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Fatigue Risk Management System
for the Canadian Aviation Industry

Fatigue Management Strategies for Employees



Canada

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Une traduction de ce document est également disponible en français : «*Système de gestion des risques liés à la fatigue pour le milieu aéronautique canadien : Stratégies de gestion de la fatigue pour les employés*», TP 14573F.

Preface

This document is part of the Fatigue Risk Management System (FRMS) Toolbox for Canadian Aviation developed by Transport Canada and fatigue consultants *edu.au* of Adelaide, Australia.

The FRMS toolbox includes the following components:

1. *FRMS for the Canadian Aviation Industry: An Introduction to Managing Fatigue*, TP 14572E: introductory material intended to raise awareness about fatigue
2. *FRMS for the Canadian Aviation Industry: Fatigue Management Strategies for Employees*, TP 14573E: provides the knowledge and skills required to apply appropriate fatigue management strategies at the individual level
3. *FRMS for the Canadian Aviation Industry: Employee Training Assessment*, TP 14574E: an optional module intended to assess employee competence in topics covered in the Fatigue Management Strategies for Employees workbook
4. *FRMS for the Canadian Aviation Industry: Developing and Implementing a Fatigue Risk Management System*, TP 14575E: explains how to manage the risks associated with fatigue at the organizational level within a safety management system framework
5. *FRMS for the Canadian Aviation Industry: Policies and Procedures Development Guidelines*, TP 14576E: proposes a policy structure while providing examples and guidelines to help organizations through the process of designing fatigue risk management policies and procedures
6. *FRMS for the Canadian Aviation Industry: Fatigue Audit Tools*, TP 14577E: provides an overview of tools available to employers to help determine whether scheduling provides employees with adequate opportunities to get sufficient sleep.
7. *FRMS for the Canadian Aviation Industry: Trainer's Handbook*, TP 14578E: in addition to a training presentation on fatigue, fatigue management systems, and individual fatigue management strategies, the package includes background information for delivery of the workshop, learning outcomes, and questions frequently asked by participants

These documents are available on the Transport Canada web site at www.tc.gc.ca

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Introduction

Why a training program on fatigue risk management?

Transport Canada is committed to improving aviation safety through the management of fatigue-related risks. To this end, a set of tools was developed to support the Canadian aviation industry in implementing Fatigue Risk Management Systems (FRMS) within Safety Management Systems.

An important part of an FRMS consists of training all employees in the management of fatigue as a safety hazard. To achieve this goal, the tools developed include various training materials that are designed to meet the business needs of participating organizations and the skills development needs of their employees in relation to fatigue risk management.

Managing human resources has always been a demanding task and now more than ever industry must acknowledge the unique needs of employees who work outside the Monday-to-Friday, 9-to-5 schedule. Non-traditional work schedule designs have benefits for employers and employees. But decisions made without thorough knowledge of the safety and

family or social impacts of such hours could result in shift patterns that compromise any potential benefits. Appropriate and efficient management of the workforce is crucial to meeting the demands of the Canadian Aviation Regulations, as well as ensuring high levels of work site productivity.

What is the purpose of this workbook?

This workbook aims to provide the knowledge and skills to help you to adopt appropriate fatigue management strategies.

More specifically, you will learn how to:

- monitor potential causes of fatigue and devise action plans to minimize their effects in accordance with company procedures;
- identify personal warning signs of fatigue and appropriate countermeasures in accordance with workplace procedures to ensure that effective work capability and alertness are maintained;

- make positive lifestyle choices to promote the effective long-term management of fatigue;
- adopt and apply effective practices and countermeasures for combatting fatigue; and
- communicate your personal fatigue management strategies to relevant people.

How to use this workbook?

This workbook involves a combination of theory and practical strategies related to both work and non-work situations. This study guide will be your reference during your training.

Each chapter begins with a list of learning outcomes. These are provided to organize the training around clearly defined outcomes that students are expected to demonstrate on completion. The content of each chapter includes background information on the featured topic and related practical strategies to minimize the effects of non-traditional work hours and fatigue. Topics covered include sleep, nutritional, physical, social, and work design strategies to minimize the risk of fatigue.

Exercises are provided throughout the workbook. Students are asked to demonstrate they can apply the knowledge learned to everyday situations by completing the exercises provided in each chapter. Knowledge checks are also included at the end of each chapter to allow students to verify whether they need to review some of the content.

Will this program be assessed?

Depending on the training format chosen by your company, you may have to complete an assessment to receive a certificate of completion for this course. Your trainer or supervisor will inform you whether an assessment process will be used and its exact format. An assessment can take various forms, including:

- If your training program includes classroom delivery for this course, the assessment could include group and case study exercises (written and oral) to reinforce the course content.
- By completing the exercises in each chapter of the workbook, you may demonstrate that you are able to apply this learning to your individual work situation. This may be endorsed by the assessor or your supervisor.
- You may be asked to complete an assessment exercise to show that you have retained knowledge and acquired skills from this training. This involves answering questions on the content of this workbook (similar to the exercises and knowledge checks).
- Skill achievement may also be demonstrated through maintaining a candidate's log. This process requires you to record how you have applied the skills learned during the course in your specific work situation and daily life.

CHAPTER 1

Working Non-Traditional Hours

Learning Outcomes

After reading through this chapter, you should be able to:

- Explain positive and negative impacts that non-traditional hours of work can have on you.
 - Identify individual differences that influence the capacity to adapt to non-traditional hours of work.
-

Working Non-Traditional Hours

Living in a 24-hour society

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. Between 15 and 30% of the workforce of industrialized countries is engaged in shift work. In Finland, 25% of the working population are shift workers, while in Singapore that figure is closer to 32%. In Canada, approx-

imately 30% of workers are employed in some form of shift work.

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

EXERCISE

What are some of the personal difficulties that you or some of your co-workers have experienced as a result of shift work or non-traditional working hours?

Can you think of positive and negative effects of these work hours on health, lifestyle, safety, or well-being?

Positive effects

Negative effects

Some shifts (such as night shifts) are more likely to be harmful to health than others (see Chapter 15 for the different types of shifts and their impact on the worker). The effects of a particular shift depend on when it falls within a 24-hour period and the disruption it causes to your body clock.

Body clock (circadian rhythms)

One of the most predictable environmental variations to which the body must respond is the cycle of night and day. This cycle relates strongly to why we feel sleepy at night and awake during the day. Many body rhythms, such as sleepiness and wakefulness, secretion of digestive enzymes, hormone production, and body temperature operate on a 24-hour cycle. These are called circadian rhythms.

These normal biological rhythms do not adjust easily to a pattern imposed by work schedules unless the schedule is day work. On the whole, most people find working at night more difficult than working during the day. This is because these schedules are more likely to disrupt sleep/wake patterns and other biological rhythms. People find

themselves trying to sleep and eat at times when their body is not programmed to do so. This is why, in the long run, shift workers are more likely to experience fatigue due to sleep disruption and gastrointestinal problems.

Performance

Work hours influence a person's ability to perform in a given situation. Other factors play a role 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, extended hours, or high-risk tasks.

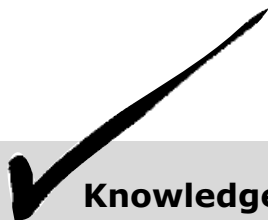
Individual differences

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 in better coping with shift work. More information is provided in the following chapters on how these factors can reduce the impact of 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 categorized either as morning or evening types depending on the moment 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.



Knowledge Check

- Name three aspects of your life that can be affected by non-traditional hours of work.
- Name two types of biological rhythms that are regulated by the body clock.
- Name three personal characteristics that influence the impact of non-traditional hours of work on a person.

CHAPTER 2

Fatigue

Learning Outcomes

After reading through this chapter, you should be able to:

- Describe what fatigue is.
 - Name factors that contribute to fatigue.
 - Identify signs of fatigue.
 - Name the times of day when fatigue is at its highest level.
-

Fatigue

What is fatigue?

Fatigue is an experience of physical or mental weariness that results in reduced alertness. For most people, the major cause of fatigue is not having obtained adequate rest or recovery from previous activities. In simple terms, fatigue largely results from inadequate quantity or quality of sleep. This is because both the quantity (how much) and the quality (how good) of sleep are important for recovery from fatigue and maintaining normal alertness and performance. Furthermore, the effects of fatigue can be made worse by exposure to harsh environments and prolonged mental or physical work.

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.

Working outside the Monday-to-Friday, 9-to-5 routine can limit the opportunity for sleep and recovery in each 24-hour period. It can reduce the amount of sleep you get by between one and three hours

per day. This is because these hours of work:

- limit the amount of time available for sleep
- disrupt the body clock, which is programmed for activity during the day and sleep at night

In addition to sleeping less, people who work non-traditional hours often obtain sleep of a lower quality.

In the current 24 hour, 7 day a week (24/7) society, there are many reasons that workers don't obtain the quality or quantity of sleep that they require to be adequately rested. Some of these reasons are work related and some are non-work related. 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 for adequate breaks during shifts
- working conditions that may compound fatigue (for example, heat stress and time pressures)

Examples of non-work-related fatigue factors include:

- undiagnosed or untreated sleep disorders
- individual family or social factors that take priority over sleep

EXERCISE

Identify at least two causes of work-related fatigue that have affected you during your working life.

