

- 5 Hoeks APG, Brands PJ, Smeets FAM, Reneman RS. Assessment of the distensibility of superficial arteries. *Ultrasound Med Biol* 1990;16:121-8.
- 6 Leeson CPM, Whincup PH, Cook DG, Donald AE, Papacosta O, Lucas A, et al. Flow mediated dilation in 9-11 year old children: the influence of childhood and intrauterine factors. *Circulation* 1997;96:2233-8.
- 7 Leeson CPM, Whincup PH, Cook DG, Mullen MJ, Donald AE, Seymour CA, et al. Cholesterol and arterial distensibility in the first decade of life: a population-based study. *Circulation* 2000;101:1533-8.
- 8 Office of Population Censuses and Surveys. *Occupational mortality decennial supplement 1979-80; 1982-83*. London: HMSO, 1986.
- 9 Kark JD, Troya G, Friedlander Y, Slater PE, Stein Y. Validity of maternal reporting of breast feeding history and the association with blood lipids in 17 year olds in Jerusalem. *J Epidemiol Community Health* 1984;38:218-25.
- 10 Leeson CPM, Thorne S, Donald AE, Mullen MJ, Clarkson F, Deanfield JE. Non-invasive measurement of endothelial function: effect on brachial artery dilation of graded endothelial dependent and independent stimuli. *Heart* 1997;78:22-7.
- 11 Office of Population Censuses and Surveys. *Health survey of England 1995*. London: HMSO, 1997.
- 12 American Academy of Pediatrics. Breast feeding and the use of human milk. *Pediatrics* 1997;100:1035-9.
- 13 Phillips DI, Barker DJP, Osmond C. Infant feeding, fetal growth and adult thyroid function. *Acta Endocrinol Copenh* 1993;129:134-8.
- 14 Mott GE, Jackson EM, DeLallo L, Lewis DS, McMahan CA. Differences in cholesterol metabolism in juvenile baboons are programmed by breast versus formula feeding. *J Lipid Res* 1995;36:299-307.
- 15 Wong WW, Hachey DL, Insull W, Opekan AR, Klein PD. Effect of dietary cholesterol on cholesterol synthesis in breast fed and formula fed infants. *J Lipid Res* 1993;34:1403-11.
- 16 Mott GE, DeLallo L, Driscoll DM, McMahan CA, Lewis DS. Influence of breast and formula feeding on hepatic concentrations of apolipoprotein and low density lipoprotein receptor mRNAs. *Biochem Biophys Acta* 1993;1169:59-65.
- 17 Hironaka K, Yano M, Kohno M, Tanigawa T, Obayashi M, Konishi M, et al. In vivo aortic wall characteristics at the early stage of atherosclerosis in rabbits. *Am J Physiol* 1997;273:H1142-7.
- 18 Stary HC. Evolution and progression of atherosclerotic lesions in coronary arteries in children and young adults. *Arteriosclerosis* 1989;99(suppl I): I 19-32.
- 19 Friedman G, Goldberg SJ. Concurrent and subsequent serum cholesterol of breast and formula fed infants. *Am J Clin Nutr* 1975;28:142-5.
- 20 Akeson PM, Axelsson IE, Raiha NC. Plasma lipids and apolipoproteins in breast-fed and formula-fed Swedish infants. *Acta Paediatr* 1999;88:1-6.
- 21 Burr ML, Beasley WH, Fisher CB. Breast feeding, maternal smoking and early atheroma. *Eur Heart J* 1984;5:588-91.
- 22 Benetos A, Laurent S, Hoeks APG, Bontonyrie PH, Safar ME. Arterial alterations with ageing and high blood pressure. *Arterioscler Thromb* 1993;13:90-7.
- 23 Dart AM, Lacombe F, Yeoh JK, Cameron JD, Jennings GL, Laufer E, et al. Aortic distensibility in patients with isolated hypercholesterolaemia, coronary artery disease or cardiac transplant. *Lancet* 1991;338:696-7.
- 24 Tomeo CA, Rich-Edwards JW, Michels KB, Berkey CS, Hunter DJ, Frazier AL, et al. Reproducibility and validity of maternal recall of pregnancy-related events. *Epidemiology* 1999;10:774-7.

