

bypassing the skilled diagnostic evaluation that the complexities of disease and disability in old age require.⁴ This must not be allowed to happen, at least until the unconvincing and overbureaucratic proposals for a single assessment process have been properly evaluated as adequate for the purpose.

But geriatricians are professional optimists, and the ERG has put some good things in the framework. The proposals for hospital geriatric services will encourage any laggard trust where such services are not already in place. The framework gives clear and robust guidelines for the treatment and prevention of stroke, and its performance indicators will capture important elements of good care. Many deaths and much disability will be prevented if the guidance is matched by resources. The proposals for mental health follow conventional wisdom, and an increase in surgical interventions to reduce disability will be welcome.

The danger from the framework's split personality will lie in deceptive implementation. Clinicians will enthusiastically endorse the ERG's good intentions, but the managerial caste will follow the IG agenda. Best hope would come from the general public and its older people taking a more informed and active interest in

their own welfare. This would need the Iron Curtain on NHS information, created by the internal market, to be lifted. Trusts should be required to make their operational data available to public scrutiny. People could then judge for themselves whether they are the victims of ageist practice. Practice is substance, policy mere spin. There is no public access to unspun data in the framework's recommendations for information in the NHS. Whatever happened to open government?

John Grimley Evans *professor of clinical geratology*

Radcliffe Infirmary, Oxford OX2 6HE

Raymond C Tallis *professor of geriatric medicine*

Hope Hospital, Salford M6 8HD

- 1 Department of Health. *National service framework for older people*. London: DoH, 2001. <http://www.doh.gov.uk/nsf/olderpeople.htm>
- 2 Kmiotowicz Z. Plan to end age discrimination in NHS is launched. *BMJ* 2001;322:751.
- 3 Topic Working Group. *Report to the NHS R&D strategic review. Ageing and age-associated disease and disability*. London: NHS Executive, 1999. http://www.doh.gov.uk/research/documents/rd3/ageing_final_report.pdf
- 4 Grimley Evans J. How are the elderly different? In: Kane RL, Grimley Evans J, Macfadyen D, eds. *Improving the health of older people: a world view*. Oxford: Oxford University Press, 1990:50-68.

Fatigue: time to recognise and deal with an old problem

It's time to stop treating lack of sleep as a badge of honour

Being awake at times that are biologically programmed for sleep, prolonged wakefulness, and having had restricted sleep over a period of time result in fatigue and sleepiness. These conditions undoubtedly adversely affect human performance. This week's issue includes another reminder of the dangers of sleepiness while driving,¹ yet we continue to fail to treat fatigue with the seriousness it deserves.

The impact of sleep loss on performance is well documented by laboratory research.² Even modest amounts of sleep loss over short periods (about two hours a night over one week) accumulate and manifest themselves as an irresistible tendency to fall asleep during inappropriate or dangerous situations, like driving.³ The vulnerability of performance to circadian rhythm in alertness and sleepiness, even in well rested individuals, is similarly well documented.² Data on accidents from a variety of sources worldwide confirm the impact of time of day on the occurrence of accidents.⁴ Working at night, and working hours that restrict sleep opportunity, have long been implicated in compromised safety at work.⁵

The size of the problem is significant. A survey of car drivers in the United Kingdom found that 29% admitted to having felt close to falling asleep while driving in the previous year.⁶ Among New York drivers about a quarter reported having at some time fallen asleep at the wheel.⁷ About a third of truck drivers responding to a national survey in Australia reported that fatigue was a substantial problem.⁸ This week's study by Philip et al shows that 10% of almost 68 000 serious road crashes in good conditions affecting only

one vehicle were related to fatigue (p 829).¹ The effects of fatigue are not limited to drivers. Over a third of a sample of junior hospital doctors reported that their hours of duty were always or often long enough to impair their work.⁹ A survey of over 3000 high school students in the United States showed that adolescents aged 13-19 do not get enough sleep, the extent of sleep loss increases with age, and sleep loss interferes with daytime functioning.¹⁰

Yet our attitude to fatigue is inconsistent with the concern that this knowledge should elicit. Lack of sleep is not seen as a risk and rest is not given high priority in the face of competing activities. Extended periods of wakefulness can even be seen as beneficial. A study of truck drivers using continuous electroencephalography convincingly showed that drivers obtained less sleep than they needed for alertness on the job, although they had enough time available in their schedules to do so.¹¹ Despite ample evidence showing that performance of hospital doctors is impaired by sleep deprivation,¹² long hours of work are seen by some as an integral part of the profession and training for it.¹³

Why, in the face of considerable evidence, is the potential for harm underestimated? Perhaps the answer lies in the fact that fatigue is a common experience. Clearly an adverse event does not accompany every occasion of fatigue. This ignores the fact that events causing injuries, on the road or at work, are multifactorial. The presence of fatigue, like the presence of alcohol, increases the risk of, rather than guarantees the occurrence of, an injury due to decreased performance capacity.

Papers p 829

BMJ 2001;322:808-9

Secondly, the nature of the experience gives the illusion of control. During the development of fatigue, alertness waxes and wanes, so that the overall and inevitable decline in performance capacity is not necessarily recognised. Changes in stimulation (increasing ventilation, going for a walk, etc) appear to restore alertness, when in fact they are temporary interruptions of a continuing decline in alertness. People do not necessarily associate fatigue and sleepiness with falling asleep.¹⁴

Thirdly, there is no simple objective test of fatigue, equivalent to a breath analyser for alcohol, that can be applied after an injury has occurred. The contribution of fatigue needs to be inferred (as Philip et al have done). The inference is based on well established causal factors implicating fatigue in performance impairment such as time awake, prior wake-rest schedule, time of day, and characteristics of the crash or other injury-causing event.

