

National Sleep Foundation's Sleep in America® Poll

Americans Can Do More During the Day to Help Their Sleep at Night

Healthy sleep can start well before nodding off.

The National Sleep Foundation's 2022 Sleep in America poll assesses how Americans' sleep health is affected by daytime activities, finding some ingrained routines that create less-than-ideal conditions for sleep. For example, appropriate light exposure, including bright light during the day and dim light at night, helps regulate the circadian rhythm, the natural sleep/wake process behind healthy sleep. However, nearly half of Americans say they're not exposed to bright light indoors in the morning and afternoon and most indulge in screen time too close to bedtime. Similarly, meals can act as an important cue for the circadian rhythm and help regulate this sleep/wake cycle, but four in 10 Americans take meals at irregular times. Finally, physical activity has widespread health benefits and promotes deeper sleep at night, but many people are sedentary for much of the day and more than a third fall short of CDC recommendations for moderate or vigorous activity.

The Sleep in America poll also found that self-reported personal stress and overall health have an important impact on sleep, with less-stressed and healthier people reporting better sleep, even when daytime and nighttime routines are less than ideal. This aligns with previous National Sleep Foundation research establishing personal stress and overall health as key predictors of sleep health. Moreover, personal health and daily habits are related. For example, people who get less light, are less active and eat on a less consistent schedule are less apt than others to report being in excellent or very good health. That's likely bi-directional – for example, poor health can lead to less exercise, while less exercise contributes to poorer health. Regardless, they're associated – and while health and stress are hard to manage directly, daily routines can be easier to address.

The Sleep in America poll is an annual study that explores attitudes on sleep and related topics, fielded concurrently with National Sleep Foundation's quarterly Sleep Health Index® (SHI). The SHI is a validated gauge of the nation's sleep health in three domains: sleep quality, sleep duration and disordered sleep. In Q4 2021, the score was 77 on a 0-100 scale, similar to its long-term average in results since 2016. (See the separate Q4 2021 SHI report for details.)

Light Exposure

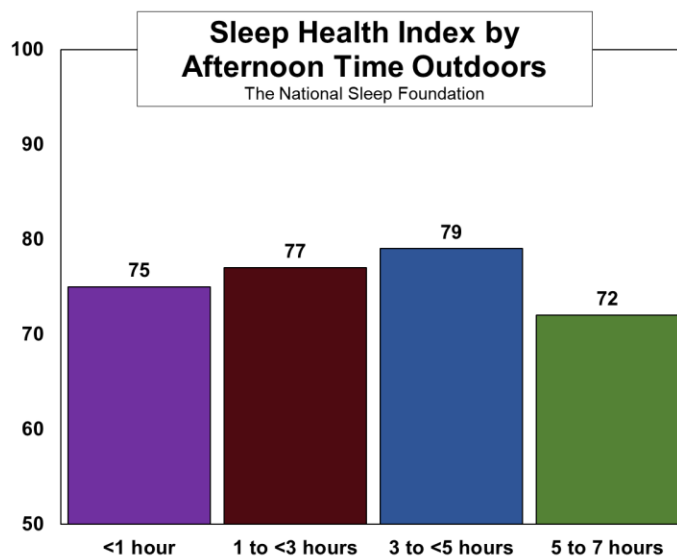
Light exposure plays an important role in regulating circadian rhythms.¹ Bright light during the day, especially in the morning, helps people wake up, while dim light in the evening, especially before bed, helps people fall asleep.

Indoor Light

Only slight majorities report exposure to bright light when they're indoors during the day, whether in the morning (51 percent) or afternoon (53 percent). Most of the rest call their environment neither bright nor dim. Women and people with \$100,000+ household incomes are 8 to 13 points more likely than men or those making less than \$50,000 a year to call their indoor environments bright at both times of day.² SHI scores are lower among those exposed only to dim light in the morning, 73 vs. 77 among those exposed to bright light and 78 for neither dim nor bright light.

Outdoor Time

Outdoor time also can provide substantial light exposure during the day. Most people report at least an hour of time outside in both the morning and afternoon each day, averaging 1.5 hours in the morning during daylight hours and 2.0 hours in the afternoon. Overall, 85 percent say they got at least an hour of outdoor daylight during these periods in the previous week, on average. Men and those without college degrees report spending more time outside at both times than women and college graduates, with differences of 30 minutes or more on average.



Sleep health is best among those spending a moderate amount of time outdoors in the afternoon, with the SHI peaking at 79 among those getting from three to less than five hours of afternoon daylight, while falling to 72 for those with five or more hours outside. Differences are less pronounced in the morning.

