

Marital breakdown and subsequent depression

Michelle Rotermann

Abstract

Objectives

This study examines the relationship between the dissolution of a marital or cohabitating relationship and subsequent depression among Canadians aged 20 to 64.

Data sources

Data are from the longitudinal component of the National Population Health Survey (1994/1995 through 2004/2005) and include the household population only.

Analytical techniques

Cross-tabulations were used to examine the association of marital dissolution with change in household income, social support, presence and number of children in the household and employment status over a two-year period. Multiple logistic regression was used to examine associations between marital dissolution and depression over a two-year period among those who had not been depressed two years earlier, while controlling for these changes. To maximize sample size, pooling of repeated observations was used.

Main results

For both sexes, dissolution of a marriage or co-habiting relationship was associated with higher odds of a new episode of depression, compared with those who remained with a spouse over the two-year period. When the influences of possible confounders were considered, the association between a break-up and depression was weakened, but persisted. Marital dissolution was more strongly associated with depression among men than among women.

Keywords

divorce, health surveys, income, longitudinal studies, common-law

Author

Michelle Rotermann (613-951-3166; Michelle.Rotermann@statcan.ca) is with the Health Analysis and Measurement Group at Statistics Canada, Ottawa, Ontario, K1A 0T6.

In Canada, an estimated 4 marriages in 10 will end before the couple celebrate their 30th wedding anniversary.¹ The most recent data available from the Divorce Registry show that nearly 71,000 married couples divorced in 2003;¹⁻³ thousands more separated.

Nationally representative cross-sectional and longitudinal studies from the United States and Europe suggest that, compared with people who remain together, those who have experienced marital breakdown are at increased risk of mental health problems.⁴⁻¹¹ Canadian research on the subject is more limited, and most of it is cross-sectional.¹²⁻¹⁶

This article uses longitudinal data from Statistics Canada's National Population Health Survey (NPHS) to examine associations between marital dissolution and subsequent depression among people aged 20 to 64 (see *Methods* and *Limitations*). Specifically, the analysis tests the hypothesis that two-year incident depression is more common among individuals who have recently experienced marital dissolution than among those who remained married. Given the prevalence of common-law unions, people who identified their marital status as “common-law” or “living with a partner” (see *Definitions*) are included as part of the study population.¹⁷⁻¹⁹ Thus, in this analysis the term “marital

Methods

Data sources

The analysis of associations between the dissolution of a marriage or common-law relationship and a new episode of depression over a two-year period among those who were free of depression at baseline is based on data from the National Population Health Survey (NPHS). The NPHS, which began in 1994/1995, collects information about the health of Canadians every two years. It covers household and institutional residents in all provinces, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas.

In 1994/1995, 20,095 respondents were selected for the longitudinal panel. The response rate for this panel was 86% or 17,276 respondents. Attempts were made to re-interview them every two years. The response rates for subsequent cycles, based on these 17,276 individuals, are: 92.8% for cycle 2 (1996/1997); 88.3% for cycle 3 (1998/1999); 84.8% for cycle 4 (2000/2001); 80.5% for cycle 5 (2002/2003); and 77.4% for cycle 6 (2004/2005). This analysis uses the cycle 6 longitudinal "square" file, which contains records for all responding members of the original panel whether or not information about them was obtained in all subsequent cycles.

More detailed descriptions of the NPHS design, sample and interview procedures can be found in previously published reports.²⁰⁻²²

Analytical techniques

NPHS respondents who met the following criteria were used for this analysis: aged 20 to 64 at baseline interview; living with a partner or living common-law or married at baseline; living in a private residence (baseline and follow-up); provided complete data on the depression modules (baseline and follow-up); and were not classified as having depression (baseline).

The analysis of the association between marital dissolution and depression was based on data from cycles 1 to 6 (1994/1995 to 2004/2005) of the NPHS. For this analysis, "pooling of repeated observations," combined with logistic regression, was used. Pooling of repeated observations results in increased cell sizes for respondents who have experienced marital or cohabitating union dissolution, and thereby reduces the probability that a lack of statistical power is responsible for non-statistically significant associations.²³ Use of the design-based bootstrapping technique for repeated observations ensured that the variance was not underestimated by eliminating the problem of dependence among observations derived from the same individual.^{24,25}

The analysis used five cohorts of pooled observations. Individual respondents for whom the requisite data were available were considered at baseline and follow-up in each two-year interval: 1994/1995 to 1996/1997 (cycle 1 to 2); 1996/1997 to 1998/1999 (cycle 2 to 3); 1998/1999 to 2000/2001 (cycle 3 to 4); 2000/2001 to 2002/2003 (cycle 4 to 5); 2002/2003 to 2004/05 (cycle 5 to 6). The first cycle in each of the two-cycle intervals served as the baseline, and the next cycle, the follow-up. For each baseline year, all respondents who were married or cohabiting and who had not had a major depressive episode in the

previous 12 months were selected. They were considered to have experienced a marital breakdown if, in the follow-up interview two years later, they reported that they were divorced, separated or single.

