



Occupational Health
Clinics for Ontario
Workers Inc.



Shiftwork: Health Effects & Solutions

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What is shiftwork?

Work that is scheduled outside “normal” daylight hours (i.e. 9 am to 5 pm) is called “Shiftwork”. Shiftwork schedules can vary from one workplace to another. Workers may rotate through shifts or remain on a single shift (i.e. permanent nights).

Where does shiftwork occur?

Shiftwork allows for continuous services and production, 24 hours per day. Examples of such around-the-clock work include health care, customs and immigration, electrical utilities, and transportation – to name a few. Many manufacturing and seasonal workplaces also work 24 hours a day to maximize efficiency and productivity.

Work hours

The modern expectation of a regular work schedule is a 40-hr workweek, 8-hrs a day, Monday-through-Friday. With the introduction of shiftwork, a 5-day workweek may change to a 4 or 3-day workweek depending on the length of a single shift.

Studies have examined the differences between various workweek schedules. When comparing a 5-day/8-hr work schedule to a 4-day/10-hr work schedule, most studies found that workers were more tired at the end of a 10-hr shift. Studies also found workers to be more fatigued following a 12-hr shift when compared to an 8-hr shift.

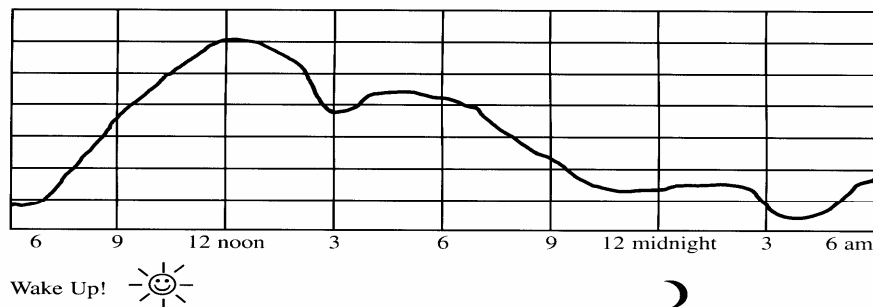
Night shifts can also be tiring. Mental and physical effects of night work have been shown to affect a worker's concentration, alertness, motivation, and memory. This can slow a worker's reaction time and increase the risk of accident. Unfortunately, night work cannot be avoided in some occupations.

Why does shiftwork affect us?

Circadian Rhythms

Our body's "biological" clocks help maintain complex internal functions throughout a 24-hr day. A number of physiological functions show distinct rhythmic changes (called Circadian Rhythms) in the course of a 24-hour period. For example, your heart rate and body temperature change throughout a 24-hour period and are typically lowest around 4:00 am and peak in mid-afternoon. The graph below shows how your body temperature may rise and fall in a 24-hour period.

For example, let us look at body Temperature.



The body's various Circadian Rhythms are "reset" every 24 hours by environmental cues, such as light and darkness. For example, body temperature increases with daylight and decreases at night (see graph).

The human body is meant to be active during daytime hours, while during nighttime hours it is meant to sleep

which allows it to recover and replace energy. Working at night and sleeping during the day is opposite to the body's "biological" clocks and what the body naturally wants to do. This may make sleeping difficult; it may also mean that the body cannot recover as quickly from physical and mental exertions/demands.

Mental & Physical Performance

Circadian rhythms have been found to be associated with changes in mental and physical performance. Circadian rhythms may partly explain why job performance can vary over a 24-hour period, with a low point occurring very late at night or very early in the morning.

Some basic human physiological functions are depressed during the night, which may suggest that people are not well suited for night work.

Performance on the night shift can be affected by:

- The type of shift schedule
- The nature of the task(s)
- The performance demands of the task
- Adjustments to tasks and shifts
- Individual differences

Shiftwork & women's health

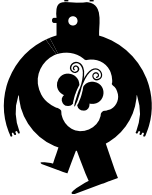
One study found the risk of breast cancer to be 60 percent higher in women who worked the night shift (beginning work after 7:00 pm and finishing before 9:00 am) compared to those who did not. The improper production of the hormone melatonin is thought to be associated with this increased breast cancer risk. Melatonin is a hormone primarily produced during

nighttime sleep and it has an affect of regulating estrogen and also serves as an antioxidant.