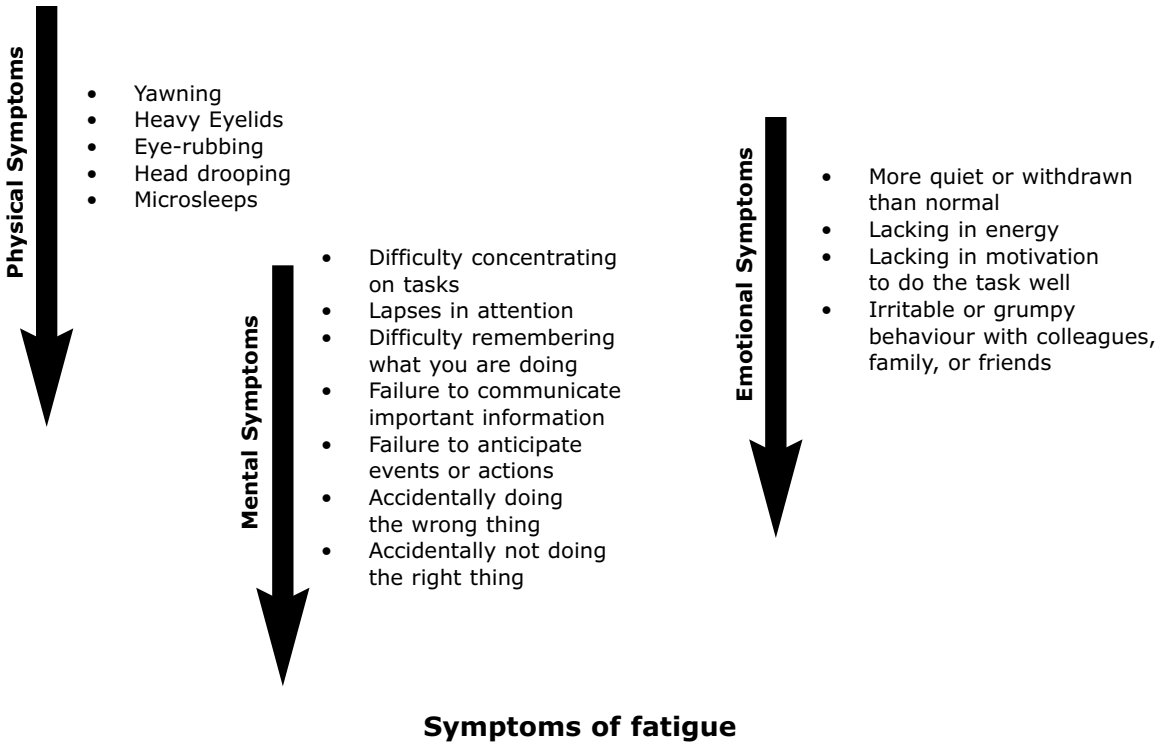
Symptoms of fatigue

In general, we are poor judges of our own fatigue levels. It's difficult to tell when our fatigue has reached a point where it's no longer safe to work or drive. However, there are signs or symptoms that can be used as a gauge.

Fatigue-related symptoms can be divided into three categories: physical, mental, and emotional. The diagram on the following page outlines some of the major symptoms in each category. Depending on the type of work being conducted, there may be some task-specific indicators of fatigue that can be added to this

list. If you experience two or more of the symptoms listed, you may be experiencing some level of fatigue or reduced alertness. Fatigue is not the only cause of all the symptoms, but when they occur together it likely indicates fatigue-related impairment.

If you exhibit fatigue-related symptoms on a regular basis, you should consider seeing an appropriate medical specialist. This is particularly important for individuals with a body mass index greater than 30 and a neck size greater than 40 cm, since they have a significantly higher risk of sleep apnea.



EXERCISE

Circle any of the above symptoms that have significantly affected you in the past. Reflect on these symptoms and indicate how they have affected your work.

Consequences of fatigue

A fatigued individual is often impaired and can't continue to perform tasks safely or efficiently. For example, fatigue can affect your ability to:

- react quickly in emergency situations
- communicate clearly with fellow employees
- work productively

Fatigue and falling asleep have been identified as significant contributors to incidents and accidents in a wide cross-section of industry. This relationship has been well supported by evidence from organizational and government investigations as well as industrial risk data. The incidents and accidents that result from fatigue can be severe and include fatalities, but are most often associated with employee injury or equipment damage.

How big a risk is fatigue?

In recent years, researchers have compared effects on performance of alcohol and fatigue. While most people understand that alcohol intoxication can be a significant risk on the roads, the effects of fatigue are not generally understood or acknowledged.

Studies have found:

- The performance of a person who wakes at 7 a.m. and stays awake for 17 hours until midnight will be as impaired as that of someone with a blood-alcohol concentration (BAC) of

0.05% – the legal driving limit in many countries.

- 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 performance as impaired as someone with a BAC of 0.10% – more than the legal limit of 0.08% in Canada.

Although there are differences between being fatigued and being drunk, this research provides valuable information. One night of sleep deprivation can leave you more impaired than would be acceptable for driving a vehicle.

High risk times for fatigue

There are particular times of the day when the risks associated with fatigue are increased, regardless of the relationship between fatigue and recovery sleep. It is important to understand these risks when making decisions about hours of work, hours of overtime, contingency planning, and emergency responses.

Times when fatigue levels increase are:

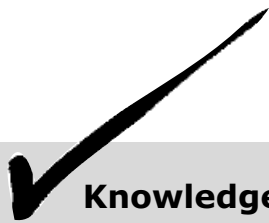
- midnight to 6 a.m. (and especially 3 a.m. to 5 a.m.). This is the low point in the body's circadian rhythm that governs alertness and performance.
- the beginning and end of shift when handover occurs. Fatigue levels can affect communication.
- when breaks have not been taken for a number of hours. Employees who have been on duty longer may have accumulated fatigue.

- early shift starts (before 6 a.m.). Early start times shorten sleep obtained the night before if you either neglect to go to bed earlier in compensation, or “clock watch” because you are anxious about getting up on time.
- when employees are new to the job or workplace. Learning the new job and

getting to know the environment and personnel is stressful. People 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.

EXERCISE

Describe one or more safety hazards you have witnessed in your work environment as a result of any of the above situations.



Knowledge Check

- What are two major causes of fatigue?
- Name four symptoms of fatigue.
- Compare performance in the following situations:
 - Being awake for over 17 to 23 hours
 - Being under the influence of alcohol

CHAPTER 3

Sleep

Learning Outcomes

After reading through this chapter, you should be able to:

- Describe the general functions of sleep.
 - Explain the consequences of sleep deprivation.
 - Explain ways of establishing a sleeping environment that can promote your sleep.
-

Sleep

What is sleep?

Sleep is defined as a state of partial or full unconsciousness during which voluntary functions are suspended and the body rests and restores itself.

Despite the obvious importance of sleep, its specific function is not fully understood. In a broad sense, it is thought that during sleep the mind and the body “recover” from the stresses of the day and “prepare” for those to come. Information about the function of sleep has mainly come from studies depriving animals and humans of sleep.

Prolonged sleep deprivation of animals over two to three weeks resulted in skin lesions, weight loss, and ultimately death. In humans, prolonged sleep deprivation leads to reduced mental and physical performance and symptoms such as hand tremors, slurred speech, and increased sensitivity to pain.

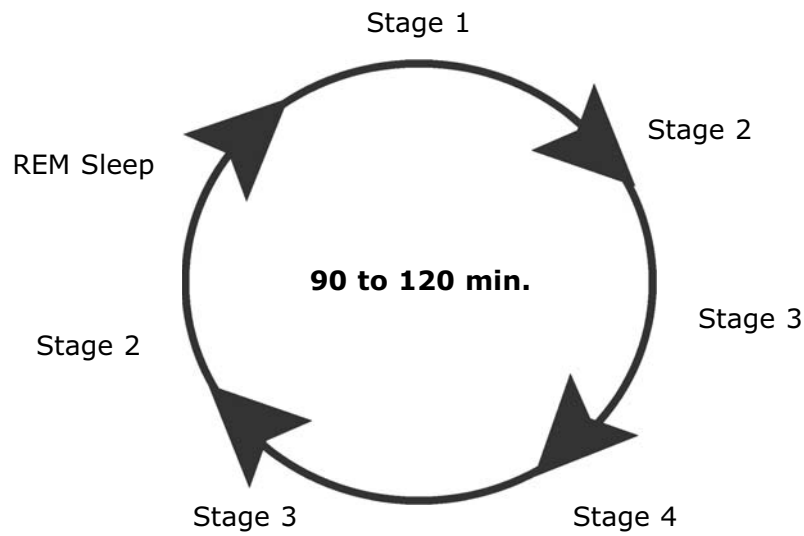
Both the quality and quantity of sleep are determined largely by the timing of sleep in the 24-hour day. Human beings are programmed to sleep during the night and to be active during the day.

Sleep cycles and sleep structure

Sleep varies through the night; it is not uniform. The various sleep stages follow each other in a continuous cycle that lasts between 90 and 120 minutes. Each cycle is composed of five sleep stages. Stage 1 is where we fall asleep. During this stage, you may occasionally experience muscle twitches or starts. Stage 2 is a light sleep stage, when you are easily awakened. Stages 3 and 4 are deep sleep stages. These stages are considered to be those where the body regenerates. People are difficult to waken during these stages. The final stage is known as REM sleep, for rapid eye movement. If you were to observe a person in this stage of sleep, you would notice their eyes moving under their eyelids, and possibly some muscle twitches. This is the stage of sleep when we dream. This stage of sleep is important in learning and in memory consolidation.

Early in the night, we spend more time in stages 3 and 4 of each sleep cycle. As the night progresses, we spend more 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).



Adapted from *Shifting to Wellness*, Keyano College, 1995.

The human sleep cycle

EXERCISE

Can you recall any situations where you have suffered from sleep deprivation? Please provide details.

Recovery sleep

Unwanted sleepiness and fatigue can be considered an annoyance – and a danger under certain circumstances. It can be fatal, for instance, while driving a vehicle or flying an aircraft.

Many strategies have been identified to reduce the likelihood or consequences of fatigue. Some are discussed later in this workbook, such as the use of caffeine or being more aware of what you eat. More extreme examples include the use of amphetamines and other stimulants. However, such strategies are only a temporary fix, no matter how effective they are. At some stage, sleep must be obtained for physical and mental recovery to occur.

The exact amount of sleep that each person needs every 24 hours to perform optimally differs, but in general it's between 7 and 9 hours. The need for sleep does not diminish as we get older, even though sleep may prove more difficult to obtain. Most people go to sleep naturally between 10 p.m. and 8 a.m. Older people tend to go to sleep earlier than younger people. 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 at all. A short sleep or nap can provide a powerful boost to alertness. However, it is important to know that napping does not eliminate the need for sleep. There are other considerations relating to napping covered in Chapter 4.

