



Fatigue Management





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Fatigue Management

Overview

This course provides the knowledge, and information to help employees in any industry, to utilise appropriate fatigue management strategies.

Duration 4 hours

Learning Outcomes

Upon completion of this course participants will be able to:

- Identify the typical causes of fatigue;
- Recognise the personal warning signs of fatigue;
- Determine personal actions that may be taken to control for the effects of each of the causes of fatigue;
- Identify the typical factors which increase the risk of fatigue-related accidents and safety incidents and personal actions that can minimise their effects; and
- State lifestyle choices which promote the effective long-term management of fatigue

Training Method

This course is provided in classroom or online.

Award

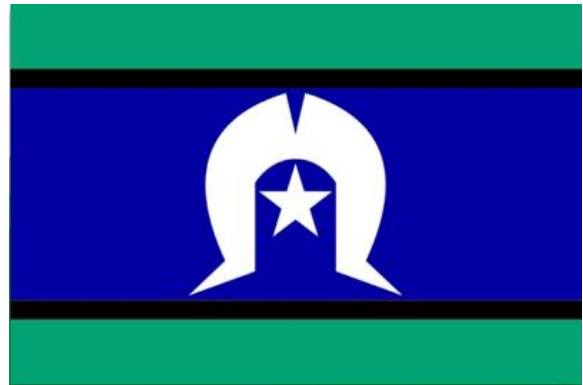
This course is a nonaccredited course, upon completion of this course, participants will be issued with a Certificate of Completion.



Acknowledgement of Country

We acknowledge Aboriginal and Torres Strait Islander people as the traditional custodians of the land upon which we meet.

We pay our respects to the Elders of the past present and future and acknowledge their spiritual connection to Country.





Module One: Introduction

Fatigue poses challenges to businesses; this must be addressed by employers and employees in all industries. An important part of any system consists of training all employees about the safety hazards of fatigue and how to effectively manage them. This fatigue management training is designed to promote the development of skills relevant to fatigue risk management.

As we become more aware of the implications of fatigue, we must acknowledge the needs of employees who work in demanding roles; who work outside the Monday-to-Friday, 9-to-5 schedule; and/or have very active lives when they are not at work. Shift workers are not the only workers at risk of fatigue at work. There are many pressures and opportunities in today's society to sacrifice sleep for other activities.

Nevertheless, the incidence and variety of non-traditional work schedules appear to be increasing. Shift work can have benefits for both employers and employees. However, scheduling decisions made without a thorough knowledge of the performance, safety and social impacts of such work schedules could result in unsafe shift arrangements that compromise any potential benefits.

What is Fatigue?

Fatigue can be defined as a condition characterised by increased discomfort with and lessened capacity for work, reduced work efficiency, loss of energy or capacity to respond to stimulation, and is usually accompanied by a feeling of weariness and tiredness.

Fatigue is a state of impairment that can include physical and/or mental elements, associated with lower alertness and reduced performance...There are a number of contributing factors to fatigue, but they usually relate to lack of sleep quantity or quality, extending the time someone is awake, or other work related or individual factors.

It is evident that fatigue can develop from a variety of sources, it can have a negative impact on a person's ability to perform tasks, can impair a person's ability to carry out tasks that require continuous concentration, complex thinking, and manual skills.

Fatigue may occur in a relatively short time (hours or even minutes) after some significant physical or mental activity, or may occur gradually over several days or weeks. The latter situation typically occurs when someone does not get sufficient sleep over a prolonged period for reasons such as having an infant at home, frequent international travel, sleep disorders such as insomnia or sleep apnoea, and shift work. Insufficient rest and work or personal demands can often cause ongoing physical and/or psychological impairment.



Sleep Deprivation Quiz

- Do you fall asleep in less than five minutes after going to bed?
- Do you often feel like you could do with a nap?
- Do you become drowsy after eating a large meal?
- Do you fall asleep when watching TV or sitting in meetings and presentations?
- Do boring activities make you sleepy?
- Do you sleep an hour or two longer than usual on days when off duty?
- Do you find that you can hardly make it through the working day without caffeine in some form?

"If you answered 'yes' to one or more of these questions, you probably are not getting enough sleep to be at your best at work. You are sleep deprived."

The effects of fatigue can be made worse by hydration and nutrition, by exposure to harsh environments, prolonged or stressful mental work, or physical work. This could surge dramatically if we are not used to the type of work, we are undertaking or are unwell or lacking fitness.

Causes of Fatigue

There are a range of factors that cause or contribute to fatigue. To summarise, fatigue is normally the product of one or more of the following:

- Emotional strain
- Mental workload
- Strenuous or sustained physical exertion
- Inadequate food and fluid intake

- Adverse environmental conditions, such as extremes of temperature, low light levels, vibration and confined spaces
- Periods of monotony or boring activities, and
- Disrupted and lost sleep.

When trying to determine why fatigue has occurred, there is often a focus on the disrupted and lost sleep. This is because both the quantity (how much) and the quality (how good) of

sleep are especially important for recovery from fatigue and for maintaining normal alertness and performance.

Inadequate sleep (quality or quantity) over a series of nights causes a "sleep debt" which results in increased fatigue that can sometimes be worse than a single night of inadequate sleep. A sleep debt can only be repaid with adequate recovery sleep.

"Sleep debt or sleep deficit is the cumulative effect of not getting enough sleep. A large sleep debt may lead to mental or physical fatigue."



Activity: Sleep debt calculation for the past 3 days					
Day		Amount of sleep we should get	Minus	Amount of sleep we actually get	Sleep Debt
1			-		
2			-		
3			-		
Total Sleep Debt					

Shift work can often:

- Reduce the amount of sleep
- Impact the quality of sleep
- Limit the amount of time available for sleep, and
- Disrupt the body clock.

There are many reasons why workers do not obtain the quality or quantity of sleep that they require to be adequately rested.

Some of the examples of work-related fatigue factors are:

- Hours of work (especially night work, early morning starts, and high total number of hours)
- Task demands or time pressures that do not allow long enough breaks between shifts for adequate sleep, and
- Sleeping conditions that may compound fatigue (for example, noisy accommodation, lack of air conditioning in hot climates, uncomfortable in-flight sleeping facilities).

Examples of non-work-related fatigue factors include:

- Disturbed sleep (noisy neighbourhood, noisy bed partner)
- Disrupted sleep (a sick child, night feeds for a baby)
- Undiagnosed or untreated sleep disorders, and
- Social activities that take priority over sleep (parties, watching tv, playing computer games, interacting on other electronic devices).

Signs and Symptoms of Fatigue

In general, it is difficult to tell when fatigue has reached a point where it is no longer safe to work or drive. However, there are signs or symptoms that can be used as a measure.



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Fatigue-related signs and symptoms are often divided into three categories:

Physical

- Yawning
- Slowed blinking
- Headache
- Eye-rubbing
- Head drops
- Microsleeps

Mental

- Difficulty concentrating on tasks
- Lapses in attention
- Difficulty remembering what you are doing
- Failure to communicate important information
- Failure to anticipate events or actions
- Unintentionally doing the wrong thing
- Unintentionally failing to do the right thing

Emotional

- Quieter or withdrawn than normal
- Lacking in energy
- Lacking in motivation to do the task well
- Irritable or bad-tempered behaviour with colleagues, family, or friends

The more of the symptoms experienced, the more likely it is that alertness is significantly reduced. Of course, fatigue is not the only cause of such symptoms, but when several occur together, it is likely to indicate fatigue-related impairment.

Consequences of Fatigue

A fatigued individual is often impaired and cannot continue to perform tasks safely or efficiently. Fatigue can affect the ability to:

- React quickly in emergencies, signals or situations
- Affect the ability to make good decisions
- Communicate clearly with fellow employees, and
- Work productively.

This can increase the risk of incidents and injury in a workplace, particularly when:

- Operating fixed or mobile high-risk plant
- Driving a road vehicle, such as a taxi or courier van
- Working at heights
- Taking part in medical or surgical procedures and settings
- Working with flammable or explosive substances
- Hazardous work, for example electrical work.

