

The role of ill health as a precursor of unemployment: a longitudinal analysis in France

F. Jusot¹², M. Khlal², T. Rochereau¹, C. Sermet¹²

Key words : health inequalities, health selection, unemployment

Code JEL : I12, J23, J16

Introduction

Throughout the world, adverse health outcomes have consistently been associated with unemployment, and yet the interpretation of the health disadvantage of the unemployed is subject to debate. One explanation is that the experience of material and social hardship related to unemployment which is damaging to health; another one, referred to as the “selection” hypothesis, is that poorer health itself increases the risk of unemployment. It has also been demonstrated that the experience of unemployment is associated with unfavourable health-related behaviours and with weight gain, but the question of whether those behaviours precede the unemployment or a consequence of going through it is still an open one. In order to properly delineate the policy implications of the relationship of unemployment to health, it is essential to reach a better understanding of the underlying mechanisms, and in particular to assess the extent to which health selection is involved in the association. For this purpose, longitudinal data specifying the temporal ordering of poor health and job loss are needed.

¹ Institut de Recherches et Documentation en Economie de la Santé (IRDES), Paris, France

² Institut National d'Etudes Démographiques (INED), Paris, France

There are not many studies of this type, and findings in the literature are controversial: several authors have established that there was an impact of poor health on mobility into unemployment(1, 2, 6, 11, 17, 31, 33), but a few others have not(19, 25).

One issue which has received relatively little attention in the selection-causation debate is the structured nature of health selection, i.e. the way health selection depends on social location defined by age, gender or cultural background. Using data from the German Socioeconomic Panel study, Arrow(1) reported that poor health is a risk factor for unemployment, but only in the context of other factors, such as gender and nationality: in the event of a long or chronic illness, female workers are at a higher risk of unemployment than male workers, and, in addition, chronic illness raises the probability of unemployment among foreign workers, but not among German workers. Conversely, using longitudinal data from the US-based Panel Study of Income Dynamics, McDonough and Amick(20) have found that men may be more vulnerable than women to the labour market effects of poor health, but only in the younger group, and that black men were less likely to leave the labour force than white men. Based on those findings, the authors come up with the paradoxical idea that “leaving the labour force in the face of poor health may be a *luxury* that only those with alternative sources of material and other forms of support may afford...”

Variable effects of ill-health on labour force participation across countries are likely, as health selection is deeply linked to social systems and social policies, and those can be very different in terms of types of employment contracts and of employment protection laws, as well as in terms of the access which they offer to disability pensions and other work-related benefits. For this reason, an international perspective on health selection out of employment, and an analysis of how it relates to social policies would be very useful to further understand how ill-health intersects with other axes of social inequality.

In France, studies on unemployment and health are scarce(32), and the most striking feature which has emerged to date is the impressive mortality disadvantage of the unemployed. The Institut National de la Statistique et des Etudes Economiques (INSEE)(7) highlighted in the mid-eighties the mortality disadvantage of unemployed men, and the related estimates have since been refined. Based on follow-up studies of census samples, Mesrine(21-23) has indicated that, during the five-year period following the report of their activity status, the mortality of the men who were unemployed at the start of the observation period was 3 times higher than that of those who were employed, and still 2.7 times higher after adjusting for occupation and education. A doubling or tripling is huge in comparison with the 20 %-30 %

excess all-cause mortality provided by most studies abroad(10), and the considerable mortality gap attached to unemployment has attracted attention in the national media(35). Concerning health and morbidity, available evidence is based on cross-sectional data: using the 1991-92 National Health Interview Survey, unemployed men were found to have the same prevalence of major physical diseases as those currently employed, together with an increased prevalence of depression, smoking, heavy drinking and use of psycho-active drugs. There is one unique follow-up health survey which is representative at the national level, and that is the National Health Care and Health Insurance Survey, but to date it has only been analysed cross-sectionally.

In this paper, we pursue the analysis of the relationship of unemployment to health in France, by building on the National Health Care and Health Insurance Survey to investigate whether perceived ill health and unfavourable health-related behaviours are predictors of mobility out of employment. In addition, we explore the role of gender as a modifier of the effect of health selection, i.e. whether men and women are exposed to the same risk of labour market exit when health is compromised.

Methods

The Health Care and Health Insurance Survey (ESPS: “Enquête sur la Santé et la Protection Sociale”) is a longitudinal survey of persons registered with national health insurance schemes in France. It is coordinated by the Research and Information Institute for Health Economics (IRDES) and the statistics department of the National Health Insurance Fund for Salaried Workers (CNAMTS). The information collected concerns the following topics: reported diseases and disorders; public coverage and private supplementary health insurance; recourse to a physician; consumption of medical goods and services; care and services administered by non-physician clinicians, and hospitalization.

Scope of the survey

At the start of the project in 1988, the sample was made of households including at least one beneficiary of the National Health Insurance Fund for salaried workers. In 1994 and 1996 the scope of the survey was extended by adding households including at least one beneficiary of the fund for the self-employed and households including at least one beneficiary of the fund for the farmers. At the present time, this ongoing survey covers more than 95 % of French households.

