Working the night shift : preparation, survival and recovery

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A guide for junior doctors

Prepared on behalf of a multidisciplinary Working Group
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Introduction

Working at night is an essential part of providing a comprehensive 24-hour service to patients in the NHS. However, night work requires doctors to remain awake and alert when physiologically programmed to be asleep. Changes to working patterns as a result of implementing the European Working Time Directive (EWTD) also mean that most junior doctors now work full 11- to 13-hour night shifts, rather than on-call, as an integral part of their rotas. On these occasions, junior doctors can expect to stay awake and working throughout the entire night.

■ Night shifts require doctors to be alert when their bodies tell them to sleep.

The Working Time Regulations were introduced by the government as health and safety legislation and they are now enshrined in UK law. This Guide does not deal with the appropriateness of this decision. Rather, it is designed to provide useful advice to doctors working at night. It does not address the legal responsibilities of the employer in these matters, although good employers will support their medical staff and provide adequate facilities for doctors to be able to apply these guidelines.

Working at night, regardless of the shift pattern, can have consequences for both patient and personal safety, as it increases the risk of making poor decisions or even mistakes. It is therefore important to learn how to prepare for night shifts and to manage your sleep, so that you minimise risk to yourself and to your patients.

Some of the suggestions in this Guide may be considered obvious but have been included for completeness. Others, such as the advice on napping, may be less obvious. However, they are all based on research, which is consistent and clear.

The aim of the Guide is to provide simple advice on how to prepare to work at night. It includes guidance on managing sleep at home, staying as alert and refreshed as possible while on duty, and how to recover from working nights in the most efficient and effective way. Although the Guide has been written with those working night shifts in mind, much of the advice is applicable to those few junior doctors who are still working extended hours on an on-call rota. Indeed, on-call rotas carry the risk of even more severe sleep deprivation than night shift working, particularly if a junior doctor is on-call for more than one night.

The working group that prepared this Guide also agreed that junior doctors should not be rostered to work more than four nights in succession; detailed recommendations will appear in a second report.

Sleep and shift work

Many people are expected to work at night, and most do so relatively successfully. However, all have to cope with the fact that working at night inevitably causes sleep deprivation and fatigue. This is because the human body is designed to sleep at night.

Our bodies are controlled by an internal daily body clock, situated in the suprachiasmatic nucleus (SCN) in the hypothalamus. The SCN spontaneously generates the circadian rhythms that regulate many physiological and behavioural processes in our bodies, such as temperature control, hormone production, alertness and sleep.

These circadian rhythms run over a period of approximately 24 hours and are strongly influenced by the natural cycles of light and dark. At night, many of the processes that are active during the day start to slow down as our bodies prepare for sleep. The circadian pacemaker also stimulates night-time release of the 'sleep hormone' melatonin from the

pineal gland, which has the effect of lowering alertness and increasing the desire for sleep.

Working at night involves fighting against these rhythms, and trying to be alert when you are programmed to be asleep. In addition, when a night shift finishes and you go home to try and sleep, the cues from your internal body clock, daylight, and society in general, all tell you that it is the time to be awake and active. Your sleep is likely to be fragmented and brief, no matter how tired you may feel. Crucially, you will not make up all of the hours of sleep that you have lost during the previous night.

■ Working at night generates an increasing sleep debt.

Although individuals vary, most people need at least one hour of sleep for every two hours awake, or approximately eight to nine hours of sleep each night. If you manage less than this (as occurs in shift workers, who have sleep of poorer quality and shorter duration than non-shift workers[1]) then you will incur a 'sleep debt'. This sleep debt is cumulative, so the more sleep you miss, the greater in debt you will be. The only way to repay the debt is by catching up on the lost sleep, and the sleep debt must be repaid soon after it is incurred. A fundamental aspect of being a successful night worker is learning how to manage your daytime sleep (and fatigue at night) so that you keep your sleep debt to a minimum.

Night work and safety

Fatigue has long been known to reduce performance. If you work at night you are trying to function when your alertness, vigilance and cognitive reasoning are at their lowest. This applies to doctors just as much as it does to other night workers.

