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ORIGINAL ARTICLE

Age and birth cohort differences in depression in repeated cross-sectional surveys in England: the National Psychiatric Morbidity Surveys, 1993 to 2007

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Background. The National Psychiatric Morbidity Survey (NPMS) programme was partly designed to monitor trends in mental disorders, including depression, with comparable data spanning 1993 to 2007. Findings already published from this programme suggest that concerns about increasing prevalence of common mental disorders (CMDs) may be unfounded. This article focuses on depression and tests the hypothesis that successive birth cohorts experience the same prevalence of depression as they age.

Method. We carried out a pseudo-cohort analysis of a sequence of three cross-sectional surveys of the English household population using identical diagnostic instruments. The main outcome was ICD-10 depressive episode or disorder. Secondary outcomes were the depression subscales of the Clinical Interview Schedule – Revised (CIS-R).

Results. There were 8670, 6977 and 6815 participants in 1993, 2000 and 2007 respectively. In men, the prevalence of depression increased between cohorts born in 1943–1949 and 1950–1956 [odds ratio (OR) 2.5, 95% confidence interval (CI) 1.4–4.2], then remained relatively stable across subsequent cohorts. In women, there was limited evidence of change in prevalence of depression. Women born in 1957–1963, surveyed aged 44–50 years in 2007, had exceptionally high prevalence. It is not clear whether this represents a trend or a quirk of sampling.

Conclusions. There is no evidence of an increase in the prevalence of depression in male cohorts born since 1950. In women, there is limited evidence of increased prevalence. Demand for mental health services may stabilize or even fall for men.

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Key words: Depressive episode, epidemiology, prevalence, pseudo-cohort analysis.

Introduction

There has been concern since the 1970s that the prevalence of mental disorders is increasing (Compton *et al*. 2006; Marcus & Olfson, 2010). The National Psychiatric Morbidity Survey (NPMS) programme (www.mentalhealthsurveys.co.uk/) includes repeated large-scale, cross-sectional household surveys of the English adult population, carried out in 1993, 2000 and 2007, with standardized and essentially unchanged methods of evaluation (Jenkins & Meltzer, 1995; Meltzer *et al*. 1995; Singleton *et al*. 2000; Jenkins *et al*. 2009; McManus *et al*. 2009). This programme was intended to monitor the mental health of people living in private households in England to inform government mental health policy. Because it involves repeated cross-sectional surveys, it is possible to compare the health experience of successive birth cohorts, re-sampled as they aged over a 15-year period. Recent analyses of the adult household sample of the NPMS (Spiers *et al*. 2011) have found no clear trend in common mental symptoms or disorders, suggesting that the prevalence of common mental disorders (CMDs) was unchanged in successive cohorts, at least in men born since 1950.

CMDs comprise different types of depression and anxiety. This study concentrates on the ICD-10 category of depressive episode (WHO, 1992) (roughly equivalent to major depressive disorder in DSM-IV), the most disabling of the CMDs, in terms both of symptoms and of impairment of social functioning (Hurry & Sturt, 1981). There are clear indications for treatment, but undertreatment is common, and the

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consequences of non-treatment are likely to be considerable (Bebbington *et al*. 2000*a*, *b*; Meltzer *et al*. 2000; NICE, 2010). Given that there have been major increases in treatments targeted on depression (Brugha *et al*. 2004; Moore *et al*. 2009), we might expect to find reductions in prevalence since the early 1990s. Specific investigation of changes in prevalence of depressive episode is therefore merited.

For this study, we used NPMS data to describe age profiles and cohort differences in major depressive disorder and depressive symptoms, with the null hypothesis that successive birth cohorts experience the same prevalence of depression as they age.

Method

Data source

The methods used for the three national surveys have been described in detail elsewhere (Meltzer *et al*. 1995; Singleton *et al*. 2000; McManus *et al*. 2009). Adults living in private households in England were sampled using population-based, multi-phase probability sampling, and interviewed in the first phase by lay interviewers. Although improvements were made in successive surveys, the emphasis was on using identical instruments wherever possible. Stratification of primary sampling units by region and socio-economic characteristics was more fine-grained in 2007 than in 2000 and 1993, but in each case data were weighted to represent the English household population at the time of each survey. Sample sizes were designed to have the statistical power required for estimating the prevalence of rare disorders (0.5–1.0%), by age, sex and region, and therefore have sufficient power to analyse prevalence of depression by age, sex and birth cohort.