Sample sizes for respondents who were married/common-law at baseline and divorced/separated/single at follow-up, household component, National Population Health Survey, 1994/1995 to 2004/2005

Cohort	Baseline	Follow-up	Married/ Common-law (baseline)		Divorced, separated, single (follow-up)	
			Men	Women	Men	Women
1	1994/1995	1996/1997	2,439	2,865	109	104
2	1996/1997	1998/1999	2,508	2,749	111	138
3	1998/1999	2000/2001	2,325	2,548	91	118
4	2000/2001	2002/2003	2,130	2,432	85	103
5	2002/2003	2004/2005	2,011	2,298	73	92
Total			11,413	12,892	469	555

Marital status, depression and most control variables were assessed at both cycles. At the end of each two-year interval, marital status was assigned one of two values: remained married or became divorced/separated/single. Depression was dichotomously categorized as not depressed or depressed at follow-up (see *Definitions*). Each eligible respondent could contribute as many as five records. For this analysis, 7,614 respondents contributed 25,329 records; 1,037 records were excluded because of depression at baseline.

The variables entered into the multivariate model, which were selected based on the literature and availability in the NPHS, were change in household income, change in social support, change in number and/or presence of children in the household, change in employment status, history of depression, education, and age.

Preliminary analysis revealed that some characteristics of respondents who were excluded because of depression before the baseline interview differed from those of respondents who were retained in the analysis (Appendix A, Table A). For example, respondents who were excluded were slightly younger, more likely to be female, less educated, and generally less likely to be employed at baseline and follow-up. These exclusions likely weakened the observed association between marital dissolution and depression.

Weighted cross-tabulations were used to examine the association of marital dissolution with the selected control variables: change in household income, social support, presence and number of children, and employment status. Decisions to collapse certain categories of control variables were guided by the distribution of responses and by sample sizes.

The relationship between marital dissolution and two-year incident depression was examined using unadjusted and adjusted logistic regression. Unadjusted odds ratios were estimated for marital dissolution in relation to depression. Because previous research has suggested that the consequences of marital dissolution may differ between men and women,^{6,9,11,14,26-28} preliminary logistic regression models were run

Methods - continued

for depression to test for interaction effects between marital status and sex. Most of the previous studies compared results from separate sex-specific models but failed to use interaction analysis to assess the observed differences between the sexes.²³ Following interaction testing, unadjusted and adjusted odds ratios were calculated for each sex (Table 1). Before exclusions, the data were weighted to represent the

target population in 1994/1995. Coefficients of variation on estimates and confidence intervals on odds ratios were calculated using the bootstrap technique, which accounts for survey design effects and dependence between observations from the same respondent.^{24,32,33} Results at the $p < 0.05$ level were considered significant.

dissolution” includes the termination of these cohabitating relationships.

The end of a marriage (legal or common-law) brings other disruptive life changes, which in themselves might be detrimental to mental health. Therefore, in this analysis, several potentially confounding factors were taken into account in multivariate analyses including: changes over a two-year period in household income, social support, presence and number of children in the household, and employment status. Because depression tends to recur, history of depression, in addition to educational attainment and age, were also controlled.^{5,9-11,15,16,29,30} Unadjusted odds ratios were calculated to examine the strength of the association between marital dissolution and incident depression before potential confounders were considered.

Marital dissolution and depression

Averaged over each two-year interval from 1994/1995 to 2004/2005, 4.2% of people aged 20 to 64 who had been married or living with a common-law partner at the time of their baseline NPHS interview were no longer in a relationship when they were re-interviewed two years later (see *Methods*) (data not shown).

Among married people who did not report having had symptoms of depression in the year before their baseline interview, a new depressive episode was nearly four times as common (12%) if they were separated, divorced or single at the follow-up interview, compared with those who remained in a relationship (3%) (data not shown).

Earlier studies have found sex differences in the association between marital dissolution and mental health.^{27-29,31} Analysis of NPHS data indicated that

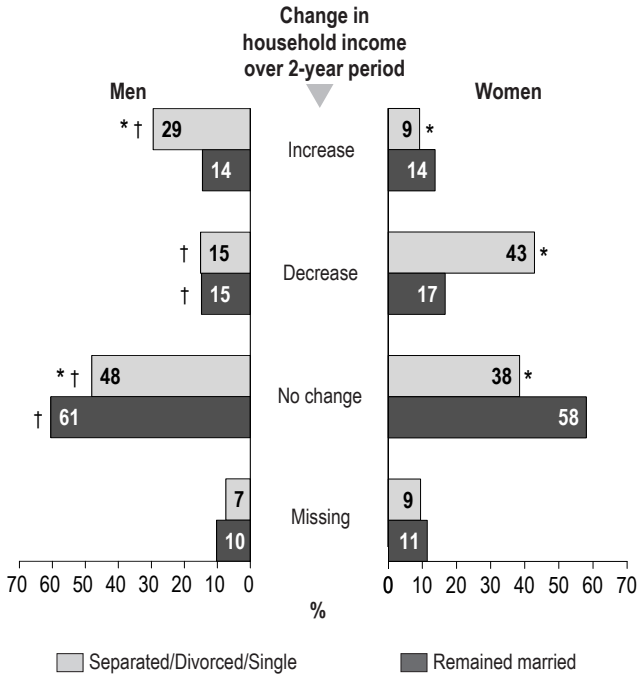
men whose marriages ended were at higher risk of depression than were women. In relation to depression, the interaction term (marital dissolution*male) was statistically significant, suggesting that marital dissolution was more detrimental to the mental health of men than of women (data not shown). Because of this difference, sex-specific analyses were conducted.

