Commentary

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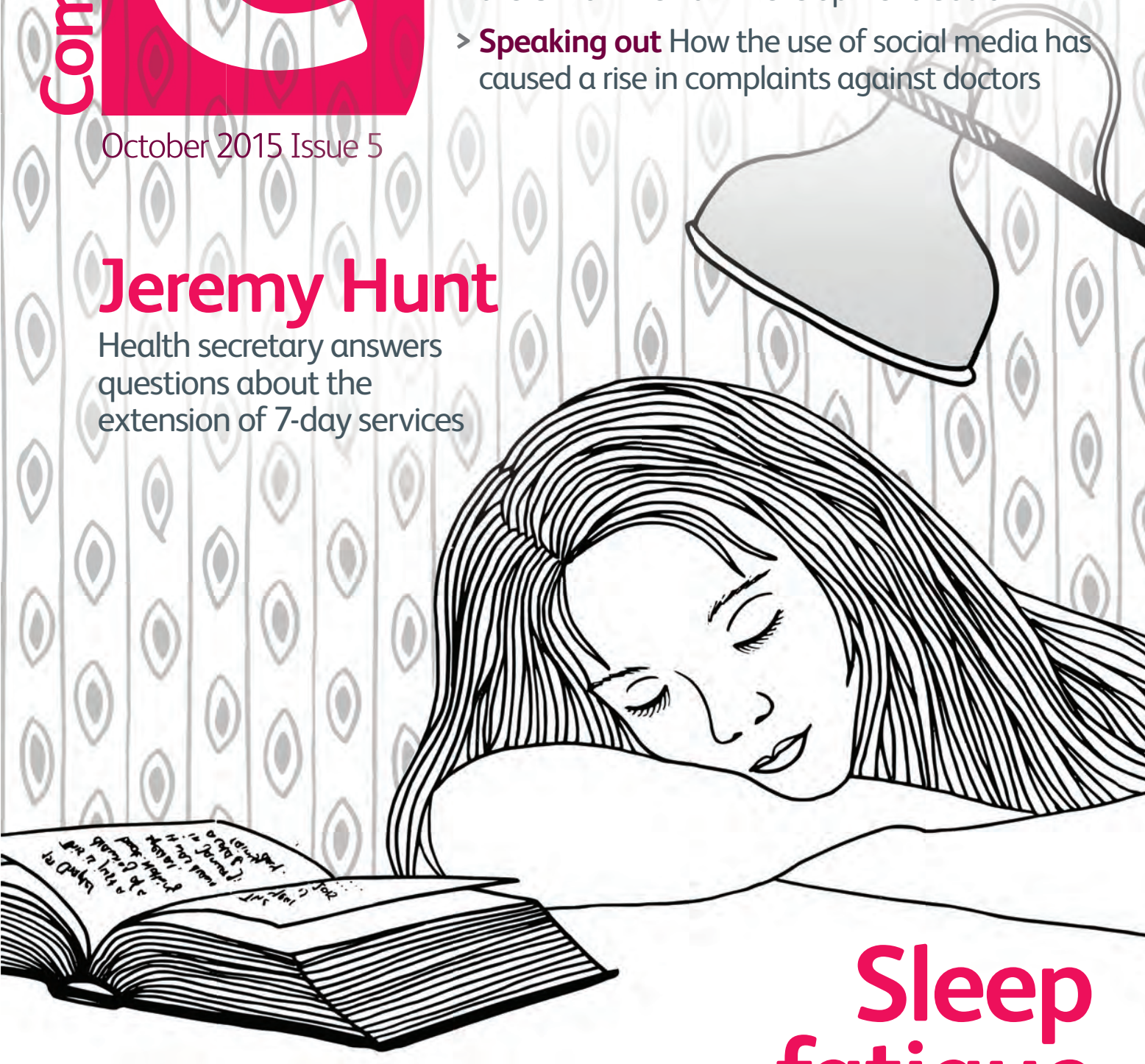