Sample selection

Between 1988 and 1997, the ESPS included every year one-fourth of the EPAS (“échantillon permanent des assurés sociaux”), which is an ongoing random sample monitored by the national health insurance funds. Since 1998, half of the EPAS is surveyed every two years, and, all in all, a sample consisting of about 14 000 households containing about 40 000 subjects is surveyed every 4 years. The ESPS survey is undertaken in two waves (spring and fall), and the information is collected using telephone interviewing and self-administered questionnaires. Whenever the household cannot be reached by telephone, face-to-face interviews are conducted.

From 1988 to 2002, the EPAS has been sampled 4 times: the first during period A (1988-1991), the second during period B (1992-1995), the third during period C (1996-1998) and the fourth during period D (2000-2002). At each time period, new subjects are included, while others are lost-to-follow-up, cannot be reached or refuse to be re-interviewed. In this study, we are focusing on the transition from period B to period C and that from period C to period D. In order to investigate the relation between health and job loss, we have selected the individuals meeting the following criteria: (1) they had to be salaried workers, aged 30 to 54 years and with either an indefinite-term or a fixed-term contract at the starting point, and; (2) to be either active or unemployed 4 years later. The workers who turned out to be inactive or retired at the second point were excluded. The reason why we did not include the active population aged less than 30 years is that it comprises a large proportion of students and apprentices, while at age 55 and above there are quite different pathways leading to labor force exit. Independent workers who are not subjected to health-based selection from employers were not included either, nor were civil servants, who benefit in France from permanent jobs. Thus our study sample consists of 4331 individuals (1813 women and 2518 men) for the transition from 1992-1995 to 1996-98, 4379 individuals (1837 women and 2542 men) for the transition from 1996-98 to 2000-02 (Annex 1).

In our study sample, about 56% of the persons interviewed during period B were followed-up in period C, and 51% of the persons interviewed during period C were followed-up in period D (Annex 2). We have looked at the profile of the losses, and the persons with the highest likelihood of loss were: (1) household members other than the one initially selected from the EPAS, as spouses may leave the household following a divorce, or young adults take a separate residence; (2) inactive or unemployed persons; (3) persons at either extreme of the income scale; (4) managers; (5) persons living alone, in single-headed families or in non-

nuclear families. Conversely, educational level has no influence on the likelihood of loss, neither have any of the health variables, except smoking, with heavy smokers more likely to be lost.

Health measures

Health measures in this study were self-rated health, reported morbidity, body mass index and tobacco consumption, all collected in a self-administered questionnaire. Concerning self-rated health, respondents were asked to rate their own health on a scale ranging from 0 to 10, and the grades were dichotomized as “greater or equal to 8” as opposed to “lower than 8”. Reported morbidity was based on a list of diseases included in the questionnaire: respondents were asked whether they were currently affected by one of those, or by any condition not included in the list, and in that case which one. Although diseases were recorded one by one, the limited size of the study group did not permit a detailed analysis of the individual diseases, and we have therefore singled out the most serious ones. Examples of serious conditions are depression, diabetes, and coronary diseases.

Smoking consumption was categorized into: non-smoker, smoker of a pack per day or less, smoker of more than a pack per day, ex-smoker. Body mass index was categorized as: less than 18.5 (underweight), greater or equal to 18.5 and less than 25 (normal), greater or equal to 25 and lower to 30 (overweight), and above or equal to 30 (obese).

Statistical methods of analysis

Logistic regression was used to analyze for men and for women separately the proportion of subjects having lost their job. The independent variables were measured at the first study point, and consisted of socio-demographic and health variables. The socio-demographic variables were: age (categorized into 5-year intervals), educational level (primary school; lower secondary; higher secondary; university), type of household composition (couple with children; lone person; lone mother or father with children; couple without children; other), and presence of young children (aged less than 6 years) in the household. The health variables were: self-assessed health (scores ranging from 0 to 10 were bracketed into less than 8 versus greater or equal to 8); declaration of at least one serious disease (yes or no); body mass index (underweight, normal, overweight, obese), and cigarette smoking (non-smoker, ex-smoker, light or moderate smoker, heavy smoker). The dependent variable was employment status at the second point: either active or unemployed.

Results

A first round of analyses was concerned with the socio-demographic variables: educational level, type of household composition, presence of young children at home and type of job contract (Annex 3). Especially in the second study period, the older the subject, the higher the odds ratio for mobility into unemployment tends to be, with a very significantly elevated odds ratio in the older age group (50-54 years) relative to the youngest one (30-34 years). University education protects from mobility into unemployment relative to lower secondary education -significantly so for women in the first period-, while the opposite is consistently found for primary-only education, although not significantly so. Expectedly, the strongest and most significant determinant of mobility into unemployment is the type of job contract, with fixed-term contracts much more associated with mobility into unemployment than long-term contracts, even more so in men (ORs=3.5 and 6.4) than in women (ORs= 2.7 and 2.1). Other significant factors relate to household composition, with a much higher likelihood of mobility into unemployment for men living alone (OR=3.3, 1st period), for women living alone with children (OR=2.7, 2^d period), or in non-nuclear households (OR=3.5 for women in the second period and 2.2 for men in the first period). Also, the odds ratios associated with the presence of young children at home is significantly higher than 1 for women at the second period.

