IMPORTANCE An increased risk of depressive symptoms has been associated with the transition to menopause, but the risk of depressive symptoms in the early postmenopausal years has not been well characterized.

OBJECTIVES To identify within-woman changes in depressive symptoms during a 14-year period around menopause, determine associations of a history of depression with the pattern of depressive symptoms, and evaluate the rate of change in reproductive hormones as predictors of depressive symptoms following menopause.

DESIGN, SETTING, AND PARTICIPANTS A randomly identified, population-based sample in Philadelphia County, Pennsylvania, of 203 late-reproductive-age women who were premenopausal at baseline and reached natural menopause.

MAIN OUTCOMES AND MEASURES Center for Epidemiologic Studies Depression Scale.

RESULTS The prevalence of high scores on the Center for Epidemiologic Studies Depression Scale decreased from 10 years before to 8 years after the final menstrual period (FMP), with a decrease of approximately 15% of baseline per year (odds ratio, 0.85; 95% CI, 0.81-0.89; \( P < .001 \)). Relative to the FMP, the risk of depressive symptoms was higher in the years before and lower in the years after the FMP. Among women with a history of depression, the likelihood of depressive symptoms was more than 13 times greater overall and 8 times greater after menopause compared with women with no depression history. Among women who first experienced depressive symptoms approaching menopause, the risk of depressive symptoms declined after the FMP, with a significantly lower risk the second year after menopause. The risk of depressive symptoms after menopause decreased by 35% for each unit (SD) increase before the FMP in the log rate of change of follicle-stimulating hormone (odds ratio, 0.65; 95% CI, 0.46-0.91; \( P = .01 \)).

CONCLUSIONS AND RELEVANCE The FMP was pivotal in the overall pattern of decreasing depressive symptoms in midlife women, with higher risk before and lower risk after the FMP. A history of depression strongly increased the risk both before and after menopause. Women who had no history of depression before the menopause transition had a low risk of depressive symptoms 2 or more years after the FMP.
Multiple studies show an increased risk of depression in the years leading to menopause, with some evidence that changes in reproductive hormones contribute to these symptoms in vulnerable women.\(^1\)-\(^7\) Whether this same risk continues in the early postmenopausal years has not been well characterized. Information about the risk of depression in midlife women is clinically important because of the diminished functioning and significant disability that accompany this common disorder\(^8\) and because depression is associated with other health-limiting conditions that increase in midlife women, such as cardiovascular disease, metabolic syndrome, and osteoporosis.\(^9\)-\(^12\)

The increased risk of depressive symptoms in the transition to menopause has been repeatedly observed in population-based studies. In the Penn Ovarian Aging Study (POAS), the risk of depressive symptoms was nearly 3 times higher in women in the menopause transition compared with premenopausal women,\(^1\) while women with no history of depression were 2½ times more likely to report depressed mood in the menopause transition compared with the premenopausal period.\(^3\)

Other cohort studies reported similar findings: the Harvard Study of Moods and Cycles,\(^7\) the Study of Women’s Health Across the Nation (SWAN),\(^2\) the Seattle Midlife Women’s Health Study,\(^4\) and the Melbourne Women’s Midlife Health Project.\(^5\)

In contrast to these studies of the years approaching menopause, there is limited information on the risk of depression in the years after menopause. In 1 SWAN study, depressive symptoms improved after the final menstrual period (FMP),\(^16\) but in another study, the risk of major depression remained high through early postmenopause compared with premenopause.\(^3\) While national survey data indicate that the prevalence of depressive disorders is highest in women aged 40 to 49 years and lowest in women older than 60 years,\(^17\) the risk of depressive symptoms in the decade between these years has not been identified.

The present study was conducted to identify within-woman changes in depressive symptoms during a 14-year period around natural menopause. We hypothesized that, relative to menopause, the risk of high depressive symptoms increased in the years before menopause and decreased in the years after menopause. Additional objectives were to determine the association between a history of depression and the pattern of depressive symptoms; evaluate other covariates such as age at menopause, race, body mass index, and current smoking as possible modifiers of the depressive symptoms; and identify the within-woman rate of change of reproductive hormones (estriadiol, follicle-stimulating hormone [FSH], and inhibin B) in the years leading to menopause as predictors of depressive symptoms in the early postmenopausal years.