(Accepted 15 December 2000)

Employment status and health after privatisation in white collar civil servants: prospective cohort study

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Abstract

Objectives To determine whether employment status after job loss due to privatisation influences health and use of health services and whether financial strain, psychosocial measures, or health related behaviours can explain any findings.

Design Data collected before and 18 months after privatisation.

Setting One department of the civil service that was sold to the private sector.

Participants 666 employees during baseline screening in the department to be privatised.

Main outcome measures Health and health service outcomes associated with insecure re-employment, permanent exit from paid employment, and unemployment after privatisation compared with outcomes associated with secure re-employment.

Results Insecure re-employment and unemployment were associated with relative increases in minor psychiatric morbidity (mean difference 1.56 (95% confidence intervals interval 1.0 to 2.2) and 1.25 (0.6 to 2.0) respectively) and having four or more consultations with a general practitioner in the past year (odds ratio 2.04 (1.1 to 3.8) and 2.39 (1.2 to 4.7) respectively). Health outcomes for respondents permanently out of paid employment closely resembled those in secure re-employment, except for a substantial relative increase in longstanding illness (2.25; 1.1 to 4.4). Financial strain and change in psychosocial measures and health related behaviours accounted for little of the observed associations. Adjustment for change in minor psychiatric morbidity attenuated the association between insecure

re-employment or unemployment and general practitioner consultations by 26% and 27%, respectively.

Conclusions Insecure re-employment and unemployment after privatisation result in increases in minor psychiatric morbidity and consultations with a general practitioner, which are possibly due to the increased minor psychiatric morbidity.

Introduction

Traditionally the public sector in the United Kingdom was immune to the pressures of the marketplace, and among its main attractions were job security, a career, and good conditions of service. The future privatisation of the executive functions of government came on to the agenda with the introduction of the "Next Steps" programme in August 1988. Early in the restructuring, one of the 20 departments participating in the Whitehall II study, the Property Services Agency, was sold to the private sector.

Rumours of the forthcoming privatisation reached the work force two to three years before the sale, and during this "anticipation" phase there was a deterioration in self reported health.¹ During the three months before the sale, both self reported morbidity and physiological risk factors had increased relative to what was reported by respondents in the control departments.²

We examined the effects on health and general practitioner consultations of employment status 18 months after the privatisation and whether any associations could be explained by changes in financial strain, psychosocial measures, and health related behaviours.

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BMJ 2001;322:647-51

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The full version of this paper appears on the BMJ's website. This article is part of the BMJ's trial of open peer review, and documentation relating to this also appears on the website

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Methods

Before the privatisation, the Property Services Agency, which was responsible for all government buildings, was split into six separate businesses between April 1990 and July 1991. Most of the Whitehall II respondents in this department at baseline were in projects division, the design and construction side, which was sold to Tarmac plc in December 1992.³ After privatisation all employees lost their original jobs.

The Whitehall II study

The target population for the Whitehall II study was all office staff based in London who were working in 20 civil service departments between late 1985 and early 1988. With a response rate of 73%, the final cohort consisted of 6895 men and 3413 women. Although mostly white collar (office) workers, respondents covered a wide range of grades. The baseline screening of the cohort involved a clinical examination and a self administered questionnaire.⁴

Property Services Agency study

A study specifically designed to investigate effects of the privatisation started in 1994. The study population was all 666 Whitehall II respondents (153 women and 513 men) who were working in the agency at baseline screening. In addition to using baseline data, we gathered follow up data by self administered questionnaire 18 months after privatisation, eight to nine years after baseline screening. We have used the baseline survey and data from the follow up questionnaire.

