



postnote

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THE 24-HOUR SOCIETY

In recent years more businesses have begun to operate outside standard hours, contributing to a culture of long or unusual working hours. The '24-hour society' can increase efficiency and help to meet consumer demand, but can also have serious health and social impacts. This briefing outlines the driving factors behind the 24-hour society and reviews options to manage its negative impacts, ranging from the European Union (EU) Working Time Directive to new technological solutions.

Driving factors and benefits

The driving factors behind the '24-hour society' (the trend towards longer and non-standard business hours) are diverse and inter-related. They include:

- **Commercial competitiveness:** by operating around the clock or with extended hours, industry can increase productivity. Some sectors (such as manufacturing) have done this for many years. However, globalisation and the advent of technologies like mobile phones and the internet mean that more sectors are following suit.
- **Consumer demand:** Demand for out-of-hours services such as shops and restaurants is increasing. A survey in 2003 found that 40% of British people say they need to shop outside the hours of 9am to 6pm. This is partly a result of more people working unusual hours (Box 1) and partly because, as research shows, people are trying to pack more activities into each day.¹
- **Government** is encouraging flexible working policies and introducing new licensing laws to allow extended opening for bars and restaurants (Box 2).

Issues

Health and safety

Health and safety lies at the centre of debates on working time. This briefing focuses mainly on shift work, as researchers increasingly believe that the timing of work creates more problems than its duration. However, both shift work and long hours can adversely affect health.

Box 1. UK working hours – facts and figures

In 2004/5 around half those in UK employment said they usually worked 31–45 hours per week. Around one-third of men and one-tenth of women worked even longer hours. The UK has the fourth longest average working hours in Europe. The proportion of workers that say they work shifts “most of the time” or “usually” rose from 13% to 15% between 1993 and 2003. The 16–19 age group shows the largest increase, from 10% to 18% in men and 12% to 20% in women. This may be due to the trend towards a service-based economy in which younger people can work in the evening or at night. In some cases shift work (and flexible hours) are used to reduce long hours worked by employees. In 2003, the transport and communication industries contained the largest proportion of shift workers (more than one employee in four). The second highest proportions were in public administration, education and health (around one in six).²

Long working hours

Research reviews by the Department of Trade and Industry (DTI)³ and the Health and Safety Laboratory⁴ highlight possible links between long working hours and health, such as cardiovascular problems, stress and psychological problems, and decreased birth weight for pregnant women. However, the reviews point to limitations in the available data. The effects linked to long hours could also be due to other related behaviours such as smoking, drinking, poor diet and reduced exercise. Limitations in data are also highlighted by the House of Lords EU Select Committee in its report on the EU Working Time Directive (Box 4). The report concluded that “*common sense suggests that very long hours working over a sustained period of time could damage the health of workers*” but said there was insufficient evidence to quantify this risk. It recommended that the European Commission carry out detailed research on this issue.⁵ So far, this recommendation has not been taken up.

Box 2. Government initiatives

There are three key policy areas contributing to the 24-hour society in the UK:

- **Flexible working:** Since 2000, the DTI have promoted work-life balance through flexible working, including practices such as job sharing, flexi-time, home and teleworking and complete breaks such as leave or sabbaticals. A recent survey showed that the number of workplaces allowing staff to work flexibly has almost doubled in the last 6 years.
- **New licensing laws:** The Licensing Act 2003 comes into force in November 2005 and will bring together legislation for the provision of alcohol, public entertainment and late night refreshment in England and Wales. It allows for up to 24-hour opening subject to local authority approval, although it is not expected to lead to 24-hour licences. By offering more flexible opening hours, the Government hopes to reduce alcohol-related anti-social behaviour (see POSTnote 244).
- **Evening and night time economies:** The Office of the Deputy Prime Minister wants to make urban environments more vibrant, inclusive and attractive. This involves discouraging high concentrations of young people with alcohol, and in planning, differentiating between the bars and pubs culture and cafes and restaurants.

