Supplemental Table 1. Sleep characteristics, sociodemographic characteristics, health behaviors, and clinical characteristics overall and by race among 39,071 adult women in the Sister Study.

	All	White	Black	Hispanic
Sample size, *N* (%)	39,071	34,062 (87)	3,167 (8)	1,842 (5)
Sociodemographic characteristics				
Age, years	54.8 ± 8.8	55.2 ± 8.8	52.4 ± 8.1	52.2 ± 8.9
Educational attainment				
<HS	1	1	1	8
HS/GED	13	14	8	14
Some college	33	32	34	35
≥Bachelor's	53	53	57	43
Marital Status				
Married or living as married	76	79	54	69
Single/never married	5	4	14	7
Widowed/separated/divorced	19	17	32	24
Currently working shift/irregular hours, yes	15	15	14	10
Total years worked shifts				
None	62	61	68	74
1 to 2	3	3	3	3
3 to 4	8	9	7	7
>4	26	27	22	16
Sleep characteristics				
Sleep duration *				
Recommended (7-9 hours)	72	75	47	63
Short (<7 hours)	28	25	53	37
Time to fall asleep				
≤30 minutes	83	85	73	73
>30 minutes	17	15	27	27
Frequent night awakenings †				
No	87	87	89	86
Yes	13	13	11	14
Napping frequency				
<3 times/week	91	91	88	87
≥3 times/week	9	9	12	13
Cumulative sleep score ‡				
0	53	55	32	41
1	32	31	41	36
2 to 4	16	14	27	23
Sleep medication use, yes §	11	11	7	9
Health behaviors				
Alcohol consumption status				
Current	83	85	73	71
Past	13	12	22	17
Never	3	3	5	12
Smoking status				
Current	8	8	9	7
Past	35	36	23	22
Never	57	56	68	71
Diet (daily glycemic load)	84.9 ± 39.1	83.7 ± 36.8	94.3 ± 53.4	90.7 ± 48.7

Physical activity (Metabolic Equivalent of Task hours)	51.6 ± 31.4	52.1 ± 31.5	46.3 ± 29.9	50.6 ± 31.2
Clinical characteristics				
Mean Waist-to-hip ratio	0.80 ± 0.08	0.80 ± 0.08	0.82 ± 0.08	0.82 ± 0.07
Waist Circumference (cm) over NHLBI guidelines (yes)	36	35	55	38
Mean BMI (kg/m²)	27.2 ± 5.8	26.9 ± 5.7	30.5 ± 6.6	27.6 ± 5.5
Menopause, yes	62	63	53	54
Hypertension, yes	37	36	55	35
Clinical depression, yes	19	20	14	22

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (N = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Incident T2DM rate per 1000 person-years by race/ethnicity: White 4.7, Black 11.7, Hispanic/Latina 10.1.

The following variables had missing data: diet (daily glycemic load), N = 825, 2% [white, n=505, 2%; black, n=229, 7%; Hispanic/Latina, n=91, 5%). All other variables with missing values were ≤1% of the total sample.

Waist circumference measurements >88 cm for females was defined as exceeding guidelines per the National Heart, Lung and Blood Institute (NHLBI).

Supplementary Table 2. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, stratified by status of shift work/irregular work hours.