Summed up, there can be general health and psychological benefits to light exposure, whether through indoor light or time spent outdoors. While

¹ Wams et al. (2017) Linking light exposure and subsequent sleep: A field polysomnography study in humans. *Sleep* 40(12):zsx165. <https://doi.org/10.1093/sleep/zsx165>; Burns et al. (2021) Time spent in outdoor light is associated with mood, sleep, and circadian rhythm-related outcomes: A cross-sectional and longitudinal study in over 400,000 UK Biobank participants. *Journal of Affective Disorders* 295:347-352. <https://doi.org/10.1016/j.jad.2021.08.056>.

² All differences described in this report have been tested for statistical significance at the 95 percent confidence level.

neither independently predicts differences in the SHI or its subindices in regression analysis, effects could be transferred through factors such as stress, health or other routines. For instance, those who report a bright environment in the mornings are 10 points more likely than others to say they're in excellent or very good health, 41 vs. 31 percent.

Screen Use

One major source of artificial light present in Americans' daily routines comes from computer, tablet and smartphone screens. Majorities say they looked at screens very or somewhat often during the past week during the day (80 percent), in the evening (68 percent), and – most troubling from a sleep health perspective – within an hour before bedtime, or in bed before sleep (58 percent). Sleep research suggests that light exposure within two hours of bedtime can be the most disruptive to one's sleep cycle.³

Screen time aligns with SHI results. The SHI is 74 among those who very often look at screens at bedtime, compared with 79 among their least-tethered counterparts, with worse sleep quality and sleep duration. (The 5-point difference, like all differences described in this report, is statistically significant.) As a practical example, very frequent bedtime screen users report trouble falling asleep on 2.6 days in a week on average, compared with 1.8 days among those who rarely or never look at screens before bed. Those bedtime screen users also report more days in the previous week as having been impacted by sleep problems, 2.0 vs. 1.3.

The screen-time relationship with sleep health holds up in regression analysis even after controlling for stress, health, other lifestyle factors and demographic variables such as age, sex and income.

Previous National Sleep Foundation research backs up these findings. Analyses in 2018 and 2017 found that looking at screens in bed on more days of the week was linked to worse sleep health, with particular damage from using devices after awakening partway through the night.

Bedtime screen use is much more prevalent among the young but occurs among older Americans as well. Forty-four percent of those age 50 and older often look at screens at bedtime; it's 71 percent among those younger than 50, with 46 percent doing so very often. It's also more common among Hispanic people, 67 percent, compared with 55 percent of white people and 53 percent of Black people. There are also notable differences by race and ethnicity in evening screen use (77 percent of Hispanic people vs. 65 percent of white people, with Black people between at 68 percent).

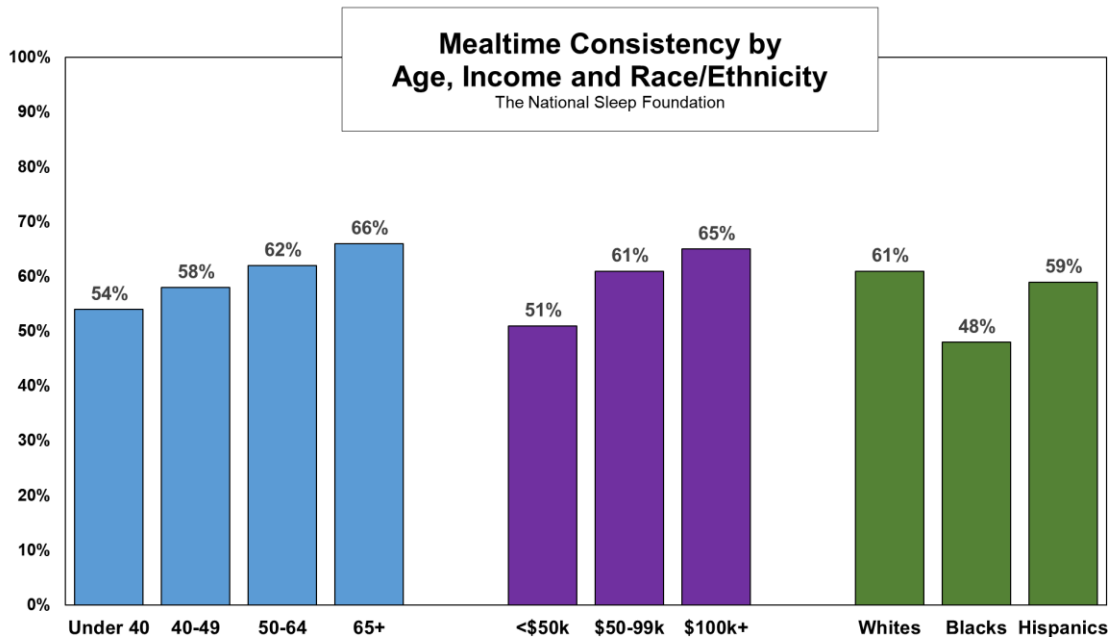
³ Centers for Disease Control and Prevention. "Effects of Light on Circadian Rhythms." April 1, 2020. <https://www.cdc.gov/niosh/emres/longhourstraining/light.html>; Gradisar et al. (2013) The sleep and technology use of Americans: Findings from the National Sleep Foundation's 2011 Sleep in America poll. *Journal of Clinical Sleep Medicine* 9(12):1291-9. <https://doi.org/10.5664/jcsm.3272>