Shift work

Shift work can cause people's circadian rhythms (the 'body clock' governing processes such as the sleep/wake cycle, Box 3) to conflict with their daily schedule. This is the main cause of adverse health and safety impacts from shift work. For example the body may think it is time to go to sleep (the 'biological night') when it is time to work. Such mismatches, which also arise from other disruptions, like jet-lag or sleep deprivation, are linked to a range of health effects discussed below.

Physiological impacts

For long-term shift workers, studies have shown the following significantly increased health risks:⁶

- A 40% increase in cardiovascular disease. Meals taken during the 'biological night' may contribute towards increased risk of heart disease.
- Reproductive problems: spontaneous abortion, low birth weight, retarded foetal development, prematurity and significantly increased risks of miscarriage. Studies of women working irregular or rotating shifts show increased incidence of severe menstrual pains.
- Evidence that shiftwork increases the risk of breast and colorectal cancer. The extent of this and its underlying mechanisms are not fully understood.
- Sleep loss and disruption (particularly with night shifts). A vicious cycle can develop where caffeine is needed for alertness during the day and alcohol or sleeping pills are used at night. Poor sleep is also related to higher rates of substance abuse.
- Gastrointestinal disorders. After sleep problems, these are the most frequently reported symptoms. Some studies have shown that 20–75% of shift workers with night work complain of appetite disturbance and gastrointestinal problems, compared with 10–25% of day and shift workers without night work. Peptic ulcers are two to eight times more frequent amongst night shift workers.

- Obesity. Inadequate sleep is associated with substantial risk of obesity in children and adults.

Box 3. Circadian rhythms

Circadian rhythms have evolved so that biological processes governing daily activities (like sleeping and digestion) are in the right state at the right time of day. Bright light (typically brighter than most artificial lighting) is the main stimulus by which the body clock is 'set' (eating times also have some influence). For example melatonin is a hormone influencing the sleep-wake cycle. The presence of melatonin tells the body it is time to sleep. When the eye detects light, melatonin production is suppressed. Although artificial light and Information and Communication Technology (ICT) allow people to work at any time, circadian rhythms have not changed. They take time to adapt to new routines and can adjust only by around an hour a day. This may be why jet lag is associated not only with sleep loss, but with gastrointestinal problems and loss of appetite: different parts of the body take different lengths of time to adapt.⁷

Circadian rhythms vary between individuals, resulting in different chronotypes. Individuals range from larks, at their best very early in the day, to owls, who function best late at night. Chronotype is dependent on genetic and environmental factors as well as age. Natural changes in chronotype with age can cause confusion in middle-aged shift workers when their ability to deal with the strains of night shift work decreases.

Safety

Mental fatigue affects cognitive performance, leading to errors of judgement, microsleeps (lasting for seconds or minutes), mood swings and poor motivation. Research in the USA shows that nurses on a repetitive shift work schedule are two to three times more likely to misdiagnose their patients than daytime staff. For some tasks, after 20–25 hours of sustained wakefulness, performance reduction is at least equivalent to that seen at a blood alcohol concentration (BAC) of 0.10%. The legal BAC limit for driving in the UK is 0.08%. Tiredness causes 1 in 10 accidents on British roads. On monotonous road like motorways this figure is closer to 1 in 5.⁸ In the UK, even after taking traffic density into account, a crash at 6am is 20 times more likely than one at 10am.

Social issues

Working unusual hours can affect social and marital life. Studies of American men married less than 5 years, with children, show shift work increases the risk of separation or divorce by six times. The Equal Opportunities Commission and Trades Union Congress (TUC) say long working hours may discourage women from applying for some managerial type jobs. In many areas women still hold under one-tenth of Britain's most senior positions. People spend a significant amount of their time on household tasks outside work, with women taking more than double the workload of men. It is hardest for low income workers to find working hours that suit because they have fewer work options. Over the next decade, non-standard work schedules in the USA are expected to disproportionately involve more women, non-Hispanic Blacks and Hispanics. Similar practices within the UK may also contribute to a social divide.