Sleep fatigue

Ways to manage fatigue and ensure excellent patient care around the clock

Royal College of Physicians

FROM THE EDITOR

Prof Humphrey Hodgson
Editor-in-chief

This issue covers a wide-ranging and disparate set of topics, which we hope will interest you. Most practical in this issue is Dr David Flower's advice on how to cope with the problems of night-shift working – possibly required reading for the secretary of state, but certainly for all those working long or unsocial hours. The RCP has surveyed its members and fellows about their involvement in research – the ambitions and the frustrations – and we publish an outline of the results, which will be used to help to define our future initiatives in this area.

On a global scale, the outcomes of the Millennium Development Goals – due for completion at the end of this year – are reviewed by Iain Fossey from the International Office, with much to celebrate but much remaining undone.

'The RCP has surveyed its members and fellows about their involvement in research – the ambitions and the frustrations – and we publish an outline of the results, which will be used to help to define our future initiatives in this area.'

On a clinical note, Mäkelä and Tolias highlight a group of patients who may slip through the gaps in post-acute care – those with traumatic brain injury – and point out the need for coordinated planning. We discuss social media and the doctor–patient relationship. Finally, while 2018 seems still a little way off, one of the commemorative programmes of the RCP's 500th anniversary is already underway, and this issue showcases the second of the ten-book series, 500 reflections on the RCP, which is due to be published periodically over the next 3 years, and demonstrates that *A garden of medicinal plants* is of much more than parochial interest. ■

Prof Humphrey Hodgson FRCP FMedSci, emeritus professor of medicine, UCL

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COVER FEATURE

Mr Christos Tolias

Mr Christos Tolias is the lead neurovascular surgeon at King's College Hospital and the associate clinical director for trauma. He has a PhD and extensive research experience in traumatic brain injury and the mechanisms of brain cell death. He undertook specialist training in neurosurgery in Liverpool and Birmingham, and was the first surgeon in the UK to perform the non-occlusive cerebral vascular bypass technique (ELANA). ■

Dr David Flower

Dr David Flower is an occupational physician with BP based in the UK. Having graduated in chemical engineering, he went on to study medicine. After hospital jobs in London and Gloucestershire, he became a principal in general practice before commencing higher professional training in occupational medicine with the UK Atomic Energy Authority and British Airways.

He joined BP in 2006 and is currently senior health director for the western hemisphere supported by a team of regional health directors in the USA, Central and South America and Asia Pacific. His role is to provide an independent view of the safety and operational risks in respect of health and assure local implementation of regulatory and BP requirements. In addition to a corporate role in fatigue management, he is also active in the development of global capability based fitness for task assessments which are compliant with equality, disability and data privacy requirements across all countries. ■

Your guide to sleep and shift working

Physicians need to work around the clock to deliver patient care, which means night work and inevitable disruption to sleep/wake cycles. This can impair cognitive function and performance, and impact on personal and patient safety. **David Flower**, occupational physician and senior health director with BP, looks at ways to manage physician fatigue effectively.

To function effectively, safely and maintain a healthy lifestyle, we need to obtain sufficient quantity and quality of sleep. Failure to do so will result in short-term problems that may include tiredness even after sleep, loss of energy and inability to concentrate. It can also lead to loss of situational awareness, and impaired judgement and decision making. In the long term, insufficient sleep has been associated with increased risk of diabetes, heart disease, depression and some forms of cancer.

These types of symptom are indicative of fatigue-related impairment. The term 'fatigue' means different things to different people, and is often used interchangeably with sleepiness and tiredness. (Throughout this article the term 'fatigue' is used to describe the sleepiness that may result from working long hours or from overnight duty. Recovery from sleepiness requires adequate restorative sleep.)

