Health care is a 24-hour business in every European general hospital. There are roles and responsibilities that can only be performed by a licensed doctor, and these skills may be required on demand, and immediately. Thus, there is a need to have doctors present in hospitals day and night.

Until 2004, most hospitals had junior doctors resident in the building, who were resting and sleeping when not actively caring for patients. This ‘on call’ system, if unregulated, could result in exhausted doctors, but it provided a pool of doctors available at short notice. The European Working Time Directive is a health and safety measure designed to protect workers, but it has made life more difficult for many junior doctors.

The Directive was applied to all European junior doctors in 2004, and it will be applied with increasing stringency in the coming few years. In 2007, the regulations expect every junior doctor to work a maximum of 13 hours in every 24 and have 11 hours rest, with a weekly average of 56 hours. This has driven European junior doctors from working on call to becoming shift workers.

The SiMAP judgement of the European Courts of Justice has caused the greatest problem – because it decided that a junior doctor sleeping on call in a hospital is still working – that is, every hour is deducted from the weekly average of 56 hours. This is not only an economic disadvantage for the employer – that is, paying for essentially no output – but these are trainee doctors, and whilst losing working hours during sleep, they are also losing their training.

The implementation of the Working Time Directive has driven a sudden change in the pattern of work of European junior doctors from working on call, to full-shift workers – there is no other way to staff a hospital 24/7. Thus, if they obey the Directive, a hospital has one team of doctors working in the day and evening, and an entirely new team coming on the late evening to work the night shift until the morning.

My evidence, from informal surveys in 2005 and 2006 of colleague gastroenterologists throughout Europe, is that the Directive is only being followed in Sweden, Denmark, the Netherlands and the United Kingdom. All the other EU Member States appear to disobey the rules, by rostering their doctors to work continuously for 24 to 36 hours.

What's so bad about a night shift? Working at night is harder than working during the day, because this is the time when the human body is programmed to be asleep. It also results in loss of sleep and increased fatigue, which directly impacts on performance. Working at night involves trying to function when one's alertness, vigilance and cognitive reasoning are all at their lowest, making it easier to make mistakes without noticing. Tired junior doctors in the USA and Denmark did exactly this, and were shown to lose concentration more often and make more clinical errors compared to when they were able to get more sleep. Of particular relevance to junior doctors in training, exhaustion also impairs recent learning and can decrease their ability to make correct diagnoses and perform technical procedures.

Importantly, because working a night shift involves trying to sleep in the day, the lack of sleep can quickly become excessive. Sleeping during the day is much harder than sleeping at night, because it is not what humans are designed to do. Bright sunlight, temperature, and noise can all keep night workers awake during the day,

Summary: In 2007, the Working Time Directive expects every junior doctor to work a maximum of 13 hours in every 24 and have 11 hours rest, with a weekly average of 56 hours. This has driven European junior doctors from working on call to becoming shift workers. Shift working at night increases errors, but the length of shifts and the number of shifts worked in succession are also safety factors. Preparation for shift work, in terms of sleep patterns and design of rotas, improves safety. Only four European countries comply with the existing regulations, and ministers should consider delaying further implementation.

Key words: European Working Time Directive, junior doctors, rotas, safety, shift work.
but perhaps most importantly, the body’s internal clock, which regulates sleep-wake patterns, acts to maintain alertness and wakefulness. This means that daytime sleep is not of such good quality or duration as sleep at night, shift workers who work several consecutive night shifts can become progressively more tired over the course of their duty. Inevitably this can then lead to further reductions in performance and an increased likelihood of accidents or mistakes.

Night shifts and safety
While working at night does contribute to an increased risk of making errors, it is not the only factor to consider. Evidence collected from a range of industries where shift work is common shows that the length of individual shifts and the number of shifts worked in succession are also very important (see Figures 1 and 2). The more shifts that are worked consecutively, the greater the relative risk compared to the first shift worked. Likewise for the length of each shift – the longer each shift, the greater the chance of an accident. Interestingly, if two otherwise identical shifts in terms of length and number of previously worked shifts are compared, the risk of an accident is always greater on the night shift than during the day.

