



Fatigue and **Sleep** Management

Personal strategies for decreasing the effects of
fatigue in Air Traffic Control



Fatigue and **Sleep** Management

For shift workers, fatigue and sleep debt can become a challenge and difficult to cope with. We have designed this booklet to give you knowledge and strategies that you can apply in your daily lives in order to help you better manage your sleep.

When reading this booklet, bear in mind that whilst some of the ideas/suggestions may seem a little eccentric, people are different, and something that may work for one person may not work for another. Find what works for you, then you will be one step closer to getting a good night's sleep and feeling less tired.

Sweet dreams!



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GENERAL INTRODUCTION TO FATIGUE, SLEEP AND SHIFT WORK

Air Traffic Control (ATC) is a safety-critical domain in which high-risk activities are organised around the clock, every day of the year. Such activities are very demanding for people working within the system, as they mobilise several resources, both mental and physical. As such, fatigue is a phenomenon of primary importance that could have an impact on the whole ATC system. In consequence, fatigue has classically been perceived negatively, as an expression of as well as a cause of operators' decline in performance.

However, fatigue can be seen from a more positive perspective. Fundamentally, fatigue is an alarm system that warn us that a recovery rest should be taken. This alarm constitutes a useful mechanism based on archaic and robust processes that enable a balance in our body (homeostasis). The presence of such a mechanism has been (and still is) fundamental for the evolution of species, allowing health and safety to be preserved by taking appropriate rest when needed. Like hunger is a signal that we need to take food, fatigue symptoms give a signal that we are losing homeostasis.

Therefore, it is important to be able to effectively detect the signals that produce fatigue. Fatigue informs us about the inadequacy of our capabilities in contexts where it is expressed, warning about insufficiency of available resources to achieve the desired task's objective. Therefore, suppressing fatigue would not be possible or desirable.

This guide is aimed at changing your potential misconceptions of fatigue, helping you see it not as a negative thing but as a positive warning sign that helps us to adjust to various situations. The aim is to help controllers detect signs and symptoms of fatigue, and to provide practical tips for fatigue management, both during operations and out of shift work. In fact, fatigue management also concerns your home life.

Fatigue is an important safety issue within the ATC system and a regulatory framework exists for implementing detection, monitoring, and management measures. For example, European Commission Regulation (ER) 2017/373 ATS.OR.135 includes requirements to develop a policy for fatigue management and a procedure to identify, prevent, mitigate, and monitor fatigue levels. Furthermore, it requires the provision of appropriate education and support for ATC staff.

Similarly, EASA “ATS.OR.320 ATCO Rostering” focuses on some limits to be considered when drawing up rostering policies, for example regarding maximum duty days and hours per duty, maximum radar time without breaks, minimum rest periods between two shifts, minimum break periods, and minimum rest periods after nightshifts.

EU Regulation No 2015/340 on the licensing and medical certification of air traffic controllers explicitly includes fatigue as medical topic in the ATCO syllabus for ADV, ADI, APP, ACP, APS and ACS ratings (appendices 1 to 12). In 2016, ICAO, CANSO and IFATCA issued a guide on Fatigue Risk Management System (FRMS) applicable to air traffic service providers. FRMS principles are meant to complement the prescriptive approach based on duty-time limitations.

his manual covers two parts:

- The first part presents some basic scientific knowledge about sleep, circadian rhythms (24-hour rhythms) and the consequences of fatigue.
- The second part provides some practical tips on sleep and fatigue management.

PART 1

SCIENTIFIC
KNOWLEDGE
ON SLEEP AND
FATIGUE

CIRCADIAN RHYTHMS AND SLEEP PATTERNS

his manual of causes of fatigue. However, a change in sleep-wake schedule is a major issue for workers who work at “abnormal” times of the day (e.g. late night or early morning) such as ATCOs. Fatigue can also be due to social constraints or medical causes. Nonetheless, lack of sleep and prolonged wakefulness are the prime work-related contributors to fatigue.

The underlying mechanism of fatigue can be described as a conflict between the hours of work and the basic human physiology, especially the sleep-wake rhythm.

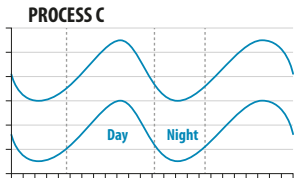
There are two basic mechanisms that control our sleep-wake rhythm:

- A body clock that controls the internal biological rhythmicity (i.e. the body clock)
- A sleep “reservoir” that fills up with the length of awakening and empties when asleep

The circadian clock regulates all body functions - not just the pattern of sleeping and waking during the 24-hour cycle, but also fluctuations in body temperature, blood pressure, and levels of digestive enzymes
And various hormones.

The clock

The biological clock, also called “process C”, has a length close to 24 hours. In normal conditions, the periodicity of rhythms is synchronised by means of external time cues, especially the light-dark cycle.

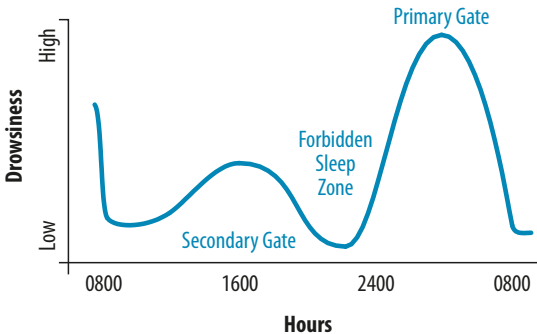


Our body clock regulates a large number of body functions, including the sleep-wake cycle. Hence, the human body is set to be active during the day and sleep during the night.

Sleep onset is controlled by the biological clock and occurs at almost the same time every day. This is why the timing of sleep greatly impacts the quality and quantity of sleep.

The biological clock controls sleep patterns by opening two periods favourable for sleep called “sleep gates” over the 24-hour period, in which sleepiness increases.

The primary sleep gate starts for most people at around 11pm and ends at around 6am. Sleepiness progressively increases in the late evening to reach a peak between 4am to 6am where alertness is at its poorest and the body temperature at the lowest. This period is called the Window of Circadian Low (WOCL).



Schematic representation of time periods favouring sleep onset - taken from Stampi, 1989

The secondary gate occurs in the early afternoon (around 1pm-3pm) and is characterised by a small increase in sleepiness. This secondary gate corresponds to the naps taken after lunch in some countries also called the “post-lunch dip”. As this occurs after lunch we tend to associate it with food digestion, whereas it is actually associated to our body clock. The “forbidden sleep zone” starts just after the end of the secondary gate and ends just before the primary sleep gate. This forbidden sleep zones reflects the fact that it is more difficult to fall asleep or to maintain sleep during this period.

During the Neolithic era, human beings used to sleep in the early afternoon to be protected from sun and heat.
This inheritance is still visible in the architecture of our current body clock, with the secondary sleep gate.

During this specific period, it is almost impossible to fall asleep, our body temperature reaches a maximum and our cognitive functions are at their highest.

The whole pattern is repeated every 24 hours.

Night duties typically disrupt biological rhythms: people are expected to perform efficiently during the night while their body is not programmed to do so. Due to the biological clock, it is therefore more difficult to stay alert at night than during the day.

A common misconception is that nocturnal sleep onset is simply a habit and is triggered based on external cues (or “time givers”). However, even when isolated from direct (e.g. watch, radio, newspapers) or indirect “time givers” (e.g. lighting, noise, temperature, vibrations), sleep-wake periodicity persists. The persistence of the sleep-wake periodicity reflects the existence of an internal system (the biological clock), which functions autonomously and has its own frequency. Hence, our sleep-wake cycle is not simply a response to the external environment.

Michel Siffre's 1972 experiment in Texas

The discovery of biological rhythms:
temporal isolation



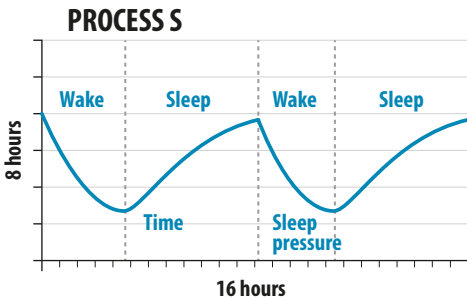
Our biological rhythms have a strong resistance to change and as such do not adjust easily to a pattern imposed by shift work schedules (e.g. night duty or morning duty).

It takes a long time for the body clock to adjust to changes in sleep-wake cycles. This is why shift work and crossing time zones can result in sleep disorders, biological rhythm disturbances and mental fatigue due to changes in the rest-activity cycle.

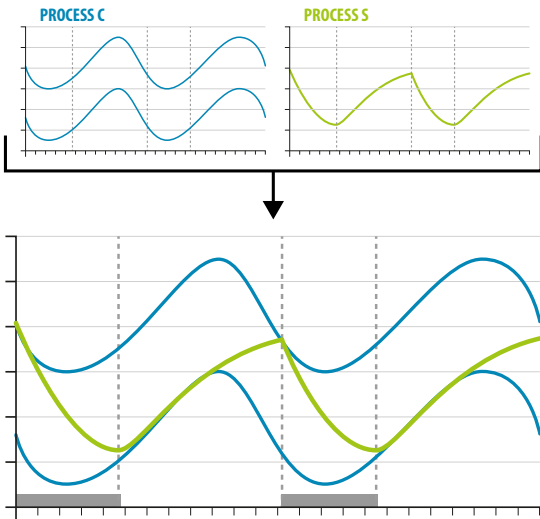
The sleep reservoir (process S)

The second basic mechanism that controls our level of fatigue is called sleep reservoir or “process S”. It directly reflects the length of wakefulness. Sleepiness increases with the length of time a person stays awake: the longer an individual stays awake, the higher the sleep pressure, the higher the tendency to fall asleep. After around 16 hours of continuous awakening, sleep pressure reaches a level that may trigger sleep. This sleep pressure can only be dissipated by sleep itself.

The relation between process C and process S



These two processes are independent but they both interact in the sleep-wake regulation. Process S is responsible for the rise in sleep pressure during waking. Therefore, process S increases during periods of wakefulness and decreases during sleep. Process C is independent from prior sleep and set two thresholds which determine the onset and end of a sleep period.



In normal conditions, i.e. when sleeping at night after day duty, these 2 processes regulate sleep by triggering sleep after around 16 hours of wake and maintain sleep during the night, as shown in the figure above.

Any change to the hours of work (e.g. a very early or a very late shift) will result in a misalignment between process S and C. This is further detailed on page 27.

Sleep Patterns

Rest will let your muscles and organs relax. It can also reduce stress, improve your mood, and increase alertness, mental clarity, creativity, and motivation. Resting won't increase your ability to remember new information. It also won't help your cells repair or regenerate themselves, and you won't get some of the other physiological benefits—such as the release of growth hormone and other hormones (including those that regulate appetite and satiety). Your body needs both sleep and rest.

Sleep is a temporary state in which the senses are disengaged. However, sleep is an active physiological process which cycles through five different stages. These stages are characterised by distinctive brain wave patterns:

- Stage 1 } **Light Sleep**
- Stage 2 } **Light Sleep**
- Stage 3 } **Deep Sleep**
- Stage 4 } **Deep Sleep**
- **Rapid Eye Movement (REM) sleep**

The duration of the phases of sleep change with age: an infant's sleep cycle will look different from that of an adult or elderly individual.