Infrastructure

Infrastructure must be carefully managed to balance demand for out of hours services (such as transport, food provision and emergency services) against worker protection and well-being.

Alcohol and anti-social behaviour

The Association of Chief Police Officers says it has “*always had concerns that the effect of increased licensing hours will be a movement of police resources to the night to deal with the problems associated with excessive drinking*” and that “*this will mean a reduction of police visibility during other hours of the day*”. Anti-social behaviour (ASB) arising from late night alcohol consumption is already a major problem in some cities, as highlighted in the ASB report by the Home Affairs Committee.⁹ Research has shown a correlation between city centre licensed capacity and street assaults. There is debate as to whether the Licensing Act (Box 2) will exacerbate or help to solve the problem of ASB.

Transport

Unlicensed minicabs are often used when there is insufficient public transport to meet late night needs. In 2002 there were 215 assaults on women in unlicensed minicabs in Greater London.¹⁰ London Underground reports a 17% growth between 10pm and closing time (around 1am) between 2001 and 2004 compared with just 3% growth in day time usage. Almost three-quarters of people say they would spend more frequent and longer evenings in central London if tube hours were extended. However, late running beyond 2.30/3am would leave little time for safety inspections and engineering works.

Managing the 24-hour society

Some measures to address the challenges posed by the 24 Hour society, such as statutory limits on working time, are already being implemented in the UK. Others such as new technologies are still at the trial stage.

Government policy and research

Working hours

The European Working Time Directive (WTD) aims to protect workers from the adverse effects of long working hours and inadequate or disrupted rest periods (Box 4). Since its implementation in 1998, the proportion of all those in employment in the UK who work over 45 hours a week has fallen from 26% to 21%.¹¹ But the WTD is criticised by some researchers on the grounds that it focuses only on average working hours, which are only loosely related to health and safety. Instead they advocate more accurate risk assessment based on factors including shift length, number of successive shifts and rest breaks. The Health and Safety Executive (HSE) is investigating these ideas.

Flexible working

Most employers involved with the DTI's Work-Life Balance programme (Box 2) say it has had a positive effect on employee relations and productivity. Allowing employees to swap shifts can help reduce the ill effects of shift work. In a DTI survey 92% of employers allowed

this; very large workplaces with over 500 employees tended to be more reluctant.

Box 4. Working Time Directive (WTD)

The WTD, implemented in the UK in 1998, limits the number of working hours per week to 48 (averaged over a period of up to 1 year). It stipulates at least 11 hours consecutive rest between each working day and 4 weeks of paid annual leave. It also limits the average number of hours worked at night to 8 per day. Amendments to the WTD mean that it now affects almost all jobs. However, the Directive allows workers to ‘opt-out’ of the 48-hour weekly limit. Many industries see the opt-out as an essential way of dealing with sectoral variation. The House of Lords EU Select Committee report argued that “*the reasonable rights of those who wish, for whatever reason, to work longer hours should also be respected where extra work is available for them to do*”.⁵ However the TUC argue that the opt-out makes the WTD unenforceable and provides an ‘easy way out’ of making positive changes to work practices.

Health and Safety

The Department for Transport (DfT) 2004 White Paper on *The Future of Transport* set a 40% reduction target for the number of people killed or seriously injured in road accidents (see later). DfT research suggests that driver education on the danger of tiredness and greater employer responsibility regarding employees’ fitness to drive, are the most effective ways to reduce tiredness related accidents.⁸ The THINK! campaign advocates common sense solutions such as forward planning to include breaks and appropriate use of caffeine. It includes radio broadcasts to reach drivers in situ.

The National Health Service ‘Hospital at Night’ project has trialled shift schemes which extend the working day to complete most of the work and use only a minimally staffed night shift for essential services. The project found that such schemes greatly increase performance. The National Programme for IT (see POSTnote 214) may enable some tasks to be performed remotely, reducing the need for night staff. Some suggest setting up specialised centres to provide remote analysis. This could mean fewer specialists will be needed in hospitals at night and may help reduce misdiagnosis due to tiredness. Specific Government interventions to reduce obesity have so far focussed on diet and exercise rather than sleep. Researchers say there is a lack of good quality nutritious food available at unusual hours.