Measures

We collected data on age, marital status, civil service employment grade at baseline, and employment status 18 months after privatisation.

Self reported health outcomes at baseline and follow up included health over the past year; presence of longstanding illness; number of symptoms in the past fortnight; number of health problems in the past year; and minor psychiatric morbidity.⁵ We also

determined the number of general practitioner consultations in the preceding 12 months. Self reported employment status 18 months after privatisation was defined as secure re-employment, insecure re-employment, unemployment, and permanently out of paid employment.

We assessed negative affectivity,⁶ financial strain,⁷ perception of low ability to influence health (external locus of control), and adverse life events in the past year. For those in employment we examined four psychosocial work characteristics—decision authority, skill discretion, job demands,⁸ and social support at work. All explanatory factors were measured at baseline and follow up, except negative affectivity.

Statistical analysis

Our aim was to determine whether change in morbidity between baseline and follow up differed between respondents in the four categories of employment after privatisation. In the absence of a control group who had not experienced privatisation we used participants in the most favourable category in the labour market (secure re-employment) as the reference group.

Sex differences for all measures were small so we combined the sexes for analysis. For continuous variables we used linear regression to produce adjusted means with 95% confidence intervals, with adjustment consecutively for age, employment grade, marital status, and the baseline level of the variable of interest. Results for continuous variables compare the exposure groups with the reference group in terms of adjusted mean differences. For dichotomous variables we used logistic regression with results presented as odds ratios and 95% confidence intervals.

Results

Employment status—Of the 666 respondents in the Property Services Agency at baseline, 541 (81%) responded to the follow up questionnaire: 219 (41%)

Table 1 Means and percentages* at baseline for demographic factors, negative affect and outcomes measures by employment status 18 months post-privatisation. Figures are means (95% confidence interval)

	Secure re-employment (n=165)	Insecure re-employment (n=155)	Permanent exit from employment (n=118)	Unemployment (n=101)	P value for test of heterogeneity among categories
Demographic measures:					
Age (years)	42.4 (41.6 to 43.3)	42.6 (41.8 to 43.4)	50.9 (50.1 to 51.7)	45.4 (44.3 to 46.4)	0.001
High employment grade (%)	37.5 (33.4 to 45.7)	22.0 (15.0 to 29.0)	22.3 (13.3 to 31.3)	16.3 (9.4 to 23.2)	0.001
Married or cohabiting (%)	83.9 (77.7 to 90.1)	84.7 (78.6 to 90.7)	71.9 (51.9 to 91.8)	77.9 (69.5 to 86.3)	0.69
Health measures:					
Self rated health average or worse (%)	18.9 (12.2 to 25.5)	19.6 (12.5 to 26.7)	16.0 (7.4 to 24.6)	36.2 (26.7 to 45.7)	0.006
Longstanding illness (%)	30.7 (21.7 to 39.7)	34.6 (26.0 to 43.3)	29.0 (18.5 to 39.4)	29.8 (20.3 to 39.2)	0.57
Symptom score	1.72 (1.4 to 2.0)	2.07 (1.7 to 2.4)	2.82 (2.0 to 3.7)	2.62 (2.1 to 3.1)	0.04
No of health problems	1.10 (0.9 to 1.3)	1.07 (0.9 to 1.3)	1.66 (1.1 to 2.2)	1.52 (1.2 to 1.8)	<0.001
General health questionnaire score	1.39 (1.0 to 1.8)	1.43 (1.0 to 1.8)	1.90 (0.8 to 3.0)	2.19 (1.6 to 2.8)	0.01
Financial strain:					
Financial strain score	1.76 (1.5 to 2.1)	2.04 (1.7 to 2.4)	1.86 (0.0 to 3.7)	1.78 (1.3 to 2.2)	0.18
Psychosocial measures:					
≥2 life events in past year (%)	29.4 (21.9 to 36.8)	37.5 (28.8 to 46.2)	49.0 (30.1 to 67.9)	34.4 (24.9 to 44.0)	0.52
Negative affect (%)	17.1 (10.3 to 23.9)	25.3 (17.3 to 33.4)	14.9 (5.8 to 24.0)	18.2 (10.0 to 26.4)	0.52
External locus of control (%)	2.6 (−1.2 to 6.3)	0.6 (−0.6 to 1.7)	2.8 (0.2 to 5.4)	4.7 (0.4 to 9.0)	0.55
Health behaviours:					
Alcohol intake over recommended limits (%)	10.7 (6.7 to 14.7)	6.6 (3.2 to 10.0)	8.9 (1.1 to 16.6)	9.8 (4.0 to 15.6)	0.47
Current smoking (%)	7.9 (3.6 to 12.1)	14.8 (8.4 to 21.2)	23.0 (5.1 to 40.9)	13.1 (6.5 to 19.7)	0.51
Hour or more vigorous exercise/week (%)	59.0 (50.5 to 67.5)	53.4 (45.0 to 61.9)	35.6 (25.2 to 45.9)	50.1 (40.5 to 59.8)	0.53