Irregular menstrual cycles and menstrual pains were reported from women in a number of industries who worked night shifts.


Higher risk of miscarriage, lower rates of pregnancies and deliveries, spontaneous abortion, delayed fetal development, increased risk of pre-term delivery and low birth weight have also been observed in some studies.

Health & social effects of shiftwork & workplace recommendations

Digestive disorders	Recommendations
<ul style="list-style-type: none"> • Shift workers tend to have a poorer diet and reduced access to wholesome foods • Increased snacking • Increase in ulcers, indigestion, and heartburn • Frequent stomach aches • Constipation, diarrhea, loss of appetite 	<ul style="list-style-type: none"> ▪ Provide exercise facilities on site ▪ Provide a 24-hour cafeteria where night workers can obtain a hot, nutritious meal ▪ Cut back on highly salted foods ▪ Reduce foods high in fat ▪ Limit caffeine and alcohol consumption ▪ Schedule regular meals ▪ Try to avoid fast food and vending machines by bringing a bagged meal to work ▪ Try to meet Canada food guide nutrition requirements ▪ Try to incorporate regular exercise into your schedule

Fatigue	Recommendations
<ul style="list-style-type: none"> • Disturbance of circadian rhythms affect (these affects can result in an increased risk of accidents): <ul style="list-style-type: none"> - Concentration - Reaction time - Motivation - Memory • Shiftwork can lead to chronic fatigue and insomnia • Shiftwork can lead to disruption of sleep patterns 	<ul style="list-style-type: none"> • Schedule the most demanding work early in the shift when workers are most alert • Schedule shorter, more frequent breaks throughout the shift • Do not schedule more than 5 to 7 shifts in a row • The workplace should be brightly lit • Night work should be reduced as much as possible • Avoid excessive overtime • Workers need training about the steps they can take to reduce the negative effects of shift work

Stress	Recommendations
<ul style="list-style-type: none"> • May result from lack of socializing with family and friends • Hard to plan for family responsibilities and take part in regular of-job activities • Rotation makes it hard to form routines • Leads to anxiety, high blood pressure and heart disease • Decreases job satisfaction and motivation 	<ul style="list-style-type: none"> • Plans shifts in advance • Keep schedules flexible by allowing workers to trade shifts • Schedule time off over weekends • Provide workshops and information sessions on stress management • Make sure demands on workers are reasonable • Maximize worker autonomy • Use relaxation techniques such as deep and slow breathing • Try to get adequate sleep and exercise • Plan days off in advance if possible • Try to prioritize tasks and tackle one at a time


Difficulty Maintaining Hobbies, Leisure Activities, Etc.	Recommendations
<ul style="list-style-type: none"> • Lack of time to spend with friends who do not work shifts • Can't participate in sports groups or clubs because of varying shift schedule • Don't have the energy or free time to participate in hobbies 	<ul style="list-style-type: none"> • Organize groups within workplace for various interests (eg. Toastmasters, support groups, etc.) • Sponsor employee sports teams and leagues (eg. Company hockey league)

Sleep	Recommendations
<ul style="list-style-type: none"> • Shiftwork can lead to chronic fatigue and insomnia • Shiftwork can lead to disruption of sleep patterns • Sleep loss can lead to chronic fatigue, persistent anxiety or depression, substance abuse, and decreased alertness 	<ul style="list-style-type: none"> • Rotate shifts forward (D-A-N) • Starting the shift at 7:00 am may be less disruptive than starting the shift at 6:00 am • Provide at least 48 hours between shift changes to allow the body to adjust • Take advantage of individual differences • Only work one or two