Marital dissolution often sets in motion a series of stressful disruptions that create further personal and financial difficulties,^{31,34} which themselves may contribute to depression. Thus, it is possible that marital dissolution is a surrogate for the other life changes that come in its wake, and that may be more directly related to incident depression. In this analysis, emphasis is placed on determining if marital dissolution is associated with depression, independent of other life changes and factors.

Women’s economic well-being suffers

Financial difficulties often follow marital dissolution, as the original family income is divided between two households and economies of scale are less pertinent. Consistent with other research,^{29,30,34,35} analysis of NPHS data shows that a substantially higher proportion of women than men experienced a drop in income after a break-up (even when adjusted for household size). Women who experienced marital dissolution were nearly three times as likely as their male counterparts to have a drop of at least one quintile in the ranking of their household income (Chart 1). As a result, after a break-up, women tended to live in households with an income ranking far below that of their male counterparts: men’s average household income decile was 6.3, compared with 4.1 for women (decile

Chart 1
Percentage distribution of change in household income over two-year period, by sex and marital status at follow-up, household population aged 20 to 64 and married at baseline, 1994/1995 to 2004/2005, Canada excluding territories



* Significantly different from estimate for those who remained married ($p < 0.05$)
 † Significantly different from corresponding category for women ($p < 0.05$)
Note: Increase/Decrease denotes at least a 20% (one-quintile) change in relative ranking of household's income over a 2-year period.
Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

1 is the bottom 10% of the household income distribution; decile 10, the highest 10%) (data not shown). Moreover, nearly 30% of recently divorced or separated men actually experienced an improvement in the ranking of their adjusted household income; the comparable figure for women was less than 10%.

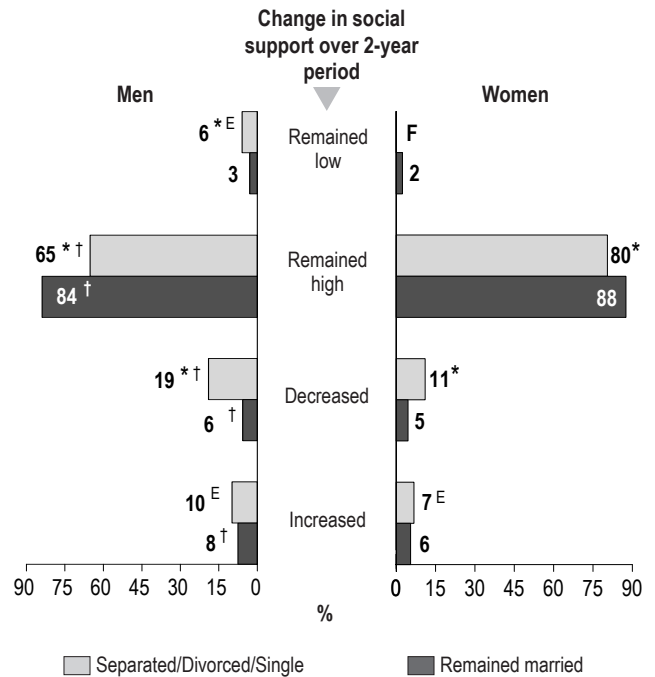
Social support disrupted

Marital dissolution can change the amount of social support available to an individual. A break-up means not only the loss of a partner, but can also reduce the size of a social network by dividing extended

family and mutual friends. The loss of social support may be particularly difficult for men. Many men rely solely on their partner for support, while women tend to have larger social networks.¹⁹

People who experienced a break-up were more likely than those who remained married to report a decline in social support between their baseline and follow-up interviews (Chart 2). Whereas 19% of men who were no longer with their spouse reported a drop in social support, the figure was 6% for those who remained in a relationship. Among women, the corresponding proportions were 11% and 5%.

Chart 2
Percentage distribution of change in social support over a two-year period, by sex and marital status at follow-up, household population aged 20 to 64 and married at baseline, 1994/1995 to 2004/2005, Canada excluding territories

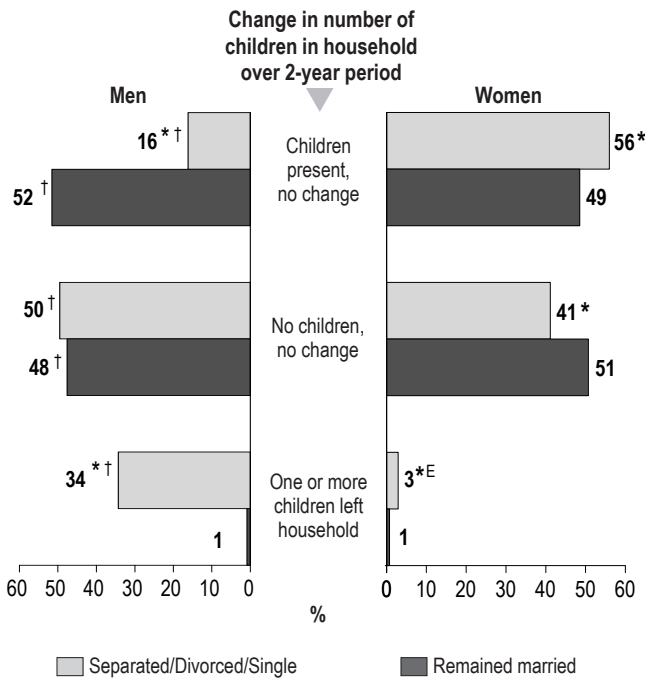


* Significantly different from estimate for those who remained married ($p < 0.05$)
 † Significantly different from corresponding category for women ($p < 0.05$)
 E use with caution (coefficient of variation 16.6% to 33.3%)
 F too unreliable to be published (coefficient of variation greater than 33.3%)
Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

Men no longer live with children

Research has suggested that loss of custody or a change in parental responsibilities is one of the most stressful aspects of post-divorce life for men.³⁶ According to the analysis of NPHS data, 34% of men and 3% of women whose relationship ended were residing with at least one fewer child(ren) between their baseline and follow-up interviews (Chart 3).