Shift work / Irregular work hours (Yes/No)	Model I HR (95% CIs)		Model II HR (95% CIs)		Model III HR (95% CIs)		Model IV HR (95% CIs)	
	Yes	No	Yes	No	Yes	No	Yes	No
Sleep duration *								
Short Sleep [a] vs. Recommended (reference)	**1.55 (1.19-2.02)**	**1.31 (1.18-1.46)**	**1.36 (1.04-1.78)**	1.10 (0.99-1.23)	**1.39 (1.06-1.82)**	1.07 (0.96-1.20)	1.27 (0.96-1.67)	0.99 (0.89-1.11)
Time to fall asleep								
>30 minutes vs. ≤30 minutes (reference)	1.22 (0.88-1.68)	**1.40 (1.24-1.58)**	1.11 (0.81-1.53)	**1.19 (1.05-1.34)**	1.03 (0.74-1.44)	**1.16 (1.02-1.31)**	0.98 (0.70-1.36)	1.10 (0.97-1.25)
Frequent night awakenings								
Yes † vs. No (reference)	**1.51 (1.08-2.10)**	**1.18 (1.03-1.36)**	**1.48 (1.06-2.06)**	1.14 (0.99-1.32)	**1.47 (1.05-2.06)**	1.13 (0.98-1.31)	1.32 (0.94-1.86)	1.06 (0.92-1.22)
Napping Frequency								
≥3 times/week vs. <3 times/week (reference)	**1.79 (1.25-2.57)**	**1.63 (1.41-1.88)**	**1.61 (1.12-2.31)**	**1.49 (1.29-1.72)**	1.44 (0.99-2.09)	**1.35 (1.17-1.57)**	1.31 (0.90-1.91)	**1.18 (1.01-1.37)**
Cumulative sleep score ‡								
1 vs. 0 (reference)	**1.37 (1.03-1.83)**	**1.25 (1.11-1.40)**	1.25 (0.94-2.32)	1.12 (1.00-1.26)	1.26 (0.94-1.69)	1.07 (0.95-1.20)	1.13 (0.84-1.52)	1.02 (0.91-1.15)
2 to 4 vs. 0 (reference)	**1.93 (1.39-2.69)**	**1.69 (1.48-1.93)**	**1.67 (1.19-2.33)**	**1.36 (1.19-1.56)**	**1.58 (1.12-2.22)**	**1.27 (1.11-1.46)**	1.41 (1.00-1.99)	1.11 (0.97-1.27)

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (N = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m²) measured at baseline

Supplementary Table 3. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for body mass index.

Body Mass Index (kg/m²)	Model I HR (95% CIs)	Model II HR (95% CIs)	Model III HR (95% CIs)	Model IV HR (95% CIs)
Sleep duration				
Short Sleep * vs. Recommended (reference)				
Underweight/Normal	**1.63 (1.21-2.20)**	**1.41 (1.03-1.91)**	1.34 (0.98-1.83)	**1.43 (1.05-1.96)**
Overweight	1.15 (0.95-1.39)	0.99 (0.82-1.21)	1.00 (0.82-1.22)	1.02 (0.83-1.24)
Obese	1.11 (0.97-1.25)	1.03 (0.90-1.17)	1.00 (0.88-1.15)	1.01 (0.89-1.16)
Time to Fall Asleep				
>30 minutes vs. ≤30 minutes (reference)				
Underweight/Normal	**2.31 (1.69-3.17)**	**1.96 (1.42-2.71)**	**1.88 (1.35-2.62)**	**1.84 (1.32-2.56)**
Overweight	1.29 (1.05-1.60)	1.14 (0.92-1.41)	1.14 (0.92-1.42)	1.12 (0.90-1.39)
Obese	1.01 (0.87-1.17)	0.97 (0.83-1.13)	0.93 (0.80-1.09)	0.94 (0.80-1.10)
Frequent night awakenings				
Yes † vs. No (reference)				
Underweight/Normal	1.30 (0.88-1.92)	1.31 (0.89-1.94)	1.34 (0.91-1.99)	1.33 (0.90-1.98)
Overweight	1.22 (0.96-1.54)	1.20 (0.94-1.53)	1.24 (0.97-1.58)	1.24 (0.97-1.59)
Obese	1.06 (0.90-1.25)	1.04 (0.88-1.23)	1.02 (0.86-1.21)	1.02 (0.86-1.21)
Napping Frequency				
≥3 times/week vs. <3 times/week (reference)				
Underweight/Normal	**2.00 (1.35-2.97)**	**1.75 (1.17-2.61)**	**1.73 (1.15-2.59)**	**1.76 (1.18-2.64)**
Overweight	**1.47 (1.14-1.89)**	**1.37 (1.06-1.76)**	1.27 (0.98-1.65)	1.25 (0.96-1.63)
Obese	**1.30 (1.10-1.54)**	**1.28 (1.08-1.52)**	1.18 (0.99-1.41)	1.14 (0.95-1.36)
Cumulative sleep score ‡				
Underweight/Normal				
1 vs. 0 (reference)	**1.46 (1.05-2.03)**	1.32 (0.95-1.85)	1.28 (0.92-1.80)	1.32 (0.94-1.85)
2 to 4 vs. 0 (reference)	**2.72 (1.91-3.87)**	**2.21 (1.53-3.18)**	**2.11 (1.46-3.05)**	**2.19 (1.51-3.16)**
Overweight				
1 vs. 0 (reference)	**1.33 (1.09-1.61)**	1.20 (0.99-1.46)	**1.18 (0.97-1.45)**	1.21 (0.99-1.47)
2 to 4 vs. 0 (reference)	**1.42 (1.12-1.80)**	1.20 (0.94-1.53)	1.20 (0.94-1.53)	1.19 (0.93-1.52)
Obese				
1 vs. 0 (reference)	0.97 (0.85-1.11)	0.93 (0.81-1.07)	0.89 (0.77-1.02)	0.91 (0.79-1.05)
2 to 4 vs. 0 (reference)	1.19 (1.02-1.39)	1.12 (0.94-1.30)	1.03 (0.88-1.21)	1.03 (0.87-1.21)