Shift length and the number of consecutive shifts must always be considered when designing new rotas. Furthermore, because of the increased risk with working at night, it is essential to remember that what is an acceptable rota for working during the day may not be sensible when planning night shifts.

Getting home after a night shift
Designing safe rotas does not just involve considering the doctor at work. After the shift, doctors must also be able to travel home safely, and often this will mean driving. Just as with performance on duty, driving ability is strongly affected by fatigue and lack of sleep. There is clear evidence that this is a particular hazard for American junior doctors working very long hours. While this should be less of a problem if doctors work two or three shorter night shifts at time, appropriate napping and preparation are nonetheless necessary. Driving while tired becomes an increasing potential hazard as shift length and the number of nights worked in succession rise, particularly if the recommendations in ‘Working the night shift: preparation, survival and recovery – A guide for junior doctors’ are not followed.

Shift patterns that don’t work, and some that should
When the Working Time Directive Regulations were implemented in the United Kingdom in August 2004, the most common pattern of shift work was for an individual doctor to work a 13-hour night shift for seven nights in succession. This made design of the roster easy – one week of nights, followed by some leave for recovery and then some weeks of day shifts. It also seemed to ‘get rid’ of the stressful period in one sharp, unpleasant week of nights. But it meant that the individual worked seven 13-hour shifts in one week – that is, a 91-hour week, which would be daunting if worked in the daytime, and clearly wrong if associated with an acute change of diurnal body rhythm. A working group from the Royal College of Physicians has published a document that discusses different solutions to this rostering problem; it recommends an innovative pattern of three overlapping nine-hour shifts to provide cover across the 24 hours.

What’s the future for European junior doctors?
In 2009, the average working week is scheduled to be reduced from 56 to 48 hours, to come into line with all other workers in the European Union. This demands an approximate 20% increase in daytime productivity (daytime, because most hospitals already roster the absolute minimum number of juniors at night, and no more reductions can be achieved at
night). This increased productivity is needed for not only work output, but also training. Only four countries have achieved compliance with the existing regulations, and it seems sensible for Ministers to consider a delay in further implementation.

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Is Denmark prepared to meet future health care demands?

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Summary: One consequence of the decentralised nature of the Danish health care system, characterised by a high degree of patient satisfaction and expenditure control, has been the somewhat uneven level of access to health care resources across the country. A series of interventions to gradually strengthen coordination and centralised control of the system have been introduced in recent decades, culminating in major structural reform being implemented from January 2007. This article presents a brief analysis of this reform process, its policy goals, key elements and potential to prepare the system to meet future health care challenges.

Keywords: Health care reform, administration, decentralisation, recentralisation, health care financing, Denmark.

Introduction

The predominantly tax-based Danish health care system has traditionally been highly decentralised politically, financially and operationally; public regional and local authorities are responsible for the provision and delivery of health care services. The system has also been characterised by strict expenditure controls and a high level of patient satisfaction. One consequence of decentralisation however, has been the somewhat uneven access to health care resources across the country. Danish politicians have, until now, given more weight to the importance of local self governance (and its potential to achieve innovation) than geographical equity. This has led to differences in waiting times, the availability of medical technologies and rates of specific diagnostic and curative activities, such as systematic breast cancer screening or the use of expensive drugs for ovarian cancer. The demands for ever more comprehensive primary care services, in addition to highly specialised secondary health care services, have not always been helped by the fragmented structure within this decentralised system. It has been argued that this structure with three political/administrative levels has led to suboptimal decision-making and management. As a consequence, a series of interventions to gradually strengthen the coordination and centralised control of the system have been introduced during recent decades, culminating in a major reform of administrative structures that came into effect on 1 January 2007.

The reform measures radically change the administrative and geographical boundaries of the health care system. Simultaneously, a centralisation and decentralisation process has been initiated, where both the state and the municipalities obtain new responsibilities and tasks. One of the goals

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