EXERCISE

Approximately how many hours of sleep do you get (on average) per day?

Is this enough and do you think your performance would improve if you got more sleep per day?

EXERCISE

Does the amount of sleep that you normally get vary with the different shifts that you work? If so, please explain.

Age and sleep

As we get older it becomes physically more difficult to stay asleep during a sleep period without waking up. This is particularly true during daytime sleep, but even nighttime sleep may prove to be more difficult as we get older. Falling asleep and poor sleep are not the only age-related changes that make non-

traditional hours of work difficult. Recent research suggests that an aging bladder can contribute to sleep disturbances because it causes you to wake up more often to visit the toilet. Along with other age-related changes, this can cause more frequent awakenings across the sleep period. Frequent awakenings can lead to increased sleepiness when you are awake.

EXERCISE

Have you noticed any significant changes in sleep patterns, either in yourself or in an acquaintance, that appear to be related to age? If so, what are they?

Setting up your bedroom

Obtaining adequate sleep can sometimes be a challenge, even in the most ideal circumstances. From both a biological and social perspective, sleeping during the day can cause the greatest difficulty. This is related to the body's biological programming to be awake during the day, as well as the fact that it is noisier and brighter during the day. In addition, you may have more pressures on your time during the day. While some of these things are hard to change, you can set up your bedroom to maximize your chances of getting sleep when you have the opportunity.

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 even an inexpensive option such as black plastic.
- Use your bedroom only for sleep, relaxation, and sex. Remove work desks, home offices, computers, and even televisions.
- Control the noise that enters your bedroom. This can be done using physical barriers such as roller shutters, double glazed windows, and insulation, but it can also 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 so that it does not disturb your sleep.
- Reduce the disruptive noise that enters your bedroom. In addition to the physical barriers listed above, there are other ways that noise can be damp-

ened out. For example, many people have success using a white noise source such as a fan, air conditioner, or relaxing CD 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. Many workplaces supply foam ear plugs, and you can buy more solid silicone-based plugs at a drugstore or sporting goods store.

- Minimize caffeine and alcohol intake in the hours before bedtime. Caffeine acts as a stimulant to keep you more awake. The stimulating effects of caffeine can last up to six hours. In addition, both caffeine and alcohol are diuretics, substances that flush water from your body. That is, they make you more likely to wake up to go to the toilet.
- 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 will wake up to control its temperature more efficiently. A thermo-neutral zone is best set up using good placement of the bedroom in the house, good use of insulation, and using an air conditioner or heater with a thermostat.
- Don't panic if you can't get to sleep. Most people have days when they can't sleep. Staying in bed, trying your hardest to get to sleep is unlikely to help, and may even make sleep more difficult. If you cannot sleep within 30 minutes, get out of bed and do something relaxing instead of staying in bed and being frustrated with yourself.
- Establish a pre-bed routine, including quiet/relaxing activities. Each bed-

time, do the same activities in the same order. For example, shower, clean your teeth, and lock the door. It doesn't matter how many things you do, so long as they are always the same and in the same order each time. This trains your body to associate these activities with falling asleep.

- Consult with your doctor if you suspect – or have been told – that you

have a sleep disorder. Signs like making choking sounds or stopping breathing regularly during your sleep are classic symptoms of sleep apnea, a breathing-related sleep disorder that can reduce your capacity to stay awake when you are at work, driving, or engaged in other activities.

EXERCISE

Are there any improvements you could make to the way your bedroom is set up? What are they?

Insomnia

Insomnia generally refers to difficulty falling asleep or staying asleep. A frequent medical complaint, it is the most common type of sleep problem. Rates of insomnia are higher in shift workers and people who work non-traditional hours.

Insomnia is usually defined as being transient (lasting up to one week), short-term (lasting weeks to months), or chronic (lasting longer than three months).

Treatments focus on chronic insomnia because most people experience transient or short-term insomnias several times a year.

There are many potential contributors to insomnia. These include work hours, life stressors, age, and sleep environment. Treatments may involve changes to schedules, habits, and lifestyle. The use of drug treatments is controversial and is most useful for transient or short-term insomnia.

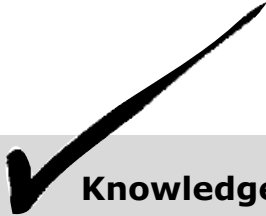
Case study



Damien is 51, married and has three grown children. He has spent 18 years working shifts as an aircraft maintenance engineer. He drives 45 minutes each way to work his 12-hour shifts.

Recently, Damien drove off the road on his way home from work at 5:45 a.m. Although it's normal to be tired after working a night shift, it was the fourth time in the past six months and this time it scared him. He stopped the vehicle, and walked around outside in the cold air before he continued home.

Although he has been avoiding talking to his doctor about a possible sleep disorder, this latest incident was the trigger for Damien to make an appointment. His wife, Tonia, has been telling him for nearly two years to do something because his stories about nearly falling asleep at work or on the way home from work scared her. Damien thought he could avoid an accident, but now realizes that he could hurt himself or others if he does not get help.



Knowledge Check

- How could Damien improve his sleep?
- Who should Damien see regarding his sleeping problem?
- On average how many hours of sleep should you ideally get each night?
- How can “white” noise positively affect sleep?
- What room temperature range is most suitable for promoting sleep?
- Explain the positive effect of a pre-bedtime routine.

CHAPTER 4

Napping

Learning Outcomes

After reading through this chapter, you should be able to:

- Discuss the benefits of napping.
 - Describe the short-term way that sleep inertia may compromise the benefits of a nap.
-

Napping

The benefits of napping

Short sleeps or naps can deliver most of the benefits of longer sleeps over a shorter time frame. These benefits can include improved short-term memory, increased performance, improved alertness, and improved reaction time. But the benefits of naps do not generally last as long as the benefits gained from longer sleeps.

Naps as short as 10 or 15 minutes can deliver measurable benefits. In general, the longer the nap is, the more beneficial it will be in terms of recovery and improvements in performance.

Some research suggests that the time of day you take a nap also affects its recovery value. Other research suggests that this is not the case and that getting any sleep is much more important than the time the nap is taken. Take naps in the way that you believe best suits you. Keep in mind that a nap can negatively affect your chances of sleeping later that day or night.

EXERCISE

Is napping permitted in your workplace? If yes, under what circumstances?

EXERCISE

Is napping a strategy that you could benefit from? If so, how could you apply it?

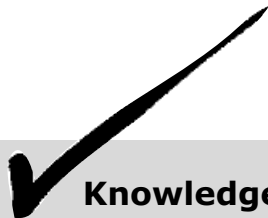
Sleep inertia

While both long sleep periods and napping are highly beneficial for a wide range of reasons, it is important to understand that your performance and alertness may be impaired for a while after you wake up. Most people experience a period of confusion when they wake or are awakened from sleep. This state is known as sleep inertia and generally lasts between five and 20 minutes. You should minimize activities that would be sensitive to sleep inertia (such as driving) for 20 minutes after waking up.

Exactly how long sleep inertia lasts depends on a number of factors. There is

no effective way to eliminate or reduce the effects of sleep inertia. Sleep inertia tends to last longer when you:

- are woken up as opposed to waking naturally from sleep
- wake up or are woken up from deep sleep compared to light sleep – this is more common following longer sleeps than shorter naps
- wake up or are woken up at the low point of the circadian rhythm (generally between midnight and 6 a.m.)
- wake up or are woken up after a nap following a period of sleep deprivation



Knowledge Check

- Explain what sleep inertia is.
- Name two benefits of napping.

CHAPTER 5

Food

Learning Outcomes

After reading through this chapter, you should be able to:

- Describe the glycemic index.
 - Distinguish high, intermediate, and low glycemic index foods.
 - Explain the impact of these foods on alertness.
 - Explain how digestion and hunger are affected by non-traditional hours of work.
-

Food

Why think about food to manage fatigue?

As discussed elsewhere in this workbook, the ability to stay awake is largely related to whether you have had adequate rest and recovery. However, there are other factors that 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 affect of low blood sugar on their ability to stay alert and safe.

Digestion and hunger

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. This is because digestive juices (stomach acids and enzymes) are mainly secreted during the day.

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. Gastrointesti-

nal upsets are very common in people who eat outside of traditional meal times. These upsets can be worsened by drinking tea, coffee, or alcohol. Research has found that night workers are five times more likely to get peptic ulcers than day workers.

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.

Controlling blood sugar with food

Given that non-traditional hours of work affect digestion and hunger, it is not surprising that it is difficult to keep your blood sugar stable under such circumstances. A stable blood sugar level is an important ally in minimizing the ups and downs in energy levels that are common for shift workers.

The belief that snacks loaded with sugar cause a fast rise and fall in blood sugar has been recently disproved. The way blood sugar levels react to different foods is known as the glycemic index (GI) of foods.

High GI foods make your blood sugar levels rise and fall quickly, whereas low GI foods make your blood sugar level rise and fall slowly. High GI foods are ideal when you have been doing physical work or exercise and need energy quickly to recover. Low GI foods are ideal to keep an already stable blood sugar level from becoming too high or low. Low GI foods are also ideal for raising blood sugar slowly and avoiding the fast drop in blood sugar (and energy) that can occur after eating high GI foods. Low GI foods are ideal as regular snacks across a shift to help avoid big changes in your energy levels.

Research into GI foods also holds important implications for people with dia-

betes. In general, medical practitioners recommend that diabetics avoid high GI foods to help regulate blood sugar levels. But high GI foods can be useful as a pick-me-up for non-diabetics, particularly after physical work or exercise. More often than not, however, low GI foods will be more useful in your day-to-day life.

Low-fat protein strategies

Research also suggests another eating strategy for shift workers: evidence shows that eating low-fat protein foods can help you stay awake. This is due to a process involving the amino acid tyrosine and leads to increases in the levels of stimulating chemicals in your body.