### Methods

#### Study Participants

The study evaluated 203 premenopausal women in the POAS who reached natural menopause during a 14-year follow-up period (1996-2010). The POAS cohort was randomly identified by telephone digit dialing to households in Philadelphia County, Pennsylvania, and sampling was stratified to obtain equal numbers of African American and white women as described in previous articles.\(^1\) All cohort participants were premenopausal at enrollment as defined by regular menstrual cycles in the reference range (22-35 days for the previous 3 menstrual cycles), were aged 35 to 48 years, and had an intact uterus and at least 1 ovary. Exclusion criteria included current use of any hormone or psychotropic medication, alcohol or drug abuse, major psychiatric disorder in the past year, pregnancy or breastfeeding, serious health problems known to compromise ovarian function, or uncontrolled hypertension.

Comparisons of the study variables at baseline between the study sample (n = 203) and the remainder of the cohort (n = 233), who were excluded because they had not reached menopause in the follow-up interval, showed that study participants were slightly older and had higher FSH levels and lower inhibin B levels compared with the remainder of the cohort; other variables in Table 1 did not significantly differ between the 2 groups. The Institutional Review Board of the University of Pennsylvania approved the study, and all participants provided written informed consent.

#### Study Design

Following cohort enrollment, follow-up assessments were conducted for 14 years at intervals of approximately 9 months in the first 5 years and then annually, with a 2-year gap between assessments 10 and 11. At each assessment period, study data were collected at 2 in-home visits timed to the early follicular phase of the menstrual cycle (days 2-6) in 2 consecutive menstrual cycles or approximately 1 month apart in noncycling women.

The study was described to participants as a general women’s health study. Trained research interviewers obtained...
menstrual dates, structured interview data on overall health, blood samples for the hormone assays, and anthropometric measures. Participants completed a set of validated self-report measures to assess health and other behavioral measures of the study at each assessment period.

**Study Variables**

The primary outcome variable of depressed mood was assessed by the Center for Epidemiologic Studies Depression Scale (CES-D), a standard measure that evaluates current depressive symptoms in the past week. Participants rated the 20 items on a 4-point scale (0-3) at each assessment period. The standard cut point of 16 or higher in the total score defined the high depressive symptom group. A higher cut point score of 25 or higher, which has greater specificity for a clinical diagnosis of depression, was also examined. In the postmenopausal predictive models, depression status was categorized in 4 groups: (1) history of depression as identified at enrollment, (2) depressive symptoms that first occurred during the study while premenopausal or (3) in the menopause transition, and (4) no depression or depression history before the FMP. Time in years, from 12 years before to 11 years after the FMP, was evaluated in relation to the FMP, which was identified after 12 or more months of no menstrual bleeding and designated as time 0 for each participant to allow longitudinal evaluation of within-woman changes in depressive symptoms each year before and after menopause. Covariate selections were based on previously determined associations with depressed mood: history of depression (yes or no) as identified at cohort enrollment by medical history interview or the Primary Care Evaluation of Mental Disorders interview, race (self-reported as African American or white), and age, body mass index, and current smoking (yes or no) at the FMP. Menopausal stages were based on the Staging System for Reproductive Aging in Women as follows: premenopausal (regular cycles in a normal range of 22-35 days), a combined menopause transition group (cycle length changes ≥ 7 days in either direction relative to the participant’s own baseline through 11 months of amenorrhea), and postmenopause (identified after 12 or more months of no menstrual bleeding). Current medication (yes or no) included antidepressant and anxiolytic medications reported at follow-up assessments. These medications were exclusions at cohort enrollment. At each follow-up period, 2 to 15 participants reported medication use, for a total of 147 (6.1%) of the observations. Of these, 50 (7.5%) occurrences were of medication use among 30 participants after the FMP.