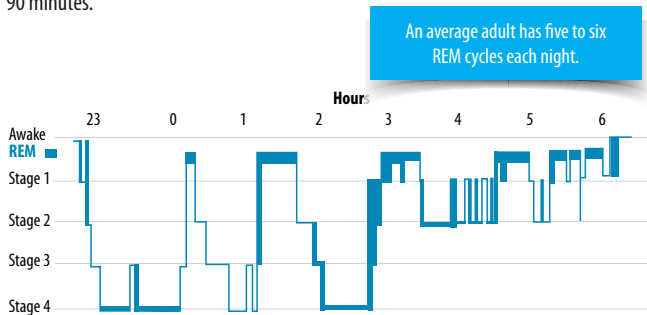
The five stages occur in sequences also called a sleep cycle. A normal night's sleep includes 4 to 5 sleep cycles depending on total sleep time. The quality of the recovery requires an optimal balance between these 5 stages of sleep.

The following table shows the proportion of each stage for a normal night's sleep.

Sleep stages	%
Light sleep stages 1 & 2	55
Stage 3 and 4	15 to 20
REM	20 to 25

Sleep composition and organization

After sleep onset, the individual progresses through Stages 2, 3, and 4 and remains for a certain time at Stage 4. Then sleep becomes lighter with a return to Stage 2 before the first REM phase occurs. This terminates the first sleep cycle. A Sleep cycle lasts around 90 minutes.



Sleep cycles and sleep stages

Despite the fact that REM sleep is the most difficult stage to be awoken from, it is always depicted in the upper part of the graph to emphasise the difference in nature in REM sleep compared to other sleep stages.

It is important not to miss the start of a sleep cycle; otherwise, we have to wait for the next cycle to fall asleep. This is often symbolised by a train: if we miss one train, we have to wait for the next one. The start of a cycle is recognisable by early signs of sleepiness such as having difficulty to keep eyes open and yawning.

Most of the recovery process occurs during deep sleep and REM sleep.

Functions of deep sleep (Stage 3 and 4)

Deep sleep is a time of practically complete disengagement from the environment. It is very difficult to awake a person from deep sleep stages. Deep sleep is extremely effective in decreasing sleep drive that builds steadily with wakefulness over the course of the day. It is therefore very important in recovering from fatigue. Some recent research also indicates that deep sleep may be important in helping clear the brain for new learning the next day.

Sleep is critical for the formation and consolidation of memories - and for your ability to retrieve them while you're awake.

Athletes may improve their performance by sleeping up to 10 hours per night, because all of that physical activity means that their bodies require more sleep to repair muscles and restore energy.

Functions of REM sleep

REM sleep remains a matter of controversy. During this stage, the brain is very active and the heart rate is also high. Dreams occur only during REM sleep.

REM sleep plays a role in the reorganisation and restoration of brain processes that mediate the flow, structure and storage of information. This includes things like problem-solving, memory consolidation, information processing, and creativity. Hence, REM stage is very important for mental performance.

Sleep inertia typically lasts 15-30 minutes, but can last as long as 4 hours. During this period, you are at a reduced level of capacity and may have trouble doing the simplest of everyday actions.

Sleep inertia

Most people experience a transient state of disorientation or mental confusion just after waking from sleep. Performance and alertness are significantly degraded during this transition from sleep to wakefulness and for a variable period of time. This phenomenon is called “sleep inertia”.

Sleep inertia is defined as “a transitional state of lowered arousal occurring immediately after awakening from sleep and producing a temporary decrement in subsequent performance” (Tassi & Muzet, 2000).

Temporary symptoms are degradation in mental performance and an alteration in mood. While its length normally varies from 5 to 30 minutes, it can reach up to several hours in case of high sleep debts. It may have critical effects on performance and safety during operations, as was reported in the following incident (Transport Air Canada, 2012).

Sleepy pilot sent Air Canada jet into a dive after mistaking Venus for oncoming plane

“Under the effects of significant sleep inertia, the first officer perceived the oncoming aircraft as being on a collision course and began a descent to avoid it. He initially mistook the planet Venus for an aircraft, but the captain advised again that the target was in the 12 o'clock position and 1000ft below. When the FO saw the oncoming aircraft, the FO interpreted its position as being above and descending towards them. The FO reacted to the perceived imminent collision by pushing forward on the control column.”

Within the first 3 minutes of waking, decision-making performance can be as low as 51 percent of the person's best decision-making ability before sleep.

Naps can leave people with sleep inertia, especially when they last more than 10-20 minutes.

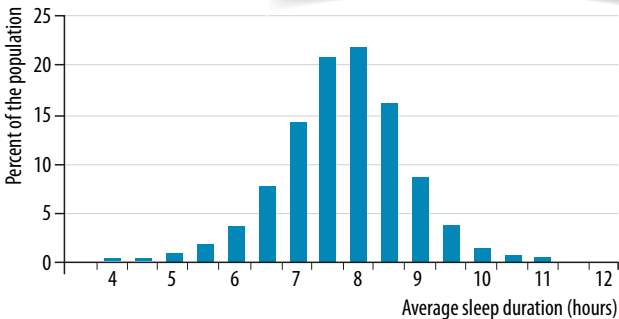
Sleep inertia, the best option is to get rid of it. However in this case, there's a risk of oversleeping.

If waking up from light sleep (Stage 1 and 2), sleep inertia usually lasts 30 minutes. This is the case when one is napping. However, if awakened from deep sleep (Stage 3 and 4) symptoms may persist up to three hours. This is why it is recommended to limit napping to 20 to 30 minutes maximum so as to avoid falling into deep sleep. Napping is a very effective strategy to overcome fatigue but needs to be carefully managed to avoid sleep inertia. Nonetheless, it is recommended to minimise critical activities for at least 20 minutes after waking up.

Individual differences

Individuals can be very different with regards to their sleep pattern, both in terms of sleep quantity and sleep timing. The figure below shows the distribution of the average sleep duration among the general population. Most people need between 7 to 8 hours of sleep. Duty time limitations and rest requirements are generally based on this type of data. However, as it can be observed, a significant number of individuals need more than 8 hours and are more likely to experience difficulties in coping with disruptive schedules.

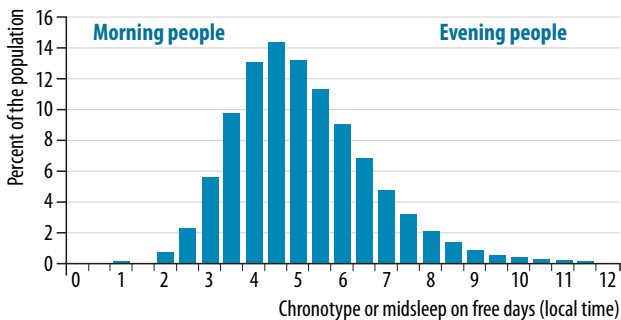
There are inter-individual differences but most people need 7-8 hours of sleep per night.



People also have different sleep habits and generally have a preference regarding their bedtime and rise time. Some prefer to go to bed early and get up early while others prefer to have late bedtimes and to sleep in. This preference is known as the “chronotype”.

One way to discover which chronotype you are is to identify your “midsleep” which can be easily calculated by dividing the average time in bed by 2 and adding the resulting number to the average time in bed on free days.

The figure below shows the distribution of midsleeps in the general population. It shows that 60% of the population have a midsleep between 3.30 and 5.30 am. Only a few individuals have a midsleep earlier than 3.30: they are known as morning types, whereas people with a midsleep later than 5:30 are known as evening types.



Another simple method to identify the chronotype is to fill in a dedicated questionnaire such as the Horne & Ostberg questionnaire (see annex).

B. What are the physical and mental effects of sleep deprivation?

The problems resulting from sleep loss are insidious, affecting virtually all aspects of performance. A famous Australian study has demonstrated that 20 hours of sleep deprivation has an equivalent effect on cognitive performance as having a blood alcohol concentration of 0.08% (Fletcher et al., 2003).

In the U.S., drowsy driving triggers at least 100,000 crashes a year, injuring 40,000 people and causing over 1,500 deaths. It is estimated that 50 to 70 million Americans experience sleep issues that affect their health.

Furthermore, sleep deprivation produces a range of symptoms that may affect safety:

- Microsleeps are more likely to occur. These are brief (several seconds or less) episodes of total perceptual disengagement from the environment. Microsleeps can occur during periods of otherwise acceptable performance. Consequently, performance tends to become more variable - people perform well for periods of time with brief lapses, errors, and other performance failures.
- Lapses are failures to respond to information, or failures to respond in a timely manner. There is also a general tendency towards slower performance, resulting in longer reaction time. The tendency to experience microsleeps, lapses, and slower reaction times combine to result in reduced vigilance.
- Short-term memory can become impaired. That is, newly learned information becomes difficult to store and retrieve from memory. Fixation on a particular task or component of a task can also occur, resulting in failure to perceive and process other possibly critical information.

- Communication often becomes reduced in amount and effectiveness.

Sleep Debt = Hours of sleep you need per night – Hours of sleep you actually get . Insufficient sleep in the U.S. rings in at an annual cost of about \$66 billion.

- Decision-making can be impaired, with people showing a tendency to choose options that involve less effort, even though these options are known to have a lower probability of succeeding.
- There can be a general loss of situational awareness in all environments. In general, the performance problems described above are more likely to occur on novel or higher-level cognitive tasks, while well-learned tasks are more resistant to the effects of sleep loss.

C. How does sleep loss affect behaviour?

- **Giving up speed for accuracy**
The nature of the performance impairment depends on the type of task. On tasks where people can proceed at their own pace, there is a marked tendency to slow down in order to maintain accuracy. This occurs despite explicit instructions to the contrary and attempts to work as quickly as possible.
- **Sacrificing routine maintenance**
When sleep-deprived, there is a general tendency to change how limited mental and physical resources are allocated.

In the operational environment, this tendency can often result in the person's shedding maintenance and other routine tasks in order to carry out the primary task.

This is a particular problem for those working with complex systems or systems requiring maintenance during the period of sleep deprivation.

- **Degraded mood**

There is a general degradation of mood with sleep deprivation. While there is a tendency to dismiss this outcome, mood is undeniably important to morale and to effective crew communication and resource management.

- **Reduced motivation**

People can function physically when sleep-deprived but will want to quit earlier due to feeling that they do not have the energy to continue. There is a marked reduction in motivation. The sleep loss itself tends to become the predominant theme. People change their behaviour as a result. Nevertheless, effort increases at the same time that motivation (i.e. desire to continue) and performance both drop. One keeps trying to do a task if asked or required, even though one does not want to continue.

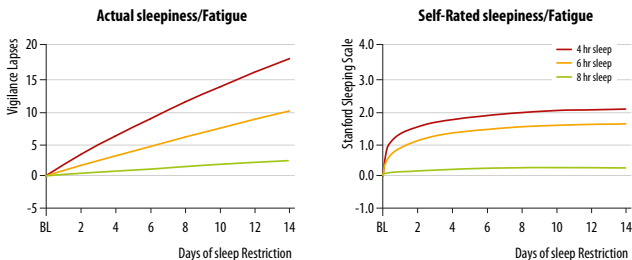
In order to keep going a greater compensatory effort is expended. This effort is often accompanied by a reduced ability to control what is happening in the environment and so can lead to anger, frustration, emotional outbursts, and saving energy.

These performance decrements will increase despite increasing compensatory effort on the part of motivated individuals.