In fact, there is now clear international evidence that junior doctors who are sleep-deprived have more attentional failures and make more clinical errors than when they are able to gain enough sleep.[2–6] Furthermore, 20–25 hours without sleep – as might be experienced by a doctor who has worked just one night and was without rest during the day leading into the shift – reduces psychomotor performance to the level of someone with a blood alcohol concentration of 0.10%.[7–10] This is greater than the current maximum level for legal driving in the UK (0.08%).

■ Sleep-deprived junior doctors have more attentional failures, and make more clinical errors and incorrect diagnoses.

Evidence from the USA shows that doctors who work extended shifts of 24 hours or longer more than double their risk of being involved in a road traffic accident on their journey home compared with those working shorter shifts.[11] The likelihood of crashing on the way home is also greater following a night shift than after other shifts.[12,13] Moreover, when you are tired you become less able to judge your own performance accurately, so you may not even realise that you are making mistakes.[14]

■ Junior doctors have more road traffic accidents when tired.

Exhaustion also impairs recent learning[15,16] and has been shown to decrease the ability of junior doctors to make correct diagnoses,[3] with important implications for both training and service.

■ Exhaustion erases recent learning.

Preparing for the night shift

The combination of fatigue and a poorly adapted body clock makes working during the night uncomfortable and increases errors. For the types of rotas that junior doctors follow, preparing to work overnight is all about making sure you are as rested and refreshed as possible before coming on duty.

Successful sleep at home

An essential first step is to manage your normal sleep when at home. Whether you are on night duty or not, make sure that your bedroom is a suitable place in which to sleep.

■ **Build a successful normal sleep routine.**

Most importantly, try to associate your bedroom with sleeping. Avoid watching the television, using a computer, or playing videogames in the bedroom. Whenever you try to sleep at home, the bedroom is where you should go, rather than curling up on the sofa or in a chair. You will sleep best lying down in bed.

Although there may be matters that demand your attention, medical or otherwise, when you are trying to fall asleep, it is helpful to try consciously not to worry. Try not to let your mind dwell on the upcoming or previous shift. If possible, you should actively put worrying concerns out of your mind and concentrate on pleasurable thoughts, or focus your mind on an innocuous but absorbing activity such as mentally walking a route through a favourite park.

If you cannot sleep after having been in bed for 30 minutes or so, get up and go to another room and do something to distract yourself. Try

some relaxation exercises, listen to some soothing music, or perhaps take a bath. When you feel tired again, get back into bed and try to sleep once more. Do not lie in bed stressed about the fact that you cannot sleep – this will not help.

It is important to try and build positive associations between being in bed and sleeping. If you can do this, your ability to fall asleep once you do get into bed will be improved.

Getting plenty of sleep before your first night shift

Once you have established a successful sleep routine, make the most of it. Many people fail to get enough sleep, both before working the first night shift and in general, so try to make sure that you are as well rested as you can be before you go on duty. Any sleep that you have missed before you start is unlikely to be made up during the time that you are working at night. The greater your sleep debt, the more fatigued you will be, and the worse you are going to feel.

■ Get extra sleep before working the first night shift.

Remember, if you have not slept or rested at all since waking the previous day, by the time you come off your first night shift you may well have been awake for 24 hours or more. To avoid this, try to have a long lie in, ideally until at least midday, on the morning before you start. Some people also stay up later the previous evening in order to begin to adapt their body clock and to make lying in easier. However, keep in mind that a late night out with alcohol consumption will make you sleep poorly and will tend to increase your sleep debt and fatigue the next day.

Taking an afternoon sleep

In addition to lying in late, taking an afternoon sleep is an extremely important way of making sure you are well rested before you start a night shift. A pre-shift two-hour sleep will reduce the build-up of fatigue, and make it much easier to remain awake and functional during the low point in the middle of the night.

Take your sleep in the afternoon rather than just before coming on duty, because early evening is one of the times when your body is most alert, and so sleep will be more difficult. By resting in the late afternoon, you can take advantage of the fatigue that you have already built up to help you sleep then and to maximise your alertness through the night. Ideally, this rest should last at least two hours, to incorporate a beneficial period of deep sleep.

■ Take a two-hour afternoon sleep before coming on duty.

Can you adapt to night work?

