

Safe working hours - doctors in training a best practice issue

ANDREW LEWIS

Andrew Lewis is Senior Industrial Relations Adviser with the Australian Medical Association (Victoria).

Abstract

In 1995, the Australian Medical Association launched its Safe Working Hours campaign. By 1998, this had been developed into a National Code of Conduct that continues to resonate in the Australian public health system. However, and particularly in respect of Doctors in Training (DITs) who continue to work long hours, there are levels of resistance to proposals that seek to re-organise work or change prevailing professional and cultural expectations.

Long working hours have substantial impacts on a DIT's capacity to consistently deliver high quality patient care, dilute the effectiveness of their training regime and have negative consequences on their health, social life and family responsibilities. While public hospitals often maintain the view that minimal budget flexibility restricts their capacity to affect change in a positive way, in fact devisable productivity and efficiency gains can be achieved by reducing working hours. Further, the medical profession needs to consider whether long hours provide an optimal environment for quality learning and performance.

Key concepts

The general thesis argued in this paper is that the sometimes extreme working hours of doctors in training (DIT), the negative health consequences that follow, and the workplace culture that allows such work practices, have a direct correlation to the quality standards of patient care, productivity of medical training and efficient patient throughput.

Simply, hospitals that successfully manage their DIT human resources reap the ongoing benefits of an efficient, productive, safe and enjoyable workplace where the task of delivering high quality patient care is more readily achieved. Therefore, the agenda of ensuring safe hours of work for DITs reflects an alignment of interest - both for hospitals and for DITs.

Environment

DITs work in an unusual environment where there are extreme stresses placed on them immediately on entry into the hospital workforce. These stresses include:

- the making of decisions that have potential life or death consequences;
- a demanding and steep learning curve;
- the establishment of highly effective working relations with medical and nursing colleagues and patients (to ensure correct clinical care and quality training outcomes);
- understanding the complexities of hospital administration; and
- managing a balance between work and home and personal life in general.

These occur within a DIT's first year and continue to an increasing extent throughout a typical seven-year training period. In the context of the work stresses, combined with long working hours and lack of sleep, DITs tolerate an environment unlikely to be acceptable to other professional groups (Holmes 1998). There is a now

a general community standard that applies limitations on the hours of work and requirements for rest and sleep where workers, such as truck drivers or airline pilots, have an implied or actual responsibility for the safety of others. For DITs, a near opposite expectation of work applies (Commonwealth Government 1996).

Physical implications

Because work patterns for DITs tend to cause regular sleep loss, this paper is largely concerned with the effects of chronic, partial sleep deprivation. Importantly, a recent study found an 'unambiguous result' - tired DITs, when compared to those who are rested, feel worse and are likely to respond less well to work situations (Williamson 1995). Interestingly, the real extent of long hours of work is unknown as empirical studies are hampered by a 'great deal of unregulated overtime and shift swapping' (Olson & Ambrogetti 1998).

Sleep has a direct and complex relationship with human psychology, biology and physiology, and is not readily rescheduled, deferred or resisted (Rogers, Roberts & Dawson 1997). As a potential consequence, where DITs are required to work long hours in a complex environment, one of the outputs may be serious clinical error; or put in another way, possible negligence. While the test of negligence is based on whether there has been an exercise of reasonable care and ordinary skill (given that there can be no guarantee of a perfect result) a jury may find it easier to determine sleep deprivation to be the significant factor given the probable complexity of clinical evidence (McNoble 1990). Ultimately, the ethical standards of DITs and medicolegal obligations relating to clinical standards exceed a hospital's directive or policy requiring long hours (Nocera & Khursandi 1998).

So, if we are considering the issue of DIT safe working hours in the context of enhanced quality patient care, efficient delivery of service and training, effective management of human resources, and reduction of risk/minimisation of liability, then what are the fundamental issues that require examination in respect of the organisation of work?