Fatigue and falling asleep have been identified as significant contributors to workplace incidents and accidents in a wide cross-section of industries.



Risk of Fatigue

Researches have compared the effects of alcohol and fatigue on performance. Even though there are differences between being fatigued and being drunk, this research has provided employers and employees with a comparison about the potential adverse effects of fatigue.

Performance tests have indicated that:

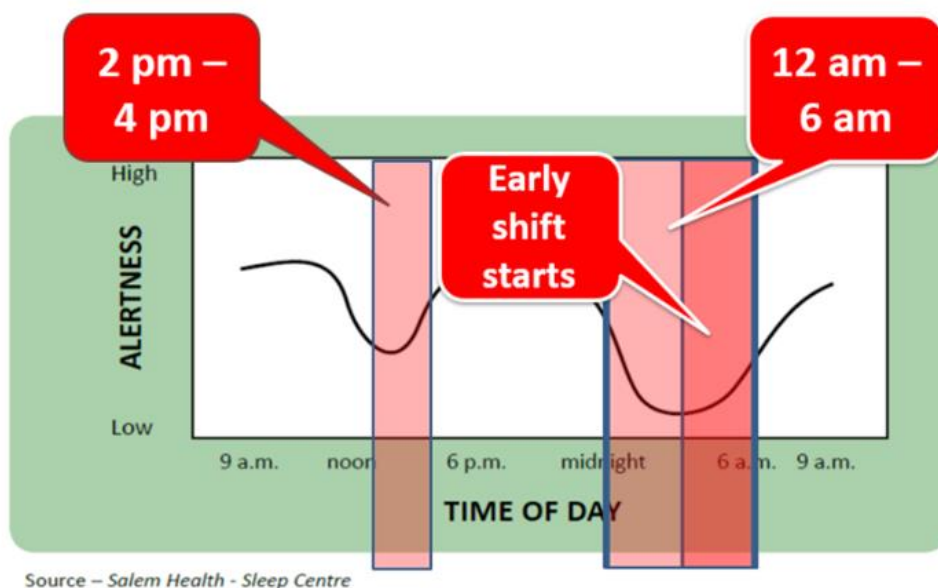
- The performance of a person who wakes at 7 a.m. and stays awake for 17 hours until midnight is, by that stage, likely to be as impaired by fatigue as someone with a blood-alcohol concentration (BAC) of 0.05% -- the legal driving limit.
- A person who wakes at 7 a.m. and then stays awake for 23 hours until 6 a.m. the following day will have a level of general performance impairment similar to someone with a BAC of 0.10% - which is twice the legal limit for fully licenced drivers in Australia.

High Risk Times of Fatigue

There are specific times of the day when the risks associated with fatigue. It is important to understand these risks when making decisions about hours of work, hours of overtime, contingency planning, and emergency response.

Times when fatigue risk levels are particularly high are:

- **Working midnight to dawn** (especially between 2 a.m. and 5 a.m.). This is the low point in several of the body's circadian rhythms (particularly body temperature) that are associated with alertness and performance.
- **When regular breaks have not been taken**
- **When shifts are longer than eight hours**
- **Early shift starts** (before 6 a.m.). Early start times often shorten sleep obtained the night before because most people often find it difficult to go to bed earlier in compensation, find it hard to get to sleep quickly if they do go to bed early, or they "clock watch" due to anxiety about not waking up on time.
- **New to the job or workplace.** Learning a new job and getting to know the environment and the people is often challenging. Some individuals may find they do not sleep as well during the first week or so of a new job while they become accustomed to the new workplace, role, commute, and hours.



Source – Salem Health - Sleep Centre

Picture 1 High Risk Times of Fatigue

Reading: 10 Major Causes of Fatigue

- 1. Not Enough Sleep.** Adults should get seven to eight hours every night.
Solution: Make sleep a priority and keep a regular schedule.
- 2. Sleep Apnea.** Sleep apnea briefly stops your breathing throughout the night. Each interruption wakes you for a moment, but you may not be aware of it. This causes sleep-deprivation despite spending eight hours in bed.
Solution: Weight loss if you're overweight, quit smoking, sleep with a Continuous Positive Airway Pressure (CPAP) device to keep airway passages open. This requires contact with a General Practitioner for consultation for healthy diet, options for quitting smoking and solution for treating obstructive sleep apnea.
- 3. Not Enough Fuel.** Eating too little and eating the wrong foods can also cause fatigue. A balanced diet helps keep blood sugar in a normal range and prevents that sluggish feeling when blood sugar drops.
Solution: Always eat breakfast, include protein and complex carbs in every meal, structure eating for sustained energy. Any changes for diet consult with your General Practitioner.
- 4. Anaemia.** Anaemia is a leading cause of fatigue in women. Menstrual blood loss can cause an iron deficiency, putting women at risk.
Solution: For anaemia caused by an iron deficiency, taking iron supplements and eating iron-rich foods, such as lean meat, liver, shellfish, beans, and enriched cereal, can help. Any changes for health consult with your General Practitioner.
- 5. Depression.** Depression also contributes to fatigue, headaches, and loss of appetite. If you feel tired and 'down' for more than a period time, seek medical advice.
Solution: Depression responds well to psychotherapy and/or medication. Mental health problems needed to be treated as physical health, consult with your General Practitioner in order to receive treatment.
- 6. Hypothyroidism.** The thyroid gland controls metabolism - the speed at which your body converts fuel into energy. When the gland is underactive and metabolism functions slowly, you may feel sluggish and put-on weight.
Solution: Seek medical help and consult your General Practitioner.



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7. **Caffeine Overload.** Caffeine can improve alertness and concentration in moderate doses, but too much can increase heart rate, blood pressure, and jitteriness. Too much caffeine can cause fatigue in some people.
Solution: Gradually cut back on coffee, tea, chocolate, soft drinks, and medications containing caffeine.
8. **Diabetes.** In diabetes, abnormally high levels of sugar remain in the bloodstream instead of entering the body's cells where it is converted into energy. The result is a body that runs out of steam despite having enough to eat.
Solution: Seek medical help and consult your General Practitioner for diabetes, lifestyle changes, insulin therapy, and medications.
9. **Dehydration.** Fatigue can be a sign of dehydration. Whether you're working outside or working a desk job, your body needs water to work well and keep cool. If you're thirsty, you're already dehydrated.
Solution: Drink water throughout the day and have at least two cups of water an hour before a planned physical activity. Your urine should be lightly coloured.
10. **Heart Disease.** When fatigue strikes during everyday activities, such as cleaning the house or weeding the yard, it can be a sign that your heart is no longer up to the job. If you notice it's becoming increasingly difficult to finish tasks that were once easy, talk to your doctor about heart disease.
Solution: Seek medical help and consult your General Practitioner for lifestyle changes, medication, and therapeutic procedures can get heart disease under control and restore energy.



Module Two: Sleep

Despite the obvious importance of sleep, during our sleep our body rests and restores itself. In a broad sense, it is thought that during sleep the mind and the body “recover” from the stresses of the day and “prepare” or “recharge” for those to come the following day.

Sleep Need

Sleep needs vary from person to person, and they change throughout the lifecycle.

- Newborns sleep between 16 and 18 hours a day
- Children in preschool usually sleep between 10 and 12 hours a day
- School-aged children and teens appear to need at least 9 hours of sleep a night
- Most adults need 7-8 hours of sleep each night to be at their best throughout the following working day.

Both the quality and quantity of sleep are determined largely by the timing of sleep in the 24-hour day. Humans have evolved to sleep during the night and to be active during the day.

Sleep Cycles and Sleep Structure

Sleep varies through the night and have cycles through different stages identifiable by distinctive brain wave patterns. Sleep stages follow each other in a continuous cycle, lasts between 90 and 120 minutes. Each cycle is composed of five sleep stages.

