

# feeling tired?



## Fatigue and Shiftwork

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## Introduction

The following document provides additional information to support the 'feeling tired?' leaflet. The purpose of the leaflet and these additional notes is to raise people's awareness about fatigue and shiftwork focussing on some of the things they can do to better cope with shiftwork and minimise the fatigue experienced.

The first part of this document is based around the questions covered in the Sleep Quiz on page 4. It is anticipated that by completing the Sleep Quiz and going through the answers the reader will gain an understanding of what fatigue is, how it is caused, our body rhythms, what the likely consequences of being fatigued are and its impact on behaviour. This understanding will hopefully lead to a greater appreciation of need for specific action to help shiftworkers. The second part of this document offers practical advice and strategies that may be employed to help shiftworkers manage the fatiguing effects of their work schedules.

Further copies of the 'feeling tired?' leaflet and this document can be downloaded from the RSSB website ([www.rssb.co.uk](http://www.rssb.co.uk)). In addition to these two documents there is also a PowerPoint presentation that may be downloaded.

Should you require any further assistance or have any further questions relating to these resources please contact RSSB on: 0207 904 7518

## **Fatigue: The hidden culprit in accidents and close calls**

There is a common but often unrecognised thread that links the Exxon Valdez oil spill, the Challenger explosion, the Bhopal chemical plant leak, the Chernobyl nuclear plant explosion and possibly the Piper Alpha disaster – as well as countless tragedies on motorways and worksites throughout the world. That thread is mental and physical fatigue, and it is strongly impacted by time of day. Each of these disasters involved decisions made during the night, a period of time when human alertness, vigilance and cognitive reasoning are typically at their lowest ebb.

Studies suggest that as many as 50 percent of fatal accidents on highways are caused by drivers falling asleep or briefly nodding off behind the wheel. Surveys of motorists show that at least a third have experienced episodes of dozing off behind the wheel; the level jumps to 80 percent for people who work around the clock.

Estimated total cost of accidents caused by human fatigue is \$80 billion per year throughout the world. Additional costs, such as those related to lost productivity and quality, increased health care and stress, boost the worldwide annual cost of human failure to more than \$377 billion.

Underlying these distressing statistics is the fact that, in our non-stop world, we have neglected to allow for human limitations. Technology is designed to run continuously day and night; our bodies, however, are not.

## SLEEP QUIZ

Please answer true or false:

1. I'm safe at work so it doesn't matter if I'm sleepy
2. I can tell when I'm going to fall asleep
3. Lack of sleep is the only cause of fatigue
4. The older you get, the fewer hours of sleep you need
5. Most people need 8 hours of sleep to function at their best
6. If I sleep now, I won't need to sleep as much later
7. Everyone has a "biological clock"
8. The human body can successfully adjust to nightshift work
9. Snoring is not harmful as long as it does not disturb sleep
10. Drinking coffee cures drowsiness while working/driving



## The Sleep Quiz: Answers and Detailed Briefing Notes

### **I'm safe at work so it doesn't matter if I'm sleepy?**

**FALSE**

Lack of sleep leads to the following problems:

- slower reaction time
- impaired judgements and decision making
- decline in attention
- decreased alertness
- increased moodiness and aggressive behaviour
- difficulty in remembering things

So if an individual is sleepy then it is unlikely that they will be working safely. Studies in road drivers show that being awake 18 hours is as great a risk as driving drunk. This reduced ability to drive can make the difference between avoiding and causing a crash.

### **I can tell when I'm going to fall asleep**

**FALSE**

Most people don't know when they're sleepy. Researchers have asked thousands of people over the years if they're sleepy, only to be told no...just before the individuals fell asleep! Many people don't know if they are sleepy, when they are sleepy, or why they are sleepy. The worst of it is, the more tired you become, the less able you are to make a good judgement about your ability to remain awake.

Signs of tiredness include:

- difficulty keeping your eyes open and focussed
- lots of yawning
- increased errors and loss of concentration at work
- feeling irritable, restless and impatient

Signs that you are not getting enough sleep:

- not feeling refreshed after sleep
- greater tendency to fall asleep while at work
- frequent naps during leisure hours
- extended sleep during days off

### **Microsleeps**

Occasionally we fall asleep with our eyes open. You may be driving down a familiar stretch of road and suddenly realise that you've missed your exit or have no recollection of the past 10 miles. These occurrences are known as microsleeps. They usually last only 5 to 10 seconds but can continue as long as several minutes. The bouts come in waves. A person may be reasonably alert one moment, then sink into drowsiness the next.