The second round of analyses focused on the role of various health indicators and health-related behaviours. The descriptive analysis appears to confirm a link between health and mobility into unemployment. The proportion of subjects having lost their job four years later is higher in the population initially in poor health than in the population in good health, whatever the health indicators used (Annex 4). These results are confirmed by the multivariate analysis (Annex 5). A relatively negative self-assessed health (graded as less than 8) is associated with significantly elevated odds ratios in both study periods, even more so in women (1.6 and 2.1) than in men (1.6 and 1.9). While the odds ratios associated with the reporting of at least one serious disease are all greater than 1, none reaches significance. Obese women are much more likely to shift into unemployment than those in the normal weight-for-height range, consistently so in both periods (ORs=1.8 and 2.2), while obese men seem to be protected from it in the first period (OR=0.3). Lastly, men who are heavy smokers are much more likely to move into unemployment, significantly so in the first period (OR=2.8).

Discussion

Determinants of the probability of unemployment

This paper was centrally focused on the role of health as a predictor of mobility into unemployment in a longitudinal study of persons registered with national health insurance schemes in France, and with its patterning by gender. For this purpose, we have investigated the influence of ill-health or unfavourable health-related behaviour of persons salaried workers at one point in time on mobility into unemployment, as reflected by activity status reported in the next survey round, 4 years later. The analysis was carried out for 2 consecutive time periods, i.e. 1992-95 to 1996-98 and 1996-98 and 2000-02, and separately for men and women in order to explore the gender patterning. Although it is not possible to interpret the extent to which these increased the probability of job loss or that of re-employment, we find that ill-health is related to labour force exit for men, and, to an even greater extent, for women, and that, for those women, obesity increases the risk of moving into unemployment. Surprisingly, we also find that men who are regular smokers while employed have a greater probability in the second period of being job seekers 4 years later.

Our relative risk estimates were adjusted for the socio-demographic factors likely to influence mobility into unemployment. Men living alone stand out as particularly exposed to the risk of moving into unemployment. A similar pattern was reported by Leino-Arjas, Liira, Mutanen et al. (1999), who find that “being a single man” to be a significant predictor of long-term unemployment. While employers may be more inclined to hire men holding family responsibilities, it is also possible that those men more actively seek re-employment to cope with the financial load of raising a family. Lastly, a pattern of this type may reflect a more general pattern, with single men more likely to be unstable both in terms of their work and their couple relationships. Another socio-demographic factor which might have been meaningful is the presence of children aged less than 6 years at home, a very demanding situation for working mothers. In the United States, where childcare for preschoolers is hard to find and very costly, McDonough et al.(20) report an almost two-fold increase of the hazard of labour force exit for women in the age range 25 to 39 years with young children at home, based on the Panel Study of Income Dynamics. In France, day care centers are more readily available and much more affordable due to public supports, and yet we do find relatively elevated odds ratios for this feature, especially for women. It is worth noting, though, that the study by McDonough et al.(20) was centered on labour force exit (i.e. shifting

from employment into “keeping house”, “permanently/temporarily disabled”, ...), while we were looking at mobility into unemployment, which restricts the scope for comparison.

We were especially interested in the differential role of ill health according to gender. Indeed, the general expectation is that women would be more reactive to poor health because they have greater discretion over their labour supply(28), and that women are likely to be more pressured in the presence of ill-health, as they have, at the same time, to meet their job’s demands and handle, more so than men, the domestic tasks and family responsibilities involved in children’s rearing and care. We found negative self-assessed health to be a significant precursor of unemployment for men and women to about the same extent, and this is consistent with the findings of van de Mheen et al.(34). Other studies have pinpointed variable roles of health according to gender and other factors: for instance, Arrow(1) concluded, based on an analysis of the German Socio-Economic Panel, that “health factors determining unemployment affect different types of workers in different way”, and that “poor health does not generally constitute a risk to employment. It only does so, when it concurs with other factors...that characterize groups, who for other reasons are vulnerable in the labour market”. Two others studies also found that women were being more likely to leave the labour force in the presence of poor health or disability (26), while the opposite was reported in at least two other studies(4, 5, 16, 16). The use of different health indicators may explain some of the discrepancies across studies: based on data from the Longitudinal Study on Socio-Economic Health Differences in the Netherlands, van de Mheen et al. in their above-cited study (34) only found gender differences for one of the three health measures, and this was “chronic condition”, as opposed to “perceived general health” and “health complaints”.