Mealtime Consistency

Food intake is another crucial element of the body’s daily cycle. Irregular mealtimes or skipped meals can negatively influence the ability to maintain sleep and wake schedules, especially if meals are eaten too close to bedtime.⁴

Most Americans say they typically eat breakfast, lunch and dinner around the same times each day (or habitually skip one of these meals) – seven in 10 or more for lunch and dinner alike and 81 percent for breakfast. But fewer, 59 percent, say they eat all meals at around the same time, leaving a substantial four in 10 who don’t.

Mealtime consistency is significantly associated with higher SHI scores, 78 among those eating all meals around the same time vs. 74 among those with more irregular schedules. This effect isn’t independently significant in regression analysis when controlling for other factors, but again, there’s an indirect relationship: People with consistent meal schedules are 14 points more likely than those with irregular mealtimes to report low stress, 58 vs. 44 percent.



Among groups, older people are more likely than younger adults to eat all meals around the same time, with 66 percent of seniors doing so compared with 54 percent of those younger than 40. There’s also a big income gap: Two-thirds of those with \$100,000+ household incomes report

⁴ Wehrens et al. (2017) Meal timing regulates the human circadian system. *Current Biology* 27(12): 1768-1775. <https://dx.doi.org/10.1016/j.cub.2017.04.059>; Faris et al. (2021) Eating habits are associated with subjective sleep quality outcomes among university students: findings of a cross-sectional study. *Sleep and Breathing*. <https://doi.org/10.1007/s11325-021-02506-w>; Shimura et al. (2020) Which sleep hygiene factors are important? Comprehensive assessment of lifestyle habits and job environment on sleep among office workers. *Sleep Health* 6(3):288-298. <https://doi.org/10.1016/j.sleh.2020.02.001>

regular mealtimes, compared with 51 percent of those with incomes less than \$50,000. And Black people are less likely than others to eat all meals at the same time, 48 percent vs. six in 10.

Physical Activity

Physical activity, too, can help regulate when the body expects to be awake and asleep and promote deeper sleep at night.⁵ While nearly all Americans say they participated in some kind of light activity (such as walking slowly) at least once in the past week, higher intensity activity is less common. Nearly one in six reports no moderate activity, such as brisk walking; and 45 percent did no vigorous activity, such as jogging. The median weekly time spent doing moderate-to-vigorous activity, including those who did not report any activity, is 4.7 hours. That exceeds the 2.5 hours recommended by the CDC, but 36 percent fall short of that mark even by their own reckoning.⁶ (Over- and under-reporting both may occur.⁷) Hispanic people (67 percent) and those younger than 30 (65 percent) are most likely to report moderate to vigorous activity that meets the CDC's recommended benchmark. Least likely are Midwesterners and Black adults (both 53 percent). There's also a gender gap: Men are 7 points more likely than women to hit the recommended 2.5 hours, 63 vs. 56 percent.

When they're not physically active, Americans spend much of their time seated. The median reported sitting time is 6 hours on weekdays and 5.5 hours on weekends. That's 41 hours sitting down, or 24 percent of the hours in a week. Sitting time can include not only desk work but also lounging on a couch or driving in a car. Under-reporting, in this case, may be a factor.⁸ Being sedentary not only prevents one from reaping the benefits of movement but also has been associated with negative health consequences that can't be offset by additional physical activity.⁹ Additionally, sitting too long in ergonomically unsound positions, such as at a poorly fitted workspace, can generate or compound musculoskeletal issues.¹⁰

There's little evidence of direct, linear links between active or seated time and sleep health in these data. But again, physical activity and sedentary behaviors do show connections with overall health. Median weekday sitting time is 6.0 hours among those in excellent or good health,