## Lack of sleep is the only cause of fatigue

FALSE

There are a number of causes of fatigue and also a number of possible consequences. Figure 1 provides an influence diagram that has been developed to show how various factors influence fatigue and the potential consequences fatigue may have on operations and personnel.

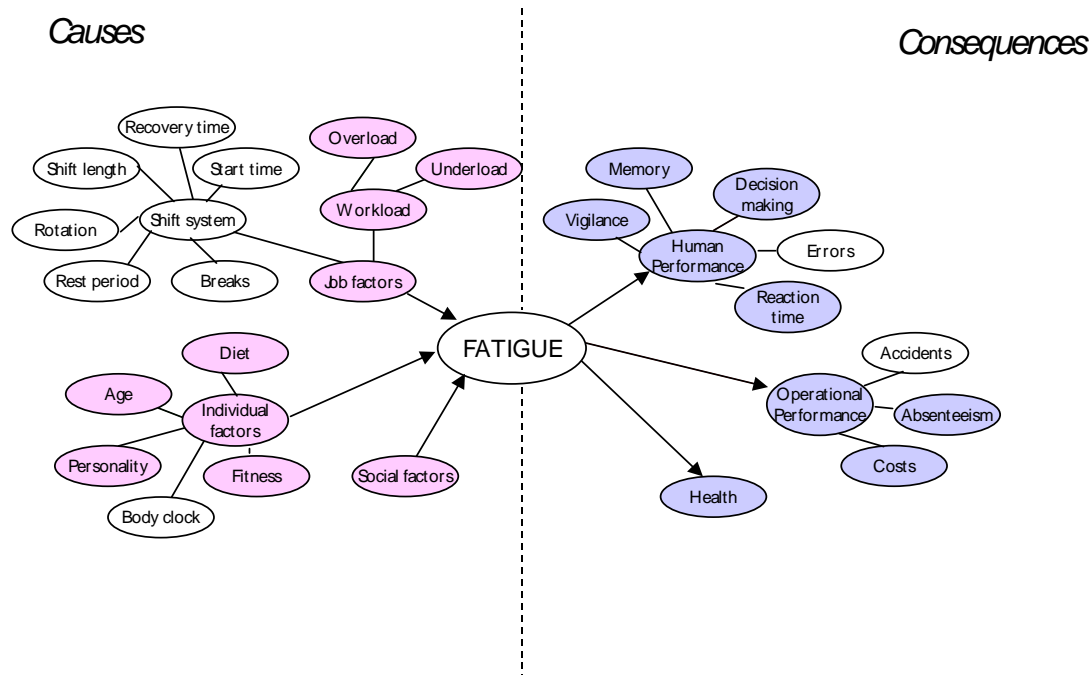


Figure 1: Causes and Consequences of Fatigue: An Influence Diagram

Potential **causes** of fatigue are as follows:

### **Workload**

Fatigue has been shown to be a consequence of both underload (boredom) and overload. In situations of relatively high workload people can become mentally and physically fatigued and their ability to remain focussed and vigilant reduces.

When people are active, they usually don't feel sleepy. When they take a break from activity, or feel bored, they may notice that they are sleepy. However, what causes sleepiness most is sleep loss: not getting the sleep you need. Adults who don't get enough good sleep feel sleepy when they're bored. Boredom, like a warm or dark room, doesn't cause sleepiness, it merely unmasks it.

### ***Social factors***

A shiftworker's social circumstances, such as marital status, number of children and leisure interests, for example, will influence likely well-being, including levels of fatigue. The extent to which he or she is able to acquire sufficient sleep will depend to an extent on the amount that his family depends upon him to integrate into family life at 'normal' times and to keep social engagements that may be difficult for him.

The neighbourhood may affect the ease with which a shiftworker can recover after night work – traffic noise may make it difficult to get to sleep and frequent interruptions, from telephone calls and visitors may also disrupt the sleep period. A shiftworker will rely upon the efforts made by his family to maintain a quiet environment during the day, when he may be sleeping, in order to ensure that he gets enough sleep.

### ***Individual Factors***

Individuals differ in their preferred time of day for mental and physical activity. Those who experience peak alertness and activity early in the day are called 'morning types', whereas others, who perform better later in the day, are called 'evening types'.

Some research has also attempted to identify shift worker "types". Individuals classed as 'flexible types', find it relatively easy to sleep at unusual times and have no preference for regular sleeping or meal times. In contrast, 'rigid types' have difficulty in getting to sleep early, or sleeping in late, even when tired. They also prefer to sleep and eat at regular times and maintain their normal sleeping habits even on holiday.