Data on depression were available at all three timepoints using identical questions. Fieldwork was carried out between April and September 1993, between March and September 2000, and between October 2006 and December 2007. Response rates for the household NPMS were 79% in 1993, 69% in 2000, and 57% in 2007. The paper-and-pencil questionnaires used in 1993 were replaced by computer-assisted interviewing in subsequent surveys, but this is not thought to have had a substantial effect upon the results (Baker *et al*. 1995).

Ethical approval

We were advised that ethical approval was not required for the Adult Psychiatric Morbidity Survey (APMS) 1993. Ethical approval was obtained for APMS 2000 and APMS 2007 from Research Ethics Committees of the National Research Ethics Service appropriate for non-clinical populations.

Measures

Depression was assessed using the Clinical Interview Schedule – Revised (CIS-R; Lewis *et al*. 1992) in all three surveys. In 1993 and 2000, the CIS-R was in an early section of the interview. In 2007, it came slightly later, after sections on health, caring, activities of daily living and medication. The CIS-R is a structured schedule, designed for lay interviewers. Questions refer to symptoms experienced in the past week or month. The participants' answers to the CIS-R were used to define the ICD-10 diagnosis of depressive disorder. The CIS-R does not differentiate between single and recurrent episodes, so this measure includes depressive episode (F32) and recurrent depressive disorder (F33) (McManus *et al*. 2009). In addition, we analysed the prevalence of the CIS-R symptoms of depression (score on depression subscale $\geqslant 2$; this asks whether respondents are miserable or depressed or unable to take an interest in things) and of depressive ideas (score on subscale $\geqslant 2$; this measures feelings of guilt and hopelessness, and how depression affects daily activities) (see Appendix).

Participants

Data were weighted to allow for survey design and differences in non-response by age, sex, region and socio-economic status, so that results are representative of the English household population of comparable age at the time of survey (McManus *et al*. 2009). The lower age limit was 16 years in all three surveys, the upper age limit was 64 years in 1993 and 74 years in 2000, and there was no upper age limit in 2007. Because of the 7-year gaps between surveys, nine 7-year birth cohorts were defined, based on participants' ages at the time of the respective surveys. These covered birth dates from 1929 to 1991, and nine age groups from 16–22 years to 72–78 years. Birth cohort attribution is approximate, insofar as precise birth dates were not available. Those aged 72–74 years in the 2000 survey were excluded from the pseudo-cohort analysis because they did not form a complete 7-year birth cohort. Those aged $\geqslant 79$ years when interviewed in 2007 were also excluded, as these cohorts were only sampled once and were strongly selected by survival, making interpretation difficult.

Statistical analysis

The challenges posed by the pseudo-cohort analysis are discussed in more detail in our earlier paper (Spiers *et al*. 2011). It is difficult to separate age, period

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Table 1. *Prevalence of depression by sex and year of survey*[a]

	1993 (age range 16–64 years)			2000 (age range 16–71 years)			2007 (age range 16–78 years)		
	n	%	95% CI	*n*	%	95% CI	*n*	%	95% CI
Men									
ICD-10 depressive episode or disorder	75	1.7	1.3–2.2	85	2.4	1.7–3.0	85	2.5	1.8–3.1
CIS-R depression	359	8.3	7.4–9.3	377	10.4	9.2–11.7	354	10.2	9.0–11.5
CIS-R depressive ideas	305	7.1	6.2–8.0	281	7.8	6.7–9.0	241	7.0	6.0–8.0
Women									
ICD-10 depressive episode or disorder	119	2.7	2.2–3.3	100	2.8	2.2–3.3	130	3.7	3.0–4.3
CIS-R depression	450	10.4	9.3–1.5	429	11.9	10.6–13.1	457	12.9	11.6–14.1
CIS-R depressive ideas	483	11.2	10.0–12.4	417	11.5	10.2–12.8	428	12.0	10.9–13.2
Base[a]									
Men	4300			3606			3454		
Women	4318			3622			3553		

CIS-R, Clinical Interview Schedule – Revised; CI, confidence interval.

[a] Data are weighted to represent the English household population of comparable age.

and cohort effects statistically, as this usually requires assumptions beyond what the data allow (Klermann & Weismann, 1989; Smith, 2008). Our approach is to carry out an age–period–cohort analysis using a constraint-based approach, as described by Keyes *et al*. (2010). We conceptualize cohort differences in depression as arising from common influences on the experience of birth cohorts at key moments of development. Period effects are conceptualized as contemporaneous influences that potentially confound the relationship between birth cohort and prevalence. In the logistic regression modelling, period effects are constrained to be zero, to estimate age and cohort effects. The validity of our constraint cannot be tested empirically, but we do examine its plausibility by reference to side information both within and extra to the NPMS dataset, for example prevailing economic conditions, indicated by changes in the rate of unemployment, and changes in health service use.