- nights in a row
- Avoid split shifts
- Avoid excessive 12 hour shifts
- For workers who medically can't work shiftwork, provide day employment
- Increase "ambient" light in work area
- Have a room with cots for workers to rest before and after a shift
- Identify and treat workers who have sleep disorders
- Evaluate shift schedule design such as length of breaks, start and finish times, etc.
- Avoid exercise, caffeine and alcohol before going to sleep
- Inform family and friends of schedule
- Make bedroom as cool and dark as possible
- Wear eye masks and ear plugs while

	sleeping
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Difficulty Meeting Parental Responsibilities	Recommendations
<ul style="list-style-type: none"> • Difficulty finding child care • Not enough time to spend with children • Children miss out on leisure activities like clubs and sports because parent's can't take them • Trouble helping with homework, meeting teachers, chaperoning school trips, etc. 	<ul style="list-style-type: none"> • Provide an on site day care facility • Offer 24 hour day care solutions • Offer activities for employee's children such as sponsoring sports teams, etc. • Provide transportation to events • Use a calendar to schedule events and activities • Plan activities around your time off

Tensions and Problems Within Marriage	Recommendations
<ul style="list-style-type: none"> • Not enough time to spend with spouse • Tensions due to sexual problems, child care related problems • Increase in arguments, and trouble with communication • Higher divorce rates 	<ul style="list-style-type: none"> • Provide workshops on communication and conflict resolution • Plan to have at least one meal together each day • Keep in touch daily • Set aside time for just you and your spouse

compared to day workers	(no kids, tv, etc.) <ul style="list-style-type: none"> • Establish good communication skills
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Depression	Recommendations
<ul style="list-style-type: none"> • Workers in high demand/low autonomy jobs have higher rates of stress which can lead to depression 	<ul style="list-style-type: none"> • Include a mental health component to employee assistance programs • Consider offering facilities for social activities such as recreation and staff social gatherings

Tips for workers who must work shifts

Dietary and Eating Patterns

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| <ul style="list-style-type: none">• Afternoon workers should have their meal in the middle of the day instead of the middle of their work shift• Night workers should eat lightly throughout the shift and have a moderate breakfast• Relax during meals and allow time for digestion• Drink lots of water• Cut back on highly salted foods• Reduce foods high in fat | <ul style="list-style-type: none">• Maintain regular eating patterns with well balanced meals (avoid junk food & limit fat intake)• Eat the usual balance of vegetables, fruit, lean meat, poultry, fish, dairy products, grains, and bread• Avoid excessive use of antacids, tranquilizers and sleeping pills• Minimize the intake of caffeine and alcohol• Avoid fast food and vending machines |
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Sleep

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| <ul style="list-style-type: none">• Make sure that family and friends are aware of and considerate of the worker's sleep hours and needs• Ensure you have a comfortable, quiet place to sleep during the day• Air conditioning, telephone answering machine, foam ear plugs and good blinds are examples of devices that may improve the worker's sleep• Make time for quiet relaxation before bed to facilitate better sleep (reading, breathing exercises, muscle relaxation techniques, etc.) | <ul style="list-style-type: none">• Sleep on a set schedule to help establish a routine and to make sleep during the day easier• Avoid strenuous exercise before sleeping because your body's metabolism will remain elevated for several hours and this makes sleeping difficult• If failing to fall asleep after one hour, read a book or listen to quiet music• If sleep still does not come, reschedule sleeping hours for later in the day |
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Social Activities

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| <ul style="list-style-type: none">• Schedule at least one daily meal with the family; this helps to keep communication channels open and promotes a good eating habit• Socialize with other shift workers and their families; this helps to minimize the disruption that shift work can have on your social life• Keep in touch with spouse and children daily• Establish good communication skills• Set time aside for just you and your spouse | <ul style="list-style-type: none">• Carefully plan family activities; family ties are a precious commodity (plan days off in advance if possible)• Pay close attention to physical fitness; a regular exercise program helps the body adjust to the negative effects of shiftwork and it can also help improve the quality and quantity of sleep• Practice stress reduction• Use a calendar to schedule events• Try to prioritize tasks and tackle one at a time |
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