Human beings are normally active during the day and sleep at night and therefore follow a diurnal rhythm. Interference with this cycle has an effect on the physiological, psychological and emotional state of the individual. In addition, when extended work hours and daytime sleep result in sleep loss, the negative impact is increased further. There is compelling evidence that long working hours and shift work have a negative effect on medical professionals' health and safety, and on patient outcomes including serious medical errors.

Why is this important to physicians?

For physicians, the critical performance effect of fatigue is the impact on cognitive functioning. They may be more likely to make mistakes and take risks, be less insightful and may be less able to respond to unusual or emergency events (see Box 1). The relationship between physicians' sleep, their physiological rhythms and cognitive skills is therefore critical to their wellbeing and to patient safety.

What are our responsibilities?

Effective management of physician fatigue is a shared responsibility. Physicians have a responsibility to report to work well rested and fit for duty each day. Their employer, however, has a corresponding responsibility to provide the motivation, knowledge and resources to allow them to do so within a sensible work schedule. This includes providing a schedule that permits adequate time for sleep (at least 8 hours per day) while considering commuting time; a schedule that is not equal to the legal limits in order to allow for events that are unplanned but not unforeseen; a schedule that is based on understanding of the principles of sleep and circadian physiology, and adequate rest episodes and breaks.

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Given the difficulty in self-assessment of sleepiness, recognising and managing fatigue in individuals relies on a well-designed work schedule and a supportive culture in which all members of staff feel free to talk about fatigue and to work as one team.

Strategies

The only way to maintain alertness and performance, and to limit fatigue, is to get sufficient good-quality sleep – there is no substitute for sleep. It may be challenging to prioritise sleep at times, but there are some simple strategies that can help.

Preparing for the night shift

Get enough sleep before the first night shift. Avoid reporting for a block of nights with a sleep debt. At least two consecutive undisturbed night-time sleep periods are recommended to help reduce acute sleep debt.

Avoid being awake for 24 hours by the time

Box 1: How are physicians affected by fatigue?

Cognitive functioning

- **As little as 2 hours' sleep loss produces measurable decrements in cognitive performance.**
- **Being awake for more than 24 hours (as can happen at the end of the first night shift) can reduce cognitive performance by more than 70% and clinical performance by more than 85%.**
- **Performance deteriorates with increasing task complexity.**

Emotional

- **Mood scores are disrupted, with increased negative mood.**
- **High burn-out rates are associated with long work hours in physicians.**
- **Physicians who are depressed are more likely to make medical errors.**

Clinical performance

- **Physicians make around 30% fewer medical errors when European Working Time Directive-compliant shift patterns are redesigned to promote sleep and circadian rhythm stability.**
- **Physicians make 36% fewer serious medical errors when extended-duration shifts of 24 hours or more are abolished, and shifts are limited to 16 hours.**
- **Physicians report making many more fatigue-related medical errors, including fatal errors, with increasing work hours and extended-shift frequency.**

the first night shift ends. Consider a long lie-in, ideally at least until midday on the morning before starting nights. This may be made easier by staying up late the night before. Alternatively, take a long nap of 90–120 minutes during the afternoon before starting work but not too soon before the start of the shift. Sleep in bed in a cool, quiet and comfortable space, use an eye mask and earplugs to help sleep, and turn off phones and pagers when possible to avoid being disturbed.

Working safely at night

Very few people adapt to night and shift work schedules and therefore most people will be at risk of excessive sleepiness at work and disturbed daytime sleep.

The strategic planning of naps, consumption of caffeine and exposure to light is key to reducing the performance impact of night work.

Levels of alertness will be low during the night and therefore a higher degree of vigilance and structured safety checks are required. Deciding whether to stay awake at night will depend in part on how much work there is to be done, but keep in mind the risk of sleep inertia. This is the subjective feeling of grogginess experienced following an abrupt awakening. It can interfere with the ability to perform mental and physical tasks. Ideally, night shifts should be short enough to not require sleep on duty.

