*	-0.4117	*0.000*	-0.2645	*0.000*
80-84	-0.3146	*0.000*	-0.2572	*0.000*	-0.4667	*0.000*	-0.3865	*0.000*
85+	-0.4194	*0.000*	-0.3871	*0.000*	-0.4945	*0.000*	-0.4415	*0.000*
All age categories (Wald test)		*0.000*		*0.000*		*0.000*		*0.000*
No. of observations		5992		7027		1431		1924
Pseudo R2		0.0741		0.0775		0.1238		0.0900

	SLID 1996 & 1998				NPHS 1996 & 1998			
	Male		Female		Male		Female	
Independent Variable	ΔP	p-value	ΔP	p-value	ΔP	p-value	ΔP	p-value
Income quartile: 1	--	--	--	--	--	--	--	--
2	0.0130	*0.323*	0.0323	*0.011*	0.0755	*0.137*	0.0090	*0.578*
3	0.0217	*0.084*	0.0413	*0.001*	0.1008	*0.043*	0.0160	*0.346*
4	0.0474	*0.000*	0.0590	*0.000*	0.1638	*0.001*	0.0417	*0.003*
All income categories (Wald test)		*0.001*		*0.000*		*0.009*		*0.030*
Education: Less than grade 11	-0.0304	*0.060*	-0.0472	*0.003*	0.0908	*0.267*	-0.0375	*0.185*
High school 11+	--	--	--	--	--	--	--	--
Some postsecondary	0.0026	*0.864*	0.0036	*0.808*	0.1401	*0.068*	-0.0180	*0.485*
University degree	0.0225	*0.227*	0.0541	*0.013*	0.1870	*0.027*	0.0081	*0.789*
All education categories (Wald test)		*0.011*		*0.000*		*0.050*		*0.234*
Age group: 50-54	--	--	--	--	--	--	--	--
55-59	-0.0549	*0.004*	-0.0390	*0.067*	0.0803	*0.279*	-0.0110	*0.655*
60-64	-0.0682	*0.001*	-0.0276	*0.220*	0.0238	*0.744*	-0.0233	*0.410*
65-69	-0.0591	*0.002*	-0.0714	*0.002*	-0.1282	*0.102*	-0.0304	*0.252*
70-74	-0.1343	*0.000*	-0.0700	*0.002*	-0.1101	*0.151*	-0.0319	*0.273*
75-79	-0.1539	*0.000*	-0.1790	*0.000*	-0.3249	*0.001*	-0.1287	*0.001*
80-84	-0.1956	*0.000*	-0.1924	*0.000*	-0.3228	*0.001*	-0.1261	*0.002*
85+	-0.3626	*0.000*	-0.3634	*0.000*	-0.3967	*0.010*	-0.2472	*0.000*
All age categories (Wald test)		*0.000*		*0.000*		*0.000*		*0.000*
No. of observations		6092		7162		1431		1925
Pseudo R2		0.0567		0.0800		0.1292		0.0683

Note: The p-values reported in the above table are calculated using the bootstrap weights associated with each dataset. 1000 bootstrap weights were provided by Statistics Canada for the SLID data and 500 for the NPHS data. See Yeo et al. (1999) for details.

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