

Thank you for your enquiry.

The researchers at the Adelaide Institute for Sleep Health – a Flinders University Research Centre of Excellence (AISH:FCRE) receive many requests to provide information or interviews to assist with senior high school research projects. We have put the following information together to help answer these requests and assist you in your research about sleep.

If you wish to quote parts of each particular answer in this document, please attribute to the author listed under each section of text.

Sleep in general

1. Why do we sleep?

Simply, we sleep because it allows us to function optimally and maintain good health. Our ability to perform tasks well, have energy to get through the day, feel happy and stay healthy are all dependent on good sleep. We know this is true from observing the negative effects from just one night of inadequate or no sleep! While sleep is important for all organs, it is critical for brain function. Sleep is a highly active period for your brain, where new neural connections can be formed while others are lost. This is known as ‘neuroplasticity’, a phenomenon that allows us to develop, learn and recover. More recently, researchers have discovered that sleep cleans up all the toxins that have accumulated throughout the day, just like a garbage truck. This gives us more reason to try and get enough sleep.

Author Reference: *Dr Amal Osman, Student Sleep FAQ, Aug 2020: AISH:FCRE, Flinders University*

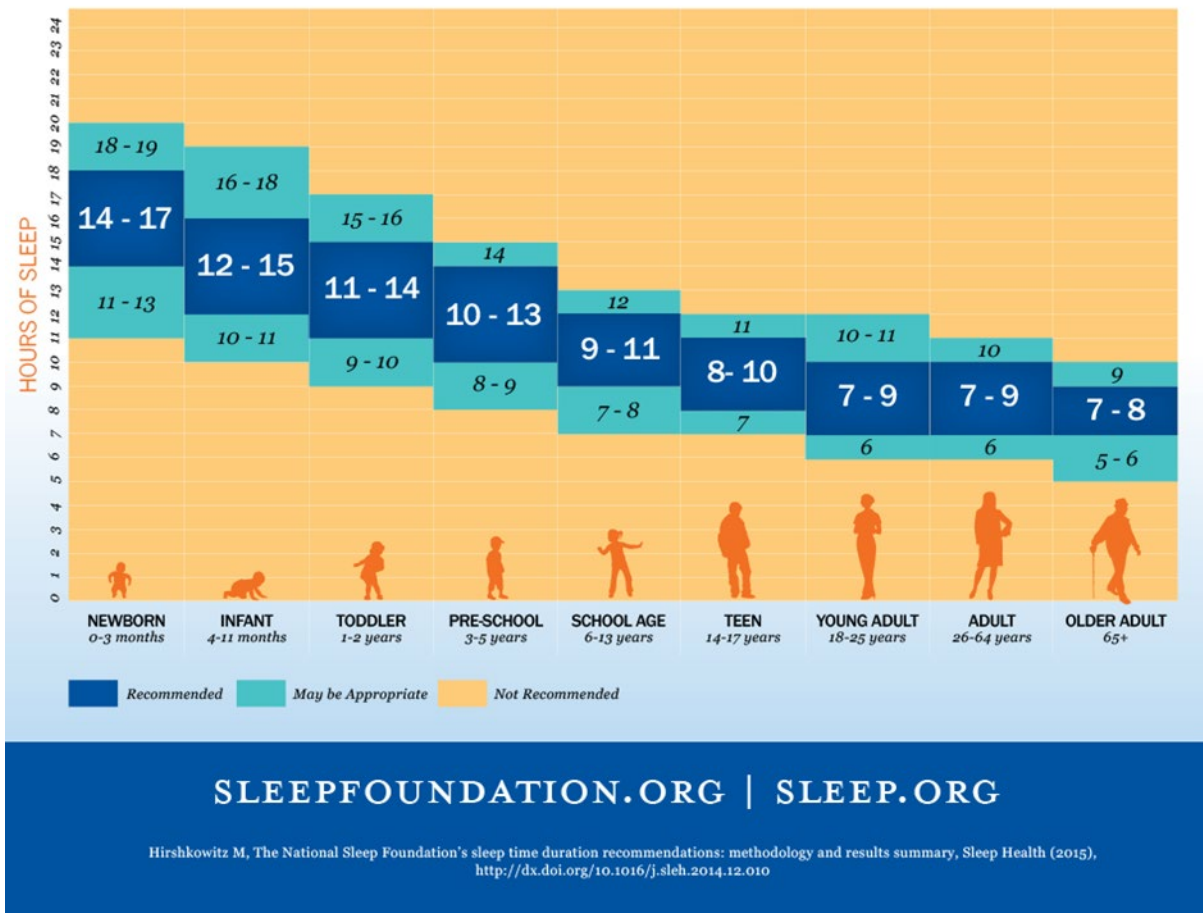
2. How much sleep do people generally need?