Stage 1 Fall Sleep. This is where you fall asleep (you drift in and out of sleep). During this stage, you may occasionally experience muscle twitches or starts. Your eyes move slowly, your muscle activity is slow, and you would be easy to wake up.

Stage 2 Light Sleep. Your body starts preparing for deep sleep. Eye movements and brain waves slow down, your body temperature drops, and your heart rate slows down. is a light sleep stage, when you are easily awakened

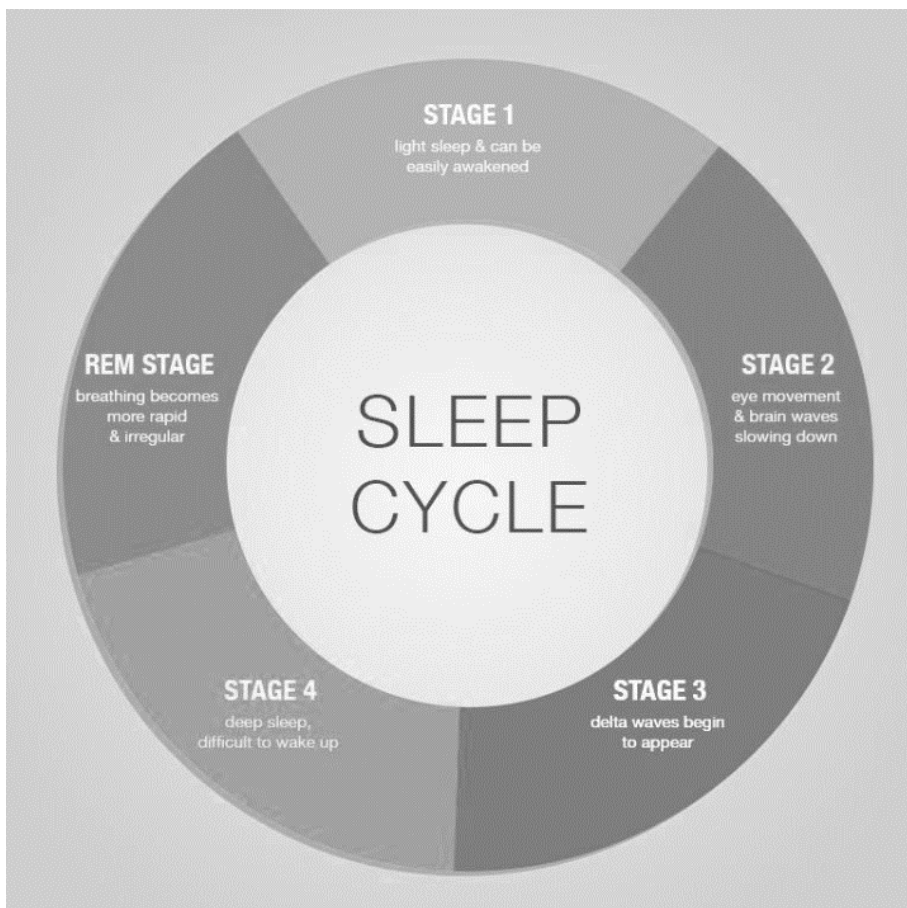
Stage 3 Entering Deep Sleep. This is the stage you are now in deep sleep. Extremely slow brain waves called delta waves are intermixed with smaller, faster brain waves. This stage is considered those where the body regenerates physically. People are usually difficult to waken during this stage.

Stage 4 Stay Deep Sleep. You stay in deep sleep and your brain almost exclusively produces the slow delta waves, guiding you towards the fifth stage. This stage is considered those where the body regenerates physically. People are usually difficult to waken during this stage.

Stage 5 Rapid Eye Movement (REM). Your eyes are closed but move rapidly from side-to-side, due to the intense dream and brain activity you go through in this stage. This is the stage of sleep when we dream.

REM sleep is important for learning because memory consolidation occurs. REM sleep is also important for mental health. Recent evidence suggests that the REM sleep stage, along with the deep sleep stages, also contributes to physical restoration.

Early in the night, we spend more time in stages 3 and 4 of each sleep cycle. As the night progresses, we spend more relative time in REM sleep. Whenever we are sleep deprived, our body will try first to catch up on deep sleep (stages 3 and 4) and REM. A person who is sleep-deprived will quickly fall asleep, and move rapidly from light sleep (stages 1 and 2) to deep slumber (stages 3 and 4).



Picture 2 Sleep Cycle

Recovery Sleep

Unwanted sleepiness and fatigue can be fatal, for instance, while driving a vehicle or operating a heavy machinery.

The exact amount of sleep that each person needs every 24 hours to perform optimally differs. This could be between 7 and 9 hours. As we get older, the need for sleep does not diminish, even though sleep may prove more difficult to obtain. Most people have a sleep clock that means a natural preference for sleeping between 10 p.m. and 8 a.m. Older people tend to sleep earlier than younger people do, although there will always be exceptions.

Sleep is most valuable if obtained in a single block. However, split sleep, or a number of short sleeps, is better than not getting any sleep at all. A short sleep or power nap can provide a powerful boost to alertness

Power nap: A power nap is a short period of sleep. It's meant to supplement normal sleep and give sleepers a burst of alertness and energy. Different people have different sleep cycle durations, but an average sleep cycle usually passes from light sleep to deep sleep at about 30-60 minutes, and from deep sleep to REM sleep at about 90 minutes.

A power nap of 10 to 30 minutes lets sleepers enjoy the benefits of the light sleep stage without running the risk of waking up in the middle of deep sleep or REM sleep, which can leave sleepers feeling groggy, crabby, or disoriented.



Insomnia

Insomnia is a common sleep disorder that can make it hard to fall asleep, hard to stay asleep, or cause you to wake up too early and not be able to get back to sleep. You may still feel tired when you wake up. Sometimes insomnia can mean sleep is consistently unrefreshing. Insomnia is the most common type of sleep problem - it is thought to affect at least a third of adults at some point in life. Rates of insomnia are even higher in shift workers and people who work non-traditional hours.

Causes of insomnia: There are many potential contributors to insomnia. These include work hours, life stressors, age, substances, medical issues, and mental health problems. Treatments may involve changes to schedules, habits, and lifestyle. The use of drug treatments is controversial.

Setting up your environment for sleep: Obtaining adequate sleep can sometimes be a challenge. Sleeping during the day can be difficult as our body's biological programming to be awake during the day (e.g. it is noisier and brighter during the day or more pressures on your time during the day).

Things you can do to your bedroom include:

- Block out as much light as possible. This might involve the use of blackout curtains, roller shutters, heavy blinds, or an inexpensive option such as black plastic.
- Use your bedroom only for sleep, and relaxation. If possible, remove work desks, home offices, computers, and even televisions.
- Control the noise that enters your bedroom. For external sources of noise, this can be done using physical barriers such as roller shutters, double-glazed windows, and insulation. Internal noise might be managed by simply placing a sign on the door when you are sleeping. Unless you are on call, you should also turn down the telephone ring tone so that it does not disturb your sleep.
- Reduce the impact of noise that does enter your bedroom. For example, many people have success using a 'white noise' source such as a fan, an air conditioner, a television set on an untuned station, or a relaxing music CD set on "repeat."
- Ear plugs can be of use if you can sleep with them in. They are especially useful if you are sleeping away from home.
- Minimise caffeine and alcohol intake in the hours before bedtime. Caffeine acts as a stimulant and makes you less sleepy. The stimulating effects of caffeine can last up to six hours.
- Set up a "thermo-neutral" zone. The body sleeps best when the environmental temperature is between 18 and 24°C. If you are too cold or too hot, your body may wake you up to change its temperature in some way.
- Establish a pre-bed routine, including quiet/relaxing activities. Each bedtime, do the same activities in the same order. For example, shower, clean your teeth, and lock the door. This can help to train your body to associate this sequence of activities with falling asleep.