⁵ Kubala et al. (2020) The association between physical activity and a composite measure of sleep health. *Sleep and Breathing* 24(3):1207-1214. <https://doi.org/10.1007/s11325-019-02007-x>

⁶ U.S. Department of Health and Human Services. *Physical Activity Guidelines for Americans*. 2nd ed. Washington, DC: U.S. Department of Health and Human Services; 2018. https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

⁷ Prince et al. (2008) A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 5. <https://doi.org/10.1186/1479-5868-5-56>

⁸ See Prince et al. (2020). A comparison of self-reported and device measured sedentary behaviour in adults: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* 17, 31 <https://doi.org/10.1186/s12966-020-00938-3>; Lagersted-Olsen et al. (2014) Comparison of objectively measured and self-reported time spent sitting. *International Journal of Sports Medicine* 35(6):534-540. <https://doi.org/10.1055/s-0033-1358467>

⁹ Dunstan et al. (2012) Too much sitting – A health hazard. *Diabetes Research and Clinical Practice* 97(3): 368-376. <https://doi.org/10.1016/j.diabres.2012.05.020>

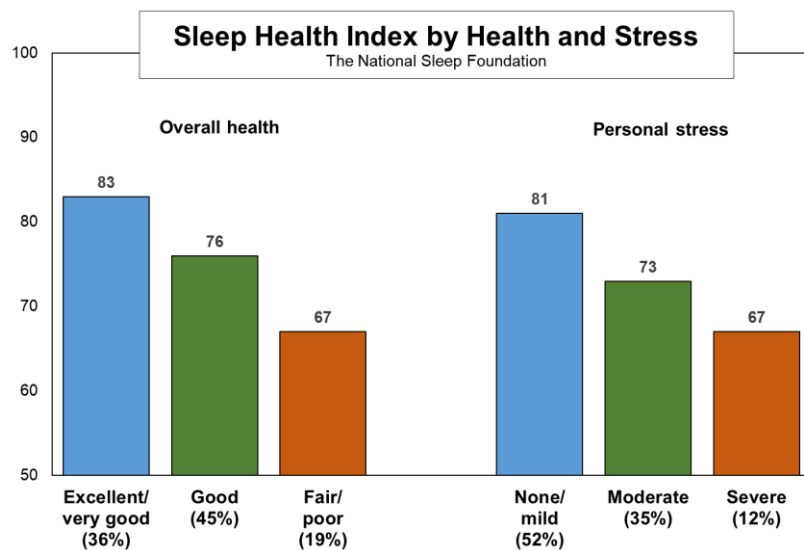
¹⁰ For instance, see Todd, A., Bennett, A. & Christie, C. (2007) Physical implications of prolonged sitting in a confined posture - a literature review. *Ergonomics SA* 19(2). <https://journals.co.za/doi/abs/10.10520/EJC33263>

compared with 8.0 hours among those with only fair or poor health. Conversely, those in excellent or good health report a median of 6.0 hours of moderate or vigorous activity per week, vs. 2.3 hours for those in fair or poor health.

Health, Stress and Sleep

Most Americans describe their health as good (45 percent), very good (29 percent) or excellent (7 percent), but one in five says it's only fair or poor. That has consequences for the nation's sleep health at large. Those in the best overall health have an average SHI score of 83, compared with 76 among those in good health and just 67 among those whose health is worse than that – dramatic differences.

The pattern is mirrored when considering personal stress. About half report mild or no stress in the past week, and their average SHI score is 81. Thirty-five percent report moderate stress, with an SHI score of 73; and finally 12 percent have severe or very severe stress, with an SHI of 67.



The strong relationships between stress, overall health and sleep health replicate previous National Sleep Foundation research, most recently in the Q3 2020 and Q3 2017 SHI studies.

Men, people age 50 and older, those with \$100,000+ household incomes and those without children all are less likely than others to report stress. Conversely, those without college educations and Black people are less likely to report very good or excellent health, as are those with lower incomes.

This study documents shortfalls in daily routines that are associated in the literature with a range of positive health, stress and sleep outcomes. Nearly half of Americans say they're not exposed to bright light in the morning and afternoon and over half of Americans often look at screens within an hour before bedtime or in bed before sleep. More than a third of Americans fall short of CDC recommendations for moderate or vigorous activity and when they're not physically active, Americans spend much of their time seated. Finally, four in 10 Americans take meals at irregular times. These behaviors not only make it more difficult to maintain a healthy sleep/wake cycle, but are clearly associated with one or both of the strongest predictors of sleep health, personal stress and overall health. Making changes to daytime habits can help set the stage for better sleep, less stress and better overall health.