Most adults need between 7 and 9 hours of sleep. However, when and how much sleep you require can vary depending on age, health and lifestyle. For instance, a newborn baby will sleep more hours than they are awake, up to 16 or more hours. While teenagers could benefit from up to 9 or 10 hours of sleep. If you are feeling unwell, you may find that you need more sleep for recovery. Many people are getting insufficient sleep due to lifestyle factors such as frequently staying up late using electronic devices or socialising, working non-traditional hours like night shifts or being a new parent. Luckily, sleep can be flexible and where you find an opportunity to for a short nap or a sleep in on the weekend may help you ‘catch up’ – just make sure to work on improving your sleep hygiene to avoid long term health problems.

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SLEEP DURATION RECOMMENDATIONS



SLEEPFOUNDATION.ORG | SLEEP.ORG

Hirshkowitz M, The National Sleep Foundation's sleep time duration recommendations: methodology and results summary, Sleep Health (2015), <http://dx.doi.org/10.1016/j.sleh.2014.12.010>

3. What happens if people don't get enough sleep?

The immediate consequences of not getting enough sleep is feeling very sleepy, fatigued and tired the next day. You may have difficulty concentrating at school or work. You could be more irritable or experience mood swings. Feeling tired can place you at risk of car or workplace accidents. Long term, you may develop serious health problems such as cardiovascular disease, obesity, depression and diabetes.

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Problems with sleep

4. What sorts of issues do people have that stop them from sleeping?

While many people can improve their sleep by practicing good sleep hygiene, there are people that will require medical intervention to improve their sleep quality and duration. People with insomnia find it difficult to initiate or maintain sleep every night. People with sleep apnoea have difficulty breathing during sleep. Narcolepsy is a disorder where you feel excessive daytime sleepiness and you fall asleep anytime! All of these disorders require a visit to your GP or sleep physician for diagnosis and management.

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5. Anxiety and depression are the first to be mentioned when I ask about sleep and related mental health issues. Why is this?

The aetiology (or the cause) of these comorbidities remains unclear. Until very recently, we did not understand the relationship of these variables, all we knew was that there was a significant association between poor sleep and anxiety/depression.

In simpler terms, we did not know if poor sleep resulted in depression or if depression resulted in poor sleep. Similarly, we did not know if poor sleep caused anxiety, or if anxiety caused worse sleep. The relationship between anxiety and sleep still remains unclear. However, very recent work suggests that depression develops as a result of initial sleep disturbance (Lovato & Gradisar, 2014).

Author Reference: Dr Gorica Micic, Student Sleep FAQ, Aug 2020: AISH:FCRE, Flinders University

6. Can you explain how poor diet and obesity can relate to sleep deprivation?

Chronic sleep restriction is suggested to play a role in the increased prevalence of diabetes and/or obesity. Current research suggests the relationship between sleep restriction, weight gain and diabetes may be facilitated by at least three different mechanisms. These include:

1. alterations in glucose metabolism;
 - Glucose tolerance refers to the ability to metabolize glucose (i.e., sugars/carbohydrates we eat) and return to baseline (i.e., the individual's 'normal' levels of glucose, not directly after they've eaten a meal). Sleep loss affects individuals' glucose tolerance and metabolism.
2. increase in appetite;