Nonfasting blood samples were collected at each study visit between days 2 and 6 of the menstrual cycle in 2 consecutive cycles (or approximately 1 month apart in noncycling women) in the 14 assessment periods. The blood samples were centrifuged and frozen in aliquots at -80°C. Assays, performed in the Clinical and Translational Research Center at the University of Pennsylvania, were run in batches that included 4 visits per participant to reduce within-subject variability due to assay conditions. Assays were performed in duplicate and repeated if values differed by more than 15%. Estradiol and FSH levels were measured by radioimmunoassay using Coat-a-Count commercial kits (Siemens). The intra-assay and interassay coefficients of variation were less than 5%. For assessment periods 11 to 14, inhibin B was assayed using inhibin B enzyme-linked immunosorbent assay kits (Beckman Coulter). The intra-assay and interassay coefficients of variation were 3.5% to 4.6% and 6.3% to 7.6%, respectively. The lower limit of detection was 7 pg/mL. Dimeric inhibin B assays for assessment 1 to 10 were conducted in the laboratory of Patrick Sluss, PhD, at the Massachusetts General Hospital (Boston) using a solid-phase sandwich enzyme-linked immunosorbent assay with plates coated with a monoclonal antibody specific for the α subunit of detection. The assay was controlled in triplicate using samples with mean concentrations of 155.3, 316.3, and 919.3 pg/mL with interassay coefficients of variation of 11.6%, 7.6%, and 9.7%, respectively, with a sensitivity of 15 pg/mL.

**Statistical Analysis**

Statistical power calculations were computed using STATA, version 8 (StataCorp LP), with “sampsii” and “samplus” commands to evaluate the pattern of postmenopausal depression for the 4 subgroups defined earlier. Each woman contributed numerous visits before menopause and a mean number of 4 visits after menopause. Based on assumptions of 2-sided tests with a type I error of 5%, a mean of 8 repeated measures per participant, and a correlation of 0.4 among the repeated measures, the study has 80% power to detect a 50% decline (odds ratio [OR], 0.50) in the prevalence of depressive symptoms after menopause for women with a history of depression and a 66% decline (OR, 0.33) for women whose depressive symptoms first occurred in the study before the FMP. There is 80% power to detect an OR of 0.33 or higher in postmenopausal rates of depressive symptoms compared between women whose depressive symptoms first occurred in the study and women with no symptoms. Because the number of women who reported a history of depression was greater than the number of women who first experienced depressive symptoms in the study, we can detect a smaller OR when comparing postmenopausal depressive symptoms between these 2 groups.

High CES-D scores (≥16) were identified in each study year. All available data were included in the analysis. The 203 participants had 2514 CES-D observations. We present 3 distinct models in Tables 2, 3, and 4 to address specific hypotheses regarding the prevalence of high CES-D scores (≥16 vs <16) as a function of time. All are versions of generalized linear mixed-effects regression models. Details of model assumptions and methods are in the eAppendix in the Supplement. For all models, observations during pregnancy, breastfeeding, and hormone use were censored. Covariates were defined a priori and added to the basic model singly and with an interaction with time. All covariates and interactions with time were further evaluated in multivariable models to determine their independent contributions.

A second set of analyses focused on the rates of depressed mood after menopause and evaluated associations with covariates and rates of change in covariates defined from the premenopausal time frame. Data from 179 participants and 685 postmenopausal CES-D observations were included in this set of analyses. The models included a random intercept only,
with variance estimates for the statistical tests on the regression coefficients adjusted for repeated observations from each participant using generalized estimating equations.23 Hormone values were modeled using natural log transformations to reduce the influence of skewed distributions. The rate of change (slope) before the FMP was calculated for each hormone for every woman as the linear regression line for all points in the observed linear range before the FMP. The linear ranges, identified by inspection of the mean slope for the log hormone values for each year from baseline to the FMP, were 3 years for estradiol, 4 years for FSH, and 6 years for inhibin B. These were consistent with those previously identified by Zheng et al,24 who used a piecewise linear mixed-effects model to identify timing changes in hormone trajectories. Hormone values are presented as geometric means with 95% CIs. Odds ratios for hormones are presented per unit (1 SD) increase in the rate of change (slope) for the log hormone.

All analyses were conducted using the SAS 9.3 statistical package (SAS, Inc). Statistical tests were 2-sided, with P < .05 considered significant.

### Results

#### Sample Description

In total, 203 participants were followed up for 14 years and contributed a mean of 12.4 CES-D observations per woman. The mean (SD) age was 42.8 (3.1) years at baseline and 51.1 (3.3) years at the FMP (range, 42-58 years), 47.3% were African American and 52.7% white, and 44.3% had a history of depression at cohort enrollment. Table 1 shows the baseline characteristics.