Sleepwalking

Sleepwalking (somnambulism) is characterised by complex behaviour (such as walking) occurring while asleep, often during the second or third hour of sleep. Sleepwalking activity may include simply sitting up and appearing awake (while actually being asleep) and getting up and walking around. The person is not aware of the activity and normally does not remember it upon waking.



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Causes of sleepwalking: Sleepwalking is a disorder of arousal, meaning it occurs during N3 sleep, the deepest stage of non-rapid eye movement (NREM) sleep. Another NREM disorder is sleep terrors, which can occur together with sleepwalking.

Many factors can contribute to sleepwalking, including:

- Sleep deprivation
- Stress
- Fever
- Sleep schedule disruptions, travel or sleep interruptions
- Sleep-disordered breathing (for example, obstructive sleep apnea)
- Taking certain medications, such as hypnotics, sedatives or certain medications used for psychiatric disorders
- Substance use, such as alcohol
- Restless legs syndrome
- Gastroesophageal reflux disease (GERD)

Treating sleep Sleepwalking will help the person sleep more easily, and may reduce the risks. Some of the options are:

- Medications If sleepwalking is caused by underlying medical conditions, such as gastroesophageal reflux, obstructive sleep apnea, seizures, periodic leg movements, or restless legs syndrome, sleepwalking episodes should stop once the underlying medical condition is treated. Consultation to General Practitioner is required.
- Relaxation techniques, mental imagery, and anticipatory awakenings are the preferred treatment options for long-term treatment of people with a sleepwalking disorder. Relaxation and mental imagery techniques are most effective when done with the help of an experienced behavioural therapist or hypnotist. Consultation to General Practitioner is required.

Tips to Prevent Sleepwalking

There is no known way to absolutely prevent sleepwalking; however, certain steps can be taken to minimise one's risk. These include:

- Get adequate sleep
- Limit stress. Meditate or do relaxation exercises, and
- Avoid any kind of stimulation (auditory or visual) prior to bedtime.

Tips to Protect Yourself When Sleepwalking

These are steps you can take to prevent harm if and when you do sleepwalk:

- Keep a safe sleeping environment, free of harmful or sharp objects
- Sleep in a bedroom on the ground floor, if possible
- Lock the doors and windows
- Cover glass windows with heavy drapes
- Place an alarm or bell on the bedroom door.

Sleep Apnea

Sleep apnoea is a breathing-related sleep disorder that can reduce your capacity to stay awake when you are at work, driving, or engaged in other activities.



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There are three types of sleep apnoea:

Obstructive sleep apnea is caused by a blockage of the airway, usually when the soft tissue in the rear of the throat collapses and closes during sleep.

In central sleep apnea, the airway is not blocked but the brain fails to signal the muscles to breathe.

Mixed sleep apnea, as the name implies, is a combination of the two. With each apnea event, the brain rouses the sleeper, usually only partially, to signal breathing to resume. As a result, the person's sleep is extremely fragmented and of poor quality.

Treating sleep apnea will help the person sleep more easily, and may reduce the risks. Some of the options are:

- For people with mild sleep apnoea, sleeping on your side (devices like special pillows and rubber wedges can help), losing weight (if you are overweight) and decreasing the amount of alcohol drunk during the evening may be all that is needed.
- Avoiding sleeping tablets, which can make sleep apnoea worse
- Quitting smoking
- Using nasal decongestant sprays, if nasal congestion bothers the person
- An oral appliance fitted by the dentist, such as special mouthguards or splints to wear while sleeping
- A continuous positive airway pressure (CPAP) pump
- Surgery, if you have severe sleep apnoea
- If you think you may have sleep apnoea, see your doctor.

Narcolepsy

Narcolepsy is a condition that affects the nervous system. It causes abnormal sleep that can affect a person's quality of life. Narcolepsy causes significant daytime drowsiness and "sleep attacks," or overwhelming urges to fall asleep, and poor fragmented sleep at night.

Narcolepsy isn't a deadly disease by itself, but episodes can lead to accidents, injuries, or life-threatening situations.

Also, people with narcolepsy can have difficulty maintaining jobs, doing well in school, and have problems maintaining relationships due to the attacks of excessive daytime sleepiness.

There is no cure for narcolepsy, but medications and lifestyle modifications can help to manage the symptoms. Your doctor may make a preliminary diagnosis of narcolepsy based on your excessive daytime sleepiness and sudden loss of muscle tone (cataplexy). (Seek medical advice for diagnosis and treatment)



Module Three: Fatigue and Shift Work

We live in a 24-hour society where many different work patterns have developed beyond the traditional Monday-to-Friday, 9-to-5 routine. An increasing proportion of the workforce is engaged in shift work and non-traditional schedules

In 2012 there were about 1.5 million people working some kind of shift-work as part of their main occupation and this grew to 1.7 million by 2015. According to the Australian Bureau of Statistics, 204,000 Australians regularly worked night and evening shifts that year.

The industries with the highest proportion of employees who usually worked shift work were mining, health care, accommodation and food services, and transportation.

Shift work serves multiple purposes within the Australian labour market. It allows employers to maximise production by making full use of 24 hours of each day. Shift work also ensures that many essential services (e.g. transportation, health care) are provided to the community around the clock.

What is Shift Work?

The term shift work refers to any work schedule that falls outside the hours of 7 am and 6 pm. Shift work can include evening, night, and early morning shifts, as well as fixed or rotating schedules.

While some employees enjoy working at night and prefer a non-traditional schedule, shift work does carry certain drawbacks. People who work night, early morning, or rotational shifts are at higher risk of developing shift work disorder and other sleep problems.

Working regular or permanent shift work or non-traditional hours involves more than just a work schedule - it is a way of life. Shift work has a fundamental impact on not only work, but also sleep patterns and the management of health, family, and social life. Research indicates that shift work affects physical and mental health, as well as work performance.

Shift Work and Fatigue

Shift work can be a contributing factor in work-related fatigue.

When determining your work schedules:

- Limit number of consecutive night shifts to four to minimise accident risk
- End night shifts by 8am

- Ensure there is a minimum of 12 hours between consecutive shifts
- Ensure that roster allows for at least two full night's sleep after the last night shift
- Allow short naps of no longer than 15–20 minutes if it fits in with the type of work that is being done
- Consider whether 12-hour night shifts are really necessary
- Use additional control measures, such as two hourly breaks of at least 5 to 10 minutes duration
- Have a room for workers to sleep before commuting home
- Encourage healthy eating at work and provide access to healthy food options at work to minimise health risks.

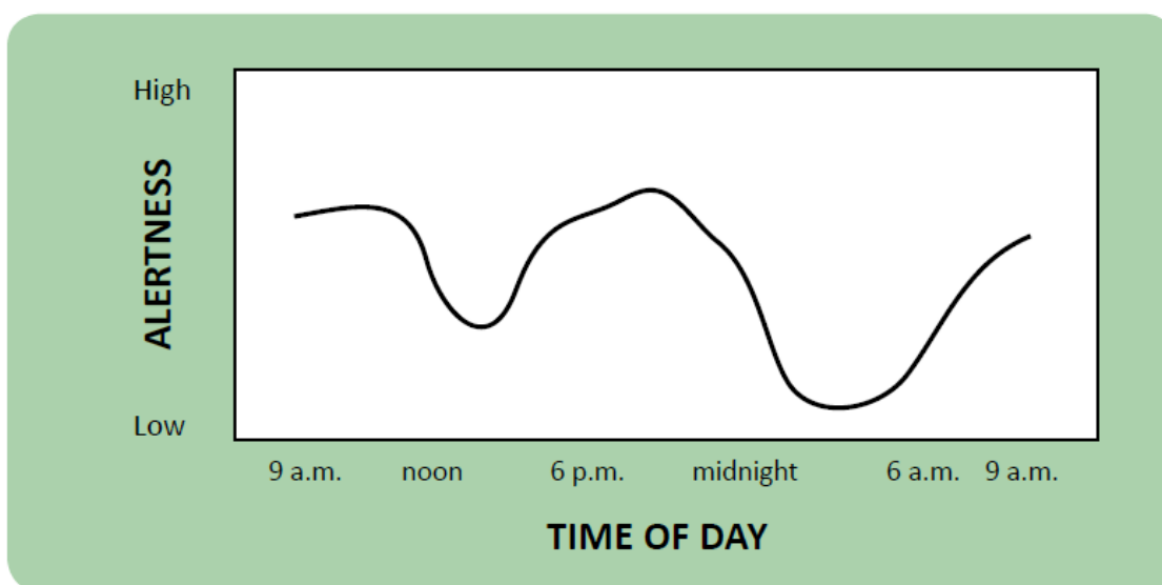


The Body Clock (Circadian Rhythms)

Circadian rhythms are physical, mental, and behavioural changes that follow a 24-hour cycle. The term circadian comes from the Latin phrase “circa diem,” which means “around a day.”