We also found different patterns for the different health indicators. For the reporting of “at least one serious disease”, no significant difference emerges, although the odds ratios were slightly elevated, essentially for women. In a previous cross-sectional study(12) on the health of unemployed men in France, we found no difference regarding major physical diseases, while the difference regarding depressive diseases, psycho-active drugs consumption and health-related life habits were quite large. In that same study, we concluded that the “short-term excess mortality among the unemployed may be related to their proneness to depression and suicide, with accidents potentially associated with psycho-active drugs and heavy alcohol drinking completing the picture”. A subdivision of the “serious diseases” reported in this study into physical and mental ones would be helpful in order to find out to which extent the depressive diseases preceded unemployment or not.

Also, while information on alcohol consumption was not yet available in the ESPS survey during the study period, we did find that employed men who reported that they smoked heavily were much more exposed to have moved into unemployment 4 years later, with a highly significant odds ratio of about 3 in the first period. This finding suggests that the higher consumption of smoking of the unemployed which was visible in the cross-sectional study was rather a precursor than a consequence of unemployment. Interestingly, a statistical association between smoking and subsequent unemployment has been reported in quite a few studies. In the British Regional Heart Study, at initial screening significantly higher percentages of men who subsequently experienced non-employment smoked or had high alcohol consumption than of men who remained continuously employed, but no difference was found with respect to body weight(24). On the opposite, loss of employment was not associated in men with increased smoking and drinking, but was associated with an increased likelihood of gaining weight. In another study from the United States(29), cigarette smoking at the time of hire was associated with elevated rates of accidents, absence, discipline, and firing among postal workers, and the authors hypothesize that smoking could indicate risk taking and susceptibility to accidents. The idea that smoking is intricately entwined with an individual's life history has been supported(14), and in a cohort study of pupils in Sweden, girls and boys who were smokers at school turned out to have a higher risk of becoming unemployed than the non-smokers(9).

The interpretation of the finding of smoking as a precursor of unemployment in men is quite complex though, as several aspects have to be considered. Now that tobacco consumption is forbidden in the workplace, is there a form of prejudice against smokers, may be particularly against those who do not respect the laws? Another point which deserves some attention is the likely recurrence of the phenomenon of unemployment: it is well known that individuals who experienced unemployment in the past are at a higher risk of renewed unemployment ("lagged state dependence on previous spells of unemployment" according to Arrow(1)), and this has been confirmed in a study of youth unemployment in France(15): the author concludes that there is a sub-population for which the likelihood of unemployment is high, and which is excluded from the market of long-term, steady jobs, and he relates this situation to personal characteristics determining some kind of intrinsic "employability". This type of hypothesis is quite similar to the concept of "indirect selection" developed by Bartley et al.(3): "there may still be some tendency for those who remain unemployed to be different to those who do not...Perhaps people at high risk of unemployment may also have certain personality

characteristics...The indirect selection hypothesis states that characteristics such as personality traits are confounders. In this case, the mechanism would be that both unemployment and health are related to a certain personality trait...”. In order to investigate this hypothesis, we would need to have extensive cohort data on psychological and physical development throughout the school years and young adult life, together with complete employment histories from leaving school.

Another health-related variable which stands out in our study is obesity, and much differently according to gender: obesity is a negative feature for women in both periods, while, paradoxically, it seems to play a protective role for men in the first period. More and more people are concerned with obesity in the United States and more recently in Europe, where it is increasingly recognized as a public health problem(30). The prevalence of this condition is known to vary greatly according to social and economic factors, but in gender-specific ways. In women, studies in the developed world have consistently reported a powerful inverse relation between socio-economic status and obesity: the higher social status, the rarer obesity. For men, the association is less consistent, as it can be positive, negative or absent(8). In our study, obese women face an odds ratio for mobility out of employment of about 2, which is considerable. Given that obesity is associated with ill-health, we have re-run the analysis with the reporting of “at least one serious disease” among the co-variables, and the findings remained essentially unchanged. This is a demonstration that the obesity role is not mediated by ill health, and is likely to be attributable to the social stigmatization of obesity and the persistent prejudice against obese women. In the literature, while longitudinal evidence is scarce for women(13), cross-sectional studies have shown an association of overweight and obesity with unemployment and/or with problems at work when employed, be it in Finland(30), or in Sweden(27). A longitudinal, population-based study in Northern Finland has established that overweight and obesity at 14 years did not predict a long history of unemployment at 31 years, but were associated among females with adverse social outcomes such as a low level of education and being single or divorced(13). Our finding that obese men were more steady in their jobs than other men does not find an echo in the literature, but one possible interpretation could be that obese men are less likely than the others to be heavy smokers and alcohol drinkers.