#### Pattern of CES-D Scores Around Menopause

The overall prevalence of high CES-D scores decreased from 10 years before to 8 years after the FMP, with an overall decrease of approximately 15% per year (OR, 0.85; 95% CI, 0.81-0.89; P < .001). When risk was compared with the FMP (Table 2), the risk of depressive symptoms was higher in each year before and lower in each year after the FMP. Repeating these models with a higher cutpoint of a CES-D score of 25 or more had similar results. The mean decrease was approximately 12% per year (OR, 0.88; 95% CI, 0.83-0.93; P < .001), and women with a history of depression were more than 11 times more likely to have high depressive symptoms (OR, 11.61; 95% CI, 5.51-24.47; P < .001).

The pattern of depressive symptoms was strongly modified by a history of depression. Women with a history of depression were more than 13 times more likely to have high depressive symptoms compared with women with no history of depression (OR, 13.62; 95% CI, 7.20-25.80; P < .001). Table 2 shows the risk of depressive symptoms relative to the FMP by history of depression in each year. Both groups had a higher risk of depressive symptoms in the years before the FMP and less risk of depressive symptoms each year after the FMP. There

### Table 2. Risk of Depressive Symptoms per Year Before and After FMP

<table>
<thead>
<tr>
<th>Variable</th>
<th>History of Depression (n = 90)</th>
<th></th>
<th>No History of Depression (n = 113)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Odds Ratio (95% CI)</td>
<td>P Value</td>
<td>No.</td>
</tr>
<tr>
<td>Years ≤–10</td>
<td>53</td>
<td>2.54 (1.16-5.56)</td>
<td>.02</td>
<td>92</td>
</tr>
<tr>
<td>–9</td>
<td>45</td>
<td>1.92 (0.94-3.93)</td>
<td>.07</td>
<td>56</td>
</tr>
<tr>
<td>–8</td>
<td>58</td>
<td>1.68 (0.91-3.09)</td>
<td>.10</td>
<td>85</td>
</tr>
<tr>
<td>–7</td>
<td>67</td>
<td>1.43 (0.74-2.78)</td>
<td>.29</td>
<td>104</td>
</tr>
<tr>
<td>–6</td>
<td>76</td>
<td>1.22 (0.67-2.22)</td>
<td>.51</td>
<td>102</td>
</tr>
<tr>
<td>–5</td>
<td>79</td>
<td>1.51 (0.86-2.66)</td>
<td>.15</td>
<td>95</td>
</tr>
<tr>
<td>–4</td>
<td>80</td>
<td>1.28 (0.72-2.28)</td>
<td>.40</td>
<td>102</td>
</tr>
<tr>
<td>–3</td>
<td>87</td>
<td>0.88 (0.51-1.51)</td>
<td>.64</td>
<td>101</td>
</tr>
<tr>
<td>–2</td>
<td>84</td>
<td>1.54 (0.88-2.69)</td>
<td>.13</td>
<td>105</td>
</tr>
<tr>
<td>–1</td>
<td>80</td>
<td>1.06 (0.63-1.77)</td>
<td>.84</td>
<td>97</td>
</tr>
<tr>
<td>FMP</td>
<td>1 Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>82</td>
<td>0.59 (0.35-0.99)</td>
<td>.05</td>
<td>99</td>
</tr>
<tr>
<td>2</td>
<td>67</td>
<td>0.59 (0.35-0.99)</td>
<td>.05</td>
<td>73</td>
</tr>
<tr>
<td>3</td>
<td>57</td>
<td>0.44 (0.24-0.83)</td>
<td>.01</td>
<td>62</td>
</tr>
<tr>
<td>4</td>
<td>39</td>
<td>0.45 (0.23-0.90)</td>
<td>.02</td>
<td>46</td>
</tr>
<tr>
<td>5</td>
<td>26</td>
<td>0.34 (0.12-0.87)</td>
<td>.03</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>26</td>
<td>0.39 (0.17-0.91)</td>
<td>.03</td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>18</td>
<td>0.24 (0.08-0.71)</td>
<td>.01</td>
<td>15</td>
</tr>
<tr>
<td>≥8</td>
<td>23</td>
<td>0.50 (0.24-1.05)</td>
<td>.07</td>
<td>17</td>
</tr>
</tbody>
</table>

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; FMP, final menstrual period.