Organisation of work

When considering the relevant factors important in assessing the safety of long hours of work and the organisation of work there appears to be no simple correlation between long hours and decreased performance. Instead there is an interaction of many factors that include the following (Williamson 1995):

- the total number of hours worked compared to the number of hours of sleep;
- the number of blocks worked in succession and the amount of rest time between blocks;
- the relative difference in risk (to patients) between night and day work;
- the types of tasks being undertaken at a particular time;
- the effect of extended hours (overtime or oncall work);
- the effect and/or availability of naps during work;
- the effect of individual inherent difference; and
- the effect of the working environment.

This paper's consideration of safe working hours is in the context of complex issues including: hospital budget constraints limiting flexibility; better staff management; and an individual DIT's physiological suitability to work long hours with minimal sleep. Importantly however, these complexities must not be used as a mechanism for hospitals and the profession to avoid the obligation to ensure a safe system of work while delivering optimum patient clinical care.

Doctors in training - the job

The community generally and DITs themselves accept that doctors are a part of an elite professional group who perform a public duty. DITs well appreciate the intrinsic rewards and job satisfaction that comes with the successful treatment and care of hospital patients. To some extent, this professional duty combined with what could be described as the accepted culture or the 'nature of the work' encourages professional motivation and commitment. Consequently, the health system relies and functions on DITs' general expectation of long (and potentially unsafe) working hours.

As a result of the Zion Case, a New York hospital patient care negligence case, the Bell Commission was set up to consider issues of DITs' working hours. Witnesses called from the American medical profession gave consistent evidence to the Commission that the making of decisions and the execution of complex tasks under the duress of extreme fatigue and stress were inextricably linked to professional functions (McNoble 1990). Extrapolating from this evidence, the professional expectations of DITs match the presumed irreversible nature of work practice. This would equally apply to the Australian context given the similarities between the United States and our hospital systems.

Interestingly and consistent with the professional drive necessary for DITs to establish a professional career, the performance of a sleep-deprived person can be improved by mental effort. This is particularly so when the task is interesting or where perceptual motor skills are required (Samkoff & Jacques 1991). However, this has only short term effect as tasks requiring high levels of attention will increasingly be compromised because of sleep debt, which is the consequence of cumulative sleep loss (Williamson 1995). Further, the doctor-patient relationship may suffer. 'As fatigue and exhaustion mounts physicians begin to develop resentment towards patients' (American Medical Student Association 2000).

Long working hours - direct effects

How the body works

Human biological rhythms have a range of cycles measured from minutes to months. These rhythms adjust behavioural and psychological functions over a 24-hour cycle (Rogers, Roberts & Dawson 1997). Where there has been sleep deprivation, the cycles no longer fit neatly into the behaviour pattern. As a consequence and after the loss of only one night's sleep, there is a measurable performance decline. With a continued decline of behavioural and psychological performance, the further the pattern of sleeplessness continues (Samkoff & Jacques 1991).

When we consider the human effects arising from a long period of wakefulness and/or shift work, circadian rhythms are the reference points. These rhythms or 'pacemakers' bear a relationship to each other and are coordinating matters such as hormone production, body temperature and sleepiness. In humans, the most conspicuous circadian rhythm is the daily cycle of sleep and wakefulness with night sleep having greater restorative effects when compared to considerably longer periods of day sleep (Rogers, Roberts & Dawson 1997).

Sleep debt

Studies examining the effect of sustained work and consequential sleep deprivation suffered by DITs are typically carried out during normal hospital working conditions. Of 28 studies, all showed statistically significant effects of sleep loss on mood that manifested as increased fatigue and reduced verve and vigour (Williamson 1995). While the affects of fatigue can be compensated by mental effort, as fatigue worsens the ability to summon the effort required to concentrate declines and time for which concentration can be maintained shortens (Olson & Ambrogetti 1998).