Chart 3
Percentage distribution of change in number of children in household over a two-year period, by sex and marital status at follow-up, household population aged 20 to 64 and married at baseline, 1994/1995 to 2004/2005, Canada excluding territories

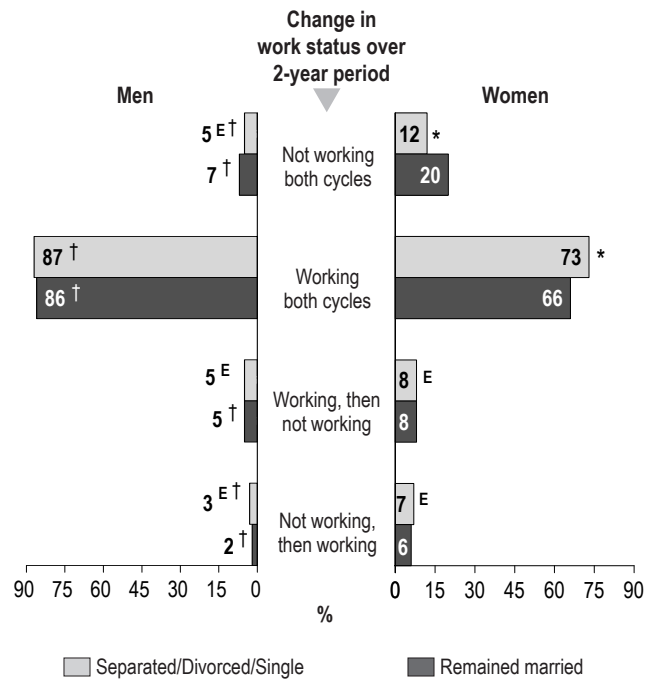


* Significantly different from estimate for those who remained married ($p < 0.05$)
 † Significantly different from corresponding category for women ($p < 0.05$)
 E use with caution (coefficient of variation 16.6% to 33.3%)
 Note: A small proportion of respondents (7.2%) who had no children at baseline reported living with children at follow-up.
 Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

Employment patterns not likely to change

The breakdown of a marital relationship may mean a change in employment status, which could have some effect on mental health. However, analysis of the longitudinal NPHS data showed no statistically significant differences in employment status over the two years between married and divorced/separated men (Chart 4). Among women, differences in employment status were significant only among those who remained consistently unemployed or who were employed at both times.

Chart 4
Percentage distribution of change in work status over a two-year period, by sex and marital status, household population aged 20 to 64 and married at baseline, 1994/1995 to 2004/2005, Canada excluding territories



* Significantly different from estimate for those who remained married ($p < 0.05$)
 † Significantly different from corresponding category for women ($p < 0.05$)
 E use with caution (coefficient of variation 16.6% to 33.3%)
 Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

Definitions

Depression is characterized by a depressed mood and/or lack of interest in most things, along with other symptoms, all lasting at least two weeks. These symptoms include appetite or sleep disturbance, decreased energy, difficulty concentrating, feelings of worthlessness, and/or suicidal thoughts. The National Population Health Survey (NPHS) measures depression with a subset of questions, administered by lay interviewers, from the Composite International Diagnostic Interview.^{37,38} These questions cover a cluster of symptoms for a depressive disorder, which are listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R).³⁹ For this article, the presence of depression refers to the 12 months before the date of the survey interview. The NPHS questionnaire is available at www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3225&lang=en&db=IMDB&dbg=f&adm=8&dis=2. Overall scores were totaled, and the results were transformed into a probability estimate of a diagnosis of depression. For this article, if the estimate was 0.9 or more (that is, a 90% likelihood of a positive diagnosis of depression, corresponding to a value of 5 or more), the respondent was considered to have experienced depression in the previous 12 months. For the algorithm and questions used to measure depression, see Appendix B.

At cycle 6 only, respondents were asked if they had ever been diagnosed with depression by a health professional, and their age at diagnosis. This information was combined and cross-referenced against the respondent's age at each baseline cycle. Respondents who had been diagnosed with depression before their age at baseline were considered to have a history of depression. Data on history of depression were missing for 14.4% of records. A missing category was included to retain as many observations as possible for the multivariate analyses. Additional analyses were done using the probability estimate of a diagnosis of depression from earlier cycles of the NPHS (data not shown). Because the association between marital dissolution and depression was virtually unchanged, this information was not included in the models.

Marital status was categorized as: remained married or experienced marital dissolution. Respondents were considered to have remained married if they reported their marital status as "married," "common-law" or "living with a partner" at baseline and again two years later. Respondents were considered to have experienced marital dissolution if they reported their marital status as "married," "common-law" or "living with a partner" at baseline, and two years later reported their marital status as "separated," "divorced" or "single." Marital status definitions were not provided to respondents.