* Wald statistic for overall test of significance.
was no significant interaction between a history of depression and CES-D during the study interval (P = .08).

Figure. A depicts the proportion of women with high CES-D scores in each study year by history of depression. Of the women with a history of depression, 50% to 65% had a CES-D score of 16 or higher in each year before the FMP; this decreased to approximately 35% in each postmenopausal year. Among women with no history of depression, 10% to 30% had a CES-D score of 16 or higher in each study year by history of depression. Of the variables associated with a CES-D score of 16 or higher, adjusted for time, current smoking was approximately 2 times more likely to report high CES-D scores in the study interval compared with nonsmokers (OR, 2.18; 95% CI, 0.99-4.79; P = .05). Race, age at menopause, and body mass index were not significantly associated with CES-D scores. When these variables were adjusted for the presence of the other variables in a multivariable analysis, only history of depression remained significant. Current medication users were more likely to have high CES-D scores (OR, 2.87; 95% CI, 1.63-5.06; P = .003). Inclusion of current medication in the multivariable analysis did not change other estimates in the model, indicating that medication use was an independent risk factor marking high depressive symptoms but did not confound other associations in the study.

### Other Risk Factors

Table 3 shows associations of the a priori covariates with CES-D in a time-adjusted analysis. Current smokers were approximately 2 times more likely to report high CES-D scores in the study interval compared with nonsmokers (OR, 2.18; 95% CI, 0.99-4.79; P = .05). Race, age at menopause, and body mass index were not significantly associated with CES-D scores. When these variables were adjusted for the presence of the other variables in a multivariable analysis, only history of depression remained significant. Current medication users were more likely to have high CES-D scores (OR, 2.87; 95% CI, 1.63-5.06; P = .003). Inclusion of current medication in the multivariable analysis did not change other estimates in the model, indicating that medication use was an independent risk factor marking high depressive symptoms but did not confound other associations in the study.

### Prediction of Depressive Symptoms After Menopause

We further evaluated the postmenopausal risk of high depressive symptoms. Depressive symptoms were approximately 50% more likely after the first 2 years after menopause than in subsequent years (OR, 0.51; 95% CI, 0.37-0.71; P = .001) (Table 4). We then estimated the likelihood of depressive symptoms after menopause by depression status in 4 categories as defined earlier. Women who had a history of depression were 8 times more likely to have depressive symptoms after menopause than women who had no depression before the FMP (OR, 8.39; 95% CI, 3.66-19.24; P < .001). In contrast, women whose first depressive symptoms occurred in the study had no significantly greater likelihood of depressive symptoms after menopause than women who had no depression, with ORs of 1.30 (95% CI, 0.39-4.33; P = .67) for women who were premenopausal and 2.39 (95% CI, 0.87-6.59; P = .09) for women in the menopause transition when depressive symptoms occurred (Table 4).

### Hormone Associations

We estimated the rate of change in FSH, estradiol, and inhibin B before the FMP as predictors of depressive symptoms after menopause. The risk of depressive symptoms after the FMP decreased by 35% for each unit (SD) increase in log FSH rate of change in the multivariable analysis (OR, 0.65; 95% CI, 0.46-0.91; P = .05) (Table 5, model 2). A sensitivity analysis of the same model with removal of the most extreme 5% (n = 7) log FSH slope observations had consistent but less significant results (OR, 0.75; 95% CI, 0.58-1.12). There was no significant association between the rate of change of estradiol or inhibin B and depressive symptoms after FMP.

### Discussion

This study identified a longitudinal pattern of depressive symptoms around natural menopause that showed symptoms decreased steadily from approximately 10 years before to 8 years after the FMP. The FMP was pivotal in this pattern, with a higher risk of depressive symptoms before the FMP and a lower risk of depressive symptoms after the FMP. The higher risk of depressive symptoms before the FMP is consistent with reports from our cohort and others that indicate an increased risk of depressive symptoms in the menopause transition. However, this study further shows that depressive symptoms decreased after menopause compared with their levels at the FMP.
A history of depression strongly modified the incidence of depressive symptoms, with odds for high depressive symptoms more than 13 times greater for women with a history of depression compared with women with no depression history. Approximately 50% to 65% of women with a history of depression had high CES-D scores in each year before the FMP, and this decreased to approximately 35% with high CES-D scores in each postmenopausal year. In contrast, 10% to 30% of women with no history of depression had high CES-D scores in the years preceding the FMP, and the incidence decreased to 0% to 15% the second year after menopause. This suggests that a risk of depressive symptoms for this group who first experienced the symptoms in the menopause transition continued for several years after the FMP but then sharply de-
increased, with a likelihood of depressive symptoms that was not significantly greater than the risk for women who had no depressive symptoms before menopause.