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (N = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m2) measured at baseline

Supplementary Table 4. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for age category.

Age Category	Model II HR (95% CIs)	Model III HR (95% CIs)	Model IV HR (95% CIs)
Sleep duration			
Short Sleep * vs. Recommended (reference)			
35-44	**1.49 (1.08-2.06)**	**1.44 (1.03-2.00)**	1.30 (0.93-1.81)
45-54	**1.20 (1.02-1.41)**	1.17 (0.99-1.38)	1.06 (0.89-1.25)
55-64	1.06 (0.90-1.26)	1.00 (0.84-1.19)	0.92 (0.77-1.09)
65+	1.14 (0.87-1.48)	1.13 (0.87-1.48)	1.13 (0.86-1.48)
Time to Fall Asleep			
>30 minutes vs. ≤30 minutes (reference)			
35-44	0.97 (0.64-1.45)	0.92 (0.61-1.40)	0.82 (0.54-1.25)
45-54	**1.26 (1.04-1.52)**	1.17 (0.96-1.42)	1.11 (0.91-1.34)
55-64	1.07 (0.88-1.30)	1.05 (0.86-1.28)	0.97 (0.80-1.18)
65+	**1.48 (1.12-1.95)**	**1.43 (1.08-1.89)**	**1.43 (1.08-1.90)**
Frequent night awakenings			
Yes † vs. No (reference)			
35-44	1.17 (0.72-1.90)	1.15 (0.69-1.90)	1.03 (0.62-1.71)
45-54	**1.41 (1.15-1.73)**	**1.37 (1.11-1.68)**	1.20 (0.98-1.48)
55-64	0.96 (0.77-1.20)	0.97 (0.78-1.21)	0.94 (0.75-1.18)
65+	1.29 (0.95-1.76)	1.29 (0.95-1.77)	1.25 (0.92-1.71)
Napping Frequency			
≥3 times/week vs. <3 times/week (reference)			
35-44	**2.06 (1.33-3.19)**	**1.71 (1.08-2.73)**	1.50 (0.94-2.42)
45-54	**1.62 (1.29-2.04)**	**1.45 (1.14-1.83)**	1.20 (0.94-1.53)
55-64	**1.46 (1.16-1.82)**	1.34 (1.06-1.69)	1.12 (0.89-1.41)
65+	1.28 (0.95-1.72)	1.25 (0.93-1.68)	1.14 (0.84-1.54)
Cumulative sleep score ‡			
35-44			
1 vs. 0 (reference)	1.36 (0.97-1.92)	1.32 (0.93-1.88)	1.16 (0.81-1.66)
2 to 4 vs. 0 (reference)	**1.62 (1.07-2.47)**	1.42 (0.91-2.21)	1.22 (0.78-1.90)
45-54			
1 vs. 0 (reference)	1.15 (0.96-1.38)	**1.11 (0.92-1.33)**	1.04 (0.86-1.25)
2 to 4 vs. 0 (reference)	**1.60 (1.31-1.96)**	**1.46 (1.18-1.79)**	1.20 (0.98-1.48)
55-64			
1 vs. 0 (reference)	1.12 (0.95-1.34)	1.05 (0.88-1.26)	0.98 (0.82-1.16)
2 to 4 vs. 0 (reference)	1.17 (0.94-1.44)	1.10 (0.87-1.36)	0.94 (0.76-1.16)
65+			
1 vs. 0 (reference)	1.07 (0.81-1.42)	1.04 (0.79-1.38)	1.02 (0.77-1.36)
2 to 4 vs. 0 (reference)	**1.61 (1.19-2.17)**	**1.58 (1.17-2.13)**	**1.50 (1.11-2.03)**

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (N = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m2) measured at baseline

Supplementary Table 5. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for sleep medication use.

