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Fifteen-minute consultation on problems in the healthy paediatrician: managing the effects of shift work on your health

Michael Farquhar

Correspondence to
Dr Michael Farquhar, Department of Children's Sleep Medicine, Evelina London Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, London SE1 7EH, UK; Michael.Farquhar@gstt.nhs.uk; @DrMikeFarquhar

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"You're not healthy unless your sleep is healthy"
Professor William Dement, Stanford University, one of the founders of modern sleep medicine

ABSTRACT

Sleep is fundamental to good health. Healthcare professionals receive little teaching on the importance of sleep, particularly with respect to their own health when working night shifts. Knowledge of basic sleep physiology, together with simple strategies to improve core sleep and the ability to cope with working nights, can result in significant improvements both for healthcare professionals and for the patients they care for.

INTRODUCTION

Sleep is an essential active process.

We spend about a third of our lives asleep. We cannot survive without sleep. Getting enough good quality sleep underpins every aspect of physical and mental health. Sleep deprivation rapidly takes its toll on even the healthiest and most robust of people and can lead to an inability to function effectively.

Moderate sleep deprivation—equivalent to being awake for 16–18 hours—can have the same effect on reaction time as being at the legal blood alcohol limit for safe driving.

Up to 20% of road traffic accidents are thought to be fatigue related, and are significantly more likely to lead to serious harm or death.[1]

Symptoms related to poor sleep are common, particularly in healthcare professionals.

Sleep quality can be affected by other health issues, including mental health factors (eg, stress, depression), physical health factors (eg, pain) or common illnesses (eg, asthma, eczema). A primary sleep disorder (eg, obstructive sleep apnoea, restless legs syndrome, narcolepsy) may also be present. Difficulties with sleep, including problems with getting to sleep and maintaining sleep, are a common reason for adults to present to their general practitioner.

Significant sleep disruption increases risks of cardiovascular disease, diabetes and obesity, reduces the effectiveness of the immune system[2] and impacts cognitive function and emotional regulation.

Despite this, most healthcare professionals receive very little education about sleep, and the importance of sleep to health.[3]

Thinking about healthy sleep is especially relevant for healthcare professionals, who often work shift patterns to provide essential and emergency healthcare 24 hours a day, 7 days a week, 365 days a year. Regularly working both night shifts and long daytime shifts will impact sleep routines and make achieving good quality sleep more challenging.

The 'hero' attitude, that patient care is always more important than appropriate self-care, is well intentioned but misguided. It is absolutely paramount that this is understood by all staff and consistently reinforced by senior clinicians and managers.

NATURAL SLEEP RHYTHMS

We function on a natural cycle of wake and sleep. Our brains and bodies are evolved to primarily be awake by day and asleep by night.

Natural cycling of wake and sleep, circadian rhythm, is regulated by the

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suprachiasmatic nucleus (SCN), the primary body clock, in the hypothalamus. The SCN is affected by many cues, with the most important being environmental light. Release of melatonin, which helps regulate wake and sleep, is controlled by the SCN.

There is an independent need for sleep, which increases the longer we have been awake. This can only be reduced by sleeping, just like hunger is only reduced by eating.

When we act against our circadian rhythm we feel fatigued and function less effectively. We experience this sense of disorientation as 'jet lag' when we rapidly move time zones via air travel. It can take up to a day for each time zone crossed for people to regain their normal sense of wake and sleep.

We cycle regularly through different sleep stages, principally light sleep (non-rapid eye movement (REM) stages 1 and 2), deep sleep (non-REM stage 3) and REM (or dream) sleep (figure 1).

Deep sleep is physically refreshing, and effectively 'recharges your batteries'. REM sleep is important for consolidation of learning, and emotional regulation.

Sleep is essential for learning—getting a good night's sleep will help you retain knowledge for Membership exams far more than staying up into the early hours ever will!

WORKING NIGHT SHIFTS

We are not physiologically evolved to function at night as we do in daytime, nor are we adapted to achieve good quality sleep during the day.

Working at night is equivalent to working while jet-lagged: your body is trying to function on Sydney time while your brain thinks that it is Greenwich Mean Time.