Given that most people have a long established habit of being active during the day, those who are subject to long working hours and whose hours extend into the night can find that they are unable to gain effective sleep during daytime. While this is in itself an uncomfortable outcome, more insidious is the chronic fatigue and sleepiness commonly known as 'sleep debt'. The level of this debt is a critical factor in performance and health and safety (Rogers, Roberts & Dawson 1997). Even at the lowest end of the sleep debt scale, measurable effects include:

- changes to the metabolic rate;
- reduction to the general quality of life;
- chronic/excessive fatigue;
- reduced motivation;
- poor work performance; and
- increased accident risk.

In a longitudinal study of DITs over their first postgraduate year, it was shown that as the year progressed, anger, fatigue and overall dysphoria increased (Samkoff & Jacques 1991). Wallace (1998) suggests that 'there is little doubt that working nights effects sleep length and quality, and produces gastro-intestinal problems in the short term ... shift workers (are) significantly less healthy than day workers'.

Mood effect

Mood is of importance to DITs because a large proportion of their work is based on personal contact. In other words, it helps to have a good doctor-patient relationship. However, a study assessing the mood of DITs found in part that the more sleep-deprived the less socially effective was the DIT (Samkoff & Jacques 1991). The following quote illustrates the point.

I know when I'm tired I get more grouchy and I snap easily. And if the job is affecting mood, like you're basically unhappy with life, it means that you can't really interact very well with anyone' (ACTU 2000).

Family/social implications

DITs themselves consider a balance between work and personal life to be vital for both personal wellbeing and to ensure time for personal responsibilities (AMA - Phase One Overview 2001). As Williamson points out, access to ones family, increased social interaction and access to personal time decreases stresses (1995). Personal fitness also has a positive effect on wellbeing where there are fatigue indicators (Wallace 1998). However, the reality for many DITs is that they are not in a position to access personal or recreational time either because the time is not available or because they are too tired. The following quote illustrate the point:

'(Before) I would have the time to go for a walk and do things; and we used to be able to take the kids hiking and all those sorts of things. That's all completely off the agenda now' (ACTU 2000).

Long working hours - effect on patient care

Humans have a marked preference for night sleep, even under optimal conditions (unlikely for DITs). Being awake at night is associated with impaired performance. Add long hours and sleep deprivation to the equation and there is likely to be a severe performance deficit (Olson & Ambrogetti 1998).

Fatigue - alcohol equivalent effects

While there is a more complex relationship between sleep and performance than alcohol and performance, Dawson & Read (1997) claim 'the effect of sustained wakefulness and moderate alcohol consumption (are similar)' There is an approximate equivalent effect of .05 percent alcohol reading after 18 hours of wakefulness and .096 percent after 24 hours. Interestingly, the highest negative impact from extended wakefulness is at the end of a night shift that coincides with a DIT's drive home (Dawson & Read 1997).

Fatigue equals short cuts

Humans initiate subconscious strategies to combat the effects of fatigue (Nocera & Khursandi 1998). Particularly, the individual seeks to minimise the effort expended and amends normal strategies/approaches to tasks. That is, there is a tendency to take short cuts (potentially the easiest but also may potentially be the riskiest option) and a tendency to increasingly exhibit inconsistent behaviour (Williamson 1995). This is supported by the results of a survey of 4,000 anaesthetists where 25 percent reported a fatigue-related incident of injecting the wrong drug and 17 percent reported a fatigue-related failure to adequately check vital equipment (Nocera & Khursandi 1998).

Fatigue impairs concentration generally, has a negative effect on data processing and short-term memory and increases variability in performance. That is, normal periods of work alternate with periods of poor work and astute decisions that may be mixed with lapses of judgement (Olson & Ambrogetti 1998). When fatigued, DITs are likely to sacrifice accuracy for speed (Olson & Ambrogetti 1998) particularly with regard to dull and repetitive tasks (Samkoff & Jacques 1991).