*Adjusted for age (except age) and sex.

were no longer working and of the 320 (59%) in employment, 155 (48%) felt insecure or very insecure in their jobs 18 months after privatisation.

Baseline differences—In general, respondents with less favourable employment outcomes had greater morbidity and poorer psychosocial profiles and health related behaviours at baseline (table 1). Analyses of health outcomes after privatisation adjusted for the baseline values of all the health measures and all the potential explanatory variables were similar to the results presented in table 1.

Health outcomes and general practitioner consultations—After adjustment for baseline measures, morbidity was greater among insecurely re-employed or unemployed respondents than among securely re-employed respondents (table 2). For minor psychiatric morbidity and four or more general practitioner consultations in the past year, differences were significant. Among respondents permanently out of paid employment, outcomes for health self rated as average or worse and number of symptoms in the past fortnight compared favourably with the reference group (secure re-employment), but there was a significant relative increase in longstanding illness (table 2).

Potential explanatory factors—All the less favourable employment outcomes were associated with a relative increase in financial strain, which was significant in unemployed people. Relative to securely re-employed respondents, those in insecure re-employment generally experienced adverse changes in other psychosocial work characteristics. Overall, health related behaviours among those with less favourable employment outcomes were better than among the securely re-employed, including an increase in vigorous exercise among unemployed respondents. However, there was a considerable relative increase in smoking among respondents permanently out of paid employment (table 3).

Potential explanations—Adjustment for negative affectivity had a negligible effect on the relation between permanent exit from paid employment and longstanding illness. The only potential mediator that attenuated the association between insecure re-employment and minor psychiatric morbidity was adverse change in decision authority (6%). Financial strain attenuated the association between unemployment and minor psychiatric morbidity by 9%. Adjustment for minor psychiatric morbidity attenuated the relation between employment status and general practitioner consultations by 26% among respondents in secure employment and by 27% among unemployed people. The effect of adjustment for all the potential mediators and negative affectivity together shows that these effects are partially independent and partially overlapping. (For more detail see the full version of this paper on the *BMJ's* website.)

Discussion

This large study of employment after privatisation shows that insecure re-employment and unemployment are both associated with increases in minor psychiatric morbidity and general practitioner consultations and that being permanently out of paid work is associated with longstanding illness. These

Table 2 Health outcomes for participants in insecure re-employment, permanently out of paid employment, and unemployed compared with those in secure re-employment 18 months after privatisation. Figures are odds ratios (95% confidence intervals) except for symptom score, health problems, and general health questionnaire, which are differences (95% confidence interval)