### **The older you get, the fewer hours of sleep you need**

#### **FALSE**

Sleep need is biological. While children need more sleep than adults, how much sleep any individual needs is genetically determined. Older people may wake more frequently through the night and may sleep less, but their sleep need is no less than during young adulthood. When older people sleep less at night, they tend to sleep more during the day. Sleep difficulties are not a normal part of aging, although they are all too common. Shift work can become harder with age (40–50 yrs) and studies suggest that they may suffer more from fatigue and need more time off to recuperate. However, there is also some evidence to suggest that this is often counterbalanced by the ability to cope with 'early starts', which tends to improve with age.

## **Most people need 8 hours of sleep to function at their best**

### **TRUE**

Seven to eight hours' continuous sleep is generally recognised as an average and normal need. If you get less than this you will build up a 'sleep debt'. You may be OK for a couple of days or nights, but it will catch up with you and you'll need a good long sleep to pay back the 'debt'. Losing two hours sleep per night for four days or nights will make you nearly as tired as losing one whole night of sleep.

How to determine what you need? Sleep until you wake on your own...without an alarm clock. Feel rested? That's your sleep need. You can teach yourself to sleep less, but not to need less sleep.

Of course, it is not just the total amount of sleep that is important. In order to get the restorative benefits of sleep you must experience all the stages of sleep. Sleep is not a simple shutdown of the brain. Instead, it comprises several distinct stages, each characterised by different brain wave activities that recur repeatedly throughout the night. These recurring patterns form what is often called "sleep architecture".

Sleep can be divided into five identifiable stages. As we begin to fall asleep, we enter non-rapid eye movement sleep, which is composed of Stages 1 – 4. Approximately 75% of the night is spent in these stages:

**Stage 1:** Light sleep; between being awake and entering sleep. During this stage, we may be vaguely aware of our surroundings; in fact, we may even claim not to be asleep. Stage 1 sleep holds dangerous implications if we slip into it while performing a critical job.

**Stage 2:** Onset of sleep; becoming disengaged with the environment; breathing and heart rate are regular and body temperature goes down.

**Stage 3 & 4:** Known as the Delta phase, this is the deepest and most restorative sleep; blood pressure drops; breathing slower; energy regained; and hormones are released for growth and development.

**Stage 5:** This stage is known as the rapid eye movement (REM) sleep and it first occurs about 90 minutes after falling asleep. It may occur four or five times during the night, building in duration as dawn approaches. Dreams occur during this phase as indicated by a sudden activity in the brain and our eyes darting back and forth. Our ability to remember a dream depends on whether we awaken during REM sleep. You are much more likely to remember a dream if you awake from the REM sleep stage during which the dream occurred. In addition to dreaming, our bodies become immobile and relaxed; muscles shut down and our breathing and heart rate may become irregular. It is thought that this stage of sleep may contribute to memory consolidation.

Sometimes when you awake from sleep you can feel groggy and disorientated and other times you can feel completely refreshed. Your condition on arousal depends on the stage of sleep from which you awake. If you awake from the deepest stages of delta sleep, you may feel like a zombie for 10 to 20 minutes or more. However, you are likely to awake from Stage 1 or 2 sleep alert and refreshed. Effective sleep management includes learning techniques to help you awake from the optimal stage of sleep for best performance.

### **If I sleep now, I won't need to sleep as much later**

**FALSE**

Sleep is not like money – you can't save it up and you can't borrow it. As was mentioned above, when you don't get enough sleep, you have a sleep debt and you "owe" more sleep to yourself. This debt can only be paid off by sleeping. You can't overcome it with willpower, and it won't go away by itself. While napping is an effective means of managing alertness it is not a substitute for regular sleep. See section on Napping.

### **Everyone has a "biological clock"**

**TRUE**

We have built in 'body clocks', or circadian rhythms that control all our important body functions. Light and dark cycles set these circadian rhythms. So our clock tells us that during daytime we will be active and will eat but that we will sleep at night.

Our body temperature is programmed to drop at night to make us sleepy and to rise during the day to help us feel alert. We are least alert and most sleepy in the pre-dawn hours around 5am. At night-time our digestive system slows and our hormone production rises to repair our bodies. The hormone melatonin helps set our body clock; it increases at night and makes us want to sleep. Exposure to bright light will help set your body clock to the daytime.

You cannot totally reverse your body clock and the main reason why night shift work is difficult is that you are working against your biological make up. However, if you are a regular night shift worker, you can partially adjust your body clock to reduce the impact of working when your body says, "sleep".