Methodological aspects

One asset of the current study is its prospective nature: the health and habits of the individuals were collected while they were employed and mobility into unemployment was investigated at a later time. And yet, we cannot rule out the possibility that study limitations related to the study design and sample may have influenced our findings. One obvious limitation is that we have no information whatsoever on the events which have occurred in the 4-year time period between the two survey rounds: an individual who report being employed at the 2 points may have experienced an unemployment episode at some point in-between. Also, an individual reporting unemployment at the second point may have lost his job right after the first survey round, or right before the second one, or in the middle of the interval, or at any other point. This type of incompleteness of the biographical information leads to a decline of the study power, leading to an under-estimation of the associations between labour market trajectories and health. Similarly, the small number of labour market exits in the different age and gender groups limit our conclusions, and raise the general problem of sample size in longitudinal studies of employment and health. Another problem in our sample characterized by a follow-up rate of 60 % is the potential attrition bias, even though our investigation of the underlying factors did not support the existence of differential attrition according to health.

One legitimate concern is about the quality of the health measures included in the study. As pointed out by McDonough et al., self-rated health has been proven to be a valid and reliable indicator(18), one which “combines the subjective experience of acute and chronic, fatal and nonfatal diseases, and general feeling of well-being, like feeling run-down and tired, having backaches and headaches”, and, to some extent, addresses the problem of endogeneity that is attached to the “work disability” item. Regarding the other indicators, the self-reported nature of the height and weight measurements from which the BMI was obtained may, to some extent, limit its validity(8). And yet it has been shown that the BMI calculated based on self-reported anthropometric measurements has an acceptable degree of validity and reliability, although it tends to be underestimated due to an overestimation of height and an underestimation of weight.

Conclusion

In this prospective study of health and health-related habits of employed men and women in France in relation to their employment status 4 years later, we find that a negative self-assessed health is associated with subsequent unemployment in both genders. Other features display gender-specific associations with unemployment: obesity for women and heavy smoking for men. Similar findings have been reported in studies dealing with populations from Canada and Northern Europe, and it is not possible to interpret the extent to which the association with unemployment reflects a higher risk of job loss or lower chances of re-employment. The prejudice against obese women is unquestionable in France, as it is in most Western countries, while the significance of heavy smoking in men as a precursor of unemployment is far less evident. Detailed analyses of health trajectories in relation to employment trajectories would provide useful insight into the complexities of individuals' experiences.

References

1. Arrow JO. Estimating the influence of health as a risk factor on unemployment: a survival analysis of employment durations for workers surveyed in the German socio-economic panel (1984-1990). *Soc. Sci. Med.* 1996;42:1651-9.
2. Bartley M. Unemployment and health: selection or causation - a false antithesis? *Sociology of Health and Illness* 1988;10:41-67.
3. Bartley M, Ferrie J, Montgomery S. Living in a high-unemployment economy: understanding the health consequences. In: Marmot M, Wilkinson R, eds. *Social determinants of health*. Oxford: Oxford University Press, 2000:81-104.
4. Belgrave L.L. , Haug M.R., Gomez-Bellange F. Gender and race differences in effects of health and pension on retirement before age 65. *Comparative Gerontology* 1987;B:108-17.
5. Chirikos T.N. , Nestel G. Economic determinants and consequences of self-reported work disability. *Journal of Health Economics* 1984;117-36.

6. Claussen B, Bjorndal A, Hjort PF. Health and reemployment in a two-year follow up of long term unemployment. *J. Epidemiol. Community Health* 1993;47:14-8.
7. Desplanques G. La mortalité des adultes. Résultats de deux études longitudinales (période 1955-1980). (The mortality of adults: Findings from two longitudinal studies (period 1955-1980)). Paris: INSEE, 1985.
8. Gutierrez-Fisac J.L., Regidor E., Rodriguez C. Economic and social factors associated with body mass index and obesity in the Spanish population aged 20-64 years. *European Journal of Public Health* 1995;193-8.
9. Hammarstrom A , Janlert U. Unemployment and change of tobacco habits: a study of young people from 16 to 21 years of age. *Addiction* 1994;89:1691-6.
10. Kasl S, Jones B. The impact of job loss and retirement on health. In: Berkman L, Kawachi I, eds. *Social epidemiology*. Oxford: Oxford University Press, 2000:118-36.
11. Kessler RC, House JS, Turner JB. Unemployment and health in a community sample. *J. Health Soc. Behav.* 1987;28:5159.
12. Khlal M, Sermet C, Le Pape A. Alcohol, tobacco and predictors of violent death among unemployed men in France. *European Journal of Epidemiology* », 2004;19, 5: 445-451.
13. Laitinen J. et al. Unemployment and obesity among young adults in a northern Finland 1966 birth cohort. *International Journal of Obesity* 2002;1329-38.
14. Lee AJ et al. Cigarette smoking and employment status. *Soc Sci Med* 1991;33.
15. Lollivier S. Récurrence du chômage dans l'insertion des jeunes: des trajectoires hétérogènes. *Economie et Statistique* 2000;49-63.
16. Loprest P., Rupp K., Sandell S. Gender, disabilities, and employment in the health and retirement study. *Journal of Human Resources* 1995;S293-S318.
17. Lundberg O. Childhood living conditions, health status, and social mobility: a contribution to the health selection debate. *Eur. Soc. Rev.* 1991;7:149-62.
18. Martikainen P. et al. Reliability of perceived health by sex and age. *Social Science and Medicine* 1999;1117-22.