These natural processes respond primarily to light and dark and affect most living things, including animals, plants, and microbes. Chronobiology is the study of circadian rhythms. One example of a light-related circadian rhythm is sleeping at night and being awake during the day. For example, they help flowers open and close at the right time and keep nocturnal

animals from leaving their shelter during the daytime when they would be exposed to more predators.



Source – Salem Health - Sleep Centre

In people, circadian rhythms coordinate mental and physical systems throughout the body. The digestive system produces proteins to match the typical timing of meals, and the endocrine system regulates hormones to suit normal energy expenditure.

Body Clock and Fatigue

Our internal circadian biological clocks, on the other hand, regulate the timing of periods of sleepiness and wakefulness throughout the day. The circadian rhythm dips and rises at different times of the day, so adults’ strongest sleep drive generally occurs between 2:00-4:00 am and in the afternoon between 1:00-3:00 pm, although there is some variation depending on whether you are a “morning person” or “evening person.”

The sleepiness we experience during these circadian dips will be less intense if we have had sufficient sleep, and more intense when we are sleep deprived. The circadian rhythm also causes us to feel more alert at certain points of the day, even if we have been awake for hours and our sleep/wake restorative process would otherwise make us feel sleepier.

Changes to this circadian rhythm occur during adolescence, when most teens experience a sleep phase delay. This shift in teens’ circadian rhythm causes them to naturally feel alert later at night, making it difficult for them to fall asleep before 11:00 pm. Since most teens have early school start times along with other commitments,



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this sleep phase delay can make it difficult to get the sleep teens need — an average of 9 1/4 hours, but at least 8 hours.

This sleep deprivation can influence the circadian rhythm; for teens the strongest circadian “dips” tend to occur between 3:00-7:00 am and 2:00-5:00 pm, but the morning dip (3:00-7:00 am) can be even longer if teens haven’t had enough sleep, and can even last until 9:00 or 10:00 am.

The circadian biological clock is controlled by a part of the brain called the Suprachiasmatic Nucleus (SCN), a group of cells in the hypothalamus that respond to light and dark signals. From the optic nerve of the eye, light travels to the SCN, signalling the internal clock that it is time to be awake. The SCN signals to other parts of the brain that control hormones, body temperature and other functions that play a role in making us feel sleepy or awake.

In the mornings, with exposure to light, the SCN sends signals to raise body temperature and produce hormones like cortisol. The SCN also responds to light by delaying the release of other hormones like melatonin, which is associated with sleep onset and is produced when the eyes signal to the SCN that it is dark. Melatonin levels rise in the evening and stay elevated throughout the night, promoting sleep.

Impacts on Performance

Due largely to fluctuations in level of alertness, work performance can be significantly influenced by time of day or night. Other factors play a role in work performance as well, such as the type of task to be performed, motivational effects, individual differences among workers, and how well workers adjust to changes in routine.

Unlike health effects, deterioration in performance can occur very soon after beginning to work certain hours. The negative effects on performance can be worse in jobs that require sustained attention and extended hours, or are characterised by high-reliability tasks.

Some specific effects of fatigue on performance are:

- **Reduced attention:** People are slow to notice occurrences in their environment.
- **Communication difficulties:** Increasingly, it is difficult to decide what needs to be said, how to say it or what someone else said. Speech may become unintelligible.
- **Mood changes:** Significant changes in mood normally accompany performance degradation. These almost always include increased irritability and can entail depression and apathy.
- **Inability to concentrate:** Maintaining attention to the task at hand, for even a few seconds, is difficult. (complex directions or perform numerical calculations and are easily confused.)
- **Increasing omissions and carelessness:** Workers begin to skip tasks, miss events and make mistakes.
- **Decreased vigilance:** As people become less alert, they may fail to detect errors and potential hazards, especially during monotonous tasks or in tedious environments. The monitoring of instruments is especially affected.
- **Slowed comprehension and learning:** It takes longer to understand any form of information; for example, it may take an excessive amount of time to comprehend a message or to find a location on a map or display.
- **Encoding/decoding difficulties:** It becomes more difficult to transform data or to process information; for example, navigation coordinates are decoded slowly, and mistakes are made while doing it.
- **Faulty short-term memory:** Recall of recent events is faulty. The content of a radio message may be immediately forgotten or recalled incorrectly. The ability to assimilate new information is badly degraded.



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- **Muddled thinking:** Reasoning becomes slow and confused. Even simple operational procedures and situations may 'stump' the employee. This can deteriorate to irrational thoughts, poor logic, and false beliefs.
- **Slowness in perception:** People are slow to understand things seen or heard, especially patterns.
- **Slow and uneven responsiveness:** People are generally slower to respond to events, but some reactions degrade more quickly.
- **Differential impacts due to task complexity:** Uninteresting and complex tasks, as opposed to those that are interesting and simple, are more seriously affected by sleep loss.
- **Hallucinations:** Sometimes when fatigue is very severe and stimulation is low, the tired brain starts to see and hear things that are not there. As these illusions can be very real, the person may respond inappropriately.

Individual Differences

The impact of a schedule varies from one person to another. Exercising, eating a balanced diet, having good sleeping habits, and using effective time management strategies are all behaviours that help to cope with shift work.

Coping with shift work and fatigue becomes increasingly difficult with age. This is in part because the body's physiological systems become gradually less able to adapt. However, as we age, our past experiences and the strategies we have developed to manage and cope with the demands of non-traditional work hours may help to counter some of the physiological effects of aging.

The ability to cope with shift work also depends on an individual characteristic related to circadian rhythms. People can be categorised as morning or evening types (chronotypes) depending on the period of the day when they perform at their best.

Morning people will better adapt to early morning hours but will have more trouble coping with night work. Evening types cope more easily with evening and night shifts. They tend to cope better with shift work overall since they generally have less rigid sleep habits and find it easier to catch up by sleeping late in the morning. Individual differences may also go beyond this simple description.

Maintain a Healthy Circadian Rhythm

While we don't have full control over our circadian rhythm, there are healthy sleep tips that can be taken to try to better entrain our 24-hour sleep cycles.

- **Seek out sun:** Exposure to natural light, especially early in the day, helps reinforce the strongest circadian cue.
- **Follow a consistent sleep schedule:** Varying your bedtime or morning wake-up time can hinder your body's ability to adjust to a stable circadian rhythm.
- **Get daily exercise:** Activity during the day can support your internal clock and help make it easier to fall asleep at night.
- **Avoid caffeine:** Stimulants like caffeine can keep you awake and throw off the natural balance between sleep and wakefulness. Everyone is different, but if you're having trouble sleeping, you should avoid caffeine after noon.



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- **Limit light before bed:** Artificial light exposure at night can interfere with circadian rhythm. Experts advise dimming the lights and putting down electronic devices in the lead-up to bedtime.
- **Keep naps short and early in the afternoon:** Late and long naps can push back your bedtime and throw your sleep schedule off-kilter.

These steps to improve sleep hygiene can be an important part of supporting a healthy circadian rhythm, but other steps may be necessary depending on the situation. If you have persistent or severe sleeping problems, daytime drowsiness, and/or a problematic sleep schedule, it's important to talk with a doctor who can best diagnose the cause and offer the most appropriate treatment.