Examples of high GI foods

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

Examples of low GI foods

Oranges or orange juice	Low-fat yogurt	Noodles or pasta
Baked beans	Lentils	Apples or apple juice
Fruit bread	Chocolate	Grapes
All bran, porridge, muesli	Peanuts or cashews	Oat bran or grain bread

Examples of intermediate GI foods

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

Examples of low-fat protein foods

Low-fat dairy products	Cooked and canned fish	Protein shakes
Hard boiled eggs	Lean chicken, beef, or lamb	Lentils

EXERCISE

What type of GI foods do you normally consume at work or before work: high, intermediate, or low? Give examples.

Are there any food changes you should consider, based on what you now know about the GI of foods? If so, what are they?

Where to from here?

It is likely that at least some of the information in this chapter is new to you. You may have picked up some fresh strategies. Try things for a while and see how they work for you. Keep in mind that you are more likely to notice a difference using these strategies if you apply them when you are tired.

It is also important to maintain a balanced diet. In general, the evidence suggests that a low-fat diet comprised mainly of

low and intermediate GI foods along with some good quality protein is most beneficial. In addition, it is important to consider the level of fibre in your diet (from fresh fruit and vegetables) as well as the levels of minerals and salt. The recommended daily salt intake is 3.8 grams per day to replace the amount lost daily through perspiration and to ensure your diet provides sufficient amounts of other essential nutrients. However, any more salt than this can result in high blood pressure, which can lead to stroke, heart disease, or kidney disease.

Case study

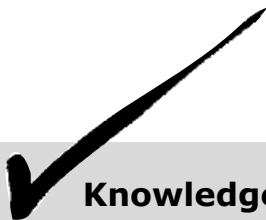


Jeff is a 58-year-old maintenance engineer who has been working in the aviation industry since he was 16 years old. His three children are grown up and have their own homes and families. Jeff and his girlfriend Lisa have been together for seven years.

Lisa prepares Jeff's meals. When he has a night shift, afternoon shift or an early morning shift, she packs whatever they would have eaten had they been together. Jeff cooks his meals in the kitchen at work and often prepares steak and eggs, reheats meatloaf, or roasts pork chops. This is the way things were before Lisa was around, and this is the way they have stayed.

The problem is that in the last few years, Jeff has been getting really bad stomach pains whenever he eats a heavy meal on the night shift. Jeff has only a few more years until he plans to retire and he doesn't want to change the way he does things now. Jeff's doctor has been saying that the pains are associated with the type of food that he eats on nights, but Jeff thinks he'll be okay.

Jeff actually has a serious case of peptic ulcer. It's unfortunate that Jeff doesn't listen to his doctor because ulcers can be treated quite easily with diet changes and short-term daily medication.



Knowledge Check

- Why might Jeff experience stomach problems after eating a heavy meal on the night shift?
- What changes might Jeff make to his diet to help reduce his stomach problems?
- Why are low GI foods generally appropriate when working shifts?
- What effect does a stable blood sugar have on energy levels?

CHAPTER 6

Water

Learning Outcomes

After reading through this chapter, you should be able to:

- Explain why being hydrated is important for alertness.
 - Name factors that contribute to dehydration.
 - Determine whether you are drinking enough water daily to stay hydrated.
-

Water

Can hydration affect alertness?

As mentioned earlier in this workbook, it is not just sleep that affects your alertness. Examples have been provided related to digestion and food. Similarly, hydration has an affect on your ability to feel alert and 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 lightheaded 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 solved by drinking more water.

Contributors to dehydration

The recommended daily intake of water is two litres or eight glasses. Drinking less than this contributes to dehydration. There are other factors that can cause dehydration, even if your daily intake of water is adequate. Some of these factors include:

- Performing physically demanding tasks
- Drinking a lot of caffeinated drinks. Caffeine is a diuretic, a substance that actively flushes water from your body
- Working in hot environments
- 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

Another problem can be the availability of water in the workplace. For example, many employees who drive vehicles for a living do not have access to water unless they bring it with them.

To be as alert and awake as possible, you need to be aware of your water intake. For some people, this may mean doubling their fluid intake or more. Surprisingly, many people find that when they drink more water they feel more alert but don't go to the toilet any more often – their urine output is simply higher each time.

EXERCISE

What sort of fluids do you drink at work?

Approximately how much water do you drink at work?

Based on what you have just read, do you think you need to make any changes in your drinking habits? Provide details.

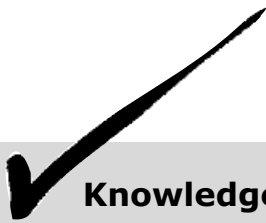
Case study



Terry is a 52-year-old pilot who has been flying for 24 years. He flies 100 to 110 hours per month at all hours of the day.

A while ago, Terry's friend suggested that drinking water might help him feel more alert while flying. She also recommended that he think more about when he drinks coffee and alcohol.

Now Terry only drinks coffee when he is really tired. This way he reduces his dehydration from caffeine but still gets its stimulating benefits. Terry also drinks more water now but doesn't need to go to the toilet any more frequently. Although he was initially sceptical, these new strategies have helped Terry feel more alert.



Knowledge Check

- Why might Terry have to go to the toilet more frequently when he drinks caffeinated drinks?
- What effects do alcohol and caffeine have on water in the body?
- How does water affect alertness?
- On average, what is the minimum amount of water you should drink every day?

CHAPTER 7

Caffeine

Learning Outcomes

After reading through this chapter, you should be able to:

- Explain the effect of caffeine on bodily functions.
 - Understand the effect of caffeine on alertness.
 - Discuss the effect of caffeine on sleep.
 - Name symptoms of caffeine withdrawal.
-

Caffeine

What is caffeine?

Caffeine is an addictive drug. You may be addicted to caffeine if you feel you cannot function without it and need to consume it every day. Caffeine occurs naturally in many plants including coffee beans, tea leaves, and cocoa nuts. It is also found in an array of food products and beverages such as chocolate and cola drinks.

If you drink caffeinated beverages, you are probably aware that caffeine perks you up. If you are low on sleep and need to remain active, caffeine can make you feel alert by blocking adenosine reception. Adenosine causes blood vessels to dilate and nerve cell activity to slow down, causing drowsiness. After drinking coffee, you may notice that your hands get cold, your muscles tense up, you feel excited, and your heart beats faster.

It takes caffeine approximately 20 minutes to enter your system, and the effects can last up to six hours. You should avoid having your last caffeinated drink too close to bedtime. The stimulant effect may reduce your chance of falling asleep.

Strategic use of caffeine

Most people don't use caffeine as effectively as they could. They tend to drink it when they are not really tired, which means the stimulating effect doesn't have much impact. Regular caffeine consumption leads to increased tolerance, which means that over time we get less effect from the same quantity. When you have a high tolerance to caffeine, drinking one or two cups when you are really tired may make little difference to your alertness.

People who are addicted to caffeine often experience withdrawal effects when they stop drinking it. These include a dull headache that lasts from one to five days, irritability, nervousness, restlessness, and sleepiness. In extreme cases, nausea and vomiting have been reported.

To use caffeine more effectively, start by being more strategic about when you drink it. Here are a number of tips on how to use caffeine to its best advantage:

- Avoid drinking caffeinated drinks when you are not tired. The caffeine

will have little effect and will contribute to increasing your caffeine tolerance. Your body will get used to having it and, over time, you will need to drink more to get the same effect.

- Avoid drinking caffeinated drinks in the morning. The early part of the day is a time when your body is waking up naturally and, generally speaking, you will feel more awake as the morning progresses. Using caffeine to speed up the process simply increases your tolerance to it. One exception may be if you have to get up really early in the morning.
- Avoid caffeinated products for a few hours before bedtime. Because caffeine acts as a stimulant, it can make falling asleep and staying asleep more difficult.

- Be aware that caffeine usually gets into your system within 20 to 30 minutes and the noticeable effects last approximately 4 to 6 hours.
- Be aware of how much caffeine is in different foods and drinks (see table below).
- If you do drink caffeinated drinks, increase your water intake to counter caffeine's diuretic effect. You may have noticed that you need to urinate more frequently when you drink caffeinated drinks.

Most importantly, be strategic: the less caffeine you drink, the more effective it will be when you need to use it to help you stay awake.

Level of caffeine in common substances

Coffee (250 ml)

- Instant 65-100 mg
- Drip 115-175 mg
- Brewed 80-135 mg
- Espresso 100 mg

Caffeinated beverages (250 ml)

- Coke 50 mg
- Jolt 100 mg
- Red Bull 80 mg

Tea (250 ml)

- Green tea 8-30 mg
- Normal 50-70 mg

Most chocolate bars

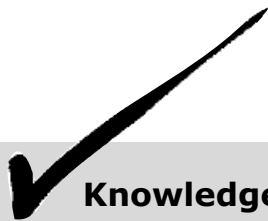
- Approximately 20-40 mg

NoDoz, 1 regular strength tablet

- 100 mg

EXERCISE

Review your caffeine intake. Are there any changes you could make to the way you use caffeine on the job?



Knowledge Check

- Why does caffeine loses its ability to improve your alertness if you drink caffeinated drinks regularly?
- Name three tips you can apply to get the maximum benefit from caffeine as a stimulant.

CHAPTER 8

Alcohol

Learning Outcomes

After reading through this chapter, you should be able to:

- Discuss the effects alcohol has on alertness.
 - Discuss the effects alcohol has on sleep.
 - Explain how alcohol consumption affects performance.
-

Alcohol

What is alcohol?

Alcohol is known to significantly impair performance at moderate and high levels of intoxication. Alcohol intoxication greatly affects the way you respond and interact with your environment and increases your risk of having an accident.

In many industrialized countries, workplaces require a zero blood alcohol concentration (BAC) for their employees. The Canadian Aviation Regulations demand that air crews not drink alcoholic beverages within eight hours of flying. In most working environments, employers cannot tell employees how much alcohol they are allowed to consume away from work. In order to be well rested and fit for work, you need to understand how alcohol works and how it influences sleep and alertness.