	Insecure re-employment	Permanent exit from employment	Unemployment
Health measures*:			
Self rated health average or worse	1.48 (0.9 to 2.5)	0.88 (0.5 to 1.7)	1.20 (0.7 to 2.2)
Longstanding illness	1.31 (0.7 to 2.3)	2.25 (1.1 to 4.4)	1.62 (0.7 to 3.0)
Symptom score	0.27 (−0.3 to 0.8)	−0.30 (−1.0 to 0.4)	0.32 (−0.3 to 1.0)
No of health problems	0.10 (−0.2 to 0.4)	−0.06 (−0.5 to 0.3)	0.16 (−0.2 to 0.5)
General health questionnaire score	1.56 (1.0 to 2.2)	0.07 (−0.7 to 0.8)	1.25 (0.6 to 2.0)
Health service use†:			
≥4 general practitioner visits	2.04 (1.1 to 3.8)	1.93 (0.9 to 4.0)	2.39 (1.2 to 4.7)

*Adjusted for sex, age, grade, marital status, and baseline value of outcome of interest.

†Adjusted for sex, age, grade, and marital status.

results cannot be explained by changes in financial strain, psychosocial factors, or health related behaviours. However, adjustment for change in minor psychiatric morbidity attenuated the relation between insecure re-employment or unemployment and general practitioner consultations.

Methodological considerations

A strength of our study is that analyses compared data for individuals from a phase of secure re-employment with those collected 18 months after privatisation. This enabled us to separate changes related to loss of secure employment from the effects of previous health and other demographic factors.

The study's weakest points are the absence of a control group and potential selection into re-employment. However, use of securely re-employed people, who also went through the privatisation, as the

Table 3 Financial strain and change in psychosocial measures and health related behaviours for respondents in insecure re-employment, permanently out of paid employment, and unemployed compared with those in secure employment 18 months after privatisation. All figures are odds ratios (95% confidence interval) except for financial strain, which is difference (95% confidence interval)

	Insecure re-employment	Permanent exit from employment	Unemployment
Financial strain*:			
Financial strain score	0.22 (−0.1 to 0.6)	0.26 (−0.1 to 0.7)	0.59 (0.2 to 1.0)
Psychosocial measures*:			
External locus of control	0.65 (0.1 to 7.0)	1.04 (0.1 to 9.7)	1.51 (0.2 to 11.4)
Social support at work:			
Adverse change	1.40 (0.9 to 2.3)	NA	NA
Beneficial change	0.67 (0.4 to 1.2)		
Decision authority at work:			
Adverse change	1.70 (1.0 to 3.0)	NA	NA
Beneficial change	0.84 (0.5 to 1.4)		
Skill discretion at work:			
Adverse change	1.56 (0.9 to 2.8)	NA	NA
Beneficial change	0.48 (0.3 to 0.9)		
Job demands at work:			
Adverse change	1.07 (0.6 to 1.8)	NA	NA
Beneficial change	1.37 (0.8 to 2.4)		
≥2 life events in past year	1.15 (0.7 to 1.8)	1.31 (0.7 to 2.4)	1.48 (0.9 to 2.5)
Health related behaviours*:			
Alcohol intake over recommended limits	0.84 (0.4 to 1.7)	0.62 (0.2 to 1.6)	0.98 (0.5 to 2.1)
Current smoking	0.82 (0.3 to 2.6)	1.87 (0.4 to 8.0)	0.90 (0.2 to 3.6)
Hour or more vigorous exercise/week	0.96 (0.6 to 1.6)	1.71 (0.9 to 3.3)	1.92 (1.1 to 3.5)

NA=not applicable.

*Adjusted for sex, age, grade, marital status and, apart from life events in past year, for baseline value of outcome of interest.

reference group is likely to result in an underestimation of effects. Furthermore, adjustment for all morbidities and potential explanatory factors at baseline had little effect on health outcomes after privatisation (data not shown), indicating that selective re-employment is unlikely to explain our findings fully.

As in most occupational studies, the generalisability of our results is limited by the subjects. Most of the employees in the agency were construction industry specialists, though a considerable number were general office staff, making it equivalent to most office-based settings in the public and private sector.