Almost all species, including humans, have evolved an internal 'body clock' that allows them to anticipate the pronounced 24-hour environmental changes. Early life forms probably simply responded to these changes, but at some point during the course of evolution it transpired that there was an advantage to actually anticipate these changes rather than merely respond to them; as the saying goes, 'the early bird catches the worm'. We now know that this clock is situated in the suprachiasmatic nuclei (SCN) of the brain. If the SCN is removed from animals, they lose their normal sleep/wake cycle and other 'circadian' (around a day) rhythms.

## The human body can successfully adjust to nightshift work

FALSE

Shift work can work against our circadian rhythms, and cause some problems. The internal body clock causes levels of alertness and performance to be at their lowest between 02:00 and 06:00 and at their highest approximately 12 hours later in the late afternoon. Hence, during a night shift an individual is trying to work at a time normally reserved for sleep and this will make us feel sleepier and less alert, can reduce physical strength, and can impair our ability to think and make decisions. If we eat a meal at a time usually reserved for sleep, it is poorly digested. Because our circadian rhythms are linked to the day and night cycle and for a shift worker that day and night cycle doesn't change, a shift worker's circadian rhythm never adjusts. And no matter how many years one works a night shift, sleeping during the day remains difficult.

Night work is also associated with loss of sleep. As well as often taking very little sleep during the day before the first night shift, sleep at home between night shifts can be shortened by up to one third compared to a normal night's sleep. Research has demonstrated that by the end of a week of night shifts the shift workers can have lost the equivalent of at least one night's sleep.

The sleep debt that accumulates over successive night shifts is known to cause an increase in risk. A number of studies have been undertaken to demonstrate this. For example, a German study of long-haul pilots found the incidence of micro-sleeps during night flights to increase substantially from the first to the second successive night flight. In addition, a number of studies done in industry have reported increases in accident risk over at least four successive night shifts. Specifically it is suggested that relative to the first night shift, the risk is increased by about 15% on the second night shift, by about 30% on the third night shift and 50% on the fourth night shift. The increase in risk is further supported by studies where the risk of accidents involving truck drivers between midnight and 2am is found to be more than double the average during the day.

The implications of these findings is that the number of successive night shifts should be kept to a minimum and they should be followed by sufficient rest days to allow people to recover sufficiently from accumulated fatigue.

There are a number of other aspects of shift patterns, which contribute, to a greater or lesser extent, to fatigue:

- **timing of shifts:** concerned with the specific risks associated with whether it is an early, afternoon or night shifts. Nights have already been discussed. Afternoon or late shifts are generally considered to be the least fatiguing. However, it is affected by the 'post-lunch dip' where we experience reduced alertness between about 13:00 and 15:00 hours. This post-lunch dip was originally thought to be related to the digestion of lunch, but has since been shown to occur irrespective of meal times.

Early starts are likely to be associated with a reduction in sleep duration. Research shows that sleep periods prior to an early start (*ie* before 07:30) were found to be, on average, three hours shorter than those obtained on a rest day.

An earlier bedtime to compensate for an early start may not be practical, partly as a result of social pressures, but also because of the influence of the so-called 'forbidden zone' for sleep. This is a period, lasting for about four hours in the evening, when the body's higher level of alertness hinders the onset of sleep. Therefore, even if shift-workers are conscientious and retire to bed early, they may experience difficulties in falling asleep. A further problem is that sleep prior to an early shift may be disturbed by the fear of not being able to wake up sufficiently early.

Given the reduction in sleep duration it would seem likely that working successive early shifts is likely to result in a cumulative sleep deficit. It would therefore seem sensible to restrict the number of consecutive early shifts worked.

- **duration of shifts:** concerned with the total length of the shift. Research suggests that while shift workers prefer 12-hour shifts, when shifts are extended beyond eight hours there is an increase in fatigue and a decrease in performance. However, it is not clear whether the longer rest periods, and fewer shifts overall counterbalance this increase in risks so until further research is undertaken the optimum length for shifts is not clear.
- **rotation of shifts:** concerned with the speed and direction of rotation. Rapidly rotating schedules, involving no more than two or possibly three night shifts are generally the most favoured by experts. Slowly rotating shift systems, including those that involve weekly rotation are generally regarded as the most fatiguing since any benefit accrued from the partial adaptation to a new shift will be immediately lost by the switch to another shift. Shifts can rotate in clockwise (early, late, night) or anti-clockwise directions (night, late, early). In the past, it has been considered that the clockwise direction (delaying system) has less ill-effects on shiftworkers than the anti-clockwise direction (advancing system) although the research is not conclusive.
- **rest and recovery periods:** concerned with rest breaks *during* a shift and recovery *between* shifts . Overall studies have shown that taking regular breaks is important in maintaining alertness levels. However, the optimum frequency and duration of breaks has not yet been established. In terms of recovery periods it is suggested that the rest period between the end of one shift and the start of the next should be long enough to enable enough sleep. Some research shows that to achieve 8-hours sleep, 12 hours rest is required before a 14:00 start, 14 hours before a 16:00 start and 16 hours before a 19:00 start.
- quick returns may severely restrict sleep duration and exacerbate the shift-worker's problems.