- Appetite is regulated by the interaction between metabolic and hormonal signals, as well as neural mechanisms. Sleep loss impacts these signal processes and neural mechanisms in a manner that increases appetite, thus leading to risks of diabetes and/or obesity.
 - Later bedtimes give rise to more opportunities to eat in the day (i.e., late at night). Late-night meals and snacks predominantly include higher-density foods, hence increasing individuals' caloric intake, resulting in weight gain & risk of diabetes and/or obesity.
3. decreased energy expenditure;
- Research in this area is limited. It is well established that sleep loss and chronic sleep restriction result in increased sleepiness, decreased vigilance and neurobehavioral function. There is some evidence to suggest that individuals with sleep problems and/or excessive daytime sleepiness report a significant reduction in their levels of physical activity and energy. Hence, lower energy expenditure may result in weight gain, diabetes, and/or obesity.

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Specific to Sleep for teens

7. How much sleep is suitable for teenager? What times do you recommend going to sleep and waking up?

Age is an important determiner of sleep need. As all of the factors mentioned above change with age, our sleep also changes dramatically, both in response to the aforementioned changes but also due to independent factors. Adolescents typically need between 8-10 hours of sleep (hence, 9 hours on average). However, there are individual differences in sleep need and some adolescents might require slightly more sleep (e.g., 11 hours) and some may need slightly less sleep (e.g., 7 hours).

As such, it is difficult for us to make recommendations about how much sleep each individual teenager needs. This really depends on their own body, lifestyle and many other factors. When we work with adolescents one-on-one, we can make more informed recommendations. However, as a general rule of thumb, most adolescents need an average of 9 hours.

Hence, to work out recommended sleep/wake times, we generally focus on the necessary wake-up time. For example, if an adolescent must wake up at 7am in order to attend daytime commitments (e.g., school), and has a 9-hour sleep need, then we would recommend a consistent bedtime of 10pm. If they have a 10-hour sleep need and need to wake up at 7am, then we would recommend a 9pm bedtime.

Author Reference: Dr Gorica Micic, *Student Sleep FAQ, Aug 2020: AISH:FCRE, Flinders University*



8. In your opinion, what is the main cause of lack of sleep in teenagers?

Many different factors can affect adolescent sleep. In particular, the following factors have been the focus of research literature:

- Biological factors (e.g., hormones, circadian rhythms)
- Physiological factors (e.g., snoring)
- Psychological factors (e.g., mood, tension)
- Social factors (e.g., staying up chatting to friends, social media)
- Intake (e.g., tobacco use, caffeine)
- Environmental factors (e.g., noises, temperature, light)
- Technology (e.g., bright light from devices, gaming)

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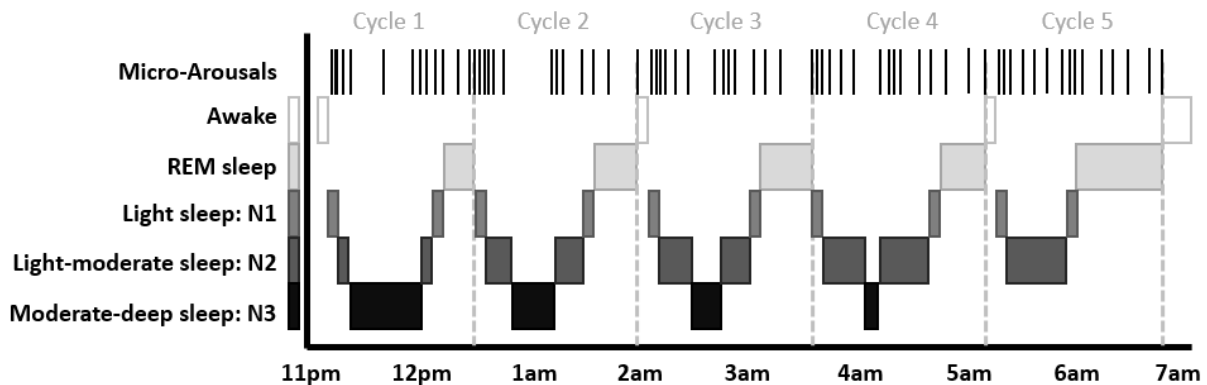
9. How can lack of sleep effect a teenager both mentally and physically? If so what can it cause and how serious are these health disorders/issues?