Module Four: Health and Safety Duties in Relation to Managing the Risks of Fatigue

Everyone in the workplace has a work health and safety duty and can help to ensure fatigue does not create a risk to health and safety at work. Fatigue is not only caused by work-related activities – it is affected by all activities carried out when a person is awake.

Psychological Hazards

PCBUs have a duty to ensure, so far as is reasonably practicable, the health and safety of each worker while at work. Health includes physical and psychological health.

This means that PCBUs must ensure that psychosocial hazards at work are effectively managed.

The PCBU’s duty to workers includes ensuring the health and safety of workers from harmful acts from third parties, such as clients, visitors, or patients.

Examples of what the PCBU is required to do to manage psychosocial hazards include ensuring they provide and maintain:

- a safe working environment
- safe systems of work
- safe use, handling, and storage of equipment, structures and substances
- adequate facilities at work
- necessary information, training, instruction or supervision of workers, and
- conditions at the workplace are monitored to ensure any risks remain adequately controlled.

State or Territory	Status	Managing Risk	Apply Risk Controls
Australian Capital Territory	Law in effect	Yes	Yes
New South Wales	Law in effect	Yes	No
Northern Territory	Law in effect	Yes	Yes
Queensland	Law in effect	Yes	Yes
South Australia	Law in effect	Yes	Yes
Tasmania	Law in effect	Yes	No
Victoria	No	Section 21 of the Victorian - Occupational Health and Safety Act (2004), employers have a general duty care to provide and maintain for employees, as far as practicable, a working environment that is safe and without risks to health	
Western Australia	Law in effect	Yes	No
Commonwealth	Law in effect	Yes	Yes



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Person Conducting a Business or Undertaking (Employer)

Has the primary duty to ensure, so far as is reasonably practicable, workers and other persons are not exposed to health and safety risks arising from the business or undertaking. This includes ensuring, so far as is reasonably practicable:

- Provision and maintenance of a work environment without risks to health and safety
- Provision and maintenance of safe systems of work, and
- Monitoring the health of workers and the conditions at the workplace for the purpose of preventing illness or injury of workers arising from the conduct of the business or undertaking.

The duty on the person conducting the business or undertaking is not removed by a worker's preference for certain shift patterns for social reasons, their willingness to work extra hours or to come to work when fatigued. The person conducting the business or undertaking should adopt risk management strategies to manage the risks of fatigue in these circumstances

Officer

Officers such as company directors, must exercise due diligence to ensure the business or undertaking complies with its work health and safety duties. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to manage the risks associated with fatigue.

Worker

Workers must take reasonable care for their own health and safety and must not adversely affect the health and safety of other persons. Workers must also comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to fatigue at the workplace, such as policies on fitness for work or second jobs.

Workers' duties in relation to fatigue do not mean they must never work extra hours. However, they should talk to their manager or supervisor to let them know when they are

fatigued. They should also avoid working additional hours and undertaking safety critical tasks when they know it is likely they are fatigued.

Managers and Supervisor

- Develop, and assist work schedules that prevent high levels of fatigue
- Develop and assist work schedules that allow for adequate rest and recovery periods
- Ensure safe work practices, such as limiting overtime to sensible levels
- Continuously assess, control, and monitor fatigue-related hazards

- Develop and assist policies, procedures, and practices to manage risks related to fatigue
- Provide and assist information on workplace hazards

Consultation

Consulting workers at each step of the risk management process encourages everyone to work together to identify fatigue risk factors and implement effective control measures.



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Consultation also helps to raise awareness about the risks of fatigue.

Consultation with safety and health representatives and committees should be part of the processes used to develop fatigue management strategies and the ongoing monitoring and review of the effectiveness of the strategies.

Safety and health representatives' functions include liaising with employees on workplace safety and health matters and reporting hazards or potential hazards to the employer. Where there is a safety and health committee, the safety and health representative may refer matters to the committee.

In workplaces where fatigue is likely to affect employer must provide the safety and health representatives with any information the employer has, or can be expected to have, about the effects of fatigue.

Issue Resolution

The WHS/OHS requires employers to attempt to resolve occupational safety and health issues with safety and health representatives, safety and health committees or employees, according to the relevant procedures for the workplace. If these procedures do not succeed, the Act sets out steps to resolve the issue.

If an issue remains unresolved and there is a risk of serious and imminent injury or harm to someone, either the employer or a safety and health representative may ask for a WorkSafe inspector to attend the workplace. If there is no safety and health representative, the request

may be made by another employee. When requested, an inspector will attend the workplace and take whatever action under the Act that he or she considers appropriate.

The inspector's role is not to mediate between the employer and employees, but to ensure that each group meets its obligations under the Act.

Managing the risk of fatigue

Measures to manage the risks associated with fatigue will vary from one workplace to the next, depending on the nature of the work, environmental conditions and individual factors

The risks associated with fatigue can be managed by following a systematic process which involves:

1. identifying the factors which may cause fatigue in the workplace

Methods to identify factors which may contribute to or increase the risk of fatigue can include:

- Consult with workers, including managers, supervisors and health and safety representatives:
 - About the impact of workloads and work schedules, including work-related travel and
 - Work outside of normal hours (for example work a person has taken home to complete).
- Examine work practices and systems of work
- Examine worker records, for example sign in-out sheets, billing sheets and shift changeovers, to determine working hours and in particular whether excessive hours have been worked or hours have been worked at times which may have led to body clock disruption.



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- Obtain advice and information on fatigue from relevant experts
- Review workplace incident data, including incidents travelling to and from the workplace, and ask the following questions:
 - What is the likelihood fatigue is contributing to the incidents?
 - What time of day do incidents occur?
 - When incidents have occurred, how long had the workers involved been working?
 - Do the incidents often happen when a worker's body clock is slowing the body down and concentration is poor?
- Review human resource data

2. Assessing the risks

A risk assessment can assist in finding out:

- Where, which and how many workers (including contractors and subcontractors) are likely to be at risk of becoming fatigued
- How often fatigue is likely to occur
- The degree of harm which may result from fatigue
- Whether existing control measures are effective
- What action should be taken to control the risk of fatigue
- How urgently action to control the risk needs to be taken.

The risks of injury from fatigue may increase if workers work long daily hours in a physically or mentally demanding job. This risk of fatigue may increase when new workers begin their job and are adjusting to work demands

3. Controlling risks by implementing the most effective control measures reasonably practicable in the circumstances

The best way to control the health and safety risks arising from fatigue is to eliminate the factors causing fatigue at the source. If elimination is not reasonably practicable, the risks must be minimised.

Some of the controls could be:

- Work scheduling
- Designing shift work and rosters
 - Offer workers a choice of a permanent roster or rotating shifts.
 - Restrict the number of successive night shifts (no more than three to four if possible).
 - Avoid early morning starts and move early shift starts before 6am forward (for example a 7am start not a 6am one).
 - Avoid long working hours (more than 50 hours per week).
 - Build regularly free weekends into the shift schedule, at least every three weeks.
- Use a rapid rotation of shifts (a select number of days) or a slow rotation of shifts (a select number of weeks). Shift design should take into account individual differences and preferences as far as possible. Use forward rotation (morning/afternoon/night).
- Arrange start/finish times of the shift to be convenient for public transport, social and domestic activities.
- Account for travelling time of worker
- Reviewing job demands



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- Reviewing the environmental conditions e.g, heat, cold
- Assessing, acknowledging and considering the non-work-related factors such as work and lifestyle
- Developing fatigue management policy, procedure
- Training, informing and supervising the staff.

4. Reviewing control measures to ensure they are working as planned

Once control measures are implemented, they should be monitored and reviewed to ensure they continue to effectively manage fatigue. To determine the frequency of monitoring and review consider the level of risk — high-risk hazards need more frequent assessments.