Two aspects should be distinguished when addressing fatigue associated with sleep deprivation: acute (i.e. a partial or total sleep deprivation for one night) and chronic (partial sleep restriction) repeated over several days.

Research suggests that chronic sleep deprivation has the same effect as acute sleep deprivation, which means that sleep restriction cumulated over several days produces the same effect as a single night of sleep loss. The figure below shows the result of a research project comparing various conditions of sleep restriction over a period of 14 consecutive days. The left part shows a linear increase of errors in a performance task as a function of the number of days and the amount of sleep restriction. The right part shows the self-rating of performance by the individuals. It clearly shows that after 2 days of sleep restriction the individuals tend to underestimate their performance decrement.

This result is critical with respect to shift work where slight reductions of sleep are repeated duty after duty, over a series of nights. Adequate scheduling is therefore essential so as to allow sufficient time off in order to prevent the accumulation of sleep loss.



Objective measures show fatigue progressively degrades cognitive performance

BUT

Self ratings of fatigue fail to recognise all but the initial fatigue effects!

Van droongen, Maislin, Mullington and Dinges (2003)

In cases of severe sleep deprivation, “night shift paralysis” was reported by some ATCOs.

This night shift paralysis has been described as short-lived but incapacitating paralysis occurring during the night shift when workers manage to maintain a state of wakefulness despite sleep pressure.

In a survey of 435 ATCOs (Folkard, 1987), it was found that 6% of ATCOs had experienced an occurrence of night shift paralysis.

The author found that 4 main factors are involved:

- Time of night (peak at 5.00)
- Number of consecutive night shifts (the risk increases for more than 2 consecutive night shifts)
- Working both a morning and night shift the same day
- Individual differences (flexibility and sleeping habits)

SHIFT WORK, A BETTER UNDERSTANDING

In the literature on air traffic control some attention has focused on how shift work and work schedules result in fatigue, and on how they affect performance, sleep, mood, and health.

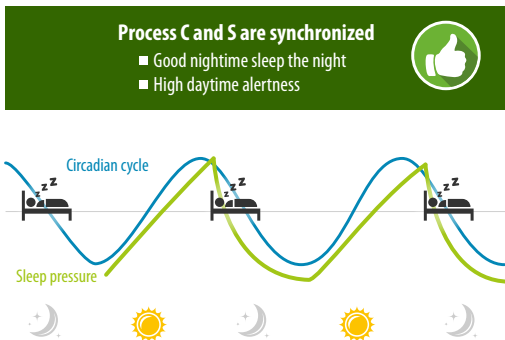
Authors investigating fatigue among ATCOs find that fatigue related to shift work is twofold:

1. ATCOs working at night are at the lowest point in their circadian rhythms and this exacerbates fatigue, sleepiness, and performance decrements.
2. Shift schedules often create sleep debt, which reduces alertness and performance, particularly during night shifts and at the beginning of early morning shifts.

As explained before, the processes, C (Clock) and S (Sleep) control sleep - wake cycle. Process C is the internal body clock that regulates several body functions (temperature, hormonal production, etc.) on a 24h basis, approximately. Its lowest peak of activity occurs in the second part of the night (i.e. between 3am and 6am). Process S is responsible for the drive to sleep after a certain amount of time in an awakened state.

In the normal situation of daytime work and sleep at night, the C and S processes are synchronised. In a normal day (for example, with a wake-up time of 7am) sleep pressure is high after 16 hours of being awake, approximately. It falls at 11 pm when process C begins to descend.

With night work, processes C and S are desynchronized. During the night, we feel very high sleep pressure as our body clock descends. During the day, we find it hard to sleep because, in spite of the fact that process S is very high, process C is now climbing.



This explains why the sleep quality of ATCOs after a night shift is very poor compared to the sleep they had before a day or evening shift, according to subjective reports by ATCOs and results obtained by measuring sleep.

Working morning shifts also results in sleep loss.

Process C and S are desynchronised

- Poor daytime sleep
- Low night-time alertness



ATCOs have difficulties in compensating for an early wake-up the next morning by going to sleep earlier, because of the forbidden sleep zone.

Compared to performance later in the day, early day shift performance is decreased. Considering the higher frequency of accidents during early morning shifts among other groups of workers, operational safety may be threatened by fatigue and performance decrements experienced at the start of early morning shifts.

Scheduling the Shifts

Scheduling is a sensitive topic and there is no “perfect roster” that fits all the physiological, social and organisational constraints.

As it can be seen in Table 1, various types of shift schedule exist to cover the 24-hour period of operations in air traffic control facilities.

Having a permanent schedule involves always working the same shift.. The slow rotation schedule, a variation of the permanent schedule, involves working five straight days on a specific shift, then rotating to another shift the following week. Other schedules imply rapid rotation of shifts during the week. Although the exact configuration may vary, two main kinds of rapid rotation schedules exist: clockwise rotation, and counter-clockwise rotation.

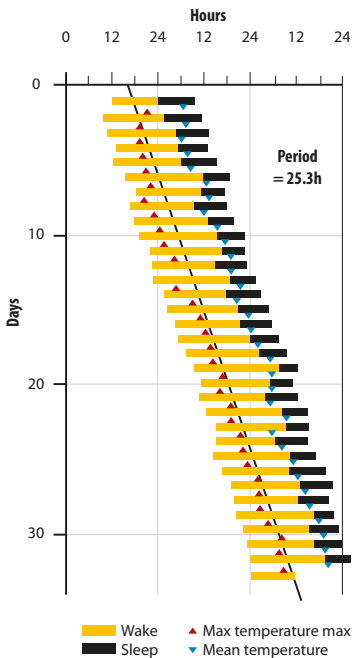
In the clockwise rotation (also called forward rotation), the work week starts with a day shift, rotating later in the week to an afternoon shift, and finally changing to a night shift.

In the counter-clockwise (backward rotation), the work week starts with an afternoon shift, then advances to an early day shift, to finally end with a night shift.

In the USA and some European countries, most ATCOs work rapid counter-clockwise rotation. One of the advantages of this kind of organisation is the fact that it makes for a longer weekend for controllers. It also eliminates the need for controllers to work more than one night shift in a single week, and it gives a long recovery period following the single night shift. Among the disadvantages, this type of scheduling is in opposition to the natural biological clock, and it only gives short rest periods between shifts (8 hours), often scheduled in daytime.



As our internal body clock would naturally regulate our body functions (e.g. temperature) on a 25h basis (instead of 24h), our natural tendency in absence of external cues would be to delay our sleep cycle i.e. to go to bed later in the night and to get up later the following morning as is shown on the next figure. Consequently, the typical backward rotation is in contrast with our sleep-wake cycle.



When comparing ATCO sleep time in the forward and backward rotations, with mean sleep time on days off, the cumulative sleep debt in the backward rotation is considerably higher and is concentrated in the three last shifts.

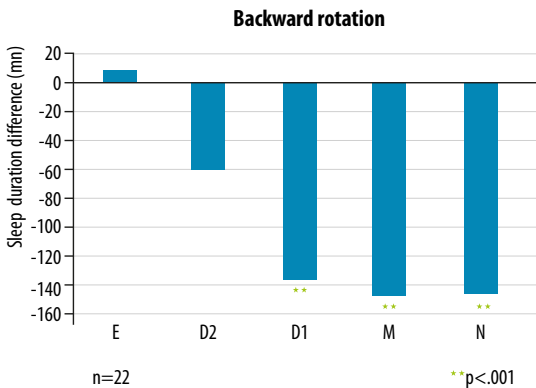
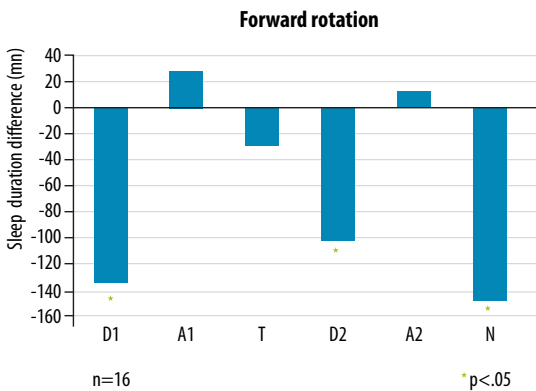


Table1:
Examples of shift schedules used in air traffic control facilities

Schedule	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
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Permanent schedule

week 1: 5 days	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	Off	Off
week 2: 5 days	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	Off	Off
week 3: 5 days	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	Off	Off

Slow schedule

week 1: 5 days	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	07:00 - 15:00	Off	Off
week 2: 5 days	15:00 - 23:00	15:00 - 23:00	15:00 - 23:00	15:00 - 23:00	15:00 - 23:00	Off	Off
week 3: 5 days	23:00 - 07:00	23:00 - 07:00	23:00 - 07:00	23:00 - 07:00	23:00 - 07:00	Off	Off

Rapid schedule

Counter-clockwise	15:00 - 23:00	15:00 - 23:00	07:00 - 15:00	07:00 - 15:00	23:00 - 07:00	Off	Off
Clockwise	07:00 - 15:00	07:00 - 15:00	15:00 - 23:00	15:00 - 23:00	23:00 - 07:00	Off	Off

PART 2

PRACTICAL TIPS

TIPS AND TOOLS FOR FATIGUE AND SLEEP MANAGEMENT

Bedtime Rituals

Bedtime and getting-up time

- Try to maintain a regular rising time (also on weekends and holidays) even if you have had trouble sleeping the night before, as “sleeping in” can disturb sleep the following night.
- Once you’re awake, get up. Don’t lie in bed thinking about getting up.
- Fresh air and a room temperature of around 18 degrees will give you the best sleeping conditions. Blankets or comforters can lock in heat without feeling too heavy or confining. Make sure your feet are warm, it’s almost impossible to sleep when your feet are very cold.
- In summer, a room that’s too hot can also disrupt sleep. An air conditioner or fan can help. If excess humidity is a problem, consider installing a dehumidifier. Waking up with a sore throat, dryness in your nose, or even a nosebleed are signs of too little humidity, so consider installing a humidifier.



Warm bath (3) (11)

Soaking in hot water before retiring to bed can ease the transition into a deeper sleep. This may be due to a temperature shift (core body temperature drops after leaving the tub, which may signal to the body that it's time to sleep), or the sleep improvement may be related to the water's relaxing properties. Don't overdo it, however, you merely want to relax your body, not exhaust it.

Your Bed

Ask yourself the following questions:

Does your mattress provide the support you like? Do you wake with your back aching? Is there enough room for you and your sleep partner? Do you sleep better or worse when you sleep away from home?

Discomfort can make falling asleep more difficult and lead to restlessness.

Mattresses can be made of slumber inner springs, foam, fabric, water or air. They may be firm or soft providing different levels of support to your body. Types of mattresses may affect body temperature and humidity, as well as comfort.

Counting Sheep

The old wives' cure for insomnia is to count bouncy little sheep leaping over a fence. It's possible that it doesn't work, because bouncy sheep are hyperactive and wide-awake. They're the last thing you need to dwell on when you want to go to sleep. So, try another variation, count sleeping sheep. Imagine a beautiful green meadow stretching to infinity.

Every ten feet or so, right in a row, lies a peaceful, sleeping sheep. Imagine that you're just gliding by, almost floating.

And that you pass by a sheep every 3 or 4 seconds (experiment to find which time interval works best for you). Count the sheep and glide on to the next, and the next, and so on. Sleeping sheep are likely to be more effective.