Minor psychiatric morbidity

Most studies of workplace closure have compared mental health in unemployed people with that in re-employed people.⁹⁻¹² With one exception¹¹ such comparisons show that re-employed people have better mental health than unemployed people, although long term unemployment narrows or eliminates this difference. After the privatisation in this study, however, re-employed people were divided into those in secure re-employment and those in insecure re-employment. This division showed that change in minor psychiatric morbidity was significant among the insecurely re-employed compared with those in secure re-employment. It has been shown previously that increased depression scores in unemployed men are not reduced by re-employment in an insecure job.¹³ Unsatisfactory re-employment after closure among male steel workers¹⁴ and car workers¹² increased depression scores, while scores for the unemployed fell in between.¹⁴ Similarly, in our findings there was slightly less minor psychiatric morbidity among unemployed respondents, although the association was highly significant. There is good evidence from other longitudinal studies that unemployment is associated with deteriorating mental health.^{15 16}

General practitioner consultations

Insecure re-employment and unemployment were associated with an increase in general practitioner consultations, confirming other findings which have

generally shown that insecure employment^{17 18} and unemployment¹⁹⁻²² are associated with increased rate of consultation. About one quarter of this increase seems to be attributable to increased minor psychiatric morbidity.

Explanations based on psychosocial factors, financial strain, and negative affectivity

Adverse changes in decision authority explained 6% of the association between minor psychiatric morbidity and insecure re-employment after privatisation. A recent Finnish study found that adjustment for decreased participation in decision making explained 19% of the association between major versus minor downsizing and medically certified sickness absence,²³ but a study among miners found that job control did not moderate the adverse effect of job insecurity on psychological strain.²⁴ As in other studies, increased financial strain was significantly associated with unemployment and explained 9% of the association with increased minor psychiatric morbidity, considerably less attenuation than documented elsewhere.^{25 26} However, Whelan has shown that unemployment has a substantial independent effect in unemployed people in addition to the mediating role of aspects of poverty.²⁷ Adjustment for negative affectivity had little influence on our findings, although respondents who report their employment as being insecure may also give adverse reports about other aspects of their life, and measures of negative affectivity may be rather limited in their ability to address this issue.²⁸

Explanations based on health related behaviours

None of the studies on workplace closure have reported data on exercise. The relative increase in unemployed respondents taking vigorous exercise was significant, and adjustment for exercise showed that general practitioner consultations would have been greater by 11% had the unemployed not adopted this health enhancing behaviour. Two studies have reported a relative increase in exercise among long term unemployed men.^{29 30}

Policy implications

All our findings suggest that employment status after privatisation has a direct effect on minor psychiatric morbidity and longstanding illness. In addition to this increase in individual morbidity, the loss of secure public sector employment adds to NHS costs through increased consultations with general practitioners, which our results show are partly related to the increased minor psychiatric morbidity associated with privatisation.

We thank all participating civil service departments and their welfare, personnel, and establishment officers; the Occupational Health and Safety Agency; the Council of Civil Service Unions; all participating civil servants in the Whitehall II study; and all members of the Whitehall II study team.

Contributors: JEF organised the data collection at follow up, carried out the analysis, and wrote the original and successive drafts of the paper. PM helped to interpret the data and commented on all drafts of the paper. MJS advised on the analysis and drafts of the paper. MGM designed and directs the Whitehall II study. SAS commented on drafts of the paper. GDS designed the substudy presented in this paper and commented on all drafts of the paper. JEF will act as guarantor for the study.