Between 3am and 6am, the circadian clock most strongly promotes sleep. If workload and local working practices permit, this is an ideal time to take a short restorative 'power nap' of 15–20 minutes.

Naps are most effective if taken early, before tiredness really takes over. You will nap better if you can recline or even lie down. If you choose to nap, don't schedule critical work shortly after waking given the sleep inertia risk. Allow at least 30 minutes, but longer if possible, before performing important tasks.

Certain workplace conditions can make the effects of fatigue more severe, for example:

- low light makes it more difficult to fight the urge to sleep
- boring or monotonous tasks are more susceptible to fatigue-related errors
- warm ambient temperatures make it more difficult to stay alert.

Food, drink and light

Eating can often be an issue on night shift, so follow a similar pattern to normal eating habits. Avoid eating high-carbohydrate and high-fat meals at night as metabolism is impaired and will result in higher circulating glucose, insulin and fats. These are risk factors for diabetes and heart disease.

Stay hydrated; the symptoms of dehydration are similar to those of fatigue! To aid digestion, eat a full meal before going on night shift and then have light 'lunch' halfway through the night. Use complex carbohydrates to provide sustained energy. They are easier to digest than heavy proteins and fats.

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Caffeine is a widely used stimulant and can be an important part of a fatigue management strategy. It becomes effective about 15–30 minutes after absorption and therefore it is very effective if taken just before a short 'power nap'.

Caffeine has a long half-life (4–6 hours) and so even caffeine taken at 10am will affect night-time sleep. Try and use caffeine little and often (1 cup of tea/coffee/soda) approximately every 2 hours to maintain a steady level (avoid large 'bolus' doses) but stop using it 3–4 hours before you plan to sleep. You should have enough in the system to maintain alertness, but not so much that sleep is impacted.

Use caffeine strategically (ie only on work days) and avoid regular consumption, as a tolerance can develop.

A mid-sized cup of barista coffee contains about 150 mg caffeine, a can of cola around

Determine your sleep need

This is best done during a vacation period. Allow yourself to sleep until you wake naturally without an alarm clock, telephone call or other prompts for at least a week. By the sixth and seventh night, you will be close to the amount of sleep that your brain would have each and every day in order not to build up a sleep debt – although sometimes it does take up to 10 or 11 days. Most people need at least 7–9 hours' sleep per 24 hours to function effectively.

Good sleep hygiene

Do >>>

- **Establish a relaxing bedtime routine. Do something relaxing before bed (warm bath, breathing exercises, meditation, reading in dim light, non-caffeinated warm drink, listen to music). Gradually dim the lights – use low-CCT (low-blue content) lighting in the evening as far as possible before sleep. Do not use a laptop, tablet or backlit e-reader – which emit a lot of blue light – in the hour before bed, as there is increasing evidence of an alerting effect from the computer screen. Do not have a TV, laptop, tablet or phone in the bedroom.**
- **Keep the sleep environment quiet and undisturbed if sleeping during the day. Use an eye mask and earplugs, and put up a 'do not disturb' sign on the door to remind family and housemates.**
- **Create a cool, dark, comfortable sleeping environment that is free from distractions including telephones.**
- **Observe the 'toss and turn' rule. If you don't fall asleep within 15–20 minutes in bed, get up and do something relaxing in dim light until you feel sleepy. Do not lie in bed getting stressed about not being able to sleep.**
- **Keep a notebook next to the bed to record any worries during the night. They can then be addressed the following day.**
- **Exercise regularly. A healthy lifestyle will improve sleep, but avoid vigorous exercise within several hours of bedtime.**

Don't >>>

- **Drink caffeine after mid-afternoon on a normal day, or within about 4 hours of bedtime after a night shift.**
- **Use alcohol as a sleep aid – it is highly disruptive to sleep.**
- **Eat large meals before bedtime.**
- **Smoke tobacco before bedtime.**