Alcohol is the second most widely consumed drug after caffeine. Alcohol is legal in most countries and is so common that it is easy to forget that it is a drug and that it can be dangerous if not used sensibly.

Alcohol is a central nervous system depressant. In small doses, it can make

you feel more relaxed and less inhibited. In larger doses, it makes you drunk and impaired.

Alcohol reduces:

- environmental awareness
- responses to sensory stimulation
- mental functioning
- physical activity.

In high doses, alcohol can produce:

- increased drowsiness
- lethargy
- amnesia
- hypnosis
- anaesthesia

Alcohol intoxication is one of the major causes of road accidents. Most countries have laws restricting people with a BAC above a certain level from driving, working, or operating dangerous equipment. In Canada, a BAC of 0.08% or higher means that driving is prohibited. Many activities in the aviation field have a zero alcohol tolerance.

Accident risk

The table below details the effects of various blood alcohol levels. Alcohol progressively impairs your ability to perform and dramatically increases the risk of accidents.

At a BAC of 0.05 to 0.08%, there is a four-fold increase in the risk of a motor vehicle accident.

At a BAC of 0.10 to 0.14%, there is a six- to seven-fold increase in the risk of a motor vehicle accident.

At a BAC of 0.15% and higher, there is a 25-fold increase in the risk of a motor vehicle accident.

Blood alcohol levels and the relative effect

Blood Alcohol Concentration	Stages	Effects
Up to 0.05%	Feeling of well being	Talkative Relaxed
Above 0.05% to 0.08%	Risk state	Judgment affected Mood affected Intense high or low moods
Above 0.08% to 0.15%	Dangerous state	Slow speech Unstable balance Blurred vision Vomiting Sleepiness
0.20% to 0.40%	Drunken stupor	Heavy sedation No bladder control Coma
0.45% to 0.60%	Shock/Death	Shock Death

Metabolizing alcohol

On average, a person can metabolize 7 to 10 grams of alcohol per hour. This is about the same as clearing two-thirds of the alcohol in a standard drink from the body through the liver, sweat, breath, and urine.

If you consume more alcohol in an hour than you are able to metabolize, your blood alcohol concentration will increase.

A standard drink

Alcohol concentration is usually expressed as alcohol “proof.” Proof means twice the percentage of alcohol. So, if a drink is referred to as 80 proof this means it contains 40% alcohol.

A standard drink contains approximately 13.5 grams of alcohol. See the table below for examples of standard drink equivalents.

According to the Canadian Health Network, guidelines for low-risk drinking are:

- Drink no more than two standard drinks on any day (see table below).
- Men should limit their weekly total of standard drinks to 14 or fewer.
- Women should limit their weekly total of standard drinks to nine or fewer.
- Drink slowly to avoid getting drunk. For example, wait an hour between drinks. Also, consume food and non-alcoholic beverages while drinking alcohol.

Alcohol and sleep

In small amounts (two standard drinks), alcohol taken close to bedtime can help some people relax and get to sleep easier. However, this is not a recommended sleep strategy, as alcohol can affect the quality of your sleep. In larger amounts (four or more standard drinks), alcohol will help you fall asleep or pass out quickly, but not only will it reduce the quality of your sleep, it will also lead to a more restless and light slumber toward the end of the sleep period. This may cause you to wake up feeling less refreshed.

Standard drink equivalents

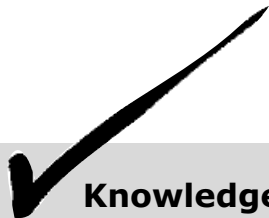
341 ml (12 oz)	Regular-strength beer	5% alcohol
142 ml (5 oz)	Wine	12% alcohol
85 ml (3 oz)	Fortified wine	18% alcohol
43 ml (1.5 oz)	Spirits	40% alcohol

Alcohol and performance

Drinking alcohol can lead to increased sleepiness and reduced alertness, even after the alcohol is no longer detectable. This effect is commonly known as a hang-over. Alcohol intoxication significantly impairs performance, as previously mentioned.

The costs associated with alcohol abuse in the workplace include:

- Increased number of accidents causing injury
- Increased absenteeism or lateness
- Reduced productivity
- Frequent stoppages
- Lower quality work
- Equipment damage



Knowledge Check

- Describe three ways sleep can be affected when you have more than four standard drinks before going to bed.
- Name four effects alcohol has on the body.

CHAPTER 9

Nicotine

Learning Outcomes

After reading through this chapter, you should be able to:

- Discuss the effects of nicotine on alertness.
 - Discuss the effects of nicotine on sleep.
 - Name symptoms of nicotine withdrawal.
-

Nicotine

What is nicotine?

Nicotine is a stimulant found in the leaves of the tobacco plant. Tobacco has been smoked or chewed for centuries. Nicotine stimulates respiration and heart rate and depresses appetite by activating nicotine-sensitive nerve receptors. In small doses, it wakes you up and gives you a high by exciting the central nervous system. It is highly addictive and the dangers to health have been well documented. Smoking cigarettes increases the chances of heart and lung disease and most smokers are less fit than non-smokers.

Cigarettes contain 1 to 20 mg of nicotine (depending on the brand and strength). The effect of nicotine mostly dissipates after 60 minutes. Nicotine readily diffuses through skin (patches), lungs (smoke), and mucous membranes such as the gums and the lining of the nose. The most common and quickest way for nicotine to enter the body is through the lungs. Nicotine moves to the small blood vessels, then to the brain, and finally to the rest of the body. Once it has reached the brain, it is responsible for the “good” feelings smokers experience. People usually keep smoking to maintain a constant level of

nicotine in their bodies. The number of cigarettes it takes to do this varies from person to person because different people metabolize nicotine at different rates. People also have varying degrees of tolerance to and dependence on nicotine.

Nicotine withdrawal

Nicotine withdrawal can occur at night, making it difficult to fall asleep and stay asleep. Nicotine withdrawal may also contribute to nightmares and problems waking up in the morning. This is especially true for heavy smokers.

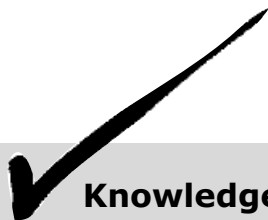
If you smoke, avoiding nicotine in the evening and at bedtime may help improve your sleep. If you stop smoking, you are likely to start sleeping better after 10 days without a cigarette. In heavy smokers, withdrawal symptoms can kick in 20-30 minutes after the last cigarette. Physical and mental withdrawal symptoms may include:

- headaches
- muscular aches
- sore gums and tongue
- impaired concentration
- low blood pressure

- lowered heart rate
- feelings of stress or anxiety
- depression and irritability

Physiological symptoms of withdrawal peak three to four days after quitting but

can last up to 10 days. Sleep improves dramatically after withdrawal symptoms have passed.



Knowledge Check

- Why might heavy smokers wake during the night?
- Name two negative health effects caused by smoking.

CHAPTER 10

Drugs

Learning Outcomes

After reading through this chapter, you should be able to:

- Name problems associated with sleeping pills.
 - Explain the difference between prescription and over-the-counter drugs.
-

Drugs

Prescription drugs

Some prescription drugs can affect your ability to drive or operate heavy machinery. They may also interact with existing fatigue levels and other drugs (including alcohol), further affecting your performance.

If you take prescription medication:

- ask your doctor about possible interactions with other drugs
- ask your doctor about the drug's effects on performance, such as your ability to drive and operate machinery
- tell your supervisor what you are taking so they are aware of your situation (depending on the policies and regulations in your workplace)
- remember anaesthetics are prescription drugs that can show a positive result on a screening test – inform your supervisor if you've had an anaesthetic recently

Drugs that come with a warning not to drive or operate heavy machinery include:

- angiotensin (such as Losartan, Valsartan or Candesartan for blood pressure)
- antihistamines (Benadryl, Claritin, or Reactine for allergies)
- barbiturates (Amytal, Seconal, and Tuinal for sleep and anxiety)
- benzodiazepines (diazepam, alprazolam, and triazolam for sleep and anxiety)
- monoamine oxidase inhibitors (Nardil and Parnate for depression)
- phenothiazines (Mellaril and Thorazine for mental disorders)

Always check the warning labels on the packaging of your medication and ask your doctor or pharmacist if you are unsure.

Over-the-counter drugs

Some over-the-counter drugs used for pain relief or colds and flu may increase drowsiness and fatigue-related symptoms. If you are unsure about the drug you are taking, talk to your pharmacist or tell your supervisor so they are aware of your situation.

Some employees who work irregular schedules and have difficulty sleeping purchase over-the-counter sleeping pills. Examples of this type of medication include Nytol, Sominex, and Sleep-eze. Various antihistamines that cause drowsiness are sometimes used to help the onset of sleep. While these drugs can be effective for getting to sleep, they can also cause increased sleepiness the following day. Use of these drugs is better avoided where possible, and limited to no more than two nights in a row.

There are also over-the-counter drugs available to increase alertness. These include caffeine-based tablets or capsules (such as No-doz and Vivarin) and pseudoephedrine, which is a decongestant (such as Sudafed). While both can be effective in increasing alertness and decreasing fatigue-related symptoms, they also have side effects. Caffeine is a diuretic, which can dehydrate the body. If taken within four hours of going to bed, it can make it harder to fall sleep. Pseudoephedrine can cause increased anxiety levels, heart palpitations, and trouble sleeping. These symptoms have the potential to affect safety and work performance. It is recommended that use of stimulants be limited.

How drugs work

Drugs are taken into the body through the mouth (ingestion), blood (injection), or nose (inhalation). After they enter the bloodstream, they act on the brain. Drugs are eliminated from the body through the liver and kidneys into the urine. Drug effects vary not only from person to per-

son; they can also vary for the same person depending on time of day, mood, tiredness, and the amount of food eaten. A person might get drunk on just a few beers one night but be hardly affected by the same amount on another night. Age, gender, and size of a person also influence the overall impact of drugs and the rate of recovery.