Working night shifts has associated risks and consequences (see box 1).[4]

The experience of feeling dangerously sleepy while driving home from work is very common among hospital night shift workers,[13] and continues to result in fatal outcomes for National Health Service (NHS) staff.[14 15]

Effects of relative sleep deprivation, fatigue and of working at night are well recognised by other professions (eg, airline pilots), and are reflected in the Highway Code.[16]

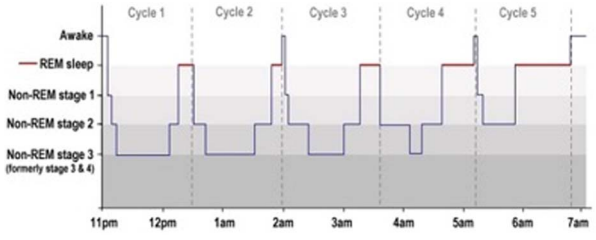


Figure 1 Hypnogram. REM, rapid eye movement. Adapted from Luke Mastin.

Box 1 Risks and consequences of working night shifts

Night shift workers:
- sleep less well and for shorter times in the day
- are less alert and perform less well than day shift workers[5–9]
- are more likely to make simple mistakes and avoidable errors, leading to increased risks to patient safety
- process information, particularly novel situations, slower
- have impaired alertness, vigilance and reaction time
- are more likely to make decisions that involve higher degrees of risk
- have increased risk of road traffic accidents after a shift[10]

Long-term effects of night shift working include:
- increased risk of primary sleep disorders
- increased risk of obesity and diabetes
- increased risk of cardiovascular disease[11]
- a possible relationship with increased incidence of cancer[12]

It is essential that professionals working night shifts, especially in intense, demanding hospital roles which require an ability to respond rapidly and to make key decisions quickly and competently, take steps to optimise their sleep and ability to function at night.

There is a personal responsibility for professionals to come to work having taken steps to ensure that they are able to function as effectively as possible.

There is also a responsibility for this to be supported by employers. Hospitals must consider strategies, particularly around night shifts, to ensure that staff are able to function at their best, and that their staff's own safety is taken into account. There is natural variation in how well individuals cope with working night shifts. Employers should consider regular screening of shift workers for health consequences of working shifts.

These ideas are not always well recognised in the NHS, which needs a significant culture shift in how to approach working at night.[17]

IMPROVING SLEEP

Core sleep

Establishing good sleep routine and habits is the foundation of addressing sleep difficulties.

Investing time in getting sleep right every night, not just when working nights, is key to improving long-term sleep quality.

Environment

Sleep environment is important. Bedrooms should be dark, cool, quiet and comfortable.

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Minimising environmental light and noise is even more important when attempting to sleep during the daytime.

Key features about good sleep environments are summarised in box 2.

Routine and habits

Good quality sleep is maintained by regular routine.

Everyone's need for sleep is different. Most adults will need approximately 7–8 hours good quality sleep each night. If you are getting adequate sleep regularly, you should wake feeling refreshed at approximately the same time each morning whether an alarm is used or not. If you regularly 'catch up' sleep at the weekend or on days off, or if you often have symptoms suggestive of sleep deprivation, this implies you are not allowing enough time for sleep each night. This should be addressed as a priority.

Regularly spending time in bed awake encourages your brain to associate being in bed with wake, which can lead to difficulties in getting to sleep.

Key features about good sleep routine are summarised in box 3.

Electronics

Electronic devices in the bedroom can have a major impact on sleep.[18]

Light, particularly at the blue end of the spectrum, has a direct effect on the primary body clock, which leads to suppression of natural melatonin secretion. Additionally, the stimulatory effect of engaging with activities when the brain is trying to wind down and relax has an inhibitory effect on sleep.

Box 2 Good sleep environment

Your bed, including mattress and pillows, should be comfortable and supportive

Make your bedroom as dark as possible:

- invest in blackout blinds/curtains
- do not switch on main bright lights if you need to get up through the night
- consider a good quality eye mask for daytime sleeping

External noise should be reduced as much as possible:

- consider use of white noise (eg, a fan, quiet relaxing music, a radio turned to static)
- consider use of ear plugs
- your bedroom should be cool
- aim for a temperature of ~18–20°C
- a warm bath, or wearing bedsocks, can encourage peripheral vasodilation before sleep, which helps to optimise core body temperature

Some natural remedies, such as lavender, can improve sleep quality

Box 3 Good sleep routine

- Ensure as much natural daylight exposure as possible
- Regular exercise, but not too close to bedtime, supports sleep—in adults with insomnia, regular exercise can be more effective than 'sleeping tablets' in improving sleep quality
- Eat regular meals
- Do not eat your main meal within 2 hours of bedtime
- A light prebed snack (eg, a bowl of cereal, fruit, yoghurt) 30 min before bed can help prevent disruption from night-time hunger, but avoid evening 'grazing'
- Minimise use of alcohol, caffeine and nicotine, particularly in the evening period
- These can affect both the ability to get to sleep and the quality of sleep obtained
- Set sleep and wake times that permit the amount of sleep that is right for you
- Aim to go to bed at roughly the same time each night and get up at the same time each morning