The 4-7-8 technique

This technique for falling asleep is based on breathing and was put forward by Professor Andrew Weil (Harvard University). Although the procedure is made of few steps relatively simple, sufficient practice is necessary to obtain good results (with daily practice, significant sleep improvements are visible after 2-3 weeks). The procedure is as follows:

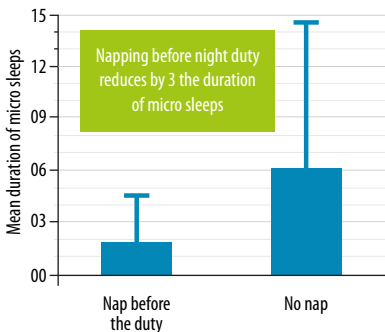
- Exhale completely through your mouth, making a whoosh sound.
- Close your mouth and inhale quietly through your nose to a mental count of four.
- Hold your breath for a count of seven.
- Exhale completely through your mouth, making a whoosh sound to a count of eight.
- This is one breath. Now inhale again and repeat the cycle three more times for a total of four breaths.

Tips if you are having difficulty sleeping

- If you can fall asleep easily on your sofa or chair, and it is difficult to fall asleep in your own bed, you may be associating your bed with everything but sleep. Use your bed only for sleep and sex, not for reading, watching television or whatever else occupies you in the evening. To learn how to associate your bed and bedroom with sleep, restrict your time in bed, initially, to the number of hours you actually sleep.
- Only get into bed when you are tired.
- Don't lie awake trying to get to sleep any longer than 30 minutes. If you are still awake after 30 minutes, get up and do something quiet and non-stimulating. When you feel tired again, go back to bed.
- While in bed, don't dwell on not sleeping or your anxiety will increase.
- Think relaxing thoughts.
- Some people find that a milky drink or light carbohydrate snack promotes sleep.

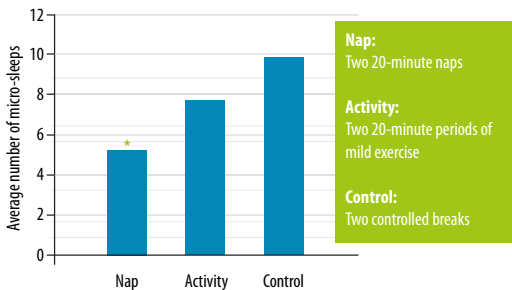
NAPPING

Naps are a very useful in sleep management, particularly before a night shift. A nap before starting a night shift is a preventive measure (10 to 30 minutes, but never more). It has been observed that when drivers nap before their night duty, the duration of micro sleeps is reduced by three..



The evening or night shift worker should take a nap during break time to increase alertness and reduce sleepiness. Napping at the workplace is especially effective for workers who need to maintain a high degree of alertness, attention to detail, and who must make quick decisions. In situations where the worker is working double shifts or longer, naps at the workplace are even more important and are highly recommended.

It has been demonstrated that two periods of 20-minute of naps significantly reduce the occurrence of micro sleeps in ATC, compared with two breaks of mild exercise.



Nap Timing

You need to determine the best time for your nap, given your schedule. Remembering your circadian rhythm, you know that there are times of the day that are more and less conducive to sleeping, regardless of how tired you feel or how much sleep you lost.

Trying to nap at a time when your body is physiologically becoming more awake may lead to an unsuccessful nap.

That is, you spend more time trying to get to sleep than you do actually napping – if you fall asleep at all.

Generally, for non-shift workers, or when on day shift the following rules of thumb can be used to determine the timing of your nap:

Avoid the period from 10 a.m. to 1 p.m. This is your “no nap zone”. Naps become more restorative the further they are from your “no nap zone”.

- Try to take advantage of the mid-afternoon dip when your alertness will naturally drop. This is a natural nap period.
- Naps should take place as close as possible to the start of your work period in order to reap the most benefit. But there should be at least 20 to 30 minutes between your nap and when you have to start working. This will enable you to overcome any sleep inertia that you might experience after it. In some cases, napping in your lunch break may bring maximum benefit, if there is a place to nap properly.
- Napping on the job for more than 10 but no more than 30 minutes can reduce fatigue; longer than 30 minutes may interfere with your regular sleep schedule and may make you feel less alert because of sleep inertia.
- A good technique for avoiding sleep inertia is the so called “power nap”, i.e. the combination of napping and caffeine. It is more effective than the regular nap in improving alertness. It involves caffeine intake immediately before nap time. Naps should not be longer than 20 to 30 min (to avoid entering the deep sleep stage), and not in a bed. Power naps help with alertness directly after awakening, improve memory recall after sleep and reverse the damage of sleep deprivation.

Don't use naps to replace normal sleeping behaviour

There are two important reasons why napping should not be used regularly to replace portions of your main sleep period:

1. One solid, continuous sleep period has a greater restorative and refreshing effect on you than several sleep periods broken up over the course of the day
2. Napping disrupts your main sleep routine, the time your body has become accustomed to sleep, and may lead to difficulty sleeping during the main sleep hours, subsequently leading to the onset of a sleep deficit.

But you should consider a nap if:

- You slept less than 5.5 hours in your bed.
- You had two or more periods of wakefulness of 30 minutes during your main sleep period.
- You felt you were in a continual state of drifting in and out of sleep.
- You felt unusually and intensely tired and lethargic upon waking.

Tips

- If driving, nap in a safe place, such as in your locked car at a well-lit rest stop.
- Don't use a nap as a substitute for a good night's sleep. If you're a regular napper, and experience difficulty falling or staying asleep at night, give up the napping and see what happens.
- Prior to napping do not take any sort of sleeping aid or eat a heavy meal. These actions will make you feel sleepy longer after you need to get up from your nap period.
- When napping do not smoke. Nicotine is a stimulant and can interfere with your ability to fall asleep.
- Napping before starting a new shift can help reduce fatigue.

LIGHT

People who work at night know all too well the problem of trying to sleep when the world around them is wide awake. When the sun's rays come streaming in, it's even harder. But the sun is more than a sign that it's daytime. Light - strong light, like sunlight - is the most powerful regulator of our biological clock. It determines when we feel sleepy and when we are alert. (3)

When light from the sun (or some other bright light source) shines in the eyes, a message is sent to the body clock. This sends a message to the pineal gland which decreases the production of melatonin, a sleep-promoting hormone. About twelve hours later the body clock turns itself back on. This signals the pineal gland to resume production of melatonin, which is released into the bloodstream and carries the hormone to the body's trillions of cells. The cells "interpret" this signal as a message that it is time to sleep. (13)

As little as 1 to 2 hours of exposure to bright light in the evening appears to help you sleep longer in the morning. A sleep specialist can help determine whether changing your exposure to light (if sunlight isn't available, using a lightbox or light visor) might improve your sleep, and when would be the best time for you to experience bright light. (3)

Tips

- Dim the bedroom and bathroom lighting. Install curtains and or shades. Make sure no light can enter the bedroom.
- Wear eyeshades.
- An illuminated bedroom clock is a source of light that can be annoying if you're having a hard time getting to sleep. If you can't replace the clock, at least block its light with something.
- Exposure to bright lights inhibits the natural production of melatonin, so preventing sleep. Being in a bright light for 30 minutes to an hour after getting up can help reset the body clock.
- The level of blue light emitted by screens on cell phones, computers, tablets is enough to inhibit the production of melatonin.
- If you plan to sleep straight after a night shift, wear dark glasses on your way home in the morning so that the rising sun does not block the release of your sleep hormone, melatonin.
- To stay awake, work under bright lights or at least take brief breaks every half hour or so and spend a few minutes under a bright light.
- Do not use a smartphone or tablet 2 hours before bedtime.

NOISE

Do you find your sleep disrupted by noises such as the screech of sirens, the rise and fall of conversation, a dog barking, or a partner snoring? If noise is disturbing your sleep, take a look at the following tips. (3) Play some soft, soothing music that will lull you to sleep.



Tips

- Soundproof your sleeping quarters with additional insulation (double glazed windows, heavy curtains, carpeting). If possible, move your quarters to a quieter part of the house or to the basement.
- Use relaxing music or tapes.
- Minimise distracting sounds:
 - Turn the phone off, move it to a distant part of the house, set it on soft ring (low ring tone) or get an answering machine
 - Wear ear plugs
 - Use “white noise” (such as a fan or humidifier) to block out other sounds
 - Place a sign on your front door to discourage interruptions while sleeping
 - Ask your neighbours not make loud noises (mowing the lawn, for instance) while you are trying to sleep..

MUSIC

You can buy records designed for falling asleep – some are specially composed music, others have the sound of waves rhythmically breaking or the steady pattern of a heartbeat. If you don't have a record player or CD player that turns off automatically, we don't recommend this technique. If you have to get up and turn it off at the end, you've obviously lost its effect.

BOOKS, TV, AND INTERNET

With the rise of the Internet and chat rooms, yet another obstacle to a restful night has appeared. It's easy to lose track of time on the Internet, or to get deeply involved in a discussion in chat rooms. Try setting a timer to alert you to when it's bedtime if you enjoy web surfing before you retire. (6)



Wait at least one-half hour (preferably longer) before going to bed after reading or watching television. The reason for this is that no matter how passively we watch television, or how harmless the book we read is, our minds may still be over-stimulated, and an over-stimulated mind – along with anxiety and stress – is likely to keep us awake. (11)

Some people say that reading a detective story or some such escapist book helps put them to sleep. If it works for you, great.

CAFFEINE

Coffee, tea, chocolate, cola drinks and other drinks contain caffeine.

Caffeine is a stimulant, which means it has an alerting or wake-up effect. (3)

How individuals respond to caffeine is variable. (3)

Tolerance is developed when caffeine is used on a regular basis. While the effects of caffeine are independent of age and gender, certain factors can extend or decrease the length of the effect. In medium to light users, the effects last about 5 to 6 hours, while in high level users the effects only last 3 to 4 hours. For some people, a small amount early in the day can cause problems in falling asleep 10 to 12 hours later, as caffeine normally increases sleep latency and could impair sleep quality. (3)

Caffeine has been shown to improve endurance and aerobic activity, but can also affect the “mental energy” by enhancing vigor, efficiency, and clear-headedness, as well as vigilance and alertness. Some of these effects can occur with as little as 32 mg of caffeine, equivalent to a weak cup of tea. It also improves both visual and auditory vigilance and usually takes about 30 minutes to take effect. (13)

Caffeine can be an affective alertness booster if used properly. As a short-term measure it can be used until more substantial countermeasures – such as changing sleep/wake routines, nutritional habits and work schedule – can be implemented. It should not be viewed as an ongoing strategy for maintaining alertness.

Consuming over 400 mg at a time has been shown to degrade performance by producing physical symptoms such as uncontrollable shaking and inability to focus mentally.



Therefore, sometimes you want a little caffeine to boost your alertness, and sometimes you need to avoid caffeine so you'll be able to fall asleep.

Unfortunately, caffeine is often seen as fuel. Excessive amounts of caffeine intake often indicate a vicious cycle. You need to stay awake, so you drink coffee, but the caffeine prevents you from resting properly, so you're tired, and need caffeine to stay awake, and so on.

Importantly, the use of caffeine should be limited on rest days when you are already alert. This will help you manage your sensitivity to this substance and will increase its benefits when used as part of a short-term strategy for raising alertness on duty days.