## **Snoring is not harmful as long as it does not disturb sleep**

**FALSE**

Snoring may indicate the presence of a sleep disorder called sleep apnoea. People with sleep apnoea snore loudly and arouse repeatedly during the night, gasping for breath. These repeated awakenings lead to severe daytime sleepiness, which raises the risk for accidents and heart problems. Yet 95% of those with sleep apnoea remain unaware that they have a serious disorder.

Sleep apnoea is caused by tissue structure problems in the breathing passage, or airway. When muscles at the base of the tongue and uvula relax and sag, the airway is blocked. (The uvula is that small piece of tissue hanging down at the back of your mouth). Apnoea also can occur in overweight people when excess neck tissue narrows the airway. The sleeper has to work harder to breathe, and these efforts cause snoring and periods of no breathing.

These stopped-breathing episodes occur when the sleeper is unable to breathe in oxygen and exhale carbon dioxide, resulting in lower levels of oxygen in the blood and higher levels of carbon dioxide. This alerts the brain to order the upper airway to reopen, an action known as an "arousal". Then the sleeper, thrashing about and sometimes choking, struggles back to regular breathing. Throughout, the sleeper is unaware of what's happening. But he or she certainly feels the consequences the next day, with effects such as general tiredness, loss of concentration and impaired work performance, and even falling asleep on the job or while driving.

The good news is sleep apnoea can be treated. Doctors and sleep specialists will need to be consulted. Effective treatments include losing weight. A weight loss of just 10 percent can reduce the number of apnoea events for most patients. However, the most widely used effective treatment is Continuous Positive Airway Pressure (CPAP). In this procedure, the patient wears a mask during sleep and an attached device forces air through the nose. Just enough pressure is used to keep throat tissue from collapsing. Thousands of patients who use CPAP therapy say it has given them their first good night's sleep in years.

Other sleep disorders include:

### **Insomnia**

Insomnia is characterized by difficulty falling asleep, waking frequently during the night, waking too early in the morning and not being able to get back to sleep, and waking feeling un-refreshed. Insomnia may be caused by many factors and the treatment will vary depending upon the cause (ie whether it is stress, depression, physical illness, caffeine intake or being in pain for example). For people experiencing insomnia, it is recommended that they first examine their sleep habits to see if their sleeplessness is connected with diet, exercise patterns, sleeping environment, or personal habits. If changing these factors does not alleviate the insomnia symptoms, then a doctor should be consulted.

**Restless Leg Syndrome** is another common disorder. It causes tingling sensations in the extremities, usually in the legs, and can affect both sexes, although it often occurs during pregnancy. Moving the limbs brings relief.

If you are concerned about whether you have a sleep disorder the best thing to do is use a sleep diary and talk to your doctor. There may be an underlying cause for your sleep problem and you will want to be properly diagnosed. Your doctor will help treat the problem or may refer you to a sleep specialist.

### **Drinking coffee cures drowsiness while working/driving**

**FALSE**

People think that having a cup of coffee, opening the window or listening to the radio will keep them awake. Studies also show that opening a window and/or listening to the radio will only work for a short period of time and ultimately fail to keep you alert. If you are driving, the only short-term solution is to pull over at a safe place and take a short nap or have a caffeinated drink. Doing both - for example, drinking coffee, then napping before the caffeine kicks in - may be even better.

Caffeine is like Dr. Jekyll and Mr. Hyde. It is an effective, inexpensive and readily available stimulant that can improve alertness, reaction time, performance of mental tasks and motor skill coordination. It also increases capacity for muscular work, and it takes effect quickly – 15 to 45 minutes after ingestion. Yet caffeine is a drug that can remain in the body on average from 3 – 5 hours and sometimes up to 12 hours. It can increase restlessness, disrupt normal sleep architecture and cause gastrointestinal disturbances.