	Model I		Model II		Model III		Model IV	
	HR (95% CIs)		HR (95% CIs)		HR (95% CIs)		HR (95% CIs)	
Sleep Medication Use (Yes/No)	Yes	No	Yes	No	Yes	No	Yes	No
Sleep duration *								
Short Sleep vs. Recommended (reference)	1.14 (0.85-1.51)	**1.37 (1.23-1.52)**	1.04 (0.77-1.39)	**1.15 (1.03-1.28)**	1.02 (0.76-1.38)	**1.12 (1.01-1.26)**	0.99 (0.73-1.34)	1.03 (0.92-1.15)
Time to fall asleep								
>30 minutes vs. ≤30 minutes (reference)	**1.44 (1.09-1.90)**	**1.33 (1.17-1.51)**	**1.34 (1.01-1.77)**	1.13 (0.99-1.28)	1.31 (0.99-1.74)	1.09 (0.96-1.25)	1.25 (0.94-1.66)	1.03 (0.91-1.18)
Frequent night awakenings								
Yes † vs. No (reference)	0.89 (0.62-1.28)	**1.27 (1.11-1.46)**	0.87 (0.61-1.25)	**1.24 (1.08-1.42)**	0.89 (0.62-1.27)	**1.23 (1.07-1.41)**	0.88 (0.61-1.27)	1.12 (0.97-1.29)
Napping Frequency								
≥3 times/week vs. <3 times/week (reference)	1.55 (1.07-2.24)	**1.66 (1.43-1.91)**	1.49 (1.03-2.15)	**1.50 (1.30-1.73)**	1.39 (0.95-2.02)	**1.35 (1.17-1.57)**	1.27 (0.87-1.86)	**1.19 (1.02-1.38)**
Cumulative sleep score ‡								
1 vs. 0 (reference)	1.28 (0.93-1.75)	**1.26 (1.12-1.41)**	1.22 (0.89-1.67)	**1.12 (1.00-1.25)**	1.24 (0.87-1.75)	1.07 (0.95-1.20)	1.17 (0.85-1.61)	1.01 (0.90-1.14)
2 to 4 vs. 0 (reference)	1.41 (1.01-1.98)	**1.75 (1.54-2.00)**	1.27 (0.90-1.79)	**1.41 (1.23-1.61)**	1.24 (0.91-1.71)	**1.32 (1.15-1.51)**	1.13 (0.80-1.61)	1.13 (0.99-1.30)

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (*N* = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m²) measured at baseline

Supplementary Table 6. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for type 2 diabetes incidence starting one year after baseline.

	Model I		Model II		Model III		Model IV	
	HR (95% CIs)		HR (95% CIs)		HR (95% CIs)		HR (95% CIs)	
Incidence Starting at One Year from Baseline (Yes/No)	1 year	Baseline	1 year	Baseline	1 year	Baseline	1 year	Baseline
Sleep duration *								
Short Sleep vs. Recommended (reference)	**1.36 (1.23-1.51)**	**1.34 (1.21-1.48)**	**1.15 (1.03-1.28)**	**1.13 (1.02-1.26)**	**1.13 (1.01-1.26)**	**1.11 (1.00-1.23)**	1.03 (0.93-1.15)	1.03 (0.92-1.14)
Time to fall asleep								
>30 minutes vs. ≤30 minutes (reference)	**1.34 (1.19-1.51)**	**1.36 (1.21-1.53)**	**1.16 (1.02-1.31)**	**1.18 (1.05-1.32)**	**1.14 (1.00-1.29)**	**1.14 (1.01-1.28)**	1.07 (0.94-1.21)	1.08 (0.96-1.22)
Frequent night awakenings								
Yes † vs. No (reference)	**1.22 (1.07-1.39)**	**1.22 (1.07-1.39)**	**1.18 (1.03-1.35)**	**1.19 (1.04-1.35)**	**1.17 (1.02-1.34)**	**1.18 (1.03-1.34)**	1.07 (0.93-1.23)	1.09 (0.95-1.24)
Napping Frequency								
≥3 times/week vs. <3 times/week (reference)	**1.60 (1.39-1.85)**	**1.64 (1.44-1.88)**	**1.46 (1.27-1.69)**	**1.50 (1.31-1.72)**	**1.34 (1.15-1.55)**	**1.36 (1.19-1.57)**	**1.16 (1.00-1.35)**	**1.20 (1.04-1.37)**
Cumulative sleep score ‡								
1 vs. 0 (reference)	**1.27 (1.14-1.42)**	**1.26 (1.13-1.40)**	**1.14 (1.02-1.28)**	**1.14 (1.02-1.27)**	1.10 (0.98-1.23)	1.09 (0.98-1.22)	1.03 (0.92-1.16)	1.04 (0.93-1.15)
2 to 4 vs. 0 (reference)	**1.70 (1.50-1.93)**	**1.71 (1.51-1.93)**	**1.38 (1.21-1.58)**	**1.40 (1.23-1.58)**	**1.31 (1.14-1.50)**	**1.31 (1.15-1.49)**	1.12 (0.98-1.29)	**1.14 (1.00-1.30)**