Here's a guide table (TCRP Report 81 - National Research Council, Washington D.C., 2002) that gives you the caffeine content of various foods and beverages

Food	Serving size	Milligrams of Caffeine
Coffee and tea		
Regular *	8 oz	80 - 150
Decaffeinated Tea	8 oz	5
Brewed **	8 oz	9 - 50
Decaffeinated	8 oz	3 - 9
Herbal (Fruit) ***	8 oz	0
Iced	12 oz	22 - 70
Chocolate		
Hot Cocoa	8 oz	5 - 8
Milk Chocolate	1 oz	1 - 15
Dark Chocolate	1 oz	5 - 35
Soft drinks		
Coca-Cola	12 oz	46
Pepsi	12 oz	38
Sprite	12 oz	0
7-Up	12 oz	0

* Depending on roast, method, and whether served with creamer, milk, etc.

** Depending on time steeped and type of tea leaves.

*** Most fruit or herbal teas contain no caffeine. There are some exceptions.

Source

- Wasleben, J.A., and Baron-Faust, R. *A Woman's Guide to Sleep*. New York: Crown Publishers, (2000).
- Lieberman, H.R., "Caffeine" Factors Affecting Human Performance Vol. II: The Physical Environment, pp. 49-72. London: Academic Press, (1992).

How do you determine the effect of caffeine effect on yourself? Try eliminating caffeinated food and drink after lunch for a few weeks.

Are you sleeping better? If so, you may have identified the culprit.

Times when caffeine use may be appropriate

- Midway through the night shift on the first or second day of the work week (the first 2 nights of the work week are most difficult if you slept at night on your days off).
- Mid-afternoon when the afternoon dip in alertness is significant due to inadequate night-time sleep.
- Prior to an early morning commute home but not within 4 hours of a planned sleep period.

Therefore, sometimes you want a little caffeine to boost your alertness, and sometimes you need to avoid caffeine so you'll be able to fall asleep.

Tips

- Try to avoid caffeine 4-6 hours before going to sleep.

Women tend to retain caffeine longer than men (up to 13 hours).

Shift workers are advised to limit the dose to around 300 milligrams of caffeine per day and to avoid caffeine in the last half of the evening or night shift, since the worker's bedtime will come soon after arriving home.

Fruit juice is a good alternative drink for the second half of the shift.

- 2-4 cups of coffee or equivalent caffeine (tea, cola drinks, chocolate, etc.) can increase alertness; many of the over the counter (OTC) drugs also have caffeine so be careful taking them before bedtime (e.g., Vivarin (alertness aid), cold relief tablets, Excedrin (headache tablets), etc.)
- Avoid caffeine on your days off or vacation as it will increase your sensitivity to caffeine while on duty.

ALCOHOL

The tradition of an alcoholic “night cap” before bedtime also causes sleepless nights. Alcohol consumed at bedtime, after an initial stimulating effect, may decrease the time required to fall asleep (many people with insomnia consume alcohol to promote sleep).



However, studies show that a moderate dose of alcohol consumed as much as 6 hours before bedtime can increase wakefulness during the second half of sleep. The subject may sleep fitfully during the second half of sleep, awake from dreams and return to sleep with difficulty. More specifically, alcohol has a negative impact on REM Sleep.

This sleep disruption may lead to daytime fatigue and sleepiness.

Drinking too much of any beverage can also lead to more awakenings because of the need to urinate during the night.

Reduced alertness may potentially increase the sedative effect of alcohol in situations such as rotating sleep-wake schedules (e.g. shift work). A person may not recognise the extent of sleep disturbance that occurs under these circumstances, increasing the danger that sleepiness and alcohol consumption will co-occur.

Tips

- Don't stop for a drink after work; although at first you may feel relaxed, alcohol disturbs sleep.

NICOTINE

Nicotine, like caffeine, is a stimulant.

When smokers go to sleep, they experience nicotine withdrawal. Research suggests that nicotine is linked to difficulty falling asleep and problems waking up. They may also experience more nightmares.



Tips

- Try to avoid cigarettes and other nicotine sources before bedtime.

FOOD AND DIET

Caffeine and alcohol aren't the only substances that affect your sleep.

Studies have shown that diets deficient in certain nutrients, particularly copper, iron and aluminum, can cause disruptions in sleep patterns. A well-balanced diet can help reduce fatigue levels.



Everything you eat can affect night-time slumber. For example, tomato products and spicy foods give many people heartburn (as does eating too fast). Lying down makes heartburn worse, and heartburn itself makes falling asleep more difficult and also awakens sleepers with middle-of-the-night discomfort.

Another cause of sleep problems can be eating too much (of any food). A heavy meal close to bedtime may make you less comfortable when you settle down for your night's rest. At the same time, going to bed hungry can be as disruptive to sleep as going to bed too full.

The timing of meals is almost as important as what an individual eats. Eating breakfast in the morning starts the body's metabolism and provides energy after the overnight fast. It also prevents mid-morning irritability and lethargy.

The midday meal is important for sustained alertness in the afternoon. Protein (e.g., meat, eggs, and beans) is important at this meal because it is believed to trigger a rise in dopamine, a brain chemical associated with mental energy. Similarly, excessive intake of high carbohydrate food (e.g. sugars and starches) at midday may increase serotonin, a brain chemical involved in sleepiness.

Bedtime Snack

A small, low protein, high carbohydrate bedtime snack, such as juice and cookies, eaten about an hour before bedtime, can help you fall asleep sooner (Pizza does not qualify). Also, studies indicate that foods with large amounts of the amino acid L-tryptophan help us sleep better. L-tryptophan is used by the brain to make the neurotransmitter serotonin, which is responsible for slowing down reaction time, imparting satiety (reducing that being full feeling) after a meal and inducing sleep.



As examples, we have:

- Warm or hot milk (but not cold milk)
- Eggs
- Cottage cheese
- Chicken
- Turkey
- Cashews

Milk has tryptophan, so a glass of warm milk 15 minutes before going to bed can help people relax and fall asleep. If you don't like milk - or are avoiding dairy products - try a cup of hot camomile, catnip, anise or fennel tea. All contain natural ingredients which may help you sleep. Most health food stores will also have special blends of herb tea designed to soothe you and help you get to sleep.

Try both food theories, and see which works best for you.

Melatonin Supplements

In the quest for a better night's rest, many people turn to melatonin supplements. Melatonin is a natural substance that builds up in the body as daylight fades, making people drowsy.

You may want to try eating things that raise your melatonin production.

- Spirulina seaweed
- Soy nuts
- Cottage cheese
- Chicken
- Pumpkin seeds
- Turkey
- Dried watermelon seeds

Melatonin rich foods include:

- Oats
- Sweetcorn
- Rice
- Ginger
- Tomatoes
- Bananas
- Barley



Some vitamins and minerals such as B6, niacin amide, calcium, magnesium, or antioxidants may help. Other herbal remedies to consider are Valerian root, Skullcap, Passion Flower, Wood Betony, or the Californian poppy.

Tips

- Do not eat or drink too much close to bedtime.
- Consider a small snack to ease bedtime hunger pains.
- Start a shift with a meal of proteins to increase alertness; finish the shift with carbohydrates (sugars, starches) to facilitate sleep.
- Snack healthily - munch on vegetables and fruits rather than chips and fast food.

MEDICATION

A large number of over-the-counter and prescription drugs can disrupt your sleeping cycle. Whenever you start a new medicine, keep a close eye on your sleeping patterns and consult your doctor if you believe the medication interferes with your rest. Insomnia is a common medication side effect, and a complete list of potential insomnia-causing medicines would cover pages.



Benzodiazepines:

(diazepam, flurazepam...) enhance the action of something called GABA, a neurotransmitter that slows activity in the brain.

Non-benzodiazepine hypnotics:

(zolpidem, zaleplon...) This type affects only specific parts of GABA.

Antidepressants:

(prozac, trazodone...) Through altering neurochemicals such as serotonin and norepinephrine, antidepressants can create a sedating effect that both helps you sleep and helps treat depression.

Diphenhydramine, doxylamine (antihistamines) Advil PM, Sominex...

These drugs block the effects of histamine, the chemical responsible for many allergy symptoms. Diphenhydramine also has a sedative effect.

Tips

- Sleep aids (e.g. Nytol) may initially help you go to sleep, but may not help you sleep deeply. They may become habit-forming, and can leave you drowsy on awakening.
- Some herbal preparations are reported to help sleep: camomile, valerian, primrose, catnip, fennel, passion flower, rosemary, skullcap, hops, bergamot, pennyroyal, lemon balm, and gentian root. For alertness, some herbs include: peppermint, blackberry, raspberry, strawberry, juniper and thyme. There is some controversy about their effectiveness however, and some people may be allergic to certain herbs.
- Antidepressants (Monoamine oxidase (MAO)) can cause sleeplessness, may be habit forming, suppress REM (Rapid Eye Movement - dream) sleep, cause REM rebound (intense dreaming), fast pulse and dry mouth.
- Antihistamines and bronchodilators may cause drowsiness but have side effects.
- Tranquilisers (e.g., Valium, Librium) may cause daytime sedation and may contribute to irritability.
- Melatonin has been used to treat jet lag and some shift workers find it helpful in making a shift adjustment, but it has not been tested for long-term side effects.

EXERCISE



Exercise can be beneficial for good sleep, especially when done regularly in the afternoon and not too close to bedtime. If you don't exercise regularly, add good sleep to a long list of reasons why you should take up the practice.

- When you exercise, whether you are physically fit and a regular or occasional exerciser, the type of exercise you select, and your age or sex may all affect sleep.
- People should avoid strenuous exercise right before sleep and even up to 3 hours before bed-time. That's because exercise has a stimulating effect and raises your body temperature. This rise leads to a corresponding fall in temperature 5 to 6 hours later, which makes sleep easier then. That's why late afternoon may be the perfect time for your exercise. If you've been exercising close to bedtime and having trouble falling or staying asleep, you may want to begin exercising after you sleep instead.
- Physical fitness training for shift workers has been demonstrated to reduce general fatigue and sleepiness at work, increase sleep duration somewhat, and decrease musculo-skeletal problems.

Exercise recommendations for shift workers include:

- 1 Moderate physical exercise is better than intensive training;
2. Exercise should be done a few hours before the main sleep period;
3. For morning or day shifts, the best exercise time is after the shift. After night shifts, exercise should be taken before an evening nap.




- People with “cerebral” jobs, like office workers, have far more trouble with insomnia than people who work physically hard all day. Even 15 minutes of exercise a day (ideally 3 hours before going to bed so as to allow your body to relax after exercise) will give your body the activity and oxygen it needs to help you relax more and sleep better.





Tips





- Exercise regularly during the day so that your body feels tired enough to want rest at bedtime. If you do not get enough exercise, try taking a walk a few hours before bedtime.
- Excessive exercise can leave you with aches or jumpiness that might interfere with sleep.
- Exercise several hours before sleeping can help you sleep better. Avoid exercise right before sleep and even up to three hours before bedtime.
- Exercising briefly on the job can briefly increase your alertness, but unfortunately has only a short effect before fatigue returns.
- Cardiovascular exercise is most recommended, in which you raise your heart rate for 20-30 minutes at least three times a week; alternately, walking for longer periods is also helpful.