19. Martikainen PT. Unemployment and mortality among Finnish men, 1981-5. *British Medical Journal* 1990;301:407-11. Notes: 1990285124 19900101
20. McDonough P, Amick BCI. The social context of health selection: a longitudinal study of health and employment. *Social Science and Medicine* 2001;53:135-45.
21. Mesrine A. Les différences de mortalité par milieu social restent fortes. (Social inequalities in mortality remain large). *Données Sociales*. INSEE, 1999:228-35.
22. Mesrine A. Overmortality associated with unemployment and economic inactivity in France since 1975. *European Conference on Population*. 1999. La Haye.
23. Mesrine A. La surmortalité des chômeurs: un effet catalyseur du chômage? (The overmortality of the unemployed: a catalyst effect of unemployment?). *Economie et Statistique* 2000;33-48.
24. Morris J.K., Cook D.G., Shaper A.G. Non-employment and changes in smoking, drinking and body weight. *British Medical Journal* 1992;304:536-41.
25. Moser KA, Fox AJ, Jones DR. Unemployment and mortality in the OPCS Longitudinal Study. *Lancet* 1984;2:1324-9.
26. Mullahy J., Sindelar J. Gender differences in the effects of mental health on labor force participation. *Research in Human Capital and Development* 1990;125-46.
27. Rosmond R., Bjorntorp P. Psychosocial and socio-economic factors in women and their relationship to obesity and regional body fat distribution. *Int. J. Obes. Relat. Metab. Disord.* 1999;23:138-45.
28. Ruhm C.J. The effects of physical and mental health on female labor supply. In: Frank R.G. & Manning W.G., ed. *Economics and mental health*. Baltimore, MD: Johns Hopkins University Press, 152-81.
29. Ryan J., Zwerling C., Jones M. Cigarette smoking at hire as a predictor of employment outcome. *J Occup Environ Med* 1996;38:928-33.
30. Sarlio-Lahteenkorva S., Lahelma E. The association of body mass index with social and economic disadvantage in women and men. *International Journal of Epidemiology*

1999;28:445-9.

31. Schwefel D. Unemployment, health and health services in german-speaking countries. Soc. Sc. Med. 1986;22:409-30.
32. Sermet C, Khlal M. La santé des chômeurs en France: revue de la littérature. Rev Epidemiol Sante Publique 2004;52:465-74.
33. Spruit IP. Vulnerability and unemployment. A process to ill-health and constraints on intervention strategies in the Netherlands. In: Starrin B, Svenson PG, Wintersberger H, eds. Unemployment, poverty and quality of working life. 1989:45.
34. van de Mheen H., Stronks K., Schrijvers C.T.M. MJP. The influence of adult ill health on occupational class mobility and mobility out of and into employment in The Netherlands. Social Science and Medicine 1999;509-18.
35. Van Eeckhout L. Des chercheurs mettent en évidence la "surmortalité" des chômeurs. (Researchers provide evidence for the over-mortality of the unemployed). Le Monde 2000;Supplément Economie:VIII.

Annex 1: Sample Characteristics

Characteristics	1992-95 / 1996-98				1996-98 / 2000-02			
	Women		Men		Women		Men	
	n	%	n	%	n	%	n	%
Employed at the second date	1668	92,0	2373	94,2	1740	94,7	2466	97,0
Unemployed at the second date	145	8,0	145	5,8	97	5,3	76	3,0
30-34 years old	398	22,0	543	21,6	415	22,6	612	24,1
35-39	413	22,8	587	23,3	392	21,3	507	19,9
40-44	449	24,8	586	23,3	423	23,0	560	22,0
45-49	355	19,6	474	18,8	362	19,7	486	19,1
50-54	198	10,9	328	13,0	245	13,3	377	14,8
Non-response for education	10	0,6	26	1,0	32	1,7	69	2,7
Primary	347	19,1	409	16,2	233	12,7	276	10,9
Lower secondary	771	42,5	1242	49,3	767	41,8	1232	48,5
Higher secondary	396	21,8	404	16,0	350	19,1	386	15,2
University	289	15,9	437	17,4	455	24,8	579	22,8
Fixed term contract	1710	94,3	2431	96,5	1678	91,3	2425	95,4
Indefinited term contract	103	5,7	87	3,5	159	8,7	117	4,6
Person alone	84	4,6	88	3,5	82	4,5	109	4,3
Couple without children	233	12,9	296	11,8	240	13,1	305	12,0
Single-headed family	105	5,8	21	0,8	108	5,9	24	0,9
Couple with children	1286	70,9	1947	77,3	1295	70,5	1928	75,9
Non-nuclear family	105	5,8	166	6,6	112	6,1	176	6,9
No child < 6 years	1456	80,3	1819	72,2	1449	78,9	1775	69,8
Presence of children < 6 years	357	19,7	699	27,8	388	21,1	767	30,2
Non-response for self perceived health	223	12,3	322	12,8	328	17,9	484	19,0
Score <8 (less than good]	418	23,1	444	17,6	362	19,7	406	16,0
Score >=8 (good]	1172	64,6	1752	69,6	1147	62,4	1652	65,0
Non response for reporting of serious diseases	160	8,8	229	9,1	285	15,5	410	16,1
No disease of this kind	1307	72,1	1843	73,2	1127	61,4	1643	64,6
At least one	346	19,1	446	17,7	425	23,1	489	19,2
Non response for BMI	168	9,3	239	9,5	297	16,2	425	16,7
Underweight	81	4,5	20	0,8	60	3,3	7	0,3
Normal	1153	63,6	1262	50,1	1069	58,2	1123	44,2
Overweight range	317	17,5	840	33,4	287	15,6	817	32,1
Obese range	94	5,2	157	6,2	124	6,8	170	6,7
Non response for tobacco consumption	166	9,2	234	9,3	286	15,6	422	16,6
Non smoker	938	51,7	695	27,6	867	47,2	743	29,2
Ex smoker	334	18,4	657	26,1	304	16,6	585	23,0
Smokes up to 1 pack/day]	354	19,5	762	30,3	355	19,3	651	25,6
Heavy smoker	21	1,2	170	6,8	25	1,4	141	5,6
Total	1813	100	2518	100	1837	100	2542	100