Sleeping pills and sedatives (benzodiazepines)

Definition

Benzodiazepines are a group of synthetic drugs prescribed by a medical practitioner mostly for the treatment of insomnia and anxiety. There are more than 30 different types available. They are taken orally or, more rarely, by injection. Some of the more common forms include:

- Valium
- Serapax
- Rohypnol
- Librium
- Mogadon
- Temazepam

Drug effects

Some benzodiazepines last as little as four to six hours, while others last as long as two to three days.

They are known to:

- relieve anxiety and reduce muscle tension, producing a feeling of calmness and relaxation

- cause sedation, drowsiness, blurred vision, and affected speech

In high doses, benzodiazepines produce symptoms similar to alcohol. In overdose situations they can cause unconsciousness, coma, and death. This is more likely to occur if benzodiazepines are combined with alcohol or other depressant drugs.

Health effects

Due to the tolerance and dependency effects of benzodiazepines, people are generally advised to take them for only short periods. Long-term usage can produce symptoms of:

- lethargy
- irritability
- lack of motivation
- nausea
- headaches
- disturbed sleep
- increased appetite
- depression
- loss of muscle and speech coordination

You can develop dependency on benzodiazepines after more than one week of use. This means that you:

- require higher doses to achieve the same effect
- will suffer physical withdrawal if you stop taking the drug – some people take up to a week before they begin to experience any withdrawal effect.

Once you stop taking benzodiazepines, withdrawal symptoms are common and may last up to a few weeks.

These symptoms include:

- headaches
- nervousness
- poor appetite
- disturbed sleep
- sweating
- anxiety
- vomiting
- muscle spasms
- depression
- flu-like symptoms

Performance effects

In general these drugs adversely affect:

- fine motor skills
- cognitive functioning
- alertness
- learning behaviour

They should not be taken when driving or operating machinery or in any other safety critical situation. They impair your ability to judge whether you are physically or mentally affected. Benzodiazepine use has been associated with hangover-type symptoms on waking. Users often report grogginess and drowsiness after using benzodiazepines. These effects could have implications for work safety. Chronic use can lead to impairment that persists long after you stop taking the drug. However, most users show improvements once they are no longer taking the drug.

Interactive effects

Combined with alcohol or other depressants in large doses, benzodiazepines exaggerate central nervous system depression, which can lead to respiratory suppression and death.

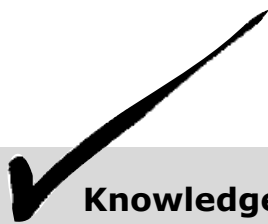
Indicators of benzodiazepine use

A person who takes benzodiazepines may show symptoms similar to those under the influence of alcohol. When used as a sleeping aid, benzodiazepines may produce hangover effects. That is, you may appear sluggish and show some mental

confusion first thing in the morning. Some of the benzodiazepines, such as Rohypnol, cause memory loss during the time they are active.

Clearance times

In general, the time the body takes to clear the drugs varies between one and seven days depending on the drug and dosage. As you age, clearance times for long acting benzodiazepines (like Valium) can greatly increase from a few days to a month. For people who abuse benzodiazepines, it may take up to six weeks for their systems to clear.



Knowledge Check

- Name three problems associated with sleeping pills.
- How does age affect the body's response to drugs?
- What is the difference between a prescription drug and a non-prescription drug?

CHAPTER 11

Well-being

Learning Outcomes

After reading through this chapter, you should be able to:

- List the body systems affected by non-traditional hours of work.
 - Discuss the effects of non-traditional hours of work on reproductive health.
 - Explain why shift workers have higher incidence of gastrointestinal problems than day workers.
-

Well-being

Many studies have found health-related problems associated with non-traditional hours of work. In general, shift workers report a higher number of health complaints than day workers. Shift workers, especially those on rotating shifts, 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 complaints associated with non-traditional hours of work are sleeping problems, fatigue, and irritability. Physical systems affected include gastrointestinal, cardiovascular, and reproductive systems. Apart from specific disorders, the adverse effects of such hours on workers' health also influence their general sense of well-being. Workers regularly 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.

Gastrointestinal problems

Research has shown that shift workers are four to five times more likely to develop a

gastrointestinal disorder, such as peptic ulcers, indigestion, heartburn, flatulence, and constipation. As discussed in the chapter on food, the digestive system is less likely to tolerate some foods at night when it slows down.

In the short term, irregularities in food intake resulting from non-traditional or changing work patterns may lead to digestive problems and gastrointestinal complaints. While the more severe disorders generally develop over time, you can reduce your chances of being affected by them by changing your habits now.

Strategies to reduce long-term gastrointestinal problems include eating at normal meal times as much as possible. As discussed in the food chapter, you should think about your diet, what you eat and drink and when, and how it makes you feel.

It is important to be aware of early warning signs of gastrointestinal disorders, particularly peptic ulcers, which are one of the most serious. They can be treated fairly easily, however. If you think you may have a digestive disorder, consult your doctor.

Cardiovascular disease

Shift workers have a higher risk than day workers of developing cardiovascular diseases such as high blood pressure and heart attack. There is also a strong link between cardiovascular disease and genetics. If any of your biological family members have been diagnosed with cardiovascular disease in the past, you should pay more attention to your own lifestyle and factors such as exercise, diet, and smoking.

Practically speaking:

- It is important to know whether your family history includes cardiovascular disease.
- Regular check-ups of blood pressure and cholesterol can help detect problems early.
- Be aware that smoking is a major additional risk factor for cardiovascular disease.
- Always try to maintain a healthy balanced diet, low in animal (and other saturated) fat.
- Get regular exercise.

Pregnancy and reproductive health in women

There are specific female health problems associated with shift work. Studies have shown that women who work shifts, and night shifts in particular, complain more

frequently of irregular menstrual cycles and more severe menstrual pain. Studies have determined a range of factors that women who work non-traditional hours should be aware of, including:

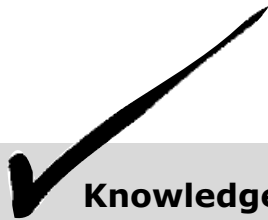
- an association between rotating shift work and how long it takes to become pregnant
- a relationship between an increased risk of spontaneous abortion and some forms of shift work
- a link between pre-term birth and night work
- an association between rotating shift schedules and lower fetal growth and birth weight

For some of these effects, the differences observed between shift workers and non-shift workers are statistically small. The body of evidence on reproductive health is also relatively small compared to other areas of research, such as effects of shift work on sleep. Nevertheless, it is wise to consider work hours as a potential factor in reproductive health.

EXERCISE

General health complaints tend to be higher among shift workers than day workers. Have you experienced any of the following?

- Sleeping problems Yes No
- Irritability Yes No
- Fatigue Yes No
- Frequent colds and flu Yes No
- Headaches Yes No
- Gastrointestinal disorders
(stomach and digestive upsets) Yes No
- Cardiovascular disease Yes No
- Pregnancy or reproductive health issues Yes No



Knowledge Check

- Name four types of health complaints often reported by shift workers.
- What is the most serious gastrointestinal disorder reported by shift workers?
- Name three factors that may contribute to cardiovascular disease.

CHAPTER 12

Physical Exercise

Learning Outcomes

After reading through this chapter, you should be able to:

- Name the effects of physical exercise on sleep.
 - Discuss the effects of physical exercise on general health.
 - Name the benefits of physical exercise.
-

Physical Exercise

Establishing a routine

Many people who work non-traditional hours find it difficult to establish regular exercise routines. On average, female shift workers are 5 to 10 kg heavier than their non-shift working colleagues, while male shift workers are 10 to 12 kg heavier.

Regular, moderate exercise such as walking three to four times a week for 30 to 40 minutes can have benefits for health, regardless of age or working hours. Most people feel better for exercising. Exercise helps to relieve stress, boost your health, strengthen your immune function, and improve your muscle tone and strength. Before you begin an exercise program, talk it over with your doctor, especially if you are over 30 years of age.

Benefits of exercise

Being fit helps:

- reduce the risk of cardiovascular disease, which has a higher incidence in the shift working population
- make you feel good

- increase your stamina
- you get more enjoyment from your leisure time.

Exercise can also improve sleep. Research shows that exercise taken approximately 30 to 180 minutes prior to bed can increase the amount of deep (restorative) sleep that you obtain. One study found that late night exercise before bed even increased the feeling of a good sleep the next morning and reduced the amount of daytime sleepiness.

Potential benefits of exercise may include:

- improved sleep
- increased energy levels
- reduced muscle tension
- reduced stress
- improved muscle tone and strength
- increased aerobic fitness (heart and lungs)
- reduced body fat
- improved bone density
- increased stamina
- improved circulation with better digestion and body functioning.

Benefits associated with different types of exercise

	Walking	Running	Tennis	Dancing	Cycling	Golf	Swimming
Endurance	*****	****	***	****	*****	**	*****
Flexibility	***	***	***	*****	**	***	***
Strength	*	*	*	***	****	*	**

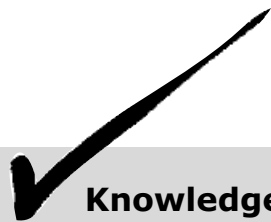
*****Excellent **** Very good *** Good ** Poor * Very poor

(Source: Sydney Hospital, OH&S Unit, 1996)

EXERCISE

What improvements could you make to your current level of physical fitness? Describe the first step you would take to achieve this.

What sort of benefits would you expect from increased fitness?



Knowledge Check

- Explain why you should engage in some form of physical exercise.
- Name three benefits of physical exercise.
- What should you do before you engage in any exercise program, particularly if you are over 30 years of age?
- What effect can physical exercise have on sleep?

CHAPTER 13

Social/Family Life

Learning Outcomes

After reading through this chapter, you should be able to:

- Explain the impacts that working non-traditional hours may have on family and social life.
 - Identify strategies that may help to balance work and family/social life.
 - Name the benefits of balancing work, family, and social time.
-

Social/Family Life

Unsocial hours

A healthy social and domestic life is an important foundation for good physical and mental well-being. Much of the research into shift work and non-traditional work hours shows that working “unsocial” hours creates unique family and social stresses. Generally, social time is arranged around the standard work week (9 a.m. to 5 p.m., Monday to Friday), and evenings and weekends are highly valued for social interaction and participation. Shift workers have been considered relatively “poor” in social time compared to those working traditional hours.