Napping

- **You must try to have a nap before the first night shift in a sequence.**
- **Try to nap before every night shift, even if you have slept earlier.**
- **Even a brief nap can improve performance.**
- **But: avoid napping too close to bedtime as this may affect the main sleep period.**
- **Although a longer sleep of 90–120 minutes will enable the body to go through a complete cycle of deep sleep and dreaming sleep, there is the penalty of sleep inertia on waking. This results in a period of confusion and poor memory and lasts at least 30–40 minutes. This can be an issue when waking shortly before starting work or if napping at work. Avoid napping at work if possible.**

50 mg, and a standard cup of tea about 40–50 mg; 0.3 mg/kg/h (about 20 mg/h in a 70 kg person) is sufficient to maintain alertness. Higher doses are unnecessary and increase the risk of side effects and tolerance.

Light is a powerful stimulant that can be used to help maintain alertness. The alerting effects increase with light intensity, so exposure to bright light will improve alertness and performance.

The alerting effects are also related to wavelength and blue-enriched light (typically high correlated colour temperature, or CCT, lamps of 5,000–8,000 K) will induce greater alerting effects than lower CCT lights.

If continuous exposure is not possible, intermittent exposure to bright or blue-enriched light, for example during breaks, will also help maintain alertness.

Communication

Review and simplify processes and implement communication strategies that are fewer in number and clearer in purpose. This will reduce the potential for errors. Repeat back instructions to ensure that they are understood and use checklists, particularly during handover. Double-check decisions or instructions and ask for a second opinion where possible. Allow more time to do tasks and to think things through.

Discuss fatigue at department meetings and use them as an opportunity to highlight fatigue risks and to identify interventions.

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This helps build a supportive culture in which lessons are learnt and individual fatigue is managed.

Clinical decision making is complex and challenging at any time of the day, but all the more difficult as a result of the cognitive challenges of working at night. Involving peers to make or check decisions will avoid failure to integrate multiple pieces of information and may reduce risk-taking behaviour.

When it comes to handover, schedule in more time than usual to allow enough time for effective communication at shift handover, and ensure that all members of the team participate. Everyone on the team has their own critical role and any team member can be the one to prevent the team from making a fatigue-related error. Pay attention to the quality of the information exchanged at the end-of-shift handover.

Recovering from the night shift

When you are on your way home, try to expose yourself to bright light immediately before and during the drive. Avoid using sunglasses (unless glare is a problem) and do not wear 'blue-light blocking' glasses that may inhibit the shorter light wavelengths that enhance alertness.

Consider using public transport, taxi services or the hospital sleeping accommodation. If you do drive, and feel sleepy, pull over as soon as you notice symptoms such as yawning.

Get home and sleep as soon as possible after finishing work. Sleep as soon as you can after the shift ends, as delaying sleep until mid-morning will make it more difficult to get sustained restorative sleep. Avoid home distractions, checking email or watching TV, and make getting to sleep as soon as possible your priority.

Sleep in bed in a cool, quiet, comfortable space and use an eye mask and earplugs to help sleep. Turn off phones and pagers when possible to avoid being disturbed. Tell others not to disturb you. Eat a light snack if you are hungry, but ensure that the food is easily digestible and avoid caffeine.

Have a nap before coming back onto the night shift. The more consecutive night shifts you have worked, the greater your cumulative sleep debt. The sooner this is paid off, the better you will feel. Go to bed early in the evening to start to catch up on sleep and have a lie-in the following morning if you can.

You may wish to go to bed earlier on the second evening also, but the sooner you can get back into your normal routine, the sooner your sleep patterns will return to normal.

Before you start a new series of night shifts, try to reduce your sleep debt by going to bed earlier and getting up later than normal for several days before. Always have a nap before the first night shifts in a sequence.

Looking forward

To manage fatigue effectively, it is important to consider the effects of acute and chronic sleep loss and circadian disruption in planning physicians' work schedules. With suitable shift schedule design and planning, physicians can improve their sleep, and in turn, their performance. ■

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