BREAK TIME STRETCHES

Feelings of fatigue can result from remaining seated for a long time. Being in this position causes blood to pool in the lower legs and feet, makes the hamstring muscles tighten up and causes back and neck muscles to stiffen. (13) Next, we'll show you some stretching exercises recommended by the National Research Council (TCRP Report 81, Washington D.C., 2002) (13) that you can do on your break time to improve circulation and loosen tight areas. Feelings of fatigue can result from remaining seated for a long time.

Body Parts	Directions	Diagram
Neck	Head turn - Keeping your head level, turn your chin towards a shoulder. You should feel the stretch in along the neck, opposite the shoulder your chin is towards. Hold the stretch for about 10 seconds and relax. Repeat twice, each side.	 A line drawing of a man's head and shoulders in profile, facing right. His head is turned towards his left shoulder. Two arrows point to the neck area, indicating the stretch.
Shoulders	Shoulder shrug - With arms hanging loosely at your side, raise your shoulders towards the ceiling until you feel a slight tension in the shoulder and neck area. Hold for 5 seconds, and then relax. 2 times.	 A line drawing of a man's upper body from the waist up, facing forward. His arms are at his sides. Two upward-pointing arrows are positioned above his shoulders, indicating the direction of the shrug.
Arms	Overhead stretch - Raise your hands above your head and interlace your fingers with palms upwards. Push slightly up and back until you feel slight tension in the upper back, arms, and shoulders. Hold stretch for 15 seconds, and then relax.	 A line drawing of a person's upper body from the waist up, facing forward. Their arms are raised above their head, and their hands are interlaced with palms facing up. An upward-pointing arrow is positioned above the hands, indicating the direction of the stretch.

Body Parts	Directions	Diagram
Arms	Arms straight front - interlace fingers, palms facing out, and hold arms straight out in front of you until you feel tension in the arms, shoulders, middle of upper back, hands and fingers, hold for 15 seconds.	
Arms	Triceps and top of shoulders - Bend one arm behind your head with one hand holding the other arm at the elbow, allowing the hand of the bent arm to rest on the upper back between the shoulder blades. Gently push the elbow of the bent arm down towards the back to stretch the triceps and top of shoulders. Hold for 15 seconds and then repeat with other arm.	
Upper Back	Shoulder blade stretch - Interlace fingers behind your head. Keeping your elbows straight, gently pull your arms back by pushing your shoulder blades together. Hold for 4-5 seconds. Can be done seated or standing.	
Entire Back	Bend while sitting - Lean forward and touch the floor with your hand if possible. This promotes circulation even if you do not feel a stretch. Hold for 15-20 seconds.	

Body Parts	Directions	Diagram
Entire Back	Twist while standing - Keeping your feet pointed straight ahead and knees slightly bent, place hands on hips and gently twist your waist.	
Entire Back	Calf stretch - Stand a little away from a wall or other solid support and rest your head into your forearms bracing the wall. Bend one leg slightly and place it on the ground straight in front of you. Step backwards with opposite leg and slowly move your hips forward until you feel the stretch in your calf. Do not bounce. Hold for 10-15 seconds. repeat with other leg.	
Ankle / Feet	Achilles tendon stretch - Keeping a similar position as in the Calf stretch, straighten your back by placing your hands on the wall with arms outstretched. Bend the knee of the leg behind you slightly and lower your hips downward until you feel the tension in the achilles tendon. hold for 5-10 seconds and repeat with other foot.	
Ankle / Feet	Ankle rotation - While standing, support yourself by holding on to something for balance. Lift one foot slightly and rotate the ankle 10-12 times clockwise, then counter clockwise. repeat with the other foot.	

RELAXATION

Relaxing may mean choosing the bedtime ritual that's right for you.

Does gentle music lull you to sleep? A calming soak in a warm bath or hot tub? Cozy pyjamas? Cuddling with your partner? Meditation or a prayer? But there are techniques you can do directly with your body.

Massage

Have your spouse (or whoever) give you a massage just before going to sleep. If you can convince them to give you a full body massage, great. If not, even a short back-rub and/or a face and scalp massage can be a big help. Have them make the massage strokes slow, gentle, yet firm, to work the tension out of your muscles and soothe you to sleep.



Abdominal Breathing

One of the most effective ways to relax at the end of a stressful day is to do some abdominal breathing. Put on some relaxing music or nature sounds (the sound of rain or running water). Dim the lights or turn them off. Stretch out on the bed or sofa and roll your shoulders around a few times. Now you can focus on your breathing.

When you are tense, breathing can be irregular and forced. Most people also use their chest to breathe when they are upset. The most natural way to breathe is to use the diaphragm, which pushes down into the abdomen. Breathing should be relaxed and rhythmic.

Take note of the following:

- Is your breathing rhythmic?
- Is your breathing relaxed?
- Is your chest moving up and down?
- Is your abdomen moving in and out?

Try the following exercises:

- Breathe without using your chest at all. Support your head on a pillow in order to relax your neck muscles.
- Take several deep breaths into the abdomen. Exaggerate this motion to give yourself a better sense of which muscles are involved.
- Place a book on your chest and another on your abdomen. The book sitting on the chest should remain still. The book on the abdomen should clearly move up and down in time with your breathing.

Practise these exercises for a minimum of 30 minutes each day so that the abdominal breathing becomes a habit that you do without thinking. Once you have formed this habit, you are ready to move on to the next phase. In this phase, you simply add a brief pause at the end of each breath.

Therefore, the breathing cycle becomes: inhale, exhale, pause... inhale, exhale, pause...

If you find that the worries of the day are intruding on your breathing exercises, simply say to yourself: "Ah ha, my mind has wandered. Let's return to the breathing task."

If this is not successful in getting you refocused on the breathing, try repeating a simple two-syllable expression to yourself. Some examples are "one-two", "deep down", and "in-out".

Deep Breathing

Most people breathe very shallowly, using only the top part of their lungs. Deep breathing allows us to use our entire lungs, so providing more oxygen to our bodies, energising and rejuvenating every organ and cell in our bodies. Some people consider this technique as probably the most effective and beneficial method of relaxation.

- 1** Lie on your back
- 2.** Slowly relax your body, starting with your feet and moving through every part of your body until you have reached — and relaxed — your face and scalp.

3. Do a quick check to see if you've missed any place. If so, relax it.
4. Slowly begin to inhale; first filling your lower belly, then your stomach area, and then your chest and the top of your lungs almost up to your shoulders. Hold for a second or two, and then begin to exhale. Empty the very bottom of your lungs first, then the middle, then finally the top.
5. Continue this breathing for 4 or 5 minutes. Don't force your breathing; it's not a contest to see how much air you can take in. Just do it in a relaxed, peaceful manner.
6. After a while, imagine that you are resting on a warm, gentle ocean. The sun is shining peacefully on your body. Imagine that you rise on the gentle swells of the water as you inhale, and that you slowly descend as you exhale.
7. Continue this relaxing breathing as long as you wish (hopefully until you fall asleep).

Note: This is particularly effective when you do it after Progressive Relaxation (see below) - if you haven't already fallen asleep!

Progressive Relaxation (11)

This exercise is most effective when you record the instructions in advance, preferably in your own voice. This way you don't have to concentrate on remembering the instructions.

You record them, with a short pause after each sentence to allow yourself time to actually do the sensing and relaxing. Lie on your back, close your eyes, and begin to listen to the recording.

- 1.** Feel your feet. Feel the weight of your feet. Feel your feet relax and sink into the bed.
- 2.** Feel your lower legs. Feel the weight of your lower legs. Feel your lower legs relax and sink into the bed.
- 3.** Feel your knees. Feel the weight of your knees. Feel your knees relax and sink into the bed.
- 4.** Feel your upper legs. Feel the weight of your upper legs. Feel your upper legs relax and sink into the bed.
- 5.** Feel your hands. Feel the weight of your hands. Feel your hands relax and sink into the bed.
- 6.** Feel your lower arms. Feel the weight of your lower arms. Feel your lower arms relax and sink into the bed.

- 7.** Feel your elbows. Feel the weight of your elbows. Feel your elbows relax and sink into the bed.
- 8.** Feel your upper arms. Feel the weight of your upper arms. Feel your upper arms relax and sink into the bed.
- 9.** Feel your buttocks. Feel the weight of your buttocks. Feel your buttocks relax and sink into the bed.
- 10.** Feel your back. Feel the weight of your back. Feel your back relax and sink into the bed.
- 11.** Feel your pelvic and belly area. Feel the weight of your pelvic and belly area. Feel your pelvic and belly area relax and sink into the bed.
- 12.** Feel your chest. Feel the weight of your chest. Feel your chest relax and sink into the bed.
- 13.** Feel your shoulders. Feel the weight of your shoulders. Feel your shoulders relax and sink into the bed.
- 14.** Feel your neck, both front and back. Feel the weight of your neck. Feel your neck relax and sink into the bed.
- 15.** Feel your skull. Feel the weight of your skull. Feel your skull relax and sink into the bed.

16. Feel your mouth. Feel any tension in your mouth. Feel your mouth relax and any tension slide off into the bed.
17. Feel your eyes. Feel any tension in your eyes. Feel your eyes relax and any tension slide off into the bed.
18. Feel your entire face. Feel any tension in your face. Feel your face relax and let any tension slide off into the bed.
19. Mentally scan your body. If you find any place that's still tense, relax it and let it sink into the bed.

Toe Wiggling (11)

OTHER TECHNIQUES

Eastern sciences (such as yoga) have known for thousands of years that the mind and body are connected (actually they're not just connected, they're one, but the idea that they're connected is sufficient for our purposes here). So, the body has to be relaxed for the mind to be relaxed.

Lie on your back and wiggle your toes up and down 12 times, wiggling the toes of both feet at the same time. This will relax your entire body, inside and out.

How does it work? According to Reflexology your feet are a kind of master control panel for the rest of your body. "Meridians" in the body - those channels of energy treated by acupuncture - end up in the feet. So, the ends of those meridians in your feet connect with every organ and every part of your entire body. When you wiggle your toes, you are stimulating - and thus relaxing - your entire body. Incidentally, this is a good place to mention that you can be energised and relaxed at the same time. It's a matter of the quality of that energy. If it flows freely and smoothly, you will be relaxed. If the energy flow in your body is restricted or blocked, you will be tense. Toe wiggling helps to bring about a relaxing, free-flowing energy. This exercise is also great first thing before getting out of bed in order to energise the body.

Quiet Ears (11)

Is an ancient Eastern meditation technique, as well as a great way to fall asleep.

1. Lie on your back with your hands behind your head, fingers
2. interlocked, and your palms cupping the back of your head. Get as relaxed as possible (may take a little while to get used to).
3. Place your thumbs in your ears so that you are pressing the outer flap of your ear and blocking the entrance to the ear canal.
4. Lie quietly and listen for a high-pitched sound that you will gradually hear inside your head.
5. Lie there for 10 to 15 minutes and concentrate on that sound. Then put your arms to your sides and go to sleep (don't worry about all the stories of people who have ringing in their ears, this is different - and natural).

If you are sleepy when your shift is complete, try taking a nap before driving home.

RIDE HOME

Remember that sleep can quickly overcome you when you least expect or desire it to. (3)

Emotions can keep us up at night: stress,



Tips (3) (5)

- Carpool, if possible. Have the most alert person do the driving.
- Drive defensively.
- Don't stop for a "night cap".
- If you are sleepy, stop to nap, but do so in your locked car in a well-lit area.
- Take public transportation, if possible.