Minimise electronics use for the 30–60 min before bed

- Consider relaxation strategies to 'wind down' before bed
- Do not use your phone as your alarm clock
- Your phone should preferably be charged outwith your bedroom while you sleep
- Avoid spending long periods of time awake in bed. Your bed should only be for sleep or sex
- If you are unable to sleep, get out of bed and do a quiet/relaxing activity (reading, jigsaw puzzle, building LEGO, etc) for 15 min, then return to bed and try to sleep again

There should be an electronic curfew for at least 30–60 min before the intended bedtime. Electronic screens should be avoided in the bedroom.

If this is not possible, then enabling features, such as 'Night Shift' on Apple iOS devices or f.lux on other devices, which reduce the amount of emitted blue light from electronic screens in the evening, may reduce some of the impact on sleep. Brightness settings on devices should be as low as possible.

NIGHT SHIFTS

Improving how you function on night shifts involves thinking about preparing for the shift, the shift itself, what you do after the shift and how you recover after a run of nights (see boxes 4 and 5).

During the night shift

See box 5.

Rest, breaks and naps

Breaks are not a luxury, especially when doing busy or intense night work.

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Box 4 Preparing for the night shift

- Maintain a good core sleep routine
- 'Bank' sleep in the 24 hours before starting nights; have a long lie, or try to have an afternoon nap
- Exercise in the morning may help encourage napping in the natural circadian 'siesta time' in the early afternoon
- Ensure you are well fed and well hydrated

Box 5 During the night shift

- Aim to stick to a consistent routine during each shift
- Work as a team to provide effective cover for breaks
- Consider use of 'bleep filtering' systems to minimise interruption to team members on breaks
- Avoid high calorie/high fat/high carbohydrate foods—night shift calories *DO* count, and contribute significantly to increased risks of impaired glucose tolerance and cardiovascular disease of working night shifts
- Try to maintain your normal eating patterns/times as much as possible when working nights
- Aim to minimise eating between 24:00 and 06:00 where possible, and when you do eat/snack choose healthier satisfying options (eg, soups/ wholegrain sandwiches/yoghurt/fruit/salads/nuts, etc)
- Keep well hydrated; carry a water bottle and drink regularly

Maximise exposure to bright light in non-clinical areas

- Your patients need their sleep—keep light and noise disruption in clinical areas to a minimum

Your breaks are essential

- During breaks, have short (15–20 min) naps
- Use caffeine carefully
- Watch the 4 am dip. This is when both you and your patients are at their lowest physiological ebb. Take time to double check all critical calculations in particular

Regular rest is essential to ensure safe, effective patient care is delivered to the best of your capability. Unless critically ill patients require immediate attention, your patients are always better served by clinicians who have had appropriate periods of rest during their shift.

Use breaks to take short naps; 15–20 min naps during night shift can have significant positive benefits. They can significantly improve levels of alertness and responsiveness[19] and can reduce the risks to your health of working night shifts. They help to reduce risks to patients as a result of fatigued professionals.

The right length of short nap will vary between individuals. It is worth doing some experimentation to find the best for you. Longer naps are not better, as they may result in you entering deeper stages of sleep which can be more difficult to quickly wake from and increase the chance of 'sleep inertia' (grogginess on waking). Set an alarm, or ask a colleague to wake you.

Prolonged sleep during a single night may also affect your ability to sleep during the day, which is particularly relevant when doing consecutive night shifts.

Not everyone is able to 'power nap' in this fashion, in which case relaxation in a dark, quiet room may also be of some benefit.

Naps during night shift breaks are supported by the Royal College of Physicians, the Royal College of Nursing and the British Medical Association.[20–22]

Caffeine

Use caffeine carefully. Caffeine increases alertness[23] but too much can lead to irritability and reduced effectiveness. Caffeine can reduce subsequent sleep quality and duration up to 6 hours after ingestion, so aim to use it mainly in the earlier part of your night shift.

Taking caffeine just before a planned short nap maximises its impact; caffeine takes 15–20 min to take effect, meaning it is just kicking in as you wake up at the end of your nap to give you a double boost.

After the shift

If you are too tired to drive—*DO NOT*. See box 6.