Samkoff and Jacques report that sleep-deprived DITs were nearly twice as likely to make errors when compared to their rested colleagues. The study to which they refer was conducted in a hospital's emergency department. It was found that for two common diagnoses, decreases in comprehensiveness of the history and physical examination written into the patients' medical records were directly correlated to the number of hours worked and the number of examinations performed (1991).

Unfortunately, at the same time as performance is decreasing, DITs are systematically losing their intuitive ability to determine that failings are occurring. 'Sleep deprivation combined with the impact of night shift on the 'body clock' can severely curtail performance at night. Further, a discrepancy between an individual's own assessment of his or her ability to perform and the performance that is measured may exist' (Rogers, Roberts & Dawson 1997).

So, the 'systemic ordering of medical work patterns on the basis of long hours ... must be considered a real impediment to the maintenance of quality care' (Commonwealth Government 1996). 'Night shifts of greater than 12 hours and day shifts of greater than 16 hours have consistently been found to be associated with reduced productivity and more accidents' (Olson & Ambrogetti 1998).

Long working hours - part of the culture

Community standards

Most industrial awards for most occupations set an ordinary working day at no more than eight hours. While in some around-the-clock work environments 12 to 14 hours of continuous work is not uncommon, overtime tends to be restricted and periods away from work tend to be regulated (Williamson 1995). In other words, the community standard is 38 ordinary hours per week and between 6 and 7.5 hours break with only 20 percent of the total workforce exceeding 50 hours per week (AMA Case Studies 1995-2000). While some professional occupations are without formal industrial regulation and work on the basis of output not time, all Australian DITs are employed under awards.

In comparison, 70 percent of DITs regularly work in excess of 50 hours per week and average a total of 6.4 hours break over that period. Further, it is probable that the actual hours exceed more than 80 hours given that rostered hours tend to be averaged and given that there is a high level of unpaid overtime, contrary to award provisions, across the profession (AMA Case Studies 1995-2000).

Professional/self image

The prevailing culture expects DITs to appreciate a professional image that characterises doctors as absolutely dedicated to their patients and to their profession. This 'moral high ground' pressures DITs to accept work overloads with refusal potentially leading to a 'not committed enough' tag and an obvious effect on reputation (ACTU 2000). The following quotes are indicative of the Australian medical experience:

'In my day we had to wake up before we went to sleep' - an Australian senior doctor's viewpoint (AMA - Phase One Overview 2001).

'There is almost a view among some practitioners that showing physical tiredness is a sign of weakness - a sign that you really aren't cut out to be a doctor' (Commonwealth government 1996).

'I'm oncall on Tuesday and I might only get 3 hours sleep. Wednesday is a full day, the day on which I can potentially catch up on sleep. And then in the evening I'm expected to go to college tutorials, so you don't ever recover from your oncall until the weekend, and then you are oncall for the weekend' - an Australian DIT's experience (ACTU 2000).

Perhaps it is overlooked by the prevailing culture that systems of work within the hospital context change over time. For example, a consultant who completed postgraduate training in the mid-1970s may have an outdated understanding of the nature of work in 2002 and a limited grasp of the changed social context in which DITs now exist. A DIT expressed this concept as follows: *'people are now not seeing medicine as a life, just a part of it. Twenty years ago it was your life, and your family either lived with it or left you'* (ACTU 2000).

To simply illustrate the point, casemix funding of public hospitals created a new emphasis on patient management by encouraging patient throughput and consequentially timely discharge. Previously there had been minimal planning in respect of post-operative stays and discharge planning. In comparison to the pre-casemix era prior to July 1993, there is now high patient turnover and an increased average complexity of work as the patients are of high acuity (Hart & Wallace 1998).