Total *household income* from all sources in the previous 12 months was adjusted for the number of people in the household and for the low-income cutoff (LICO) specific to the household and community

size. Adjusted household incomes were then grouped into deciles (10 groupings each containing one-tenth of Canadians). A two-decile (one-quintile) change in the ranking between two consecutive NPHS cycles was defined as a change in adjusted household income. Because of missing values, the change in adjusted household income could not be calculated for 10.2% of records. A missing category was included to retain as many observations as possible for the multivariate analyses.

Number of children in household was based on the number of children aged 15 or younger in the household at baseline and the number aged 17 or younger in the household at follow-up two years later. Because many older adolescents leave home for postsecondary education, the ages of youth included in this calculation were restricted. Only households in which children were reported to reside at baseline were considered to have them. Households were defined as those from which children had departed if the number of children decreased between consecutive NPHS cycles. An additional variable for no children in household at baseline was included to retain individuals without children in the analyses.

Four questions measured *social support* across all six NPHS cycles, using an abridged version of measures in the Medical Outcomes Study (MOS).⁴⁰ Respondents were asked if they had someone to confide in, to give them advice, to count on in a crisis, and to make them feel loved and cared for or to show them love and affection. In 1994/1995 and 1996/1997, the possible responses to these questions were "yes" or "no." In the remaining cycles, responses were structured on a five-point scale: "all of the time," "most of the time," "some of the time," "a little of the time," and "none of the time." Respondents who answered "no" (in 1994/1995 and 1996/1997) and "none of the time" or "a little of the time" (in subsequent cycles) to at least one of the four questions were considered to have low emotional support in that cycle. Respondents were grouped into four categories depending on their level of support and any change between cycles: support increased, support remained high, support decreased, and support remained low.

Work status was assigned one of four possible values: working at baseline and follow-up; working at baseline, but not at follow-up; not working at baseline, but working at follow-up; and not working at baseline or follow-up. Respondents who reported having a job last week and those who reported currently working were classified as working; those who did not have a job or who were permanently unable to work were considered not to have been working.

Respondents were grouped into three *education* categories based on the highest level attained at baseline: secondary graduation or less, some postsecondary and postsecondary graduation.

Age at baseline was used as a continuous variable and ranged in value from 20 to 64.

Marital breakdown independently associated with depression

Compared with men who remained married, those who underwent a break-up over a two-year period had six times the odds of reporting symptoms of depression. Among women, the unadjusted odds of two-year incident depression were three and a half times greater if their relationship ended (Table 1, unadjusted odds). When the effects of changes in income, social support, presence of children and employment status, as well as a history of depression, education and age, were taken into

account, the relationship between marital dissolution and two-year incident depression remained statistically significant for both sexes, although the strength of the association was reduced (Table 1, adjusted odds). The adjusted odds of depression for men whose relationship ended were about three times those of men who remained with their spouse; for women, the adjusted odds of depression after a break-up were about two and a half times greater. The weakening of the association between marital dissolution and depression suggests that other factors that may accompany a break-up, notably

Table 1
Unadjusted and adjusted odds ratios relating marital dissolution and selected characteristics to a new episode of depression over a two-year period, by sex, household population aged 20 to 64 and married at baseline, Canada excluding territories

	Men				Women			
	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Marital dissolution[†]	6.0*	4.0 to 8.8	3.3*	1.7 to 6.5	3.5*	2.4 to 4.9	2.4*	1.6 to 3.5
Household income								
Decreased			1.0	0.7 to 1.5			1.5*	1.1 to 2.1
Increased or unchanged [‡]			1.0	...			1.0	...
Number of children in household								
Children present, no change [‡]			1.0	...			1.0	...
No children, no change			0.8	0.6 to 1.2			1.3	1.0 to 1.8
One or more children left household			1.9	0.9 to 4.2			1.1	0.5 to 2.6
Social support								
Increased			0.9	0.5 to 1.6			1.7*	1.1 to 2.5
Remained high [‡]			1.0	...			1.0	...
Decreased			2.3*	1.3 to 3.9			2.4*	1.6 to 3.5
Remained low			2.9*	1.4 to 6.0			1.7	0.9 to 3.0
Work status								
Working at baseline and follow-up [‡]			1.0	...			1.0	...
Working at baseline, not at follow-up			1.7	1.0 to 3.1			1.4	1.0 to 2.0
Not working at baseline, working at follow-up			0.5	0.2 to 1.4			1.3	0.8 to 2.0
Not working at baseline or follow-up			1.1	0.7 to 1.9			1.4	1.0 to 1.9
History of depression[†]			5.8*	3.6 to 9.2			3.2*	2.3 to 4.3
Education								
Secondary graduation or less [‡]			1.0	...			1.0	...
Some postsecondary			0.7	0.4 to 1.1			0.9	0.6 to 1.3
Postsecondary graduation			0.6*	0.4 to 0.9			1.0	0.7 to 1.5
Age[§]			1.0*	1.0 to 1.0			1.0*	1.0 to 1.0

[†] Reference category is absence of characteristic. For example, reference category for "marital dissolution" is "remained married."

[‡] Reference category

[§] Used as a continuous variable

* Significantly different from reference category ($p < 0.05$).