Men and women were analysed separately. The weighted prevalence of depression was graphed by age (the midpoint of the 7-year age group) and birth cohort. The SVY logistic procedure in Stata 11.0 for Windows (Stata Corporation, USA) was used to fit logistic regression models for age and birth cohort, taking into account the complex survey design. The final model was chosen using backwards selection to determine the adjustment for age, starting with cubic age. Using the age midpoint for each 7-year age group, the linear effect of age, together with indicator variables for the 7-year birth cohort, was forced into the model. Thus, all models included a linear effect of age, and quadratic and cubic effects of age were included where statistically significant at the 5% level. Models were compared using the adjusted Wald test with a two-sided 5% significance level. Differences in prevalence of depression were estimated between successive pairs of birth cohorts. Smoothed profiles of depression prevalence by age were plotted for the median cohort, born 1957–1963.

Results

Sample characteristics

A total of 8670 adults aged 16–64 years were interviewed in English private households in 1993, 6799 adults aged 16–71 years in 2000, and 6815 adults aged 16–78 years in 2007. The prevalence of depression by sex and survey is given in Table 1. Overall prevalence increased between 1993 and 2001 in men, but then scarcely changed between 2000 and 2007. Prevalence of depressive episode in women was increased in 2007, relative to the earlier surveys. Missing items were minimal and did not affect the conclusions.

Age cohort models for depression

Male rates of depressive episode and CIS-R depressive ideas peaked in middle age (Fig. 1), whereas rates of the CIS-R symptoms of depression continued to rise across the older age groups. The cohort of people born between 1950 and 1956 had significantly higher

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Table 2. *Birth cohort differences in depression, NPMS 1993, 2000 and 2007, adjusted for age*[a]

Seven-year birth cohort, by middle year	Odds ratio (current cohort/preceding cohort)[a]		
	Depressive episode	CIS-R depression	CIS-R depressive ideas
Men			
1939 *v.* 1932	1.5	1.5*	0.9
1946 *v.* 1939	0.7	1.1	0.8
1953 *v.* 1946	2.5**	1.6**	1.5*
1960 *v.* 1953	0.8	0.9	1.0
1967 *v.* 1960	1.3	0.9	1.0
1974 *v.* 1967	1.5	1.2	1.1
1981 *v.* 1974	1.4	1.2	0.9
1988 *v.* 1981	1.2	1.0	1.3
Women			
1939 *v.* 1932	1.9*	1.1	1.6**
1946 *v.* 1939	1.2	1.3*	1.0
1953 *v.* 1946	1.5	1.2	1.3*
1960 *v.* 1953	1.5*	1.3*	1.2
1967 *v.* 1960	0.9	1.0	0.8*
1974 *v.* 1967	0.7	1.0	1.2
1981 *v.* 1974	1.4	1.3	1.1
1988 *v.* 1981	1.4	1.2	1.1

NPMS, National Psychiatric Morbidity Survey; CIS-R, Clinical Interview Schedule – Revised.

[a] Adjusted for linear trend with age, with the exception of depressive episode and CIS-R depressive ideas in men (adjusted for cubic age).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

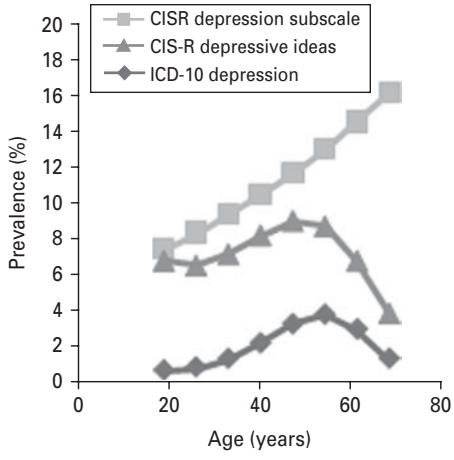

Fig. 1. Predicted age profiles of depression from age–cohort models: men. Profiles were for the median cohort born 1957–1963. CIS-R, Clinical Interview Schedule – Revised.

rates of depression than their precursors born between 1943 and 1949, across all three depression measures (Table 2). Age-specific rates of depression were then relatively stable across all cohorts born after 1956, with the possible exception of depressive disorder. The latter showed consecutive but non-significant increases in prevalence across all four pairs of cohorts from 1964–1970 to 1985–1991. The models for the CIS-R depressive symptom scales support a step change in prevalence in men, with the cohorts born before 1949 having low rates and subsequent cohorts higher rates. For depressive episode, however, it is less clear whether there was a step change, or just an unusually high prevalence in the cohort born 1950–1956 (Fig. 2).