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (*N* = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m2) measured at baseline

Supplementary Table 7. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for baseline menopausal status.

Menopausal status	Model I		Model II		Model III		Model IV	
	HR (95% CIs)		HR (95% CIs)		HR (95% CIs)		HR (95% CIs)	
	Post	Pre	Post	Pre	Post	Pre	Post	Pre
Sleep duration *								
Short Sleep vs. Recommended (reference)	**1.22 (1.08-1.38)**	**1.59 (1.34-1.89)**	1.07 (0.94-1.21)	**1.27 (1.07-1.52)**	1.06 (0.93-1.20)	**1.22 (1.01-1.46)**	0.98 (0.86-1.11)	1.11 (0.93-1.34)
Time to fall asleep								
>30 minutes vs. ≤30 minutes (reference)	**1.32 (1.15-1.51)**	**1.44 (1.17-1.77)**	**1.18 (1.02-1.35)**	1.16 (0.94-1.44)	**1.16 (1.01-1.34)**	1.08 (0.86-1.34)	1.09 (0.95-1.26)	1.04 (0.84-1.30)
Frequent night awakenings								
Yes † vs. No (reference)	1.13 (0.97-1.32)	**1.43 (1.13-1.81)**	1.12 (0.96-1.31)	**1.32 (1.04-1.68)**	1.12 (0.96-1.31)	**1.30 (1.02-1.66)**	1.04 (0.89-1.22)	1.20 (0.94-1.53)
Napping Frequency								
≥3 times/week vs. <3 times/week (reference)	**1.54 (1.32-1.81)**	**1.88 (1.47-2.40)**	**1.44 (1.22-1.68)**	**1.60 (1.25-2.05)**	**1.32 (1.12-1.56)**	**1.43 (1.10-1.84)**	1.16 (0.98-1.36)	1.23 (0.95-1.60)
Cumulative sleep score ‡								
1 vs. 0 (reference)	**1.18 (1.03-1.34)**	**1.45 (1.21-1.74)**	1.09 (0.96-1.24)	**1.22 (1.01-1.47)**	1.03 (0.91-1.18)	**1.22 (0.99-1.46)**	0.98 (0.86-1.13)	1.13 (0.93-1.37)
2 to 4 vs. 0 (reference)	**1.52 (1.32-1.77)**	**2.12 (1.71-2.64)**	**1.30 (1.12-1.51)**	**1.61 (1.29-2.01)**	**1.24 (1.07-1.45)**	**1.43 (1.14-1.81)**	1.10 (0.94-1.28)	1.25 (0.99-1.58)

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (*N* = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m2) measured at baseline

Supplementary Table 8. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep, with a sensitivity analysis for baseline clinical depression.