... not applicable

Notes: The adjusted model for men is based on 11,443 records (439 missing) of respondents aged 20 to 64 at baseline who did not report depression two years earlier. The adjusted model for women is based on 13,202 records (245 missing) of respondents aged 20 to 64 at baseline who did not report depression two years earlier. Missing values for change in adjusted household income and history of depression were included in models to maximize sample size; the odds ratios are not shown. A small proportion of respondents who had no children at baseline and reported living with children at follow-up (7.2%) were included in the "No children, no change" category. Because of rounding, some odds ratio with lower or upper confidence limits of 1.0 were statistically significant.

Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

Limitations

The potential for bias due to respondent attrition is problematic in longitudinal research. From one National Population Health Survey (NPHS) cycle to the next, respondents were lost for reasons such as refusal to participate, item non-response, death, institutionalization, or relocation out of country. Selective loss to follow-up, notably failure to collect information from respondents who had poorer mental health, may have weakened the observed association between marital dissolution and depression. Out of the pooled total of 27,662 respondents assessed in the baseline cycles, 2,333 (8.4%) did not respond in the follow-up cycle.

Respondents and non-respondents (unweighted sample), household population aged 20 to 64 at baseline, by two-cycle interval, National Population Health Survey, 1994/1995 to 2004/2005

	Number of respondents at baseline	Number of respondents at follow-up	Number (percentage) of respondents at baseline who became non-respondents next cycle
1994/95 to 1996/97 (Cycle 1 to 2)	5,927	5,517	410 (6.9%)
1996/97 to 1998/99 (Cycle 2 to 3)	5,906	5,506	400 (6.8%)
1998/99 to 2000/01 (Cycle 3 to 4)	5,563	5,082	481 (8.6%)
2000/01 to 2002/03 (Cycle 4 to 5)	5,281	4,750	531 (10.1%)
2002/03 to 2004/05 (Cycle 5 to 6)	4,985	4,474	511 (10.3%)
Total	27,662	25,329	2,333 (8.4%)

The survey weights were those applied to the cycle 1 (1994/1995) data. The weights were not adjusted to account for subsequent non-response, which could have biased the estimates if continuers in the longitudinal panel differed from non-respondents according to characteristics considered in this analysis. To assess the potential effects of non-response on the results, the weighted proportions or averages of selected variables between non-respondents and respondents were compared. Statistically significant differences by respondent status emerged: non-respondents were more likely than respondents to be male and to have been in a common-law relationship (rather than legally married) at baseline (data not shown). Because of these differences, it is possible that the strength and/or magnitude of the observed associations between marital dissolution and depression in the study population were different from what they might have been if non-respondents had participated.

Information about whether respondents had ever been professionally diagnosed with depression was collected at cycle 6 only, and appended to the earlier records for the same respondent. Owing to loss to follow-up, the likelihood that this information could be appended to respondents varied by cycle: it was missing from less than 1% of records for cycle 6 (2004/2005), but 23% of records for cycle 1 (1994/1995) (data not shown).

Because NPHS interviews are conducted every two years and respondents are asked about depressive symptoms that occurred during the 12 months before the interview, those who experienced depression only in the year following their baseline interview are categorized as not having suffered from depression. Misclassifying respondents because of the one-year period would dilute the strength of the true association between marital dissolution and depression.

The NPHS does not ask respondents when marital dissolution occurred. It could be argued that knowing the precise date would not contribute substantively to the analysis, since marital breakdown is an extended process that does not occur at a single point in time. On the other hand, the point in the process at which the interview took place could influence the findings. It is also unclear if depression preceded the breakdown of the relationship or if depression followed the marital dissolution.

The definition of "remained married" required only that respondents report that they were married both at baseline and follow-up two years later, even though they might have divorced and married someone else. Such a scenario was probably rare, given the frequency of data collection (every two years).

Sample size restrictions prevented analysis of associations between the dissolution of specific types of marriages (legal versus common-law) and subsequent depression.

Household income is based on total household income, household and community size and the associated low-income cutoff (LICO). While child support and alimony are included in the calculation of total household income, such payments are not deducted from the household incomes of those who pay them. As a result, the adjusted household income of those paying support might be overestimated.

The NPHS data show an association between marital dissolution and depression; causality cannot be inferred. As well, the associations observed may result from factors not considered in this analysis such as beliefs about marriage, spousal infidelity, re-marriage, age at marriage, marriage duration, or which partner initiated the break-up.

The analyses are based on self-reported data, and the extent to which the data are biased because of reporting error is unknown.

changes in income and social support, contributed to the risk of experiencing incident depression among men and women.

For many, depression short term

For the majority of individuals who experienced depression in the post-relationship period, the passage of time was beneficial. More than three-quarters of those who had had a depressive episode in the two-year period associated with the break-up did not report another episode when they were re-interviewed after another two years had passed (that is, four years later) (data not shown).

Concluding remarks

These longitudinal results from the National Population Health Survey support the hypothesis that marital dissolution is linked to subsequent depression. This association persisted even when other events that often accompany a break-up—change in adjusted household income, change in

social support, change in number of children in household, change in work status—were taken into account, along with having a history of depression, educational attainment and age. While some of these factors were associated with an increased risk of depression, they did not completely account for it. The results are consistent with the findings of other longitudinal studies.^{5,8,11,31,41}

Also, as reported in previous research,^{27-29,31} the NPHS data show sex differences in the association between marital dissolution and mental health. Men who experienced a break-up were more at risk of experiencing depression than were women.