In our previous studies, we showed that greater variability (SD) in FSH and estradiol was significantly associated with depressive symptoms in the menopause transition. Herein we show that a faster rate of change in FSH before the FMP predicted a lower risk of depressive symptoms after FMP in women with and without a history of depression. We speculate that women with a more rapid rise in FSH had a faster transition to menopause, followed by stable hormone levels that resulted in fewer depressive symptoms, but further studies are needed to more fully investigate this hypothesis.

Several limitations are noted. Depressive episodes are often time limited and may not have been fully identified at annual evaluations. The CES-D, with a cut point at 16 and higher, is a standard measure of depressive symptoms and may not indicate a clinical diagnosis of depressive disorder, although it is noteworthy that results were similar with a higher cut point of 25 or more. We evaluated several covariates of depressive symptoms, but other factors likely exist. To extend interpretations of these findings, we are investigating longitudinal patterns of sleep disturbance and vasomotor symptoms to evaluate their joint relationships with depression. Finally, studies are needed to extend or refute these findings of a decreased risk of depression after menopause, particularly for women who had no history of depression before the menopause transition.

Major strengths of the study include the analytic approach that evaluated within-woman changes in depressive symptoms relative to the FMP for 10 years before and 8 years after natural menopause in a population-based sample. All women had a premenopausal baseline and reached menopause during the study, thereby providing a clear identification of menopause with minimal recall bias. Longitudinal measures defined the rate of change (slope) in reproductive hormones before the FMP to uniquely evaluate the rate of change prior to menopause as predictors of depressive symptoms after the FMP.

Although only a small percentage of women experience mood difficulties in relation to menopause, many want to know what to expect in this transition period. Women overall can expect a low risk of depressive symptoms after the second year following menopause.

Clinician review of depressive symptoms is needed to provide treatment when symptoms are debilitating and to evaluate the effect of depression on other major disorders, such as cardiovascular disease, metabolic syndrome, and osteoporosis. Women with a history of depression may benefit from an antidepressant or psychotherapy appropriate for a chronic disorder. However, women with no history of depression may have a low risk of depressive symptoms after the second postmenopausal year and benefit from short-term hormone therapy or short-term treatments with antidepressants that have demonstrated efficacy for menopausal symptoms. Further studies to confirm these findings and elucidate the risk of depressive symptoms in later postmenopausal years are warranted.

Table 5. FSH Rate of Change Before FMP as a Predictor of Postmenopausal Depressive Symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds Ratio (95% CI)</td>
<td>P Value</td>
<td>Odds Ratio (95% CI)</td>
<td>P Value</td>
</tr>
<tr>
<td>FSH rate of change, 4 y</td>
<td>0.63* (0.46-0.84)</td>
<td>.004</td>
<td>0.65* (0.46-0.91)</td>
<td>.01</td>
</tr>
<tr>
<td>Time after menopause, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥2</td>
<td>0.49 (0.35-0.69)</td>
<td>&lt;.001</td>
<td>0.49 (0.35-0.69)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>&lt;2</td>
<td>1 Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of depression</td>
<td>6.52 (2.76-15.42)</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First depression in study</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before menopause</td>
<td>1.12 (0.34-3.65)</td>
<td>.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menopause transition</td>
<td>1.61 (0.56-4.61)</td>
<td>.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No depression before FMP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current medication</td>
<td>1.98 (1.14-3.44)</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: FMP, final menstrual period; FSH, follicle-stimulating hormone.
* Odds ratio indicates the likelihood of postmenopausal depressive symptoms for each 1SD (.33) increase in the rate of change (slope) for log hormone FSH.
* Wald statistic for overall test of significance.

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Depressive Symptoms Around Natural Menopause

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REFERENCES