EMOTIONS: STRESS, DEPRESSION AND MORE

excitement, anger and grief can all prevent a restful night. A fight with a spouse, or worry about an upcoming deadline, can lead to sleeplessness. Most often, this is temporary: when the emotion ends, sleep patterns return to normal. Chronic stress, worry and depression can cause longer-term rest disturbances. (6)

If you find your thoughts turning to worries when bedtime approaches, keep a worry book by your bedside. Jot down a brief note about what's on your mind. Schedule time the next day to focus on the problem and a solution. Problems often seem smaller in the daylight. (6)

The shift worker faces special problems in trying to maintain family relationships and

BALANCING LIFE AND WORK

social and community ties. It becomes difficult to balance work, sleep and private time. (3)

For individual coping strategies to be effective, families must be involved, that is why it is important to talk with family members and friends about your concerns. Remember that sleep loss and feeling at odds with the rest of the world can make you irritable, stressed and depressed.

As one expert puts it, "Blame the shift work - not your kids!" (3) (9)

Some Guidelines



Family Support and Education Tips (7)

- At times, your shift work will require you to spend less time with your family and friends.

Your job requires you to sleep enough to perform at an acceptable, alert state when on duty. For this to happen, you cannot skimp on your sleep time. Rather, plan times when you will see your friends and daily time for your family so no one feels neglected. Protect your schedule of activities with your family.

- Family Scheduling - Post a calendar so all family members know what's going on shiftwise.
- Hold family meetings to discuss any problems with shift work before they become bigger.
- Explain shift work and daytime sleeping to younger children in terms that they can understand, so they are less likely to make noise.

DECREASING THE EFFECTS OF SHIFT WORK

- Try following as closely as possible the same sleep schedule on both work days and days off.

If you work nights, this may not be feasible due to family and social activities. For night workers whose personal schedules allow them to continue their workday sleep pattern on days off who feel their bodies are adjusted to the night work schedule, this is an appropriate sleep strategy. However, most people never completely adapt to working nights and sleeping during the day. This means that you will probably be less fatigued if you return to night time sleep on days off.

For people not working night shifts, plan on:

- Obtaining 8 hours of sleep each night.
- One continuous sleep period each day without naps or other sleep periods.
- Starting your sleep time prior to 3 a.m. and ending your sleep prior to 11 a.m.

For people regularly working night shifts, plan on:

- Trying to get 9 hours sleep per day; calculate that you will need an extra hour of sleep per day compared to your day-working counterparts due to less restorative sleep.
- If possible, waiting to start your main sleep period until you hit your circadian midday dip – around 2 to 3 p.m., and sleep for 9 continuous hours.
- If unable to wait to sleep or have other time constraints during the day, start

your first sleep period as soon after work as possible. Calculate how many more hours you need to equal 9 and try to get those either starting at the midday dip or prior to going to work for the following shift. If you choose this second option, remember to leave at least 1 hour between when you wake up and when you have to report for duty.

- A couple of days before starting a night shift, go to bed a bit later at night and wake up later in the morning. This phase delay will give your circadian rhythm a head start for adjusting to the new shift. (2)
- Avoid working other jobs on days off.
- Avoid working every day of the week.
- Avoid extended work hours; this includes working prolonged shifts and excessive overtime, and taking short breaks.
- Avoid long commutes; they use up valuable time that could be spent sleeping.
- Decrease the number of night shifts worked in a row. Shift workers working the night shift sleep less than day workers and become progressively more sleep deprived over several days. If one can limit the number of third shifts to 2 to 4, with days off between, recovery from sleep deprivation is more likely. If working a 12-hour shift instead of the usual 8 hours, it is recommended that one limits work to 4 shifts in a row. Furthermore, one should optimally have more than 48 hours off after a string of night shifts.

- Avoid rotating shifts more than once a week. It is more difficult to deal with such alteration than it is to work the same shift for a longer period of time. The sequence of shift rotation can be important as well. Working the first shift (day), then the second shift (evening), and then the third shift (night) is easier than working the first, the third, and then the second shift. Make sure it rotates in a forward direction – day, evening, night – rather than backward: night, evening, day.
- Get sufficient sleep on days off. Practice good sleep hygiene by planning and arranging a sleep schedule and by avoiding caffeine, alcohol, and nicotine.
- Wear wraparound dark glasses on your way home from work if you are on the night shift to keep morning sunlight from activating your internal “daytime” clock.
- Set the stage for sleep even though it might be broad daylight outside and prepare your body and mind. Ensure that you have a quiet place to sleep during the day.
- At home, ask family and friends to help create a quiet and peaceful setting during your sleep time. Have family members wear headphones to listen to music or watch TV. Ban vacuuming, dish washing, and noisy games during your sleep time.
- Put a “Do Not Disturb” sign on the front door so that delivery people and friends will not knock or ring the doorbell. Schedule household repairs for after your sleep time.
- Make a nutrition plan. Planning your meals ahead of time, and when you will eat them will play a large role in how well you will adapt to working shifts. Analyse what you are currently eating and determine its caloric and fat content.
- Avoid drinking caffeinated beverages for at least 4-6 hours before sleep.

- Eat at or before 1 a.m. and after 5 a.m. Your body has a rhythm for food digestion, which slows down during the late night-early morning hours. If you eat heavy meals during this time, the food will likely remain undigested for much longer than normal, which may lead to you having gastrointestinal distress or constipation. You are also more likely to convert the food into stored fat. Eat only light snacks - such as fruit, soup and toast - at night.
- Avoid meals of more than 600 calories as they can induce sleepiness. Large meals right before or during your work period should be avoided, regardless of your work shift. This is because your body is diverting its resources to digest your food and store it rather than use your reserves to maintain proper body functioning and alertness.
- If you notice big discrepancies in what you eat, what you should eat, and when:
 - Try to plan (with your family if applicable) your meals right before and during your work period.
 - If you do not pack a lunch, avoid restaurants that serve only fried, fast or greasy food. If you must eat from vending machines, try to avoid foods high in carbohydrates, such as cold cut sandwich meats and chips.

Please remember that there is no one “best” sleep pattern for all shift workers. You must determine the scheme that gives you the most restful sleep.

Promoting Alertness at Work

Just as you can take steps to ensure a good night's (or day's) sleep, you can try these steps to stay alert on the job.

- Take short breaks throughout the shift.
- Try to work with a “buddy”. Talking with co-workers can help keep you alert. Also, co-workers can be on the lookout for signs of drowsiness in each other.
- Try to exercise during breaks. Use the employee lounge, take a walk, play basketball in the parking lot, or climb stairs.
- Try to eat three normal meals per day. Eat healthy snacks, avoiding foods that may upset your stomach.
- If you drink a caffeinated beverage (coffee, tea, and colas), do so early in the shift, e.g., before 3 a.m. for the night worker.
- Don't leave the most tedious or boring tasks to the end of your shift when you are likely to feel the drowsiest.
Night shift workers hit their lowest period around 4 a.m. This is the time when human errors are most likely.
- Exchange ideas with your colleagues on ways to cope with the problems of shift work. Set up a support group at work so that you can support and learn from each other.

For The Employer

There are a number of ways of making the workplace safer and more productive for shift workers.

Educate managers and shift workers about the need for sleep and the dangers of fatigue.

- Install bright lights in the work areas. A well-lit workplace signals the body that it is time to be awake and alert.
- Provide vending machines with healthy food choices and a microwave oven.
- Schedule shifts to allow sufficient breaks and days off, especially when workers are re-assigned to different shifts. Plan enough time between shifts to allow employees to not only get enough sleep, but also attend to their personal lives.

Don't promote overtime among shift workers.

- Encourage napping by providing a sleep-friendly space and time for scheduled employee naps. A short break for sleep can improve alertness, judgement, safety and productivity.

WHEN TO SEEK HELP

Having a sleep problem is serious and is not something that will resolve itself. Similarly, it is not something to be ashamed of.

If your sleep problems persist for longer than a week and are bothersome, or if sleepiness interferes with the way you feel or function during the day, a doctor's help may be needed.

To get the most out of your doctor's visit, you'll find that it is often helpful to keep a diary (see Attachment A) of your sleep habits for about ten days to identify just how much sleep you're getting over a period of time and what you may be doing to interfere with it. It can help you document your problem in a way that your physician can best understand.

In attachment A, you will find tools to help you test and plan your sleep and test your knowledge on sleep issues.

WANT TO KNOW MORE?

The following documents were used in the preparation of this handbook:

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www.merck.com/pubs/mmanual_home/sec6/64.htm
- Multimedia Sleep Disorder Library
http://insomnia.healthology.com/focus_index.asp?b=insomnia&f=sleep_disorders
- Sleep Deprivation Information
www.sleep-deprivation.co.uk
- Sleep Insomnia Program
www.iris-publishing.com/sleep.html
- www.sleepnet.com

APPENDIX

QUICK AID ON FATIGUE AND SLEEP HYGIENE

The Epworth Sleepiness Scale

How likely are you to doze off or fall asleep in these situations?

Would never doze	=	0 point
Slight chance of dozing	=	1 point
Moderate chance of dozing	=	2 points
High chance of dozing	=	3 points

Situations	Points
Sitting and reading	
Watching TV	
Sitting inactive in a public place (e.g. theatre or a meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after lunch without alcohol	
In a car, whilst stopped for a few minutes in traffic	

Total score meaning:

0 - 10: normal 10 - 12: borderline 12 - 24: abnormal

Morningness Eveningness Questionnaire (MEQ)

Instructions

- Please read each question very carefully before answering.
- Please answer each question as honestly as possible.
- Answer ALL questions.
- Each question should be answered independently of others. Do NOT go back and check your answers.

1. What time would you get up if you were entirely free to plan your day?

5:00 - 6:30 AM	5
6:30 - 7:45 AM	4
7:45 - 9:45 AM	3
9:45 - 11:00 AM	2
11:00 - 12 NOON	1

2. What time would you go to bed if you were entirely free to plan your evening?

8:00 - 9:00 PM	5
9:00 - 10:15 PM	4
10:15 PM - 12:30 AM	3
12:30 - 1:45 PM	2
1:45 - 3:00 PM	1

3. If there is a specific time at which you have to get up in the morning, to what extent do you depend on being woken up by an alarm clock

Not at all dependent	4
Slightly dependent	3
Fairly dependent	2
Very dependent	1

4. How easy do you find it to get up in the morning (when you are not woken up unexpectedly)?

Not at all easy	1
Not very easy	2
Fairly easy	3
Very easy	4

5. How alert do you feel during the first half hour after you wake up in the morning?

Not at all alert	1
Slightly alert	2
Fairly alert	3
Very alert	4

6. How hungry do you feel during the first half-hour after you wake up in the morning?

Not at all hungry	1
Slightly hungry	2
Fairly hungry	3
Very hungry	4

7. During the first half-hour after you wake up in the morning, how tired do you feel?

Very tired	1
Fairly tired	2
Fairly refreshed	3
Very refreshed	4

8. If you have no commitments the next day, what time would you go to bed compared to your usual bedtime?

Seldom or never later	4
Less than one hour later	3
1-2 hours later	2
More than two hours later	1

9. You have decided to engage in some physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him is between 7:00 – 8:00 am. Bearing in mind nothing but your own internal “clock”, how do you think you would perform?