The longer-term follow-up suggests that, for the majority, depression was isolated to the period immediately surrounding the break-up. Nonetheless, depression continued to be a problem for a sizable minority four years later. Given the frequency of divorce and separation and its association with mental health problems, these findings are relevant to population health. ●

References

- 1 Statistics Canada. *Divorces 2003 – Shelf Tables* (Statistics Canada, Catalogue 84F0213) Ottawa: Minister of Industry, March 2005.
- 2 Statistics Canada. *Changing Conjugal Life in Canada* (Statistics Canada, Catalogue 89-576) Ottawa: Minister of Industry, 2002.
- 3 Wu Z. The stability of cohabitation relationships: The role of children. *Journal of Marriage and the Family* 1995; 57(1): 231-6.
- 4 Willitts M, Benzeval M, Stansfeld S. Partnership history and mental health over time. *Journal of Epidemiology and Community Health* 2004; 58: 53-8.
- 5 Simon RW, Marcussen K. Marital transitions, marital beliefs, and mental health. *Journal of Health and Social Behavior* 1999; 40(2): 111-25.
- 6 Cheung YB. Can marital selection explain the differences in health between married and divorced people? From a longitudinal study of a British birth cohort. *Public Health* 1998; 112: 113-7.
- 7 Wade TJ, Pevalin DJ. Marital transitions and mental health. *Journal of Health and Social Behavior* 2004; 45(2): 155-70.
- 8 Richards M, Hardy R, Wadsworth M. The effects of divorce and separation on mental health in a national UK birth cohort. *Psychological Medicine* 1997; 27(5): 1121-8.
- 9 Gahler M. “To divorce is to die a bit...”: a longitudinal study of marital disruption and psychological distress among Swedish women and men. *The Family Journal: Counseling and Therapy for Couples and Families* 2006; 14(4): 372-82.
- 10 Mastekaasa A. Marital dissolution and subjective distress: panel evidence. *European Sociological Review* 1995; 11(2): 173-85.
- 11 Marks NF, Lambert JD. Marital status continuity and change among young and midlife adults. *Journal of Family Issues* 1998; 19(6): 652-86.
- 12 Wade TJ, Cairney J. Major depressive disorder and marital transition among mothers: Results from a national panel study. *Journal of Nervous and Mental Disease* 2000; 188(11): 741-50.
- 13 Wu Z, Hart R. The effects of marital and nonmarital union transition on health. *Journal of Marriage and Family* 2002; 64: 420-32.
- 14 Strohschein L, McDonough P, Monette G et al. Marital transitions and mental health: Are there gender differences in the short-term effects of marital status change? *Social Science and Medicine* 2005; 61: 2293-03.
- 15 Beaudet MP. Depression. *Health Reports* (Statistics Canada, Catalogue no. 82-003) 1996; 7(4): 11-24.
- 16 Cairney J, Thorpe C, Rietschlin J, et al. 12-month prevalence of depression among single and married mothers in the 1994 National Population Health Survey. *Canadian Journal of Public Health* 1999; 90(5): 320-4.

- 17 Le Bourdais C, Neill G, Turcotte P. The changing face of conjugal relationships. *Canadian Social Trends* (Statistics Canada, Catalogue no. 11-008) Spring 2000: 14-17.
- 18 Wu Z, Pollard MS. Economic circumstances and the stability of nonmarital cohabitation. *Journal of Family Issues* 2000; 21(3): 303-28.
- 19 McDaniel SA, Strike C. *Family and Friends: General Social Survey Analysis Series* (Statistics Canada, Catalogue no. 11-612) Ottawa: Minister of Industry, 1994.
- 20 Swain L, Catlin G, Beaudet MP. The National Population Health Survey—its longitudinal nature. *Health Reports* (Statistics Canada, Catalogue no. 82-003) 1999; 10(4): 69-82.
- 21 Tambay J-L, Catlin G. Sample design of the National Population Health Survey. *Health Reports* (Statistics Canada, Catalogue 82-003) 1995; 7(1): 29-38.
- 22 Statistics Canada. National Population Health Survey. Available at: <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3225&lang=en&db=IMDB&dbg=f&adm=8&dis=2>.
- 23 Jaccard J. *Interaction Effects in Logistic Regression*. Thousand Oaks: Sage, 1987.
- 24 Statistics Canada. National Population Health Survey—Household Component Cycle 6 (2004/05): Longitudinal documentation 2006 http://www.statcan.ca/english/sdds/document/3225_D5_T1_V3_E.pdf
- 25 Statistics Canada. National Population Health Survey—Household Component Cycle 6 (2004/05): Derived variables documentation 2006 http://www.statcan.ca/english/sdds/document/3225_D10_T9_V2_E.pdf
- 26 Kohler Riessman C, Gerstel N. Marital dissolution and health: do males or females have greater risk? *Social Science and Medicine* 1985; 20(6): 627-35.
- 27 Livingston Bruce M, Kim KM. Differences in the effects of divorce on major depression in men and women. *The American Journal of Psychiatry* 1992; 149(7): 914-7.
- 28 Williams K, Umberson D. Marital status, marital transitions, and health: A gendered life course perspective. *Journal of Health and Social Behavior* 2004; 45(1): 81-98.
- 29 Smock PJ. Gender and the short-run economic consequences of marital disruption. *Social Forces* 1994; 73(1): 243-62.
- 30 Joung IMA, Stronks K, van de Mheen FWA, et al. The contribution of intermediary factors to marital status differences in self-reported health. *Journal of Marriage and the Family* 1997; 59(2): 476-90.
- 31 Aseltine RH, Kessler RC. Marital disruption and depression in a community sample. *Journal of Health and Social Behavior* 1993; 34(3): 237-51.
- 32 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.
- 33 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.
- 34 Bianchi SM, Subaiya L, Kahn JR. The gender gap in the economic well-being of nonresident fathers and custodial mothers. *Demography* 1999; 36(2): 195-203.
- 35 Gerstel N, Kohler Riessman C, Rosenfield S. Explaining the symptomatology of separated and divorced women and men: The role of material conditions and social networks. *Social Forces* 1985; 64(1): 84-101.
- 36 Umberson D, Williams CL. Divorced fathers: Parental role strain and psychological distress. *Journal of Family Issues* 1993; 14(3): 378-400.
- 37 Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Archives of General Psychiatry* 1994; 51: 8-19.
- 38 World Health Organization. *CIDI Online*. Available at <http://www.who.int/msa/cidi/index.htm>. Accessed October 13, 2006
- 39 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Text Revision*. Washington DC: American Psychiatric Association, 1980.
- 40 Sherbourne CD, Stewart AL. The MOS social support survey. *Social Science and Medicine* 1991; 32(6): 705-14.
- 41 Menaghan EG, Lieberman MA. Changes in depression following divorce: a panel study. *Journal of Marriage and the Family* 1986; 48(2): 319-28.