The most notable feature of the prevalence of depression in the female population is very high rates across all three measures in the cohort born between 1957 and 1963, when surveyed in 2007 aged 44–50 years. For example, the prevalence of depressive episode in this age–sex group was 7.1% (Fig. 3), compared to 5.1% predicted by the age–cohort model. This contrasts with the male population, where prevalence for those born in 1957 to 1963 was consistent with the rates in younger cohorts. Because the high prevalence in women aged 44–50 years in 2007 was potentially influential, a sensitivity analysis was carried out with

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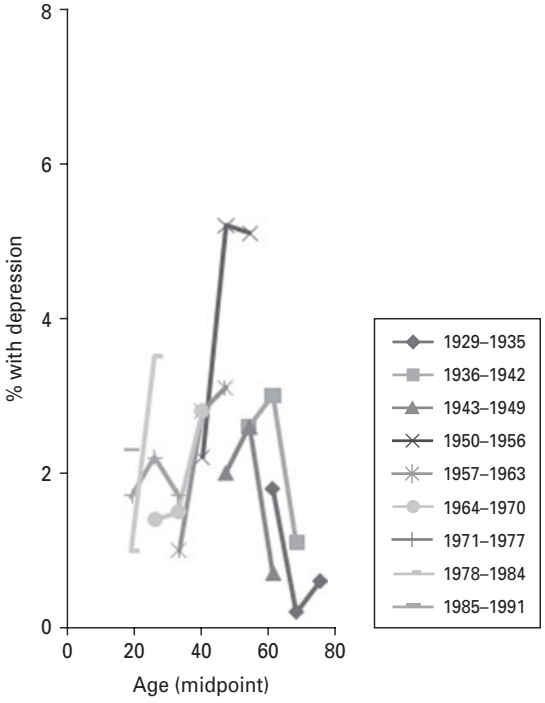

Fig. 2. Prevalence of ICD-10 depressive episode or disorder by age and birth cohort: men.

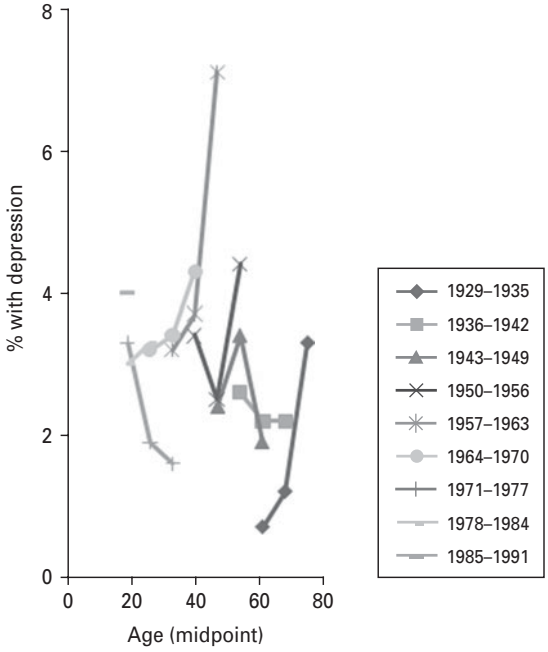

Fig. 3. Prevalence of ICD-10 depressive episode or disorder by age and birth cohort: women.

the addition of an indicator variable to allow for the increased rates in this age–sex group in 2007.

In the female population, the predicted prevalence of depressive episode showed a statistically significant increase with age, but this was largely due to the outlying value for women aged 44–50 years in 2007. When the outlying group was accounted for in the model, the prevalence of depression was unchanged with age, at around 3–4% (Fig. 4). There was no evidence of age changes in the prevalence of the CIS-R symptoms of depression and depressive ideas.

There was a very low prevalence of depressive episode and CIS-R depressive ideas in women born between 1929 and 1935 when surveyed in late middle age in 1993 and 2000, although it was higher in this cohort in 2007 (Table 2, Fig. 3). The significant increases in prevalence of depressive episode and CIS-R depression between those born 1950–1956 and those born 1957–1963 are almost entirely due to the unusually high prevalence in the latter cohort in 2007. There were further significant increases in the prevalence of CIS-R depression between cohorts born 1936–1942 and those born 1943–1949, and in the prevalence of depressive ideas between cohorts born 1943–1949 and those born 1950–1956. There were no significant increases in prevalence on any depression measure in women born since 1963.