Body clock adjustment is very unlikely to occur in junior doctors working rotating shifts that last only a matter of days. Given this, perhaps the most important thing to remember is that you need to take an active approach to managing sleep and fatigue. This is particularly true for the lifestyles and types of rota that junior doctors are likely to follow. You *will* get tired, and you will become sleep-deprived, especially if you work several consecutive night shifts in a row. Inevitably, this will affect both how you feel and how you perform.

However, by preparing yourself sufficiently in advance, mentally and physically, you can reduce the negative impact of night shifts on your well-being. This will not only make the experience less painful (or even enjoyable), but also safer for you, your patients and those around you.

Surviving the night shift

Actually staying awake when you are in the hospital will depend very much on how much work you have to do. However, your levels of alertness and vigilance will be much lower than normal, and so maintaining your performance at a safe level should be your priority.

Maintaining your alertness and vigilance while on duty

The circadian nadir is in the middle of the night, between about 3 am and 6 am. This is when the body is programmed to be at its least active. During this time, workload in the hospital also tends to be low. However, low activity, especially at this time, may make it more difficult to stay awake, and so this middle period of the night shift may well be when you feel most inclined to sleep.

Napping while on duty

Developing a napping routine is an indispensable part of working safely overnight. A 'prophylactic' afternoon sleep before you come on duty will help keep fatigue at bay, but taking a nap during the night is essential for maintaining vigilance and alertness. Naps are powerful means of staying refreshed,[17,18] both before and while on duty, and even naps as short as 20 to 45 minutes have been shown to provide positive benefits to shift workers.[19]

■ Take 20- to 45-minute naps to counteract fatigue.

The New Deal, agreed in anticipation of the Working Time Regulations (the enactment of the EWTD in the UK), states that junior doctors working full shifts should receive natural breaks of at least 30 continuous

minutes after approximately four hours of work. Taking a brief nap during these times will refresh you more than simply taking a break, and should avoid the groggy after-effects or 'sleep inertia' that you may suffer if you rest for longer.

Your night shift naps should last no longer than 45 minutes. This is because there are different stages of sleep, which follow in cycles of 90- to 100-minutes' duration. Each stage varies in the intensity and depth of the sleep achieved. By being careful about how long you nap, it is possible to avoid having to wake up during a period of deep sleep, when the general effort of waking and any associated sleep inertia will be much greater. This is important for a junior doctor who may need to be fully alert without warning.

Set an alarm before you nap to make sure you do not fall into a prolonged deep sleep, and to give yourself enough time to recover fully from your snooze. Ask your night coordinator to give you a 30-minute break from non-emergency bleeps, and possibly provide your wake-up call.

Naps are most effective if taken early, before you feel really tired, and should be taken in surroundings that are quiet and dark. Try to lie down, or have your legs supported. It will be much harder to rest if you cannot at least recline.[20]

If you are working a series of consecutive night shifts, try to avoid prolonged sleeping (rather than just napping) during the night. The more sleep that you get at night, the harder it will be to do so during the day, when you have the opportunity for longer cycles of potentially unbroken and beneficial deep sleep. If you have periods of inactivity during a night shift you should offer help to other members of the Hospital at Night team; repeated inactivity should lead to a review of rostering arrangements.

Bright light

Plan to maximise your exposure to light throughout the night shift. Exposure to light during the night, including indoor light from a bright desk lamp or normal overhead lights, has an alerting effect on the brain and improves performance.[21]

■ Your alertness will be improved by exposure to bright light during the night.

Apart from when napping, try to make your medical area brightly illuminated, especially when working. Importantly, intermittent light exposure is nearly as effective as continual exposure.[22] Even if you can only be exposed to indoor light from time to time through the shift, it will still be beneficial.

Eating at night

Eat and drink properly so that you do not start your night shift hungry or dehydrated. It is very easy when working at night to miss proper meals, because circadian patterns affect appetite, and canteen facilities are often limited or closed. Ideally, you should try to maintain a similar eating pattern to the one you follow during the day. There is some evidence that a high-protein low-carbohydrate meal is best for maintaining night shift alertness.[23]

■ Do not miss proper meals when working at night.

Eat a full meal before you come on duty, have 'lunch' halfway through your shift, and finally enjoy an easily digestible meal before trying to sleep when you are at home, if you feel hungry then. If your hospital does not have adequate facilities for providing good meals at night, then bring in your own food.