Annex 2: Characteristics of follow-up in the ESPS panel

Population of salaried workers (fixed term contract or indefinite term contract] aged 30 to 54 years in 1992-95 : 8057			
4528 persons interviewed in 1996-98 56.20 %		3529 not interviewed in 1996-98 43.80 %	
4041 employed 89.2%	290 unemployed 6.4%	197 inactives 4.4%	
Population of salaried workers aged 30 to 54 years in 1996-98 : 8858			
4557 persons interviewed in 2000-02 51.45 %		4301 not interviewed in 2000-02 48.55 %	
4197 employed 92.1%	173 unemployed 3.8%	187 inactives 4.1%	

Annex 3: Socio-demographic determinants of mobility into unemployment ¹

Characteristics	Women				Men			
	1992-95 / 1996-98		1996-98 / 2000-02		1992-95 / 1996-98		1996-98 / 2000-02	
	O.R.	I.C	O.R.	I.C	O.R.	I.C	O.R.	I.C
Age								
30-34	1		1		1		1	
35-39	1,2	[0,7 - 2,1]	1,4	[0,7 - 2,6]	0,9	[0,5 - 1,6]	1	[0,4 - 2,2]
40-44	0,7	[0,4 - 1,3]	1	[0,5 - 2,1]	1,4	[0,8 - 2,4]	1,5	[0,7 - 3,4]
45-49	0,9	[0,5 - 1,6]	0,8	[0,4 - 1,7]	1,3	[0,7 - 2,3]	1,6	[0,7 - 3,7]
50-54	2*	[1,1 - 3,8]	1,5	[0,7 - 3,3]	2,4**	[1,3 - 4,4]	3,6**	[1,6 - 8,1]
Education								
Primary	1,3	[0,8 - 2,1]	1,5	[0,8 - 2,8]	1,3	[0,9 - 2,1]	1,2	[0,6 - 2,4]
Lower secondary	1		1		1		1	
Higher secondary	1,2	[0,8 - 1,9]	1	[0,6 - 1,8]	0,9	[0,5 - 1,5]	0,8	[0,4 - 1,6]
University	0,5*	[0,2 - 0,9]	0,7	[0,4 - 1,2]	0,7	[0,4 - 1,3]	0,9	[0,5 - 1,7]
Non response	3,7	[0,7 - 18,5]	0,6	[0,1 - 4,3]	1	[0,2 - 4,5]	0,8	[0,2 - 3,7]
Type of job contract								
Fixed term contract	2,7***	[1,6 - 4,8]	2,1**	[1,2 - 3,8]	3,5***	[1,9 - 6,6]	6,4***	[3,5 - 11,7]
Indefinited term contract	1		1		1		1	
Household composition								
Couple with children	1		1		1		1	
Person alone	1,3	[0,6 - 2,9]	1,5	[0,5 - 4,4]	3,3***	[1,7 - 6,5]	2,1	[0,8 - 5,4]
Single-headed family	1,4	[0,7 - 2,8]	2,7**	[1,4 - 5,5]	0,7	[0,1 - 5,7]	1,4	[0,2 - 11,8]
Couple without children	1,5	[0,9 - 2,6]	1,6	[0,8 - 3,1]	1,2	[0,7 - 2]	1,6	[0,8 - 3,2]
Non-nuclear family	1,4	[0,7 - 2,7]	3,5***	[1,8 - 6,6]	2,2**	[1,3 - 3,8]	1	[0,4 - 2,7]
Presence of children of less than 6 years								
No	1		1		1		1	
Yes	1,3	[0,8 - 2,1]	1,9*	[1,1 - 3,3]	0,9	[0,5 - 1,4]	1,9	[1 - 3,6]