Discussion

The prevalence of depression presented here generally supports our earlier conclusion of no overall trend towards poor mental health. Successive cohorts of men born since 1950 have experienced a similar prevalence of depression as they age through adulthood. Consistent with the previous analysis of CMDs (Spiers *et al*. 2011), men born between 1950 and 1956 had higher prevalence than those born between 1943 and 1949. The results for women were less consistent, with some significant increases and decreases in depression between pairs of earlier cohorts, but stability or a decline in rates in those born since 1963.

An exception was the very high prevalence of depression in women born between 1957 and 1963, when surveyed aged 44–50 years in 2007. Although this is a single age–sex group with unremarkable levels of depression when sampled in 1993 and 2000, the high prevalence in 2007 is clearly unusual. This group also had a high prevalence of CMD at age 44–50 years, noted in our earlier paper, partly because of their high prevalence of depression. As the excess prevalence is confined to a single age–sex group, it is unlikely to be due to improved recognition or lower diagnostic threshold. Although a change in prevalence of this magnitude within 7 years is implausible, it is impossible to determine the extent to which the high rate is a quirk of sampling, or represents some unique experience of this female birth cohort as they reached middle age.

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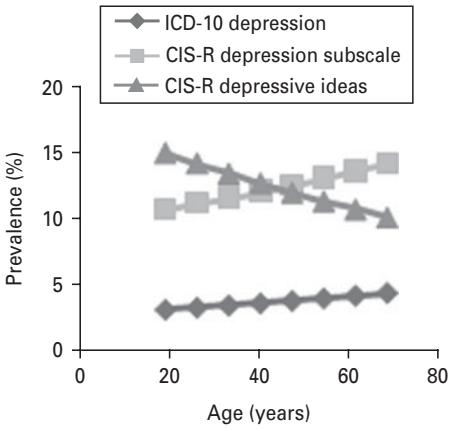

Fig. 4. Predicted age profiles of depression from age–cohort models: women. Profiles were for the median cohort born 1957–1963, from model with outlying age–sex group accounted for. CIS-R, Clinical Interview Schedule – Revised.

Comparison with other studies

Data from the USA give conflicting results for trends in mental disorder between the early 1990s and 2000s. Rates of treatment for depression increased (Kessler *et al*. 2005; Marcus & Olfson, 2010), and a comparison using consistent assessment instruments in two large nationally representative cross-sectional surveys found that past-year depressive episode increased markedly between 1991–1992 and 2001–2002 (Compton *et al*. 2006). This increase was consistent across age groups and so not associated with a particular birth cohort. By contrast, results from the National Comorbidity Survey (NCS) 1990–1992 and the NCS replication 2001–2003 (Kessler *et al*. 2005) showed no increase in mental disorder or serious mental disorder. Differences in the questionnaires used to assess major depression, and in the age groups surveyed, make comparison with other surveys difficult. More recent data from the US National Survey on Drug Use and Health show a slight decline in prevalence of past-year major depressive disorder between 2004 and 2007 (www.nimh.nih.gov/statistics/1MDD_ADULT.shtml).

Our results are broadly comparable with a British cohort study of self-reported mental health diagnoses (Rice *et al*. 2010). A lack of change in the prevalence of psychological morbidity has also been reported from Scottish routine data and health surveys (Munoz-Arroyo *et al*. 2006). Rait *et al*. (2009) reported no increase in the incidence of depression between 1996 and 2006, based on General Practice records from the Health Improvement Network. In an analysis of the incidence of depression between 1993 and 2005 in the General Practice Research Database (GPRD), Moore *et al*. (2009) found either no change or a decline in incidence, with the exception of an increase in younger women and, to a lesser extent, in young men. Relating changes in prevalence of depression to studies of incidence must remain speculative, given that depression represents a broad spectrum of morbidity with a heterogeneous course (Patten *et al*. 2008; Colman & Ataullahjan, 2010). The increase in reported incidence of depression in young women aged 18–30 years from the GPRD is not followed by an increase in prevalence in the same birth cohort in the NPMS, surveyed at similar ages in 1993 and 2000 and then again in their twenties and thirties in 2007. General practitioners (GPs) were being exhorted to diagnose depression more during this period (Rix *et al*. 1999), so the increase in the GPRD may be an artefact of altered practice. However, these cohorts are yet to reach middle age in the NPMS, so a corresponding increase in prevalence in newer cohorts reaching middle age remains a possibility.