If the hours you work are constantly changing or unpredictable, the opportunities for social interaction are reduced. It may also be difficult for shift workers or those working non-traditional hours to see themselves as part of the community. Shift workers are less likely to be members of clubs, attend meetings, join political organizations, and undertake group activities such as sports.

Balancing family and work can be a source of conflict, regardless of whether

you work traditional or non-traditional hours. Such conflict may make it hard for you to meet your family’s needs or expectations. Conflicts can worsen as the demands of work or family increase.

The conflicts associated with shift work or non-traditional working hours can hold especially true for women, as they generally assume responsibility for managing the house and parenting. However, many men are taking on equal responsibilities and experience similar pressures. In such situations, it is not uncommon for people to place family and social responsibilities before their personal needs. This often causes significant stress for the worker.

When people are not able to meet family and social obligations, they often feel a sense of isolation. This, in turn, can lead to depression, which can significantly affect the health and well-being of the worker.

As such feelings of isolation increase, people may begin to sacrifice sleep time for social or family time. This is a potential safety hazard for employees and employers. If you find yourself in this situation be aware of your elevated fatigue levels, and

the associated risk of either a work- or non-work related accident.

The potential conflicts in trying to balance non-traditional hours of work with social and family life are clear. However, where you can effectively balance the two, working non-traditional hours can prove beneficial. Some of the benefits include:

- *Increased income.* Many jobs that require non-traditional work hours have higher salaries to compensate for the social and family sacrifices.
- *Free time during the day.* This can be particularly useful for paying bills, running errands, and having access to public services that are only available during the traditional 9-to-5 work day.
- *Free child care.* Many parents choose to work non-traditional hours, so that one parent can always be home to look after young children.

Some working arrangements have potential advantages for families and activities outside of the workplace. One example is the 12-hour shift system. Assuming overtime is not worked, 12-hour shifts generally involve long uninterrupted blocks of time away from the workplace. These blocks of free time are often highly valued by employees because they provide the opportunity for a more flexible lifestyle. This may include being able to spend more quality time with family, time to relax and engage in social activities, or time to perform household chores. But it also has a considerable downside. On working days, employees have little time for anything other than work and sleep, which may contribute to difficulties with child care and involvement in daily family life.

EXERCISE

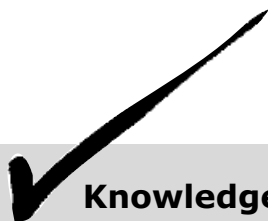
Provide some examples of changes in family and social life that are brought on by non-traditional hours of work.

Coping strategies

There are a number of strategies that workers can use to balance work, social, and family time, and thus avoid feelings of isolation. One of the main strategies is talking about your work schedule with your partner and children. This can be effective in planning ahead to spend time together as a family. Your family will also be more aware of when you are likely to be sleeping after work. As a result, they can arrange to be out of the house when you are sleeping, or be more considerate of the need for quiet. This in turn can provide you with uninterrupted sleep, allowing more energy for social and family interaction during non-work and non-sleep time.

Another strategy is to actively organize family and social events. Make a point of spending time with those close to you, including your family, friends, and colleagues. This may be organized on a routine basis around your work schedule to ensure regular contact.

Joining a recreational organization can also be a useful strategy to minimize feelings of isolation. This can be particularly effective for meeting friends who work a similar schedule to yours. It provides an opportunity to socialize and relax when most other people are working.



Knowledge Check

- Why are some working arrangements referred to as being “unsocial”?
- Describe two strategies that can help in balancing work and family.

CHAPTER 14

Commuting

Learning Outcomes

After reading through this chapter, you should be able to:

- Discuss why commuting can be a hazard for workers.
 - Name strategies that may help reduce the risks associated with commuting.
-

Commuting

Commuting as a hazard

So far, we have focused on fatigue as a workplace hazard. Driving to and from work when fatigued should also be considered a hazard. This is increasing in importance as commute times continue to grow significantly longer.

You will always be at risk of falling asleep behind the wheel if you are driving 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 6 a.m. (biological low point)
- Driving in heavy traffic
- Long stretches of road with low traffic

In many cities, it is not uncommon for people to commute an hour or even two hours to and from work. This situation arises mostly where jobs are scarce, property prices have driven people further out, or where traffic density is high.

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

What can be done?

- Take public transport if it is available. This option is not only safer but is less expensive than running your own vehicle. For many people, the downside is losing the convenience of having your own car, and taking longer to get to and from work. Others argue that the extra travelling time can be well spent reading, relaxing, or just watching the world go by.
- Move closer to work. On first consideration, this may not be a realistic option but some who have done it report considerable benefits. This option is most attractive if you are renting or would be happy to sell your home to move closer to work. In some cases, such a move might be inexpensive and could save you five to ten hours a week of commuting.

- If you live close enough to work, consider riding, running, or walking to work. This is a particularly good strategy if you've been trying to get some regular exercise into your week. Another advantage is that, apart from the cost of shoes or a bike, it's free!
- Car pool. This may be a viable option if you live close to people who work with you. Car pooling allows costs to be shared and gives the driver company during the ride, reducing the monotony of the drive.
- Don't be in a hurry. Many accidents occur when people rush, so plan for delays and don't get stressed out. Taking risks is unnecessary. Enjoy the conversation, music, or scenery during your journey.
- Never use a cell phone while driving. Recent research clearly shows that dividing your attention between driving and talking on a cell phone is dangerous. This is true even of cell phones with a hands-free attachment.

If a call is that important, find a safe place to pull over until the call is finished.

- Take a nap. As detailed in the sleep and napping chapter, naps can be a powerful and efficient strategy for gaining temporary improvements in alertness and performance. Naps are rarely convenient unless they are pre-planned, but you should get off the road if you observe any warning signs of fatigue. Keep your nap short, say 10 to 15 minutes, and be sure to give yourself at least 10 to 15 minutes to shake off your sleep inertia before you drive off. This wake-up time can generally be shortened if the nap is during the day.
- Have some caffeine. As covered in the caffeine chapter, caffeine can provide a boost to alertness, making commuting safer. Caffeine can reduce your ability to get to sleep once you get home, but it is more important to make it there safely.

EXERCISE

Why is commuting a fatigue risk?

Are there any changes you could make to the way you commute that would reduce fatigue-related risks?

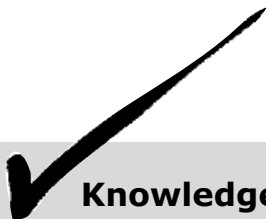
Case study



Marie was 38 years of age, married with one child at home. She was a pilot for almost 12 years, working in an emergency rescue operation. She had been called in to fly a hospital transfer for a critical patient. While the transfer was expected, the exact timing was unknown. Marie had experience with hospital transfers at all times of the day and night, so she was not worried about the timing.

She had been awake all day and had just gone to bed when the hospital rang at 11 p.m., asking her to pick up the patient. She arrived at the hospital after midnight and delivered the patient to the next hospital after 2:00 a.m. By the time she returned and completed her paperwork, it was past 5:00 a.m. Marie was tired but told her work colleagues that she wanted to drive home because she slept better in her own bed. She never made it.

There was no evidence of corrective action being taken by Marie before she hit the stationary semi-trailer. This suggests that Marie was either asleep or otherwise unable to react before impact. The investigation of the accident concluded that she had fallen asleep at the wheel on her way home.



Knowledge Check

- Propose three strategies Marie could have used to get home safely that morning.
- Name two reasons why many workers spend more time in their cars travelling to and from work?

CHAPTER 15

Work Schedule Design

Learning Outcomes

After reading through this chapter, you should be able to:

- Discuss respective responsibilities of employee and employer in the context of a fatigue risk management system.
 - List considerations when designing working time arrangements.
 - Explain the pros and cons of different types of shifts.
-

Work Schedule Design

Shiftwork on the rise

It is estimated that fatigue is responsible for at least as many crashes on the road as alcohol. Despite this, fatigue has only recently begun to receive attention from regulatory bodies. As the workforce increasingly moves towards shift work and alternative working arrangements, the potential for fatigue-related risks increases. This problem is further compounded by the growing use of high-powered machinery where the margin for error is small and the potential for serious injury is high.

Globalization and competition are forcing organizations to adopt new flexible working time arrangements that include 24-hour operations.

There is little doubt that flexible working time arrangements have productivity benefits. Flexible, non-standard working hours are also attractive to employees whose home responsibilities and personal commitments prevent them from working traditional schedules.

Work schedule design as a countermeasure to fatigue

The best-known countermeasure to fatigue is sleep. Sleep opportunity is determined to a great extent by the hours you are not at work. Therefore, fatigue reduction strategies must include work schedule design. It is important to remember that there is no perfect working time arrangement that suits everyone all the time.

When designing working time arrangements, the following should be considered:

- length of shifts
- number of consecutive shifts
- direction of rotation in alternating shifts (forward or backward)
- type of shifts to be worked (nights, afternoons and mornings, days)
- staffing levels, experience, expertise, and opportunities for job rotation
- breaks between and within work periods
- types of tasks being undertaken, (repetitive, boring, exciting, stimulating)
- consulting with all stakeholders about developing new work schedules –

participation by all is likely to foster feelings of ownership of the outcome

- testing changes to the work schedule to determine impacts on the health, safety, and productivity of employees and the company.

Employer and employee responsibilities

Managing fatigue and associated risks are the dual responsibility of employers and employees. As will be seen in the next two sections, various types of shifts have various effects on workers and their lives, and entail some fatigue-related risks. Both employers and employees must be aware of the risks involved with various types of shifts. Examples of the respective responsibilities of employers and employees with regard to fatigue are listed below.