Control measures should also be reviewed when:

- There is an indication risks are not being controlled
- New tasks, equipment, procedures, rosters or schedules are introduced
- Changes are proposed to the work environment, working hours, schedules and rosters
- There is an incident due to fatigue at the workplace
- New information regarding fatigue becomes available
- The results of consultation, including a request from a health and safety representative
- Indicate that a review is necessary.



Module Five: Food, Fatigue and Shift Work

The ability to stay awake is related largely to whether you have had adequate rest and recovery. However, other factors may contribute to feeling weary, sluggish, and more tired in general. One of these is low blood sugar. Many people underestimate or are unaware of the effect of low blood sugar on their ability to stay alert and safe.

Digestion

As humans, we are programmed to be awake during the day and asleep at night. Many other processes also follow this pattern, including digestion. Digestion is programmed to be most efficient during the day and much less so at night.

Food eaten at night is digested at a slower rate. This can often lead to feeling bloated or constipated and can cause heartburn and indigestion. Gastrointestinal upsets are very common in people who eat outside of traditional meal times. These upsets can be made worse by drinking tea, coffee, or alcohol. Research has found that night workers are five times more likely to get peptic ulcers than day workers are.

Many people working outside traditional daytime hours also notice that their hunger patterns change and that they get hungry at unexpected times of the day.

Body Clock and Food

Our body clock (also known as the Circadian clock) tells us to do certain things at certain times of the day/night including eating, working and sleeping. A human's body clock is naturally programmed to eat and work during the day time (sunlight hours) and sleep and fast from food during the night time (dark hours). When we disrupt the natural rhythm of our body clock, our bodies can find it hard to adjust. This can result in problems getting to sleep, feeling fatigued, feeling more stressed and an increase in eating and drinking high sugar/fat/calorie foods and drinks.

Shift Work and Health

Studies have found that shift workers are at increased risk of developing heart disease, type 2 diabetes and obesity, even when compared to non-shift workers with identical diet and exercise habits. It has also been found that after 8pm, the body doesn't burn its food energy in the same way that it does when you eat during the day. This means that a shift worker is likely to burn 60 calories per day less than day-time workers. This may not seem much, but when this is occurring on a daily basis, it can have long-term effects on our weight and health.

Factors Contributing to Food Choices of Shift Workers

There are many factors which contribute to the food choices made by shift workers. These include:

- Choosing higher sugar foods/drinks to keep us awake and energised
- Feeling stressed which leads to higher calorie 'comfort' eating
- Less healthy food choices available for purchase in the workplace
- Interrupted and unscheduled break times, contributing to irregular eating patterns, and
- Using food as a reward for working hard throughout the night.



Recommendations for Managing Your Diet

Timing of meals: Planning and regulating when and how often we eat can help us to keep our body clock on track. The recommendations for meal timing are:

- When you're awake, eat every 4 – 6 hours
- Eat a small meal 1 – 2 hours before going to bed in order to prevent waking up from hunger, and
- Try to have a small (around 5 hours) fasting period during the night (sometime between 10pm and 6am).

Day Shift:

When you wake

Breakfast meal to provide you with energy for your day.

During your shift

Lunch meal and snacks to keep you alert and energised.

After your shift

Dinner meal (small meal if immediately before sleeping) to help you sleep and stop you from waking due to hunger

Night Shift

After your shift and before sleeping

Small breakfast to help you sleep and stop you from waking due to hunger.

After your sleep

Lunch meal to provide you with energy for your day.

Night time meal breaks

Early in your shift small dinner meal or snack.

Late in your shift

A small snack every few hours to keep you alert and energise

Choosing What to Eat

All meals should include a balance of protein, low GI carbohydrates including fruits and vegetables.

Examples of high GI foods

White or whole grain bread	French fries	Breakfast bars
White or quick brown rice	Cakes	Muffins
Baked or mashed potato	Doughnuts	Puffed corn or rice cakes
Cornflakes or Coco Pops	Rice crackers	Pancakes

Examples of intermediate GI foods

Banana	Soft drinks	Full-fat ice cream
Sugar	Rye or high-fibre bread	Flavoured milk drinks
Sweet corn	Weetabix	Cranberry juice
Basmati rice	Cookies	
Pineapple		

Examples of low GI foods

Oranges or orange juice	Noodles or pasta	Lentils
Low-fat yogurt	Baked beans	Apples or apple juice



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Fruit bread
Chocolate

Grapes
All bran, porridge, muesli

Peanuts or cashews
Oat bran or grain bread

Examples protein strategies

Fish
Poultry

Leaner cuts of red meats are examples of low-fat protein sources.
Beans

Lentils
Greens like broccoli
Peas



Module Six: Hydration and Fatigue

Hydration has an effect on your ability to feel alert and therefore to be safe. When your body is low on water, it tries to conserve what you have left. It does this by reducing your activity and making you relax and slow down. When you are relaxed, you have a higher chance of falling asleep. Being dehydrated can also make you feel light-headed and cause headaches.

Most people do not drink enough water to be fully hydrated. In extreme cases, this can result in medical problems, including kidney problems. In most cases, however, the effects of dehydration are short-term and are easily resolved by drinking more water.

Make sure you drink plenty of water during your shift to maintain hydration. Being dehydrated will only increase the feeling of fatigue. If you're feeling thirsty, it means you're already dehydrated. Drink mouthfuls of water at regular intervals rather than a whole bottle of water every few hours.

Contributors to Dehydration

The recommended daily intake of water is two litres or eight glasses (although the science supporting this advice remains obscure). Drinking less than this is likely to contribute to dehydration. Other factors can cause dehydration, even if your daily intake of water is adequate. Some of these factors include:

- Performing physically demanding tasks
- Working in hot environments
- Drinking many caffeinated drinks - caffeine is a diuretic - a substance that actively flushes water from your body
- Drinking alcohol, which is also a diuretic
- Drinking soft drinks, which may not provide the same degree of hydration as plain water
- Eating foods that are high in salt, which require additional water to be processed through the body.

To be as alert and awake as possible, you need to monitor your fluid intake. For some people, optimising their alertness by being fully hydrated might mean doubling their normal fluid intake or more. Surprisingly, many people find that when they drink more water, they feel more alert but do not necessarily go to the toilet any more often - their urine output is simply higher each time.



Module Seven: Caffeine and Fatigue

Coffee drinking is associated with feelings of alertness and has a role in counteracting some of the symptoms of fatigue. The main active component in coffee is caffeine, a natural compound found in a number of plant species including coffee beans, tea leaves and cocoa.

It is also found in an array of food products and beverages such as chocolate and cola drinks.

Caffeinated beverages can make the person feel alert by blocking adenosine reception. Adenosine causes blood vessels to dilate and nerve cell activity to slow down, causing drowsiness. After drinking coffee, hands get colder, muscles might get tense, might feel excited, and heart might beat faster.

It takes caffeine about 15 – 30 minutes to enter the system, and its biological effects peak after about an hour after the caffeine reaches the bloodstream. The intake of caffeine can be speeded up with more direct forms of ingestion, such as caffeine-impregnated chewing gum.

The effects of caffeine usually last for approximately five hours. This is one of the reasons why it is important to avoiding caffeinated drink too close to bedtime. The stimulant effect may reduce your chance of falling asleep.

Some of the advantages of caffeine include:

- Nearly everyone has personal experience with using caffeine
- It is not an illegal substance
- It does not affect with recovery sleep following sleep deprivation, and
- It has low misuse potential.