Moore *et al*. (2009) concluded that changes in antidepressant prescribing were due to small changes in the numbers who progress to long-term prescribing and in the average duration of this prescribing. Changes in the prevalence of depression may be influenced by similar small changes in the risk and duration of recurrent or relapsing disease. In the Canadian National Health Population Survey, one in five patients with a major depressive episode fulfilled criteria for persistent or recurring depression (Patten *et al*. 2010). This is consistent with results from the Upper Bavarian Longitudinal Community Study, where 85% of participants were disease free at long-term follow-up (Fichter *et al*. 2010). Other sources suggest that the proportion progressing to persistent disease may be larger (Young *et al*. 2008; Vuorilehto *et al*. 2009). Such patterns of persistent disease imply that the prevalence pool would continue to expand as the birth cohorts age. However, the decline in male prevalence of depression after age 60 in the NPMS and elsewhere (Kessler *et al*. 2003; Blazer & Hybels, 2005) contradicts this, and suggests that recoveries do occur, although selection by mortality may be an alternative explanation (Murphy *et al*. 2010).

Strengths and limitations

A major strength of this study is the use of standardized psychiatric evaluation with identical measures, across three large representative cross-sections of the English household population spanning 15 years. As such, it is an essential adjunct to studies using routine data from self-selected general practices, which may be subject to variations in help-seeking behaviour by patients, and in diagnostic and reporting behaviour by GPs.

The surveys measured mental health symptoms experienced in the past week or month, so recall bias was minimized. There is a possibility that the later placement of the CIS-R in 2007, after sections on health, caring, activities of daily living and medication, may have influenced responses. This would be expressed as a period difference that could not be addressed in our analysis. However, depression prevalence in 2007 was not consistently higher than in the previous surveys. Overall, the possibility of spurious period differences arising artefactually from changes in survey methods is small, but there is a period difference in the response rate, which was clearly lower in 2007 than in 1993 and 2000. Although national surveys have the advantage of producing data on large representative samples, falling response rates are a concern. The 2007 survey data used for this analysis were based on a response rate of 57%. Nevertheless, great care was taken to reduce biases by the use of a sophisticated weighting procedure. In addition, recent non-response analyses of surveys from Scandinavian countries (especially those using a population register as a sampling frame) indicate very little non-response bias on a wide variety of physical and mental health measures (Korkeila *et al*. 2001; Sogaard *et al*. 2004; De Winter *et al*. 2005).

When analysing the prevalence of depression, we chose to fit age–cohort models, with the consequence that hypotheses about period differences could not be tested. It is also possible that such influences confound the relationships that we have reported between birth cohort and depression. To assess the potential for such confounding, we have critically examined the possibility of period effects due to survey, treatment, and economic and social conditions, discussed in detail in our earlier paper (Spiers *et al*. 2011). English unemployment peaked in 1993, after rising since 1989, and the subsequent improvement in economic conditions might be expected to have some effect on depression prevalence, which could not be accounted for in our analysis.

It is also possible that the stability of the prevalence of depression is attributable to the increase in treatment with antidepressants between 1993 and 2000, which may have suppressed an increase in prevalence of depression. Overall prevalence of antidepressant use increased from 1.1% to 4.5% between 1993 and 2000 and then continued to rise to 5.3% in 2007. The numbers needed to treat for depression in primary care have been estimated at 7–16 for tricyclic antidepressants and 7–8 for selective serotonin reuptake inhibitors (Arroll *et al*. 2009), insufficient to make a substantial difference to depression trends.

A further potential limitation is the exclusion of people who are homeless or living in institutions, likely to be older and in poorer mental health than those in private households. These subgroups have been sampled elsewhere in the national survey programme, and are small relative to the general population, especially at ages less than 65 years. As exclusion criteria remained the same with each survey, trends are unlikely to be affected.

Conclusions

These results are consistent with our previous conclusion that demand for mental health services may stabilize or even fall for men, although economic recession may have impacts that are not accounted for in our analysis. In women also, there is no clear trend towards higher prevalence of depression. However, the findings turn the spotlight on the birth cohort of women in their late forties in 2007, and the need for further data to monitor an apparently serious increase in prevalence of depression in this group.

Appendix

Calculation of symptom score for depression

Score 1 for each of:

- Unable to enjoy or take an interest in things as much as usual in the past week.
- Felt sad, miserable or depressed/unable to enjoy or take an interest in things on four days or more in the past week.
- Felt, sad, miserable or depressed/unable to enjoy or take an interest in things for more than three hours in total on any day in the past week.
- When sad, miserable or depressed, you did not become happier when something nice happened, or when in company.