Employer responsibilities

- Appropriate and safe work schedule design that allows for adequate recovery periods during the shift and between shifts.
- Ensuring safe work practices, such as scheduling sensible levels of overtime.
- Appropriate and safe shift duration.
- Assessment, control, and monitoring of fatigue related hazards.
- Development of policies, procedures, and practices to manage risk related to fatigue. For example, where napping is allowed, there should be clear instructions on how to deal with sleep inertia.
- Providing information on workplace hazards, such as fatigue.

Employee responsibilities

- Arriving at work in a fit state to work the expected shift length.
- Reporting all incidents and accidents.
- Maintaining communication with work colleagues, management, and relevant unions.
- Being aware of fatigue and how to counter it in the workplace; for example, by getting adequate rest or sleep prior to work times.

Different types of shifts

There are a number of different types of non-traditional shifts that are worked in industry. Extended shifts are but one alternative to the regular 9-to-5 workday. Workers can also find themselves assigned to shifts starting early morning, in the afternoon, or at night. Work teams can be assigned to these shifts according to slow or fast rotations. There are no hard-and-fast rules about which shift schedule is best. However, as discussed below, some are more attractive than others in terms of the physiological, psychological, and social impact they have upon workers.

Extended shifts

Extended shifts involve either starting a shift earlier or finishing later than the standard 9-to-5 work day. There are many reasons an organization may choose to use extended shifts. In some cases, extended shifts allow for longer hours of production, without the need for night work. Extended shifts are also popular among employees because of the extra money they can earn working longer hours.

Alternatively, the standard 37.5 hour work week can be compressed into three or four days, allowing bigger blocks of time off between shift sequences.

Working the occasional extended shift is unlikely to significantly affect fatigue-related risk. This is especially so if the shift does not affect sleep opportunity (i.e., starting before sunrise, or finishing after “normal” bedtimes). Over longer periods, shifts longer than 10 or 12 hours should be avoided. Even if these shifts do not specifically affect your sleep periods, they will reduce the amount of social time available. Research has shown that employees often sacrifice sleep in exchange for a healthy social life if they do not have sufficient time for both, producing higher fatigue levels. If longer shifts are required, make sure you have adequate recovery time after your shift has ended.

Night shifts

Humans are diurnal, which means we are naturally active during the day and sleep at night. Because of this, it is particularly difficult to completely adjust to night shifts. Night work requires you to be awake when your natural tendency is to be asleep, which disrupts body rhythms and affects the quality and quantity of sleep. Night workers generally get less sleep, and the sleep they do get is of poorer quality than that of day workers.

Unlike most other animals, we are influenced and motivated by what we choose to do and how we choose to do it.

Motivation plays a role in how you manage your work hours. Money has generally been used to compensate employees who work at non-traditional times. Those who work at night, in the evening, and on weekends are traditionally paid at a higher rate than those who work days, Monday to Friday.

Morning shifts and afternoon shifts

Although they may be less problematic than night shifts, morning and afternoon shifts are not without problems. Morning shifts that start before 7 a.m. force workers to cut sleep periods short, which can cause higher levels of fatigue at work. This has been supported by studies that show a higher frequency of accidents at the start of early morning shifts. As with the night shift, the risk of a fatigue-related incident if sleep is cut short over multiple days becomes a significant safety risk.

From a sleep perspective, afternoon shifts are ideal. Workers get home around 11 or 12 p.m., after which very few people would struggle to get 7 to 9 hours sleep. While for many people sleep is easiest after an afternoon shift it is not ideal from a social perspective. The evening meal with family or friends is valued by most as the most important period of social time. This is particularly the case for workers with young children at home. As discussed above, when individuals are deprived of social time by extended shifts, they will often sacrifice sleep to catch up on lost social time on other days. Again, this can cause a vicious cycle with fatigue-related risk.

Shift rotation

Where night work is required, rotating shifts are often employed to share the night shifts among employees, rather than restricting them to one group of employees. Employees working nights typically get less sleep, which can accumulate to cause high fatigue levels particularly over multiple days in a row. Using

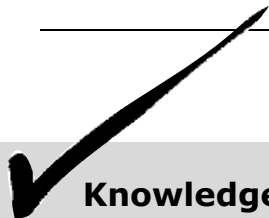
a rotating shift schedule can reduce fatigue-related risk by giving employees fewer night shifts in a row.

Research has found that rapid rotation of shifts (i.e., changing every few days) is preferable to a slow rotation. Similarly, rotating shifts forward (i.e., morning, afternoon, night) is preferable to rotating backward (i.e., night, afternoon, morning).

EXERCISE

Have you noticed any differences between your sleep patterns when you're on night shift and when you're on other shifts?

Do you have any suggestions about how current working hour arrangements could be improved? If yes, what are they?



Knowledge Check

- Name three factors you should consider when designing work schedules.
- Name two employee responsibilities and two employer responsibilities with respect to managing fatigue-related risks.
- Name one negative aspect for each of the following shifts: morning, afternoon, and night.

CHAPTER 16

Jet Lag

Learning Outcomes

After reading through this chapter, you should be able to:

- Describe why long-distance travel causes jet lag.
 - Explain why travelling east can produce more jet lag than travelling west.
 - Provide practical strategies to ease the effects of jet lag.
-

Jet Lag

Jet lag is a condition caused when we travel across time zones, and our normal circadian rhythms are disrupted. It is experienced in the form of physical and psychological discomfort. The symptoms may include excessive sleepiness, feeling depressed, reduced efficiency, and premature awakening. Some people also experience this for the first day or two following the change to daylight saving time, when bed and wakeup time is shifted by an hour. Since daylight saving time only displaces our body clocks by an hour, the effects are likely to be minimal. Likewise, crossing only one or two time zones is not likely to produce substantial effects of jet lag.

The determining factor in the impact and experience of jet lag is how many time zones are crossed. Since time zones change only when travelling in east or west directions, north-south flights produce far less jet lag. For example, flying from Vancouver to Montreal (three hours difference) will produce substantial jet lag. However, a traveller on a north-south flight of the same duration – Vancouver to Los Angeles, for example – will not be affected by jet lag, only fatigue resulting from travelling.

Jet lag and the body clock

The body clock has already been discussed in Chapter 1 in terms of the effects of shift work and trying to sleep during the day. While circadian irregularities are fundamentally the same for international travel, there are two main differences between shift work and jet lag:

- the time zone change associated with jet lag is preceded by the fatiguing activity of travel
- the day/night environment surrounding sleep will have changed (i.e., become earlier or later), which confuses the body clock
- although the new “night” sleep actually occurs during the local nighttime when it is dark, it may still be daytime at home and thus not a normal sleep time

Effects of jet lag

It is easier to move our sleep and waking time forward rather than backward, making the day longer rather than shorter. Eastbound travel shortens the day or

night, so travelling west produces less jet lag.

You are more likely to be effected by jet lag by flying east because:

- depending on the distance travelled, you lose several hours of sleep time
- your body clock will only partially reset when changing time zones. The body clock takes an average of one day to adjust for each time zone crossed. A difference of four hours between home and local time may take you up to four days to adjust.

The impact and experience of jet lag varies dramatically between individuals. How you are affected depends on many factors, including:

- direction of travel (travelling west is easier)
- physical fitness (better fitness improves circadian adjustment)
- age (the effects of jet lag increase with age)

One of the most common symptoms of jet lag is sleep disruption. This is likely to include:

- difficulty getting to sleep at regular bedtime
- waking up during the night and not being able to get back to sleep
- fighting sleep during the day

This level of sleep disruption is likely to lead to insufficient sleep quality and quantity, and subsequent fatigue.

In 1994, a survey was conducted of international flight attendants in New Zealand. Almost all flight attendants surveyed said that despite being accustomed to international travel, they regularly suffered from jet lag. One of the particular symptoms reported by the flight attendants following a long flight was a sensation of confusion or “fuzziness.” For example, some flight crew members reported checking to make sure their hotel rooms were locked two or three times.

Easing the effects of jet lag

The most obvious technique for minimizing the effects of jet lag is maximizing sleep quality and quantity. Methods vary between individuals. Three useful tips are recommended:

- set up your sleeping environment to minimize light and noise disturbance, and set the temperature to between 18 and 24°C
- drink lots of water
- keep physically fit

Resetting the body clock is more easily accomplished gradually than all at once. Depending on the direction you have travelled, and how long you plan on staying at the destination, one option is to start adjusting sleep and eating times before you leave. Even shifting your bed and meal times by an hour or two can jumpstart the change in your body clock in the right direction.

Ensure you are well rested before the flight. Many travellers are tempted to stay

up late, and get very little sleep before a flight so they will be able to sleep better upon arrival at their location. In reality, people who are already in sleep debt before a flight will experience more symptoms than those who are well rested. Other than sleep, one of the easiest and most practical techniques to ease the effects of jet lag is to drink plenty of water. Dehydration and the dry air aboard aircraft can cause headaches and nasal irritation, which exacerbate the symptoms associated with jet lag. Drink lots of water before, during, and after the flight. Some tips to remember are:

- take a large bottle of water with you on the flight – water is better than coffee, tea, soft drinks, and fruit juices
- avoid coffee and alcohol, which are diuretics and cause dehydration

- avoid overeating (especially salty foods)
- avoid motion sickness drugs when possible (they are depressants).

Regular exercise also has a large impact on the severity of jet lag. People who are unfit tend to experience longer periods of jet lag.

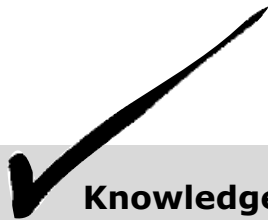
Regardless of your actual fitness, being forced to remain immobile is one of the most taxing aspects of long flights. Move around and exercise wherever possible, throughout the flight or during stopovers. Don't worry what other people think. If you look like you're enjoying yourself, they may get up and join in.

EXERCISE

Have you ever experienced jet lag? Describe your experience.

What techniques do you use to cope with jet lag?

Based on what you have just read about jet lag, are there any changes you should think about making? If so, what?



Knowledge Check

- Explain what causes jet lag.
- Identify two factors that can affect the experience of jet lag.
- Explain two ways to ease the negative effects of jet lag.

Suggested Readings

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