Caffeine

Some junior doctors use caffeine as a stimulant to help them to stay awake. Despite its widespread use, caffeine does have side effects and it is improper to encourage its misuse. Depending on your tolerance, too much caffeine can cause gastrointestinal upsets and muscle shakes. In addition, it should not be taken at least four hours before the end of a night shift, since its long-lasting effects may cause you to find it harder to sleep once you get home.

■ **Use caffeine cautiously, if at all, as it is a stimulant.**

If you do decide to use caffeine to aid your alertness, it may be best to take it in small amounts.[24] The effects of a cup of coffee can start being felt within as little as 20 minutes, and may last for up to three or four hours, depending on the individual and the brew of coffee. Likewise, caffeine-containing energy drinks may help you to stay alert. By taking an appropriate small dose of caffeine just before you nap, its effects should start to be felt about the time that you return to duty. The caffeine may also help to overcome the transient sleep inertia you may feel after the nap.

The caffeine content of some common drinks and food.[25]

Drink/food	Caffeine content (mg)
Average cup of instant coffee (200 ml)	75
Average cup of brewed coffee (200 ml)	100–250
Average cup of tea (200 ml)	50
Herbal tea	0
Decaffeinated tea or coffee	3–5
Hot chocolate	5–7
Horlicks-type drinks	0
Coca-Cola (330 ml can)	32
Diet Coke (330 ml can)	42
Pepsi (330 ml can)	35
Diet Pepsi (330 ml can)	34
Red Bull (250 ml can)	80
Bar of plain chocolate (50 g)	up to 50
Bar of milk chocolate (50 g)	up to 25
Pro Plus caffeine tablets	50 mg per tablet
Anadin Extra	45 mg per tablet
LemSip Max Sinus capsules	50 mg per 2-capsule dose

Recovering from the night shift

How you behave at the end of a night shift should depend very much on whether or not it is your last shift. If you are working further night shifts, then it is important to focus on keeping your sleep debt under control. However, if your night duties have finished you should aim to repay any sleep debt you have built up, before getting back to your normal daytime life.

Getting home from work

Once your shift is over, it is likely that you first thought will be to get out of the hospital and go home. If you are planning to drive a long distance, however, then just consider whether this is wise. Exhausted drivers kill both themselves and others, and driving whilst over-tired is effectively no different to driving whilst over the legal limit for blood alcohol concentration.[7–9] If you have worked overnight you will have slowed reflexes and poor judgement, or you may fall asleep at the wheel. Once you finish your shift you are likely to switch off very quickly and the longer your journey home, the greater the risk that you will cause an accident.[26,27]

■ If planning a long drive home, consider the risks.

When you are tired, your ability to judge your own performance is impaired, so you may well think that you are better able to cope with driving than you actually are. In fact, the more tired you are, the less able you are to accurately assess your own performance.[14] Furthermore, you cannot judge the exact point when you will fall asleep even though you can anticipate broadly when it is going to happen – it is time to pull off the road if you are fighting to keep your eyes open. Despite the

inconvenience and cost, it may be better to either use public transport to ensure that you are delivered home safely, or to use sleeping accommodation which must be provided free of charge by your employer. This is a potentially important issue for specialist registrars who are rotated to posts that are distant from their home.

Working further night shifts

If you have to work more nights and are not driving, wear dark sunglasses on your way home to minimise your exposure to sunlight.[21] Bright light is one of the key triggers for resetting your internal body clock back to its normal daytime schedule, and it should be avoided if you need to sleep.

As soon as you get home the best thing to do is to try and sleep. Your aim should be to recuperate as fully as possible before your next shift, and to keep your body on a night work setting.

Before you go to bed

When you get home, don't get distracted by other things that cause you to delay going to bed. The longer that you delay, the more awake you are likely to become and the harder you will find it to sleep, no matter how tired you may be. Shift workers who go to bed at 10 am tend to sleep for at least four hours, whereas those who retire at midday sleep for an hour less.[28]

■ On getting home, try to sleep immediately.

If you are hungry or thirsty, however, have something to eat and drink. You don't want to be awoken from precious daytime sleep by feelings of hunger or thirst.