¹ Significance level : * 5%, **1%, ***0.1%, bold odds ratios correspond to a significance level less than 10%

Annex 4: Proportion of unemployed according to health status

Health status	Women				Men			
	1992-95 / 1996-98		1996-98 / 2000-02		1992-95 / 1996-98		1996-98 / 2000-02	
	Unemployed (%)	Employed (%)	Unemployed (%)	Employed (%)	Unemployed (%)	Employed (%)	Unemployed (%)	Employed (%)
Self-perceived health								
Score >=8 (good)	6,1	93,9	4,2	95,8	4,7	95,3	2,4	97,6
Score <8 (less than good)	10,8	89,2	9,1	90,9	8,1	91,9	4,7	95,3
Non-response	12,6	87,4	4,9	95,1	8,1	91,9	3,7	96,3
Reporting of serious diseases								
No disease of this kind	6,7	93,3	4,5	95,5	5,0	95,0	2,7	97,3
At least one	10,7	89,3	7,1	92,9	8,1	91,9	3,5	96,5
Non-response	13,1	86,9	5,6	94,4	7,0	93,0	3,4	96,6
Body mass index								
Underweight	3,7	96,3	8,3	91,7	10,0	90,0	0,0	100,0
Normal	6,9	93,1	4,3	95,7	6,3	93,7	2,8	97,2
Overweight range	8,8	91,2	6,3	93,7	5,1	94,9	3,1	96,9
Obese range	13,8	86,2	9,7	90,3	3,2	96,8	2,9	97,1
Non-response	13,1	86,9	5,4	94,6	6,7	93,3	3,3	96,7
Tobacco consumption								
Non smoker	8,3	91,7	5,4	94,6	4,0	96,0	2,6	97,4
Ex smoker	6,0	94,0	3,6	96,4	5,6	94,4	3,2	96,8
Smokes up to 1 pack/day	6,8	93,2	5,6	94,4	5,9	94,1	2,6	97,4
Heavy smoker	9,5	90,5	12,0	88,0	10,6	89,4	5,0	95,0
Non-response	12,7	87,3	5,6	94,4	7,3	92,7	3,3	96,7
Total number	145	1668	97	1740	145	2373	76	2466

Annex 5: Impact of health status on mobility into unemployment, controlled for socio-demographic characteristics²

	Women				Men			
	1992-95 / 1996-98		1996-98 / 2000-02		1992-95 / 1996-98		1996-98 / 2000-02	
Health status	O.R.	I.C	O.R.	I.C	O.R.	I.C	O.R.	I.C
Self-perceived health								
Score >=8 (good)	1		1		1		1	
Score <8 (less than good)	1,6*	[1,1 - 2,5]	2,1**	[1,3 - 3,4]	1,6*	[1 - 2,4]	1,9*	[1 - 3,3]
Non-response	2**	[1,2 - 3,2]	1,1	[0,6 - 2,1]	1,6	[1 - 2,5]	1,6	[0,9 - 2,8]
Reporting of serious diseases								
No disease of this kind	1		1		1		1	
At least one	1,4	[0,9 - 2,2]	1,6	[1 - 2,6]	1,4	[1 - 2,2]	1,1	[0,6 - 2]
Non-response	2**	[1,2 - 3,4]	1,3	[0,7 - 2,3]	1,3	[0,7 - 2,2]	1,2	[0,7 - 2,3]
Body mass index								
Underweight	0,5	[0,2 - 1,7]	1,9	[0,7 - 5,1]	1,5	[0,3 - 6,8]		
Normal	1		1		1		1	
Overweight range	1,2	[0,7 - 1,9]	1,4	[0,8 - 2,5]	0,7	[0,5 - 1,1]	1	[0,6 - 1,7]
Obese range	1,8	[1 - 3,6]	2,2*	[1,1 - 4,4]	0,3*	[0,1 - 0,9]	0,9	[0,3 - 2,5]
Non-response	1,9*	[1,2 - 3,3]	1,2	[0,7 - 2,2]	0,9	[0,5 - 1,6]	1,1	[0,6 - 2,2]
Tobacco consumption								
Ex smoker	0,8	[0,5 - 1,3]	0,7	[0,4 - 1,4]	1,3	[0,8 - 2,3]	1,3	[0,6 - 2,5]
Smokes up to 1 pack/day	0,8	[0,5 - 1,4]	1	[0,6 - 1,8]	1,5	[0,9 - 2,5]	1	[0,5 - 2,1]
Heavy smoker	1,2	[0,3 - 5,4]	1,9	[0,5 - 6,9]	2,8**	[1,5 - 5,2]	2,2	[0,9 - 5,4]
Non smoker	1		1		1		1	
Non-response	1,6	[0,9 - 2,7]	1	[0,6 - 1,9]	1,7	[0,9 - 3,2]	1,4	[0,7 - 2,8]

² Significance level : * 5%, **1%, ***0.1%, bold odds ratios correspond to a significance level less than 10%.