## Caffeine Survey

In order to increase awareness of the dangers of excessive caffeine intake, it is useful to determine how much caffeine is consumed per day using the following guide:

Caffeine Type x Number of Servings = Total Caffeine

1. Coffee and tea	(milligrams per 5-ounce cup)	Total
Decaffeinated	2	
Instant coffee	60	
Tea (medium brew)	60	
Brewed coffee	120	

2. Soft Drinks	(milligrams per 12-ounce can)	Total
Diet Pepsi	34	
Pepsi-Cola (Regular)	43	
Diet Coke	45	
Coca-Cola (Regular)	65	

3. Over-the-counter medicine	(milligrams per tablet/capsule)	Total
Painkillers:	0-65	
Aspirin	0	
Anacin	32	
Excedrin	65	
Cold / allergy	16-30	
Stimulants:	100-200	
No-Doz	100	
Vivarin	200	
Diuretics	0-75	

4. Chocolate	(milligrams per 1 ounce)	Total
Brownie (with nuts)	6	
Cocoa beverage (6 oz.)	10	
Chocolate candy bars (2 oz.)	12	
Chocolate cake	14	

<b>Daily Total</b>	
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With the above information, you should be able to calculate your daily caffeine intake. Multiply the number of cups, cans, capsules or tablets of the various drinks and medications you take in a day by the milligrams of caffeine that each contains. Then add each amount to come up with a daily total. How do you rate?

### Total Milligrams Per Day

0 - 250

250 - 500

Over 500

### Status

No problem

High, reduce intake

Very high, take immediate action

## Coping with Shift Work

### 1. Introduction

Depending on your point of view, shift work can be a boon or a curse. On the plus side, working nights or unsociable hours gives you the time to do your own thing away from the crowds. But chronic tiredness, health and relationship problems and difficulties at home are all common complaints from the bleary-eyed.

The following advice is offered on ways in which you can cope with the fatiguing effects of shift work. The advice falls broadly into the following categories:

**Managing your work time** is concerned with actions you can take to ensure you do not accumulate too much sleep debt and minimise the disruption to your body clock.

**Creating a good sleep environment** is about the things that you can do to ensure when you do go to sleep you fall asleep quickly and remain asleep

**Creating good sleep routines** is about the need to establish regular pre-sleep routines and regular bedtime/wake-up schedules to ensure you fall asleep easily and minimise the disruption to your body clock

**Napping Strategies** used carefully are a way in which alertness between sleeping can be improved

**Physiological measures** are concerned with advice about caffeine intake, diet and exercise all of which can be used to help you sleep more soundly.

### 2. Managing Your Work Time

There are three types of shift work:

- Fast shift rotations (with changes every few days or less);
- Slow shift rotations (changes fixed for more than a few days); and
- Permanent night shift.

Whichever shift you work, there are ways to help your body adjust. Here are some tips.

### ***Fast Shift Rotations***

Try to maintain a daytime setting for your body clock. Ways to do this can be:

- ❑ Spending time out in the daylight before and after your night shift;
- ❑ Avoiding a heavy meal during the night;
- ❑ Having a nap at home before your night shift (early afternoon would be best); and
- ❑ Having a 20-30 minute nap during your night shift if possible/appropriate (allow at least ten minutes to wake up properly before returning to work duties).

### ***Slow Shift Rotations***

Try to adjust your body clock as rapidly as possible to a setting for being awake at night by:

- ❑ Going to bed as soon as you get home from night shift. Avoid having your main sleep in the evening – your body temperature/alertness is up and sleep is more difficult
- ❑ Having an afternoon nap if you didn't get enough sleep in the morning
- ❑ Avoiding a nap during the night shift, unless you are very sleepy. (If you do nap, keep it short – 20-30 minutes)
- ❑ Trying to avoid exposure to early morning daylight on the way home from work, as this can set your body clock to daytime setting, (try wearing sunglasses)
- ❑ Eating three regular meals, with 'lunch' during your night shift.

Remember, you can't totally fool your body clock, so your day sleep is likely to be shorter, lighter and more fragmented than your night sleep. So, after a few nights you could be in 'sleep debt' and very tired – just when you have to drive home in the morning. If this happens, find an alternative to driving.

After your last night shift try to adjust your body clock to being awake in the daytime. Ways to do this are:

- ❑ Sleep for only two-three hours on the first morning after night shift and then get a good long sleep that night and subsequently; and
- ❑ Get plenty of exposure to daylight/sunlight on your days off. The shift back to a daytime body clock setting will therefore be quite rapid.