Funding: Economic and Social Research Council (R000235083). Medical Research Council; British Heart

What is already known on this topic

Epidemiological evidence points to greater morbidity and more consultations with a general practitioner among those who remain unemployed after job loss

Re-employed people have better mental health than unemployed people

Most studies have failed to differentiate between secure employment and insecure re-employment

What this study adds

Insecure re-employment and unemployment increase minor psychiatric morbidity and the number of consultations with a general practitioner

Adjustment for change in minor psychiatric morbidity attenuated the association with general practitioner consultations by over 25%

Adjustment for financial strain, change in other psychosocial work characteristics, and health related behaviours accounted for only a small proportion of observed change

Foundation; Health and Safety Executive; Department of Health; National Heart Lung and Blood Institute (RO1-HL36310), US, NIH; National Institute on Aging (RO1-AG13196), US, NIH; Agency for Health Care Policy Research (RO1-HS06516); and the John D and Catherine T MacArthur Foundation Research Networks on Successful Midlife Development and Socioeconomic Status and Health. PM is also supported by the Academy of Finland (grant 48600) and the Signe and Ane Gyllenberg Foundation. MJS is supported by the British Heart Foundation. MGM is a Medical Research Council research professor. GDS was a Wellcome Fellow in Clinical Epidemiology when baseline data for this study were collected.

Competing interests: None declared.

- 1 Ferrie J, Shipley MJ, Marmot MG, Stansfeld S, Davey Smith G. Health effects of anticipation of job change and non-employment: longitudinal data from the Whitehall II study. *BMJ* 1995;311:1264-9.
- 2 Ferrie J, Shipley M, Marmot MG, Stansfeld S, Davey Smith G. An uncertain future. The health effects of threats to employment security in white-collar men and women. *Am J Public Health* 1998;88:1030-6.
- 3 Draper P. The rise and demise of the PSA. *Government Purchasing* 1995;May:8-9.
- 4 Marmot MG, Davey Smith G, Stansfeld S, Patel C, North F, Head J, et al. Health inequalities among British civil servants: the Whitehall II study. *Lancet* 1991;337:1387-93.
- 5 Goldberg DP. *Manual of the general health questionnaire*. Windsor: National Foundation for Education Research Publishing, 1979.
- 6 Bradburn NM. *The structure of psychological wellbeing*. Chicago: Aldine, 1969.
- 7 Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav* 1978;19:2-21.
- 8 Karasek R. Job demands, job decision latitude, and mental strain: implications for job redesign. *Admin Sci Q* 1979;24:285-311.
- 9 Cobb S, Kasl SV. *Termination. The consequences of job loss*. Cincinnati: National Institutes for Occupational Safety and Health, 1977 (DHEW-NIOSH Publication No 77-224).
- 10 Iversen L, Sabroe S. Psychological well-being among unemployed and employed people after a company closedown: a longitudinal study. *J Soc Issues* 1988;44:141-52.
- 11 Dew MA, Bromet EJ, Penkower L. Mental health effects of job loss in women. *Psychol Med* 1992;22:751-64.
- 12 Hamilton V, Hoffman W, Broman CL, Rauma D. Unemployment, distress, and coping: a panel study of autoworkers. *J Pers Soc Psychol* 1993;65:234-47.
- 13 Burchell B. The effects of labour market position, job insecurity, and unemployment on psychological health. In: Gallie D, Marsh C, Vogler C,

eds. *Social change and the experience of unemployment*. Oxford: Oxford University Press, 1994:188-212.