Would be in good form	4
Would be in reasonable form	3
Would find it difficult	2
Would find it very difficult	1

10. At what time of day do you feel you become tired as a result of need for sleep?

8:00 – 9:00 PM	5
9:00 – 10:15 PM	4
10:15 PM – 12:45 AM	3
12:45 – 2:00 AM	2
2:00 – 3:00 AM	1

11. You want to be at your peak performance for a test that you know is going to be mentally exhausting and will last for two hours. You are entirely free to plan your day. Considering only your own internal “clock”, which ONE of the four testing times would you choose?

8:00 AM – 10:00 AM	6
11:00 AM – 1:00 PM	4
3:00 PM – 5:00 PM	2
7:00 PM – 9:00 PM	0

12. If you get into bed at 11:00 PM, how tired would you be?

Not at all tired	0
A little tired	2
Fairly tired	3
Very tired	5

- 13.** For some reason you have gone to bed several hours later than usual, but there is no need to get up at any particular time the next morning. Which ONE of the following are you most likely to do?

Will wake up at usual time, but will NOT fall back asleep	4
Will wake up at usual time and will doze thereafter	3
Will wake up at usual time but will fall asleep again	2
Will NOT wake up until later than usual	1

- 14.** One night you have to remain awake between 4:00 – 6:00 AM in order to carry out a night watch. You have no commitments the next day. Which ONE of those alternatives will suit you best?

Would NOT go to bed until watch was over	1
Would take a nap before and sleep after	2
Would take a good sleep before and nap after	3
Would sleep only before watch	4

- 15.** You have to do two hours of hard physical work. You are entirely free to plan your day and considering only your own internal “clock” which ONE of the following time would you choose?

8:00 AM – 10:00 AM	4
11:00 AM – 1:00 PM	3
3:00 PM – 5:00 PM	2
7:00 PM – 9:00 PM	1

- 16.** You have decided to engage in hard physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him is between 10:00 – 11:00 PM. Bearing in mind nothing else but your own internal “clock” how well do you think you would perform?

Would be in good form	1
Would be in reasonable form	2
Would find it difficult	3
Would find it very difficult	4

- 17.** Suppose that you can choose your own work hours. Assume that you worked a FIVE hour day (including breaks) and that your job was interesting and paid by results). Which FIVE CONSECUTIVE HOURS would you select?

5 hours starting between 4:00 AM and 8:00 AM	5
5 hours starting between 8:00 AM and 9:00 AM	4
5 hours starting between 9:00 AM and 2:00 PM	3
5 hours starting between 2:00 PM and 5:00 PM	2

- 18.** At what time of the day do you think that you reach your “feeling best” peak?

5:00 – 8:00 AM	5
8:00 – 10:00 AM	4
10:00 AM – 5:00 PM	3
5:00 – 10:00 PM	2
10:00 PM – 5:00 AM	1

19. One hears about “morning” and “evening” types of people. Which ONE of these types do you consider yourself to be?

Definitely a “morning” type	6
Rather more a “morning” than an “evening” type	4
Rather more an “evening” than a “morning” type	2
Definitely an “evening” type	0

To calculate your chronotype, sum all the scores associated to chosen responses (second column in each table).

TOTAL SCORE:

.....

Find your chronotype in the following Morningness-Eveningness scale:

16-30	31-41	42-58	59-69	70-86
Definitely Evening Type	Moderately Evening Type	Neither Type	Moderately Morning Type	Definitely Morning Type

Sleep Test

Check if any of the following applies to you:

- You were told that you snore loudly and often.
- You or others have observed that you stop breathing or gasp for breath during sleep.
- Feel sleepy or doze off while watching TV, reading, driving or engaging in daily activities?
- Have trouble staying alert during boring or monotonous situations when fatigue is often “unmasked”?
- Do you feel like you need a nap during the day?
- Have difficulty sleeping 3 nights a week or more (e.g. trouble falling asleep, wake frequently during the night, wake too early and cannot get back to sleep or wake unrefreshed)?
- Feel unpleasant, tingling, creeping feelings or nervousness in your legs when trying to sleep?
- Interruptions to your sleep (e.g., night-time heartburn, gastrointestinal distress, need to urinate, acid reflux, pain, bad dreams, sleep difficulties of family members, or an uncomfortable environment e.g., too much noise, light, or unpleasant temperature)?

- Tendency to be unreasonably irritable with co-workers, family or friends, and have difficulty concentrating or remembering facts?

**If you answered “yes” to any of these questions,
you may not be getting enough good quality sleep!**

Sleep Diary

This Sleep Diary sample belongs to The National Heart, Lung, and Blood Institute, Bethesda (Maryland, USA). (14)

Sleep Diary - Name:

		Example					
Complete in AM	Date	Monday 4/10					
	Bed time (of previous night)	10:45 pm					
	Rise Time	7:00 am					
	Estimated time to fall asleep (previous night)	30 min					
	Estimated # of awakenings & Total time awake (during previous night)	5 times 2 hours					
Complete in PM	Naps (Time & Duration)	3:30 pm 45 min					
	Alcoholic drinks (Number & Time)	1 drink @ 8:00 pm 2 drinks @ 9:00 pm					
	List stresses experienced today	Flat tire Argued w/ son					
	Estimated time to fall asleep (previous night)	30 min					
	Rate how you felt today 1- Very tired/ sleepy 2- Somewhat tired/sleepy 3- Fairly alert 4- Wide awake	2					
	Irritability 1- Not at all/ 5- Very	5 = very					
	Medications						

Sleep I.Q.

National Institutes of Health (National Heart, Lung, and Blood Institute) Test Your Sleep I.Q.

The following true or false statements test what you know about sleep. Be sure to read the correct answers and explanations after taking the test.

		True	False
1	Sleep is a time when your body and brain shut down for rest and relaxation.	<input type="checkbox"/>	<input type="checkbox"/>
2	If you regularly doze off unintentionally during the day, you may need more than just a good night's sleep.	<input type="checkbox"/>	<input type="checkbox"/>
3	If you snore loudly and persistently at night and are sleepy during the day, you may have a sleep disorder.	<input type="checkbox"/>	<input type="checkbox"/>
4	Opening the car window or turning the radio up will keep the drowsy driver awake.	<input type="checkbox"/>	<input type="checkbox"/>
5	Narcolepsy is a sleep disorder marked by "sleep attacks."	<input type="checkbox"/>	<input type="checkbox"/>
6	The primary cause of insomnia is worry.	<input type="checkbox"/>	<input type="checkbox"/>
7	One cause of not getting enough sleep is restless legs syndrome.	<input type="checkbox"/>	<input type="checkbox"/>
8	The body has a natural ability to adjust to different sleep schedules such as working different shifts or travelling through multiple time zones quickly.	<input type="checkbox"/>	<input type="checkbox"/>
9	People need less sleep as they grow older.	<input type="checkbox"/>	<input type="checkbox"/>
10	More people doze off at the wheel of a car in the early morning or mid-afternoon than in the evening.	<input type="checkbox"/>	<input type="checkbox"/>

Answers to the Sleep I.Q. Quiz:

1. False. Although it is a time when your body rests and restores its energy levels, sleep is an active state that affects both your physical and mental wellbeing. Adequate restful sleep, like diet and exercise, is critical to good health. Insufficient restful sleep can result in mental and physical health problems and possibly premature death.
2. Many people doze off unintentionally during the day despite getting their usual night of sleep. This could be a sign of a sleep disorder. Approximately 40 million Americans suffer from sleep disorders, including sleep apnoea, insomnia, narcolepsy, and restless legs syndrome. An untreated sleep disorder can reduce your daytime productivity, increase your risk of accidents, and put you at risk for illness and even early death.
3. True. Persistent loud snoring at night and daytime sleepiness are the main symptoms of a common and serious sleep disorder, sleep apnoea. Another symptom is frequent long pauses in breathing during sleep, followed by choking and gasping for breath. People with sleep apnoea don't get enough restful sleep, and their daytime performance is often seriously affected. Sleep apnoea may also lead to hypertension, heart disease, heart attack and stroke. However, it can be treated and the sleep apnoea patient can live a normal life.
4. False. Opening the car window or turning the radio up may arouse a drowsy driver briefly, but this won't keep that person alert behind the wheel. Even mild drowsiness is enough to reduce concentration and reaction time. The sleep-deprived driver may nod off for a couple of seconds at a time without even knowing it - enough time to kill himself or someone else. It has been estimated that drowsy driving may account for an average of 56,000 reported accidents each year claiming over 1,500 lives.

5. True. People with narcolepsy fall asleep uncontrollably at any time of the day, in all types of situations regardless of the amount or quality of sleep they've had the night before. Narcolepsy is characterised by these "sleep attacks," as well as by daytime sleepiness, episodes of muscle weakness or paralysis, and disrupted night-time sleep. Although there is no known cure, medication and behavioural treatments can control symptoms, and people with narcolepsy can live normal lives.
6. False. Insomnia has many different causes, including physical and mental conditions and stress. Insomnia is the perception that you don't get enough sleep because you can't fall asleep or stay asleep or get back to sleep once you've awakened during the night. It affects people of all ages, usually for just an occasional night or two, but sometimes for weeks, months, or even years. Because insomnia can become a chronic problem, it is important to get it diagnosed and treated if it persists for more than a month.
7. True. Restless legs syndrome (RLS) is a medical condition distinguished by tingling sensations in the legs - and sometimes the arms - while sitting or lying still, especially at bedtime. The person with RLS needs to constantly stretch or move the legs to try to relieve these uncomfortable or painful symptoms. As a result, he or she has difficulty falling asleep or staying asleep and usually feels extremely sleepy and unable to function fully during the day. Good sleep habits and medication can help the person with RLS.
8. False. The human body's biological clock programs each person to feel sleepy during night-time hours and to be active during the daylight hours. So, people who work the night shift and try to sleep during the day are constantly fighting their biological clocks. This puts them at risk of error and accident at work and of disturbed sleep. The same is true for people who travel through multiple time zones quickly; they get "jet

lag” because they cannot maintain a regular sleep-wake schedule. Sleeping during the day in a dark, quiet bedroom and getting exposure to sufficient bright light at the right time can help improve daytime alertness.

9. False. As we get older, we don’t need less sleep, but we often get less sleep. That’s because our ability to sleep for long periods of time and to get into the deep restful stages of sleep decreases with age. Older people have more fragile sleep and are more easily disturbed by light, noise, and pain. They also may have medical conditions that contribute to sleep problems. Going to bed at the same time every night and getting up at the same time every morning, getting exposure to natural outdoor light during the day, and sleeping in a cool, dark, quiet place at night may help.
10. True. Our bodies are programmed by our biological clock to experience two natural periods of sleepiness during the 24-hour day, regardless of the amount of sleep we’ve had in the previous 24 hours. The primary period is between about midnight and 7:00 a.m. A second period of less intense sleepiness is in the mid-afternoon, between about 1:00 and 3:00. This means that we are more at risk of falling asleep at the wheel at these times than in the evening-especially if we haven’t been getting enough sleep.

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- **9-10 Correct** Congratulations! You know a lot about sleep.
Share this information with your family and friends
 - **7-8 Correct** Very Good.
 - **Fewer Than 7 Correct** Go over the answers and try to learn more about sleep.

CONTACTS

Further information is available at:

<http://www.eurocontrol.int/articles/human-performance-atm>

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