Avoid alcohol, because although its relaxing effects may help you to fall asleep initially, the quality of your sleep will be diminished and you may well suffer from insomnia. Alcohol disturbs the stages of deep sleep. When you wake up you will not feel refreshed and, more significantly, your sleep debt will not have been greatly reduced.

If you are a smoker then it is also a good idea to avoid smoking before you try to sleep. Nicotine is a stimulant and it will make it more difficult for you to sleep. Avoid any activities that may increase your alertness until the hours before your next shift.

Sleeping in the daytime

Your bedroom should be quiet and dark, and not too hot. Noise, bright sunlight and temperature are common complaints of people unable to sleep during the day. Make sure you have good blackout curtains that filter out all external light, or use eyeshades. Wear expandable foam earplugs if necessary to block out daytime noises like traffic and building work. Keep the room cool; an electric fan will not only circulate air, but can also provide a neutral and constant background noise. A soothing CD playing at very low volume may be helpful.

■ Develop a routine for sleeping during the daytime.

Switch off your mobile phone, disconnect any landline or switch on an answerphone. Consider putting a notice on your front door to warn others that a shift worker is trying to sleep, but only if it is safe to do so.

Sleeping tablets are not recommended to keep you asleep after a night shift, because of their potential hangover and addictive effects. Consult your GP if you feel that they are absolutely necessary, but certainly do not self-prescribe. Sleeping in the daytime *is* more difficult than sleeping

at night, but many people manage it successfully. It is far better to review your sleep routine and sleeping arrangements than to rely on sedation.

■ **Keep your sleep debt to a minimum.**

If you wake up earlier than intended, just relax and you may fall asleep again. Otherwise, get up and take it easy. Remember to have at least a two-hour sleep before going back on duty, and make sure you are fed and watered properly. The most important thing is to try and keep your sleep debt to a minimum, so the more daytime sleep that you get, the better you are going to feel. Reserve your recreation and stimulation for the early evening, and only expose yourself to bright light once you are ready to go to work.

Recovering after your final night shift

If this is your final night shift, remember that the more consecutive nights you have worked, the greater your cumulative sleep debt is likely to be. Reducing the build-up of sleep debt and repaying this sleep debt promptly will help you to recover sooner, and may also have longer-term health benefits.

Have a sleep when you get home from work to get over some of your initial fatigue. When you wake up, get out of bed and do normal daytime things. Make sure you receive some exposure to daylight, but go to bed early that night and use this time to start really catching up on sleep. If you can lie in the next morning then do so, but then get up and get on with your life. An early night on the following evening will help you to catch up on more missed sleep, but the sooner you get back into your daily 'daytime' routine, the sooner your sleep patterns will return to normal.

The way ahead

Few junior doctors look forward to working overnight. Nevertheless, because healthcare is a 24-hour service in almost every specialty, a proportion of junior doctors will always need to care for patients at night, and the experience can be very rewarding. Whether these hours are worked as night shifts or on-call, the risks associated with working during the biological night remain, and need to be approached systematically.

Each person is different, and so finding the best combination of techniques for you may require some time. We hope the advice in this Guide will make the challenge of these duties not only a bit easier to tolerate, but also safer for both hospital patients and you, their doctor.

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Maximising your ability to cope with night shifts – KEY POINTS

FACTS

- Night shifts require doctors to be alert when their bodies tell them to sleep.
- Working at night generates an increasing sleep debt.
- Sleep-deprived junior doctors have more attentional failures, and make more clinical errors and incorrect diagnoses.
- Junior doctors have more road traffic accidents when tired.
- Exhaustion erases recent learning.

KEY ADVICE

Preparing for the night shift

- Build a successful normal sleep routine.
- Get extra sleep before working the first night shift.
- Take a two-hour afternoon sleep before coming on duty.

Surviving the night shift

- Take 20- to 45-minute naps to counteract fatigue.
- Your alertness will be improved by exposure to bright light during the night.
- Do not miss proper meals when working at night.
- Use caffeine cautiously, if at all, as it is a stimulant.

Recovering from the night shift

- If planning a long drive home, consider the risks.
- On getting home, try to sleep immediately.
- Develop a routine for sleeping during the daytime.
- Keep your sleep debt to a minimum.