Once awake for ~16–18 hours, reaction times are likely to be similar as if you are at the legal drink-drive limit. Your ability to safely drive, and your judgement as to whether you think you can are impaired.

Employers should have a policy on how to assist staff who feel too tired to safely drive. If alternative provisions (eg, public transport) are not possible, then ideally a bed should be provided, free of charge, for you to have enough sleep to then be able to safely drive home. You should be aware of your employer's policy.

Recovery

You will have slept less, and less well, while you are on nights.

Your priority should be to re-establish your normal routine as quickly as possible.

See box 7.

HOW CAN HOSPITALS MAKE THINGS BETTER?

While professionals have a personal responsibility to ensure they are able to function during night shift to work as effectively as possible, employers also have a responsibility to support their staff. Simple interventions can make big differences.

Where health services are under increasing pressure, even basic measures to support staff can be difficult to achieve. Nevertheless, attention to appropriate,

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Box 6 After the night shift

If too tired to drive—DO NOT

- Use public transport if you can
- If possible wear sunglasses on the way home—daylight will encourage your brain to feel awake and reduce your chance of getting good quality sleep

  Be cautious of wearing sunglasses if driving however
- Aim to be in bed as quickly as possible after your shift ends—the later you get to sleep, the less total sleep you are likely to get
- Resist the temptation to use electronic devices
- Have a light meal/snack about 30 min before going to sleep—do not go to bed hungry
- Avoid alcohol, nicotine and caffeine
- If you share a house/flat with other people, make sure they clearly know you are trying to sleep
- Do not allow daytime deliveries during the time you expect to be asleep
- Your phone should preferably be in a different room in airplane mode
- On waking ensure you are exposed to bright light for the first 20 min after waking
- Try to do some light exercise

Box 7 Recovery

- Postnights team breakfasts are not just a social event. They allow you to informally 'decompress' and reflect on events which may have occurred during your shifts. Airing worries and anxieties in a supportive environment will likely help you sleep better
- After your final night, aim for a short morning nap (1–2 hours), ideally before midday, then get up and do as many 'normal' activities as possible

  Re-establish normal eating and exercise patterns
- Aim for as close to your normal bedtime as possible
- Aim for a short lie in only on the following morning; try to get up as close to your normal wake time as possible, and to go to bed only slightly earlier than usual
- You are likely to need two 'normal' nights to successfully re-establish your usual sleep pattern
- …remember your judgement is likely to be a bit impaired after nights, so beware the attraction of the postnights spending spree!

adequate rest and other factors to improve performance during night shifts are not areas where compromise can safely be made. The attendant risk of fatigue-related error rapidly escalates when working in pressured medical environments.

It is absolutely paramount this is acknowledged and actively supported by senior healthcare and clinical leaders. See box 8.

Box 8 How can hospitals make things better?

- Use forward-rotating (day-evening-night) rota designs
- Minimise frequent transitions between day and night shifts
- Provide adequate recovery time after nights to re-establish normal wake/sleep patterns
- Provide basic education for staff at induction regarding sleep and working nights, as well as general healthy lifestyle advice and support
- Ensure staff are compliant with current rest/break entitlement requirements:
  - Current 'New Deal' contract: at least 30 min continuous rest after approximately 4 hours duty
  - New contract: at least one 30 min paid break for a shift rostered to last more than 5 hours and a second 30 min paid break for a shift rostered to last more than 9 hours
- Encourage team-based 'hospital at night' approach, including bleep filtering and protection policies to permit consistent breaks
- Provide appropriate rest areas (not necessarily an 'on-call room') overnight, which allow staff to nap during breaks if they choose to
- Provide access to good quality food for night staff
- Provide beds, free of charge, for postnights staff who feel too tired to drive home
- Offer regular screening of shift workers for primary sleep disorders

GET HELP IF YOU NEED IT

Doctors and other healthcare professionals are at increased risk of having formal sleep disorders. If you think you have a genuine sleep problem, see your own doctor or occupational health service. Do not ignore it—it will often just get worse.

Avoid the temptation to self-medicate, whether with prescription medication or non-prescription options, such as alcohol, sedative antihistamines or non-prescribed melatonin.

CONCLUSION

Finding a pattern of wake and sleep in preparation for, while working, and recovering from night shift is a very individual process. There are no universal 'magic bullets' that will improve the experience for everyone.

Simple strategies by both professionals and employers to support core sleep and while working night shifts are likely to make working nights a bit less challenging and to improve both personal health and patient safety.

Further reading: A more comprehensive list of references is included in the Royal College of Physicians summary document 'Working the Night Shift'.[17]

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