Appendix A. Methodology and Topline Results

This quarter's survey for the National Sleep Foundation was conducted among a random national sample of 1,082 adults, Nov. 5-15, 2021. Results have a margin of sampling error of 3.2 points for the full quarterly sample. Error margins are larger for subgroups.

The survey was produced by [Langer Research Associates](#) of New York, N.Y., with sampling and data collection by Ipsos Public Affairs via its online KnowledgePanel®, which provides internet access to randomly recruited participants.

Full results follow. * = <0.5%

1-14 released separately.

15. Thinking about the last seven days, on average, about how many hours per day did you spend outdoors during daylight hours?

Summary Table - 11/15/21

	----- Number of hours outdoors -----					Mean	SD	Skipped
	<1	1 to <3	3 to <5	5 to 7				
a. In the morning	37	42	13	6	1.5	1.6	2	
b. In the afternoon	24	45	21	8	2.0	1.7	2	

16. Now thinking about when you are indoors during the daytime, considering both the natural light that comes in and the electric lights that are on, how bright or dim is it usually?

Summary Table - 11/15/21

	----- Bright -----				----- Dim -----			
	NET	Very	Bright	Neither	NET	Dim	Very	Skipped
a. In the morning	51	11	40	37	12	10	2	0
b. In the afternoon	53	10	42	38	8	7	1	1

17. In the past seven days, on average, how much of your day did you spend seated on weekdays or workdays? This could include sitting at home, at work and driving or commuting.

	----- Number of hours seated: Weekday -----					Mean	SD	Skipped
	<3	3 to <6	6 to <9	9 to <12	12+			
11/15/21	9	34	28	16	13	7.0	3.9	*

18. Now thinking about the weekend or days you did not work - in the past seven days, on average, how much of your weekend or non-work day did you spend seated?

	----- Number of hours seated: Weekend -----					Mean	SD	Skipped
	<3	3 to <6	6 to <9	9 to <12	12+			
11/15/21	11	40	26	12	12	6.4	3.6	*

19. Still thinking about the last seven days, on how many days, if at all, did you do the following kinds of activity as part of work or leisure?

Summary Table - 11/15/21

	0 days	1-2 days	3-4 days	5-6 days	7 days	Mean	SD	Skipped
a. Light physical activity, such as walking slowly or light household chores	5	20	22	15	36	4.5	2.4	2
b. Moderate physical activity, such as walking briskly, vacuuming or mowing a lawn	15	38	21	12	10	2.8	2.2	3
c. Vigorous physical activity, such as jogging, running or carrying heavy loads	45	29	11	7	3	1.4	1.9	5

20. [IF DID ACTIVITY ON AT LEAST 1 DAY] On the days you did these kinds of activities, how long did you spend doing them on average?

Summary Table - 11/15/21

	- Number of hours of activity per day -				Mean	SD	Skipped
	<1	1 to <2	2 to <3	3+			
a. Light physical activity, such as walking slowly	13	26	26	34	2.5	2.1	2
b. Moderate physical activity, such as walking briskly, vacuuming or mowing a lawn	18	32	22	26	2.1	1.9	1
c. Vigorous physical activity, such as jogging, running or carrying heavy loads	26	39	15	19	1.8	2.2	2

21. In the last seven days, how often did you look at a computer screen, tablet or smartphone?

Summary Table - 11/15/21

	--- More often ---				---- Less often ----			
	NET	Very	Somewhat	Occasionally	NET	Rarely	Never	Skip.
a. During the day	80	57	23	16	4	4	*	0
b. In the evening	68	39	29	24	8	7	1	1
c. Within an hour before bedtime, or in bed before sleeping	58	36	22	20	21	16	5	*

22. In the last seven days, did you usually have meals at (around the same time each day), or at (different times)?

Summary Table - 11/15/21

	Around the same time	Different times	Don't eat this meal	Skipped
a. Breakfast	64	19	16	*
b. Lunch	65	27	7	0
c. Dinner	68	29	2	0

23. In the last seven days, how would you describe your personal stress?

	--- None/mild ---				----- Severe -----			
	NET	None	Mild	Moderate	NET	Severe	Very	Skipped
11/15/21	52	13	39	35	12	9	3	*
7/27/20	50	12	38	38	12	10	2	*
12/20/19	51	14	38	36	13	10	3	*

24. In the last seven days, how would you describe your overall health?

	----- Better -----				----- Worse -----			
	NET	Excellent	Very good	Good	NET	Fair	Poor	Skipped
11/15/21	36	7	29	45	19	17	2	*

END