### ***Permanent Night Shift***

If you are a permanent night worker or are returning to night shift after your days off, use the tips above from 'Slow Shift Rotation'. On your days off, try to remain as 'nocturnal' as possible. This can be difficult and not suit your family or social life, so try the following:

- ❑ Get up late in the morning (e.g. after midday) and go to bed late at night (e.g. after midnight);
- ❑ Avoid morning sunlight (stay indoors as much as possible or wear sunglasses); and
- ❑ Try to stay with your night shift meal schedule as much as possible.

### 3. Creating a Good Sleep Environment

A good sleep environment is one that is:

- quiet, without loud or sudden noises.
- dark no matter what time of day/night
- warm or cool enough to help you sleep
- comfortable, in terms of the mattress\*
- well ventilated
- free from interruptions

If noise is disturbing your sleep, you could consider:

- earplugs
- white noise, which comes from a noise-making machine such as a fan or generator
- rugs
- heavy curtains or drapes
- double-pane windows
- relaxing music or tapes

*\* Although there isn't much published research on mattresses, mattress quality may affect how sleep feels to the sleeper. Discomfort can make falling asleep more difficult and lead to restless slumber. Mattresses may be made of inner springs, foam, fabric, water or air. They may be firmer or more responsive to your body. This, in turn, may affect body temperature and humidity, as well as comfort.*

As well as the physical environment, a good sleep environment is also concerned with ensuring you recognise it as a place to sleep.

Just as the body and mind can learn that it is time to relax and go to sleep, if the bed or bedroom is associated with activities that are too engaging or negative, they can signal stress and wakefulness. Therefore, try to avoid using the bedroom for work, balancing the chequebook, watching television, or other activities that might be activating or stress inducing rather than relaxing. Use your bed only for sleep and this will strengthen the psychological association between bed and sleep.

Other things that you can do to this are:

- Only getting into bed when you're tired. If you don't fall asleep within 15 - 30 minutes, get out of bed. When you're sleepy, go back to bed.
- While in bed, don't dwell on not sleeping or your anxiety will increase. In addition, if looking at a bedroom clock makes you anxious about how much time you have before you must get up, move the clock out of sight. Do not engage in activities that cause anxiety and prevent you from sleeping.
- Protect your sleep time. Identify a specific sleep time(s) and protect it by minimising other distractions or responsibilities. At home, this takes planning, persistence, and understanding when trying to balance sleep requirements with family obligations and activities.

#### **4. Creating Good Sleep Routines**

Your body and mind can learn that it is time to relax and go to sleep. Establishing a regular pre-sleep routine can provide specific cues that indicate to your body and mind that it is time for bed and sleep. For example, consider a regular schedule of reading, listening to music, or using relaxation techniques before bed. Also, consider the timing of taking a warm bath, getting dressed for sleep, and actually getting into bed.

Consideration should also be given to establishing regular bedtime and wake-up schedules. For many, this is difficult or impossible; however, the internal body clock relies on consistent signals to keep it on time. Whenever possible, try to maintain consistent sleep and wake-up times on off-duty days and on duty days. Because the internal body clock seems to be especially effective as an alarm clock, maintaining a consistent wake-up time can be particularly beneficial.

#### **5. Napping Strategies – Not to be used as a strategy whilst at work**

Napping and sleeping are not the same thing. Sleeping is long and deep, while napping is brief and shallow. However naps can be a very effective means of managing alertness but there is an art to taking them. Several factors must be considered, including time of day, length of nap and individual differences in sleep patterns.

Time of day impacts napping in several ways. Our bodies continue to follow pre-programmed circadian rhythms regardless of how long we have gone without sleep. Thus, at some times of the day, it is very difficult to sleep, no matter how tired a person feels. Conversely, a nap taken when a person is more relaxed and ready for sleep will be deeper and more restorative.

One particularly interesting napping phenomenon is the impact of length of naps. It may surprise you to know that naps of 15 minutes' duration can be just as restorative as those of a half-hour to an hour in length. Sleep physiologists have discovered that, because of the body's 90- to 100-minute sleep cycles, short (15 to 20 minutes) or long (2 hours) naps are the most restorative.

Another important factor to consider in napping is sleep inertia, the time it takes to return to full alertness after a nap. At certain times of the day, for example, a prolonged nap can actually be detrimental to performance because of long recovery time. Relatively brief naps, however, produce minimal sleep inertia, and the napper typically returns to full alertness within minutes. Awakening in the midst of deep stages of sleep also increases inertia. That is why 1-hour naps are less desirable than those of 20 minutes or 2 hours.

Early afternoon and the pre-dawn hours are particularly viable napping times because they are the times of lowest circadian alertness levels. In fact, sleepy drivers are particularly well advised to pull off the road and nap at these times, when single-vehicle accident rates are at their highest.