	Model I HR (95% CIs)		Model II HR (95% CIs)		Model III HR (95% CIs)		Model IV HR (95% CIs)	
Depression Status	Yes	No	Yes	No	Yes	No	Yes	No
Sleep duration *								
Short Sleep vs. Recommended (reference)	1.18 (0.96-1.46)	**1.40 (1.25-1.56)**	1.00 (0.80-1.24)	**1.18 (1.05-1.32)**	0.97 (0.78-1.21)	**1.16 (1.03-1.30)**	0.91 (0.73-1.14)	1.06 (0.94-1.19)
Time to fall asleep								
>30 minutes vs. ≤30 minutes (reference)	**1.32 (1.07-1.63)**	**1.31 (1.15-1.51)**	1.19 (0.96-1.48)	1.12 (0.97-1.29)	1.12 (0.90-1.40)	1.12 (0.97-1.28)	1.13 (0.90-1.41)	1.05 (0.91-1.21)
Frequent night awakenings								
Yes † vs. No (reference)	1.00 (0.77-1.30)	**1.28 (1.10-1.48)**	0.93 (0.71-1.21)	**1.26 (1.09-1.46)**	0.95 (0.73-1.25)	**1.25 (1.07-1.45)**	0.89 (0.68-1.16)	1.15 (0.99-1.34)
Napping Frequency								
≥3 times/week vs. <3 times/week (reference)	**1.54 (1.20-1.96)**	**1.62 (1.38-1.90)**	**1.47 (1.15-1.88)**	**1.45 (1.24-1.71)**	**1.32 (1.02-1.71)**	**1.34 (1.14-1.58)**	1.21 (0.93-1.56)	**1.20 (1.01-1.41)**
Cumulative sleep score ‡								
1 vs. 0 (reference)	**1.26 (1.01-1.56)**	**1.25 (1.10-1.41)**	1.14 (0.91-1.42)	1.12 (0.99-1.26)	1.12 (0.89-1.40)	1.07 (0.94-1.22)	1.08 (0.86-1.35)	1.01 (0.89-1.14)
2 to 4 vs. 0 (reference)	**1.43 (1.12-1.83)**	**1.76 (1.53-2.21)**	1.20 (0.93-1.54)	**1.42 (1.23-1.64)**	1.10 (0.85-1.42)	**1.37 (1.18-1.58)**	1.01 (0.78-1.31)	**1.19 (1.02-1.38)**

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

* Long sleep duration (>9 h) is not reported (*N* = 356).

† Frequent night awakenings was classified as "No" if participant reported waking up while sleeping less than 3 times per week and "Yes" if participant reported waking up while sleeping more than 3 times per night/day for more than 3 nights/days per week.

‡ Cumulative sleep score was calculated by summing each participant's "yes" response for each sleep characteristic. Scores range from 0 to 4, with poor sleep characteristics being combined into the category "2 to 4"

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m2) measured at baseline

Supplemental Table 9. Hazard ratios (95% CI) for type 2 diabetes risk among 39,071 adult women in the Sister Study, with women with poor sleep compared to women with recommended sleep.

	n	Model I HR (95% CIs)	Model II HR (95% CIs)	Model III HR (95% CIs)	Model IV HR (95% CIs)	Model V HR (95% CIs)
Napping Frequency						
≥3 times/week vs.	3,681	**1.65 (1.45-1.89)**	**1.50 (1.32-1.72)**	**1.36 (1.18-1.56)**	**1.19 (1.04-1.37)**	**1.30 (1.13-1.49)**
<3 times/week (reference)	35,390					
Napping Frequency						
≥3 times per week	3,681	**1.94 (1.67-2.26)**	**1.80 (1.55-2.10)**	**1.62 (1.38-1.89)**	**1.33 (1.14-1.56)**	**1.53 (1.30-1.79)**
≥once per month and <3 times per week	13,624	**1.41 (1.25-1.58)**	**1.43 (1.27-1.61)**	**1.38 (1.22-1.55)**	**1.20 (1.07-1.36)**	**1.35 (1.20-1.52)**
< once per month	8,540	1.09 (0.95-1.25)	**1.16 (1.01-1.33)**	**1.18 (1.02-1.36)**	1.12 (0.97-1.29)	**1.17 (1.01-1.34)**
Never (reference)	13,226					

HR = hazard ratio, CI = confidence interval, HS=high school, GED=general education diploma, BMI=body mass index, MET=metabolic equivalent of task. Significant hazard ratios are bolded.

Model I - adjusted for age (years) at baseline

Model II - further adjusted for race/ethnicity, educational attainment (<HS, HS/GED, some college, ≥bachelor's degree), marital status, and status of shift work/irregular hours (yes/no)

Model III - further adjusted for smoking status (current, past, never), alcohol consumption (current, past, never), diet (daily glycemic load), and physical activity (MET hours)

Model IV - further adjusted for hypertension, waist-to-hip ratio (WHR), and BMI (kg/m^2) measured at baseline

Model V - without WHR and BMI