Calculation of symptom score for depressive ideas

Score 1 for each of:

- Felt guilty or blamed yourself when things went wrong when it hasn't been your fault at least once in the past seven days.
- Felt that you are not as good as other people during the past week.
- Felt hopeless, for instance about your future, during the past seven days.
- Felt that life isn't worth living in the past week.
- Thought of killing yourself in the past week.

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Declaration of Interest

None.

References

Arroll B, Elley CR, Fishman T, Goodyear-Smith FA, Kenealy T, Blashki G, Kerse N, Macgillivray S (2009). Antidepressants versus placebo for depression in primary care. *Cochrane Database of Systematic Reviews* **3**, CD007954.

Baker RP, Bradburn NM, Johnson RA (1995). Computer-assisted personal interviewing: an experimental evaluation of data quality and cost. *Journal of Official Statistics* **11**, 413–431.

Bebbington P, Brugha T, Meltzer H, Farrell M, Ceresa C, Jenkins R, Lewis G (2000*a*). Psychiatric disorder and dysfunction in the UK National Survey of Psychiatric Morbidity. *Social Psychiatry and Psychiatric Epidemiology* **35**, 191–197.

Bebbington P, Brugha T, Meltzer H, Jenkins R, Ceresa C, Farrell M, Lewis G (2000*b*). Neurotic disorders and the receipt of psychiatric treatment. *Psychological Medicine* **30**, 1369–1376.

Blazer DG, Hybels CF (2005). The origins of depression in later life. *Psychological Medicine* **35**, 1241–1252.

Brugha TS, Bebbington PE, Singleton N, Melzer D, Jenkins R, Lewis G, Farrell M, Bhugra D, Lee A, Meltzer H (2004). Trends in service use and treatment for mental disorders in adults throughout Great Britain. *British Journal of Psychiatry* **185**, 378–384.

Colman I, Ataullahjan A (2010). Life course perspectives on the epidemiology of depression. *Candaian Journal of Psychiatry* **55**, 622–632.

Compton WM, Conway KP, Stinson FS, Grant BF (2006). Changes in the prevalence of major depression and comorbid substance use disorders in the United States between 1991–1992 and 2001–2002. *American Journal of Psychiatry* **163**, 2141–2147.

De Winter AF, Oldehinkel AJ, Veenstra R, Brunnekreef JA, Verhulst FC, Ormel J (2005). Evaluation of non-response bias in mental health determinants and outcomes in a large sample of pre-adolescents. *European Journal of Epidemiology* **20**, 173–181.

Fichter MM, Quadfleig N, Fischer UC, Kohlboeck G (2010). Twenty-five-year course and outcome in anxiety and depression in the Upper Bavarian Longitudinal Community Study. *Acta Psychiatrica Scandinavica* **122**, 75–85.

Hurry J, Sturt E (1981). Social performance in a population sample: relation to psychiatric symptoms. In *What is a Case?* (ed. J. K. Wing, P. Bebbington and L. N. Robins), pp. 202–213. Grant McIntyre: London.

Jenkins R, Meltzer H (1995). The National Survey of Psychiatric Morbidity in Great Britain. *Social Psychiatry and Psychiatric Epidemiology* **30**, 1–4.

Jenkins R, Meltzer H, Bebbington P, Brugha T, Farrell M, McManus S, Singleton N (2009). The British Mental Health Survey Programme: achievements and latest findings. *Social Psychiatry and Psychiatric Epidemiology* **44**, 899–904.

Kessler R, Berglund PO, Demler O, Jin R, Koretz D, Merikangas KR, Rush J, Walters EE, Wang PS (2003). The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication NCS-R. *Journal of the American Medical Associaton* **289**, 3095–3105.

Kessler RC, Demler O, Frank RG, Olfson M, Pincus HA, Walters EE, Wang P, Wells KB, Zaslavskt AM (2005). Prevalence and treatment of mental disorders, 1990 to 2003. *New England Journal of Medicine* **352**, 2515–2523.

Keyes KM, Utz RL, Robinson W, Guohua L (2010). What is a cohort effect? Comparison of three statistical methods for modelling cohort effects in obesity prevalence in the United States, 1971–2006. *Social Science and Medicine* **10**, 1100–1108.

Klermann GL, Weismann MM (1989). Increasing rates of depression. *Journal of the American Medical Association* **261**, 2229–2235.