That the prevailing culture and connected expectations of the profession may not be reflecting the realities of 2002 hospital medical practice (ie, comparing apples with oranges) the following statistics may be of interest:

	1984/1985*	2000/2001
Number Acute Public Hospital Admissions	2.36 Million	3.87 Million
Number beds per 1,000 population	4.36	2.60
Average length of stay (days)	6.90	3.90

*Commonwealth Steering Committee Review
(AIHW 2002)

The above data reflects the fact that there is a high demand for health services in public acute care hospitals. However, demand for services appears to not be the key driver for DIT work pressure. Instead, 29 percent of DITs responding to a survey identified consultants as the main factor for them working additional hours compared to eight percent identifying staff shortage and 12 percent identifying medical emergency as the reason (AMA - Case Studies 1995-2000).

Therefore the nature of patients' average acuity has increased and the clinical demands and intensity of the work have changed, and to insist that DIT working hour expectations should not change is unreasonable. 'The illusion of the never tiring professional culture is that it can be done while maintaining high standards of care' (Commonwealth government 1996).

Long working hours - legal liability

There is a nexus between fatigue (incurred as a consequence of long working hours) and clinical accidents. In these circumstances, hospitals can be exposed to litigation either due to their vicarious liability for the actions of their employees, their apparent breach of duty of care to patients and/or DITs or because of breaches of occupational health and safety legislation. Importantly, fatigue is no defence against an action taken by a patient (Nocera & Khursandi 1998). Also, hospitals owe a non-delegable duty of care to their employees and patients to ensure that reasonable care is taken.

Case illustrations

Where clinical accidents occur because of DIT fatigue, the issue of negligence can arise. Negligence is defined as the failure to possess or exercise the required degree of skill and knowledge in caring for a patient. In the context of Australian DITs' long and potentially unsafe working hours, the following two cases illustrate the liability that may arise:

1. Brotherson v Royal Perth Hospital (Australia)

Facts: A boy (12 years of age) developed glucose intolerance after open heart surgery for a congenital condition. Eight days after surgery the boy suffered severe brain damage. The lack of proper recording of a downward trend in his blood sugar levels ensured no preventative action could be taken prior to injury.

Outcome: Royal Perth Hospital was ordered to pay \$2.79 million in damages. The Court found that it was difficult to avoid the conclusion that the long shifts the staff worked, combined with an overwhelming workload, had contributed to the oversight.

2. Johnstone v Bloomsbury Health Authority (United Kingdom)

Facts: Dr Johnstone took his employing hospital to court alleging that his employment contract breached the hospital's duty to him to provide a healthy and safe workplace. The doctor was working from 40 hours Monday to Friday and then a further 48 hours on weekends.

Outcome: The Court rejected the Hospital's defence. It had been argued that 'if you can't stand the heat - get out of the kitchen'. The Court instead stated:

'(It is) a matter of grave concern that junior doctors should be required to work such long hours without proper rest that not only their health may be put at risk but their patients as well'.

Liability - beyond the obvious

In a study of Birmingham University (United Kingdom) medical graduates, 39 percent indicated that long hours hampered their working efficiency. What is of interest in respect of potential exposure to legal action is that 28 percent indicated that long working hours were effecting patient relationships (Samkoff & Jacques 1991). As Nocera & Khursandi point out 'psychological mismanagement of patients can generate ... litigation even when medical management has been exemplary' (1998).

Additional costs may be incurred as a consequence of indemnity insurers introducing penalty premiums because 'organisational failures' can be identified in the system of work (ie, unsafe and long hours).

Other exposures to liability may include the following:

- A DIT has a car accident on the way home. At the end of a long shift where the fatigue effect can be presumed to be at its greatest, DITs are at a high risk of injury to themselves or others.
- A DIT being unable to consolidate technical skill. An accident is waiting to happen where long working hours cause a reduction in access to effective training or where fatigue has limited the capacity to retain information and work effectively.

In respect of long working hours, irrespective of what may be argued as conformity with a 'common standard', it will be always open to a court to find that standard to be dangerous or substandard. Hospitals will continue to be liable where they have not ensured a safe system of work by way of safe working hours and where a clinical error then occurs as a consequence of fatigue. 'The liability of hospital for actions of overtired DITs ... looms as a potential issue in every malpractice case' (McNoble 1990).