- 14 Leana CR, Feldman DC. Finding new jobs after a plant closing: antecedents and outcomes of the occurrence and quality of reemployment. *Human Relations* 1995;48:1381-401.
- 15 Murphy GC, Athanasou JA. The effect of unemployment on mental health. *J Occup Organ Psychol* 1999;72:83-9.
- 16 Bjorklund A, Eriksson T. Unemployment and mental health: evidence from research in the Nordic countries. *Scand J Soc Welfare* 1998;7:219-35.
- 17 Beale N, Nethercott S. Job-loss and family morbidity: a study of a factory closure. *J R Coll Gen Pract* 1985;35:510-14.
- 18 Rowlands P, Huws R. Psychological effects of colliery closure. *Int J Soc Psychiatry* 1995;41:21-5.
- 19 Yuen P, Balarajan R. Unemployment and patterns of consultation with the general practitioner. *BMJ* 1989;298:1212-4.
- 20 Mathers CD, Schofield DJ. The health consequences of unemployment: the evidence. *Med J Aust* 1998;168:178-82.
- 21 D'Arcy C, Siddique CM. Unemployment and health: an analysis of "Canada Health" data. *Int J Health Serv* 1985;15:609-35.
- 22 Carr-Hill RA, Rice N, Roland M. Socioeconomic determinants of rates of consultation in general practice based on fourth national morbidity survey of general practices. *BMJ* 1996;312:1008-12.
- 23 Kivimaki M, Vahtera J, Pentti J, Ferrie JE. Factors underlying the effect of organisational downsizing on the health of employees: a longitudinal cohort study of changes in work, social relationships and health behaviours. *BMJ* 2000;320:971-5.
- 24 Barling J, Kelloway EK. Job insecurity and health: the moderating role of workplace control. *Stress Med* 1996;12:253-9.
- 25 Rodgers B. Socio-economic status, employment and neurosis. *Soc Psychiatry Psychiatr Epidemiol* 1992;26:104-14.
- 26 Jackson PR, Warr P. Unemployment and psychological ill-health: the moderating role of duration and age. *Psychol Med* 1984;14:605-14.
- 27 Whelan C. The role of income, life-style deprivation and financial strain in mediating the impact of unemployment on psychological distress: evidence from the Republic of Ireland. *J Occup Organ Psychol* 1992;65:331-44.
- 28 Macleod J, Davey Smith G, Heslop P, Oliver S, Hart C. Always look on the bright side of life? The influence of reporting tendency when exposure and outcome measurements are based on self report. *J Epidemiol Community Health* 1999;53:660.
- 29 Janlert U. *Work deprivation and health: consequences of job loss and unemployment*. Lulea, Sweden: Karolinska Institute, 1991.
- 30 Arjas-Leino P, Liira J, Mutanen P, Malmivaara A, Matikainen E. Predictors and consequences of unemployment among construction workers: prospective cohort study. *BMJ* 1999;319:600-5.

(Accepted 16 January 2001)

Cardiovascular events in users of sildenafil: results from first phase of prescription event monitoring in England

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Sildenafil is used to treat erectile dysfunction, and prescription on the NHS is restricted. We are conducting a study of prescription event monitoring for sildenafil in England, the first phase of which investigates possible short term effects in a cohort of about 5000 users. In view of the interest in myocardial infarction as a possible short term side effect¹ we report on an analysis of selected cardiovascular events reported in the first phase.

Methods and results

Prescription event monitoring has been described elsewhere.² Patients were identified from NHS prescriptions in England. Simple questionnaires were posted to the prescribing general practitioners about five months after the first prescription. These forms requested reporting of events after the drug had been prescribed. An "event" was any new diagnosis, any reason for referral to a consultant or admission to hospital, unexpected deterioration (or improvement) in a concurrent illness,

suspected drug reaction, clinically important alterations in laboratory measurements or other investigations, or any other complaint considered to be of sufficient importance to enter in the patient's notes.

We sent questionnaires for 9748 patients who were first prescribed sildenafil between September 1998 and March 1999. Of the 5950 questionnaires returned, 5601 contained usable information. The mean (SD) age of the patients was 57.4 (11.3) years (range 18-90 years). The main indication for use of sildenafil was impotence (3552; 63.4%); the indication was not specified in 1927 (34.4%). Diabetes mellitus was the second indication in 789 (14.1%), and in 39 (0.7%) it was the primary indication. Eighty three patients had other first indications for treatment. The number of patients with diabetes may be an underestimate as data on more than one indication for treatment are not specifically requested. Three months after the first prescription 85.6% were still using the drug.

We followed up all patients with non-fatal myocardial infarction and selected patients with angina,

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BMJ 2001;322:651-2