Korkeila K, Suominen S, Ahvenainen J, Ojanlatva A, Rautava P, Helenius H, Koskenvuo M (2001). Non-response and related factors in a nation-wide health survey. *European Journal of Epidemiology* **17**, 983–1057.

Lewis G, Pelosi AJ, Araya A, Dunn, G (1992). Measuring psychiatric disorder in the community: a standard assessment for use by lay interviewers. *Psychological Medicine* **22**, 465–486.

Marcus SC, Olfson M (2010). National trends in the treatment for depression from 1998 to 2007. *Archives of General Psychiatry* **67**, 1265–1273.

McManus S, Meltzer H, Brugha T, Bebbington P, Jenkins R (2009). *Adult Psychiatric Morbidity in England, 2007: Results of a Household Survey*. The NHS Information Centre for Health and Social Care: Leeds.

Meltzer H, Bebbington P, Brugha T, Farrell M, Jenkins R, Lewis G (2000). The reluctance to seek treatment for neurotic disorders. *Journal of Mental Health* **9**, 319–327.

Meltzer H, Gill B, Petticrew M, Hinds K (1995). *OPCS Surveys of Psychiatric Morbidity in Great Britain, Report 1: The Prevalence of Psychiatric Morbidity Among Adults Living in Private Households*. HMSO: London.

Moore M, Yuen H-M, Dunn N, Mullee MA, Maskell J, Kendrick T (2009). Explaining the rise in antidepressant prescribing: a descriptive study using the General Practice Research Database. *British Medical Journal* **339**, b3999.

Munoz-Arroyo R, Sutton M, Morrison J (2006). Exploring potential explanations for the increase in antidepressant

prescribing in Scotland using secondary analyses of routine data. *British Journal of General Practice* **56**, 423–428.

Murphy JM, Gilman SE, Lesage A, Horton NJ, Rasic D, Trinh NH, Alamiri B, Sobol AM, Fava M, Smoller JW (2010). Time trends in mortality associated with depression: findings from the Stirling County Study. *Canadian Journal of Psychiatry* **55**, 776–783.

NICE (2010). Depression: The Treatment and Management of Depression in Adults (update). National Institute for Health and Clinical Excellence (NICE) clinical guidelines CG90 (www.nice.org.uk/CG90). Accessed 15 April 2011.

Patten SB, Bilsker D, Goldner E (2008). The evolving understanding of major depression epidemiology: implications for practice and policy. *Canadian Journal of Psychiatry* **53**, 689–695.

Patten SB, Wang JL, Williams JV, Lavorato DH, Khaled SM, Bulloch AG (2010). Predictors of the longitudinal course of major depression in a Canadian population sample. *Canadian Journal of Psychiatry* **55**, 669–676.

Rait G, Walters K, Griffin M, Buszewicz M, Petersen I, Nazareth I (2009). Recent trends in the incidence of recorded depression in primary care. *British Journal of Psychiatry* **195**, 520–524.

Rice NE, Lang IA, Henley W, Melzer D (2010). Baby boomers nearing retirement: the healthiest generation? *Rejuvenation Research* **13**, 105–114.

Rix S, Paykel ES, Lelliott P, Tylee A, Freeling P, Gask L, Hart D (1999). Impact of a national campaign on GP education: an evaluation of the Defeat Depression Campaign. *British Journal of General Practice* **49**, 99–102.

Singleton N, Bumpstead R, O'Brien M, Lee A, Meltzer H (2000). *Psychiatric Morbidity Among Adults Living in Private Households*. The Stationery Office: London.

Smith HL (2008). Advances in age-period-cohort analysis. *Sociological Methods and Research* **36**, 287–296.

Sogaard AJ, Selmer R, Bjertness E, Thelle D (2004). The Oslo Health Study: the impact of self-selection in a large, population-based survey. *International Journal for Equity in Health* **3**, 3.

Spiers N, Bebbington P, McManus S, Brugha TS, Jenkins R, Meltzer H (2011). Age and birth cohort differences in the prevalence of common mental disorder in England: National Psychiatric Morbidity Surveys 1993–2007. *British Journal of Psychiatry* **198**, 479–484.

Vuorilehto MS, Melartin TK, Isometsä ET (2009). Course and outcome of depressive disorders in primary care: a prospective 18-month study. *Psychological Medicine* **39**, 1697–1707.

WHO (1992). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines*. World Health Organization: Geneva.

Young AS, Klap R, Shoai R, Wells KB (2008). Persistent depression and anxiety in the United States: prevalence and quality of care. *Psychiatric Services* **59**, 1391–1398.

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