Appendix A

Table A

Averages and proportions for selected characteristics in sample included and in sample excluded because of depression at baseline

	Included	Excluded because of depression at baseline
Experienced marital dissolution over two-year period (%)	4.0	9.5*
Age (average years)	43.2	41.1*
Male (%)	49.6	30.8*
Adjusted ratio of household income (average 0-1) [†]	0.18	0.17
Children present, no change (%)	49.6	50.3
No children, no change (%)	49.0	46.8
One or more children left household (%)	1.4	2.9*
Working at baseline and follow-up (%)	75.8	63.7*
Working at baseline, not at follow-up (%)	6.5	7.6
Not working at baseline, working at follow-up (%)	4.0	7.2*
Not working at baseline and follow-up (%)	13.7	21.4*
Secondary graduation or less (%)	33.1	35.2
Some postsecondary (%)	25.7	29.0
Postsecondary graduation (%)	41.1	35.8*

* Significantly different from estimate for respondents included in study ($p < 0.05$)

[†] Lower ratios suggest household is in difficult financial situation because spending on necessities likely accounts for substantial proportion of income.

Source: 1994/1995 to 2004/2005 National Population Health Survey, longitudinal file (square)

Appendix B

Using the methodology of Kessler et al.,³⁷ the National Population Health Survey (NPHS) measures a major depressive episode with a subset of questions from the Composite International Diagnostic Interview. These questions cover a cluster of symptoms for a *depressive disorder*, which are listed in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R)*.³⁹ The question numbers refer to those used in the mental health section of the NPHS questionnaire. There are three possible paths through these questions: “yes” to 2, then 3 to 13; “no” to 2, “yes” to 16, then 17 to 26; and “no” to 2 and “no” to 16.

- 2 During the past 12 months, was there ever a time when you felt sad, blue, or depressed for two weeks or more in a row?
(Yes - go to 3; No - go to 16)
- 16 During the past 12 months, was there ever a time lasting two weeks or more when you lost interest in most things like hobbies, work, or activities that usually give you pleasure?
(Yes - go to 17; No - end)
- 3/17 For the next few questions, please think of the two-week period during the past 12 months when: 3. these feelings were worst. 17. you had the most complete loss of interest in things. During that time how long did these feelings usually last?
(All day long; Most of the day; About half of the day; Less than half the day)
- 4/18 How often did you feel this way during those two weeks?
(Every day; Almost every day; Less often)
- 5 During those two weeks did you lose interest in most things?
(Yes; No)

- 6/19 Did you feel tired out or low on energy all of the time?
(Yes; No)
- 7/20 Did you gain weight, lose weight, or stay about the same?
(Gained weight; Lost weight; Stayed about the same; Was on a diet)
- 8/21 About how much did you gain/lose?
- 9/22 Did you have more trouble falling asleep than you usually do?
(Yes; No)
- 10/23 How often did that happen?
(Every night; Nearly every night; Less often)
- 11/24 Did you have a lot more trouble concentrating than usual?
(Yes; No)
- 12/25 At these times, people sometimes feel down on themselves, no good, or worthless. Did you feel this way?
(Yes; No)
- 13/26 Did you think a lot about death—either your own, someone else's, or death in general?
(Yes; No)

A value of 1 was assigned to any “yes” answer to the “yes/no” questions. For questions 8 and 21, a score of 1 was assigned if the change in weight was at least 10 pounds (4.5 kilograms). For questions 10 and 23, a score of 1 was given to respondents who reported having trouble falling asleep every night or nearly every night. Those who replied “yes” to question 2, and whose symptoms lasted all day or most of the day, and had occurred every day or almost every day, had a maximum possible score of 8. For those who responded “yes” to question 16, and whose symptoms lasted all day or most of the day, and had occurred every day or almost every day, the maximum possible was 7. Respondents who replied “no” to questions 2 and 16 scored 0.