Strategic use of caffeine include:

- Avoid drinking caffeinated drinks when you are not tired. The caffeine will have little effect, body will get used to effects and will cause caffeine tolerance
- Avoid drinking caffeinated drinks in the morning. The early part of the day is a time when your body is waking up naturally and you normally will feel more awake as the morning progresses without any need to ingest caffeine
- Ingesting large amounts of coffee first thing in the morning can aggravate the effects of the early afternoon circadian dip. This caffeine has a half-life of about six to seven hours and drinking a large amount of caffeine at six or seven o'clock in the morning means that the alerting effects will decline from about midday
- Using caffeine to speed up the natural morning waking process may simply increase your tolerance to the drug
- Avoid caffeinated products for a few hours before. As previously noted, caffeine acts as a stimulant, and therefore can make falling asleep - and staying asleep - more difficult
- Be aware that caffeine ingested as a fluid usually takes at least 15 to 30 minutes to enter the system and to take effect; noticeable effects normally last approximately 5 hours for most people
- Be mindful of caffeine in different foods and drinks.
- If you do drink caffeinated drinks, it has been recommended to increase water intake to counter caffeine's diuretic effect (i.e., an elevated fluid loss due to increased urination).
- Less caffeine you drink, the more effective it will be when you need to use it to help you stay awake.



Module Eight: Medications and Fatigue

Drugs are taken into the body through ingestion, injection, or inhalation. After they enter the bloodstream, they act on the brain, may cause drowsiness and fatigue-related symptoms. Drugs are processed from the body through the liver and kidneys into the urine.

Effects of drug vary:

- From person to person
- Depend on time of day, mood, tiredness, and the amount of food eaten
- Age, gender, and the size of a person

Prescription medications

Some prescription drugs can affect the ability to drive or operate heavy machinery. They may also interact with existing fatigue levels and other drugs, and the performance.

Anyone taking prescription medication, and working in high-risk roles, should:

- Consult their general practitioner the medications possible interactions with other drugs
- The medications' effects on performance, such as your ability to drive, fly, and operate machinery and technical equipment
- Inform their supervisor what they are taking so they are aware of your situation

Prescribed medications that come with a warning not to drive or operate heavy machinery include those for the treatment of:

- Blood pressure
- Allergies
- Sleep and anxiety problems
- Depression
- Other mental disorders

Some over-the-counter drugs used for pain relief or colds and flu may increase drowsiness and fatigue-related symptoms. It is important to know the side effects and consult GP or the pharmacist about the effects and impairment the medications can cause.

Performance effects of medications

In relation to functioning, can adversely affect the following performance enablers:

- Fine motor skills
- Cognitive functioning (particularly memory)
- Mood
- Realistic self-appraisal
- Alertness and
- Learning behaviour.



Module Nine: General Health, Well-being and Exercise

Shift workers report a higher number of health complaints, have a higher incidence of sick leave, a higher rate of visits to workplace clinics, and poorer scores on a variety of health scales.

Some of the most common health complaints are:

- Sleeping problems,
- Fatigue
- Irritability
- Gastrointestinal
- Cardiovascular
- Reproductive systems
- General sense of well-being.

Shift workers also report increased levels of stress, increased use of alcohol and other drugs, and a general feeling of weariness. This may be made worse by mental stress related to being less satisfied in the domestic and social areas of their lives.

Physical well-being: Physical well-being has a number of key components: notably exercise, diet, hydration, and sleep. On the other hand, physical well-being can be undermined by substance abuse – notably alcohol and nicotine. Proper physical self-care results a range of positive outcomes including reserves of energy during the working day, consistent and restful sleep patterns, proper concentration spans and a satisfying sense of feeling healthy.

Material well-being: For many people, material well-being is important to their overall well-being. Material well-being will have an impact on your family as well. Finance is the major stressors in modern life. Once basic material needs are met (a place to live, security, clothing and food), most people seek other, nonmaterial goals and rewards from their work.

These goals and rewards might be some form of recognition, such as promotion and awards, increased responsibility, and more satisfying work roles.

Spiritual well-being: For some people, the fundamental foundation of well-being is found in spirituality. Spirituality refers to the intangible, non-physical matters that provide a sense of meaning or purpose in our lives. Spirituality is intensely personal, and is about the person's understanding on how they should live and the purpose and meaning of their life.

Seek balance: Being fit to perform at work is linked to one's level of well-being – one's overall contentedness, health and sense of accomplishment. Most fundamentally, a

balanced approach to one's life goals and activities appears to be the key to a strong sense of well-being. Models of 'life balance' typically emphasise work, friendship / family, and leisure as the core 'triad' of facets underpinning well-being.



The health benefits of sleep

Sleep makes us feel better, but its importance goes way beyond just boosting our mood or banishing under-eye circles. Adequate sleep is a key part of a healthy lifestyle, and can benefit heart, weight, mind, and more. Here are some health benefits researchers have discovered about a good night's sleep:

- Improved memory
- Longer lifespan
- Enhanced creativity
- Better performance
- Effective study and learning
- Sharpened attention
- Weight control
- Lower stress
- Fewer accidents
- Less depression

Benefits of exercise

The health benefits of regular exercise include increased protection from heart disease, stroke, high blood pressure, diabetes, obesity, back pain, and osteoporosis.

Exercise traditionally has physical health and holistic effect on the human body. This includes the promotion of psychological health include improved mood, better stress coping, and enhanced self-esteem and well-being.

Exercise can also improve sleep. Research has shown that exercise taken 30 to 180 minutes prior to bed can increase the amount of deep (restorative) sleep that we obtain. Furthermore, being fit helps to increase stamina and thereby increase the potential enjoyment of leisure time.

More specifically, other potential benefits of physical exercise include:

- Increase energy levels
- Reduce muscle tension
- Reduce stress
- Improve muscle tone and strength
- Increase aerobic fitness (heart and lungs)
- Improve flexibility
- Strengthen immune function
- Reduce body fat
- Improve bone density
- Improve circulation
- Better digestion

Exercise and fatigue

Recent research has found that inactive people who regularly complain of fatigue can increase their energy levels by up to 20 per cent and decrease their reported fatigue by up to 65 per cent by engaging in regular, low intensity exercise. Regular exercise was shown to increase feelings of energy in most of the participants. The finding that exercise can reduce fatigue adds an additional technique to the battery of fatigue management techniques.



Module Ten: Commuting

Commuting as a hazard

Driving to and from work when fatigued should be considered a hazard. This hazard is increasing in significance as cities expand, people settle in suburbs, and public transport options diminish. As a consequence of these and other factors, many people are undertaking longer and longer commute times to their workplaces. This could cause risk of falling asleep behind the wheel while tired or sleep deprived.

There are certain high-risk times when you are more at risk of having a fatigue-related accident. These include:

- long drives without a break
- driving home after a long shift
- driving between midnight and dawn
- driving in heavy traffic
- long stretches of road with low traffic
- roads with little variation in bearing or outlook.

While it is difficult to eliminate all the risks associated with commuting, it is possible to take some measures to improve safety on the road. While the following suggestions may not be relevant to everyone, it should be able to create a road safety strategy that suits specific circumstances.

Tips for making commuting safer:

- Take public transport if it is available
- Move closer to work
- If you live close enough to work, consider riding, running, or walking to work
- Car pool
- Don't be in a hurry
- Do not use a mobile phone while driving
- Take a nap
- Have some caffeine

Summary

We have covered information to assist you the use of appropriate fatigue management strategies. Fatigue poses challenges to businesses, must be addressed by employers and employees in all industries. Important part of the fatigue management system consists of risk management, training, consultation, and issue resolution.



Reading and Resources

Heavy Vehicle Transport

- Heavy vehicle national law
- National Heavy Vehicle Regulator

Rail

- Rail safety national law
- National Rail Safety Regulator

Aviation

- Fatigue management for the Australian aviation industry

Medical Professionals

- Managing the risks of fatigue in general practice
- AMA code of practice
- AMA safe hours audit
- ANF fatigue prevention

Drivers (i.e. taxi drivers)

- Fatigue management (QLD)

Emergency services

- Emergency Services Guideline for Risk Managing Fatigue. (SA)

Mining

- Fatigue management – mining (NSW)
- Fatigue management – mining (WA)
- Fatigue Management- Mining (Qld)

General information

- Managing Fatigue (QLD)
- Managing fatigue risks
- HSE Managing Shiftwork
- Fatigue risk index
- Human Factors: fatigue
- National Transport Commission

Safework Australia

Code of Practice: Managing the risk of fatigue