### ***A Personal Napping Strategy***

A personal napping strategy is an invaluable tool for achieving alertness when required and sleep when desired. To develop this strategy, first identify your ideal nap. What time does it take place? Where does it take place? How do you get ready for it? How long does it take you to fall asleep? How long do you nap? How do you feel when you wake up?

After you've identified your ideal napping habits, put them to work for you. Use your knowledge to develop effective pre-nap rituals, establish a conducive napping environment and develop a wake-up routine.

Once you've adapted to your ideal nap, break the routine. Try to nap at different times, in different places and for varying durations. The objective of a personal napping strategy is to be able to capitalise on any napping opportunity, even if it does not come at an ideal time or place or for an ideal duration.

## **6. Physiological Measures**

### ***Managing Caffeine***

Caffeine, although present in coca cola and chocolate is mainly consumed in the form of coffee and strong tea. It can also be found in many over-the-counter medications, such as pills for headache and cold relief.

Caffeine is like Dr. Jekyll and Mr. Hyde. It is an effective, inexpensive and readily available stimulant that can improve alertness, reaction time, performance of mental tasks and motor skill coordination. It also increases capacity for muscular work, and it takes effect quickly – 15 to 45 minutes after ingestion. Yet caffeine is a drug that can remain in the body on average from 3 – 5 hours and sometimes up to 12 hours. It can increase restlessness, disrupt normal sleep architecture and cause gastrointestinal disturbances.

What is your caffeine intake like? The Caffeine Survey provides guidelines on how to work out your daily caffeine intake.

If you tend to over-use caffeine, the following guidelines will help you manage your intake:

- ❑ Use caffeine in moderation. This includes obvious sources such as coffee, tea, cola drinks and stimulants as well as painkillers, cold/allergy medicine and chocolate.
- ❑ Time your use of caffeine for when it is needed most, and avoid it for several hours prior to sleep.
- ❑ Replace caffeine with fruit, fruit juice or water.
- ❑ If you are currently a heavy caffeine user, don't quit "cold turkey", but cut back gradually over 1 to 2 weeks.
- ❑ Monitor your intake with the caffeine survey.

### ***Nicotine***

Nicotine, like caffeine, is a stimulant. Smoking before bed makes it more difficult to fall asleep. When smokers go to sleep, they experience withdrawal from nicotine, which also causes problems falling asleep or waking in the morning. Smokers may also experience more nightmares. Giving up smoking may cause more sleep problems at first, but the long-term effect on sleep and health is much better.

### ***Nutrition***

Eating the right foods – and avoiding the wrong ones – is even more important for people who work irregular schedules, because they must deal with the added stress of a constantly changing lifestyle and irregular eating patterns. Poor nutrition can not only deter alertness but also lead to gastrointestinal disorders, heartburn, ulcers, loss of appetite or weight gain and, potentially, cancer and cardiovascular disease.

In addition to the advice about managing your caffeine intake, there are a few simple rules for managing what you eat to help you cope with eating and shiftwork:

- ❑ When working through the night, avoid greasy, starchy or high-fat foods. Your body is not able to digest food properly in the middle of the night. Instead, eat light snacks such as clear soups, fruit or toast.
- ❑ Avoid a heavy meal just before bed. Your body won't be able to digest it, and it will keep you awake, trying. However, if you are hungry do eat something as being hungry or thirsty can impede the onset of sleep
- ❑ Keep your main meals on a regular scheduled. Your body responds best when meals occur at regular intervals. Try to eat at least three meals per day, even if they are light.
- ❑ Eat a wide variety of foods, particularly fruits, vegetables, lean meats and low-fat dairy products.
- ❑ Remember that tomato juice, strongly flavoured seasonings, spicy foods, coffee and cola drinks are gastro-irritants.
- ❑ Avoid alcohol. Although many people think of alcohol as a sleep aid because of its sedating effect, it causes more sleep disruptions throughout the night. Consuming alcohol before bedtime usually helps people to relax and fall asleep, but can lead to a night of disturbed sleep.

**Exercise**

Exercise can be a boon for good sleep, especially when done regularly in the afternoon and not too close to bedtime. Research suggests that exercise can help deepen your sleep, which means that you spend more time in deeper stages of sleep and you wake feeling more refreshed. Also, people who exercise may take less time to fall asleep than people who don't.

Traditionally, sleep experts have cautioned people to avoid strenuous exercise right before sleep and even up to three hours before bedtime. That's because exercise has an alerting effect and raises your body temperature. This rise leads to a corresponding fall in temperature five to six 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, try to arrange your workout earlier in the day.