Solutions exist

The framework

Having examined the existing 'world' of the DIT where long hours are the norm, consideration must be given as to how to change work practices. The Accreditation Council of Graduate Medical Education (USA) has adopted the following guiding principles (McNoble 1990):

- education of physicians is the primary objective of DIT training and is integrally related to patient care;
- patient safety and delivery of high quality health care should be of prevailing importance; and
- patient care and training is best achieved where appropriate schedules designed to maximise educational experiences without producing counter-productive stress, fatigue, depression are in place.

A DIT's work period should also take into account the fact that different types of tasks have different vulnerability to the effect of sleep loss and the time of day has an impact on work efficiency. This can be explained as follows (Williamson 1995):

- immediate processing (low memory load) or low cognitive (vigilance) tasks improve over a day but decline at night;
- working memory (mental arithmetic) declines after midday; and
- low demand tasks are best performed in the afternoon/evening.

Safe working hours - budget savings?

In the United Kingdom, innovative rostering practices have assisted in realising quality care and training outcomes while reducing working hours at the same time. This was possible without increasing the number of DITs recruited and therefore within then existing budget parameters. New team frameworks have been devised

where increased hand-over time has value added to training opportunities and improved the continuity of care (AMA - Country Profiles 1995-2000).

When Europe first introduced safe working hour regulation for doctors, DITs were excluded only the basis of the anticipated high cost of implementation. This belief was based on DITs being 38 percent of the total medical workforce. However, when the regulations did flow on to DITs, the cost when compared to the total health budget was only between one and four percent (AMA - Country Profiles 1995-2000).

In the American experience, 30 percent of total theatre time is wasted as a consequence of operations being inefficiently planned and performed by sleep-deprived physicians (American Medical Students Association 1995-2000). Samkoff & Jacques report that, as a direct consequence of fatigue, in excess of 30 percent of all operations have measurable inefficiencies, practitioner indecision and poorly planned manoeuvres (1991).

Safe working hours - savings via productivity and efficiency?

A hospital that has a commitment to reducing hours of work for DITs can realise other less easily quantifiable cost savings. Hospitals that reduce working hours and increase workplace flexibility will improve their business because of:

- enhanced attractiveness as an 'employer of choice' thus improving the overall quality of care by increasing the capacity to recruit the 'best and brightest' DITs;
- reduced DIT resistance to hospital initiatives that introduce reasonable technology/work practice change due to a general environment of goodwill;
- enhanced trust based relations thereby encouraging team building - often a prerequisite for efficiency gains; and
- enhanced peer management, professional initiative, and morale - a consequence of having demonstrated positive employee relations.

While many hospital schedules are structured in such a way that DITs' oncall arrangements and long hours are an integrated part of the way in which care is provided to patients (Samkoff & Jacques 1991), the cumulative effect of fatigue has direct effects on quality care, productivity and patient throughput. It may be a 'seachange' but good shift practices as follows have the potential to act as a driver for budget efficiency (Samkoff & Jacques 1991):

- night shifts shortened preferably to 8 hours (and not exceeding 12 hours);
- no work exceeding 16 consecutive hours;
- consecutive night shifts minimised to no more than 2 or 3 in a row;
- 24 hours free from duty after every two night shifts;
- avoidance of oncall shifts where frequent night calls can be anticipated prior to the day roster beginning; and
- discourage DIT voluntarism to work night or additional unrostered hours when on regular day shift.

Conclusion

While long hours have historically formed a part of a DIT's work and education, it is only the recent past where the safety of such practices has been held up to scrutiny. Notwithstanding the view held by some that long hours are a DIT's 'right of passage', it is important to appreciate that neither experience, commitment nor seniority can limit the damaging effects of fatigue on clinical performance (Olson & Ambrogetti 1998).

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