There is also the practical issue of determining the level of fatigue at which performance poses a real risk. How do we set standards for fatigue? How much fatigue is too much? We recently compared the effects of sleep deprivation and alcohol intoxication and found that after 17-19 hours without sleep, starting from waking at about 0600 hours, individuals' performance was equivalent to or worse than at 0.05% blood alcohol concentration.¹⁵ In other words, commonly experienced levels of sleep deprivation—one extended day for a well rested individual—had a profound effect on performance. At around 2230-2430, well before reaching the circadian trough in alertness, performance levels were low enough to be considered incompatible with safe driving in many countries.

Fatigue is not new. Nor is knowledge about its potential for harm. Convincing evidence about the size of the risk and actual consequences has been slower to accumulate. While the evidence base needs to be strengthened, we already know enough to issue some cautions. Driving and working after extended wakefulness, after a night without sleep, after sleep has been

restricted, or at vulnerable times of the day and night all contribute to fatigue. The effects of such conditions are exacerbated by alcohol.¹⁴ Public awareness of the potential hazards of fatigue and its causes needs to be raised in general, and among drivers in particular. Employers need to understand, and take responsibility for, the impact of work-rest schedules on performance at work and on performance when driving to and from work. Lack of sleep needs to stop being regarded as a badge of honour and seen for the serious hazard that it actually is.

Anne-Marie Feyer *director*

New Zealand Environmental and Occupational Health Research Centre, PO Box 913, Dunedin, New Zealand
(afeyer@gandalf.otago.ac.nz)

- 1 Philip P, Vervialle F, Le Breton P, Taillard J, Horne JA. Fatigue, alcohol, and serious road crashes in France: factorial study of national data. *BMJ* 2001;322:829-30.
- 2 Monk TH, ed. *Sleep, sleepiness and performance*. Chichester: John Wiley, 1991.
- 3 Dinges DF, Pack F, Williams K, Gillen KA, Powell JW, Ott GE, et al. Cumulative sleepiness, mood disturbance and psychomotor vigilance performance decrements during a week of sleep restricted to 4.5 hours per night. *Sleep* 1997;20:267-7.
- 4 Mitler MM, Carskadon MA, Czeisler CA, Dement WC, Dinges DF, Graeber RC. Catastrophes, sleep and public policy: consensus report. *Sleep* 1988;11:100-9.
- 5 Spurgeon A, Harrington MJ, Cooper CL. Health and safety problems associated with long working hours: a review of the current position. *Occup Environ Med* 1997;54:367-75.
- 6 Maycock G. Sleepiness and driving: the experience of UK car drivers. *Accid Anal Prev* 1997;29:453-62.
- 7 McCart AT, Ribner SA, Pack AI, Hammer MC. The scope and nature of the drowsy driving problem in New York State. *Accid Anal Prev* 1996;28:511-7.
- 8 Feyer A-M, Williamson AM. Work and rest in the long distance road transport industry in Australia. *Work and Stress* 1995;9:189-205.
- 9 Wilkinson RT, Tyler PD, Varey CA. Duty hours of young hospital doctors: effects on the quality of work. *J Occup Psychol* 1975;48:219-29.
- 10 Wolfson AR, Carskadon MA. Sleep schedules and daytime functioning in adolescents. *Child Dev* 1998;69:875-87.
- 11 Mitler MM, Miller JC, Lipsitz JJ, Wylie CD. The sleep of long haul truck drivers. *N Engl J Med* 1997;337:55-61.
- 12 Samkoff JS, Jacques CHM. A review of studies concerning effects of sleep deprivation on residents' performance. *Acad Med* 1991;66:687-93.
- 13 Holzman IR, Barnett SH. The Bell Commission: ethical implications for the training of physicians. *Mt Sinai J Med* 2000;67:136-9.
- 14 Horne J, Rayner L. Vehicle accidents related to sleep: a review. *Occup Environ Med* 1999;56:289-94.
- 15 Williamson AM, Feyer A-M. Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occup Environ Med* 2000;57:649-55.

Home delivery: chemotherapy and pizza?

Evidence on safety and acceptability of home chemotherapy is growing

Paper p 826

The past century has seen hospitals become the focus of the healthcare system despite attempts to shift the emphasis of care to the community. Most attempts to move complex and invasive procedures out of hospital completely and into patients' homes remain marginal. One example of this is home chemotherapy, the subject of a randomised trial in this week's issue (p 826).¹

Home chemotherapy is a service that provides a package of care to support the administration of chemotherapy to patients in their homes by specialist healthcare professionals (usually nurses). It may be distinguished from ambulatory chemotherapy, where patients visit the outpatient department to be connected to portable disposable pumps prefilled with cytotoxic drugs, which are then administered via a central venous catheter for 48 to 168 hours, and from day hospital

chemotherapy, where patients visit the hospital daily to have their chemotherapy administered.

In the United Kingdom home chemotherapy is chiefly the domain of a few private "intravenous access" companies, whereas the NHS service is limited to a handful of nurse led projects being piloted in both urban and rural areas. In north America, however, home intravenous therapy was recently the fastest growing segment of the healthcare system.²

The most obvious shift in chemotherapy practice in the UK has been from inpatient to outpatient ambulatory therapy, with evident cost savings and enhanced patient satisfaction. If the next logical evolution in service delivery is establishing home chemotherapy, then there are three issues that must be resolved: Is it safe? Given a choice, do patients prefer it? And is it cost effective?

BMJ 2001;322:809-10