Yes, lack of sleep has been shown to affect adolescents mentally and physically. There is a growing body of work indicating the deleterious effects of chronic sleep reduction on adolescents' mood, mood regulation, concentration, daytime functioning and impairments. These factors impact on adolescents' ability to perform at school, work, sports, social activities, etc. Hence if these factors limit the extent to which an adolescent can engage in necessary/enjoyable activities, then their quality of life may become significantly impacted. As a result, inadequate sleep has been particularly linked with anxiety & depression.

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10. Do the stages of sleep (REM and NREM) have any connection with the quality of sleep that teenagers get each night?

Over the course of a period of sleep, REM and NREM (further split into 3 stages relative to the depth of sleep) sleep alternate cyclically (see figure below). The function of alternations between these two types of sleep is not yet understood, but irregular cycling and/or absent sleep stages are associated with sleep disorders and 'normal' cycling is important for 'normal' quality sleep. For example, instead of entering sleep through NREM, as is typical, individuals with narcolepsy enter sleep directly into REM sleep. People with depression have significantly more REM sleep than individuals without depression and most anti-depressants work such that they suppress REM sleep.



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General Strategies to maintain healthy sleep

11. What is sleep hygiene?

Sleep hygiene is what nearly ~40% of tired and sleepy Australians need to be doing every night! This is a set of behaviours and habits that will help people achieve longer and improved quality sleep. Ensuring a quiet bedroom for sleep, limiting exposure to bright light, avoiding exercise and dinner at least 2 hours before planned sleep time are just some of many good sleep hygiene practices to adopt and stick to! Sleep hygiene is all about making sleep a priority so you can stay healthy.

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12. Are taking naps bad to have during the day? What are the possible consequences of taking regular, long naps?

Short power naps of 20 minutes, are shown to have recuperative effects for individuals, such that they feel (and are) less sleepy and more vigilant following a brief nap. Naps should be taken in the late morning/early afternoon and not too close to bedtime.

As aforementioned, each individual has their own “sleep need”. Naps that are >20 mins start to buy into the individual’s sleep need, such that they may not be sleepy until a much later time in the evening. As a result, they might stay up significantly later into the cycle of the night and struggle to wake up at the necessary time on the following morning. Alternatively, they may attempt to go to bed at their usual bedtime but since they’ve used up some of their sleep need, may not be sufficiently sleepy to fall asleep. Hence may lie in bed tossing and turning as they do not feel sleepy and cannot fall asleep or maintain sleep.

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13. Are there any strategies that you would recommend to teenagers to overcome these sleep deprivations?

Teenagers tend to consistently choose later bedtimes due to factors mentioned in question 5. As a result of early morning awakenings to get to school/work, most obtain significantly less amount of sleep throughout the week than they should (e.g., 7.5 hrs/night instead of the recommended average of 9 hrs/night). To make up for lost sleep throughout the week, they tend to sleep in later on weekends. However, sleeping in on a Saturday morning (e.g., 9-11am) means that the adolescent will choose and much later bedtime on Saturday night as they've fulfilled their sleep quota and don't feel sufficiently sleepy until a much later time (e.g., 2am). As a result, they will sleep in even later on Sunday morning and will find it next to impossible to fall asleep in a timely manner on Sunday night, in order to obtain enough sleep by Monday morning. Sleep deprivation tends to continue throughout the week, until the next available opportunity to catch up on sleep by sleeping in.

Thus, the main strategy for overcoming sleep deprivation is to ensure adolescents have a regular bedtime window that allows them to obtain sufficient sleep throughout the entire week. If there are nights when the adolescent has gone to bed later than they should have, rather than sleeping in, the best strategy is to go to bed earlier the following evening.

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Further information

14. What links to further information from reliable sources can you provide?

- Sleep Foundation – a wealth of internationally relevant information available for general public and practitioners: <https://www.sleepfoundation.org/>
- The Conversation – searchable database of journalistic style articles posted by academics on a range of topics including sleep: <https://theconversation.com/au>
- AISH:FCRE, Flinders University website - <https://www.flinders.edu.au/adelaide-institute-sleep-health>