Evening and night time economy

In March 2005 the Office of the Deputy Prime Minister, working with eight other government departments, launched the *How To Manage Town Centres* guide for practitioners in local communities. It suggests ways to deal with the negative impacts of the growing evening and night time economies. One case study involves a partnership between a Leicester bus company, police and three nightclubs. A trained nightclub door supervisor rides on each night bus, which is fitted with a protected driver area and CCTV, while police officers are present at departure times. Violence and disorder incidents have fallen and the scheme is now financially self sufficient.

Other policy options

Shift scheduling

It is hard to generalise about what constitutes a good shift scheme because each worker and workplace has different needs. The most common shift is the two-shift system (for example 6am-2pm/2pm-10pm) alternating over a week or more. Typically, shifts with faster rotations, or those with early starts or quick return times, lead to the greatest sleep disruption. The HSE advise against specific fast rotations in well-studied cases, such as workers on offshore oil rigs.

Circadian adaptation strategies

It is theoretically possible for the body to adapt to constant shift work. Experiments at a Volkswagen plant in Wolfsburg, Germany are showing that carefully timed bright light exposure can help circadian adaptation to night shifts. Other work is showing that reducing light exposure towards the start of the 'biological night' also has benefits. However, any benefits are usually lost during time off when people revert to standard routines. The relatively socially isolated environments on oil rigs are among the few that allow complete circadian adaptation, but still, adaptation is lost on days off.

Chronobiologists say workers should be educated about circadian issues, but on an ongoing basis, rather than a single training session. They also argue that educational and vocational courses do not attach enough importance to circadian issues. Measures which could help to reduce the ill effects of long or unusual work hours include improved 'sleep hygiene' (practices which help obtain a good night sleep, such as a quiet environment and removal of factors causing stress). Short naps (around 15 minutes) can significantly improve short term performance. Studies indicate that people can assess their own chronotype (Box 3) accurately via questionnaire. This kind of awareness might help shift workers to select appropriate working patterns.

Technology

As the relationships between sleep quality, time of day and performance become better understood, there is potential for technology to help reduce safety risks. The Advisory System for Tired Drivers (ASTiD) is an example, although drivers need training to use it properly (Box 5).

Box 5. ASTiD

ASTiD is an early warning system the size of a car stereo. It works by continually assessing factors linked to driver tiredness and builds a profile of the driver and journey. It considers information from the driver, such as the time of the journey, quality of sleep in the last 24 hours and the length and type of driving involved. It also takes into account the vehicle's steering movements such as subtle changes and exaggerated corrective actions. By assessing these factors, the system can spot the onset of tiredness in advance and warn the driver by audible and visual alerts, even before they are aware of it. A major European logistics business, Christian Salvesen, has already fitted 550 of its truck fleet (~10%) with ASTiD devices and expect to increase this by a few hundred each year.

Drugs

Melatonin is often used as a supplement to help people recover from jet lag. Some advise caution in its use as no studies have been done on the long term effects of flooding the brain with the chemical, which is normally present in relatively minute quantities. Unlike the USA, the UK has banned melatonin sales over the counter. Modafinil is a drug which has been shown (in unpublished reports) to result in sustained alertness for up to 88 continuous hours without the severe side effects associated with other drugs⁶.

Overview

- Negative impacts of the '24-hour society' for workers include increased incidence of cancer, cardiovascular disease, obesity and higher divorce and accident rates.
- Negative health effects are more clearly linked to shift work than long working hours; there are calls for more research into the latter.
- Current statutory limits on working time are widely debated. Some researchers suggest risk assessment models would be more effective, but these are not yet widespread.
- There is criticism of the lack of working-time flexibility and appropriate food available to shift workers.
- Education programmes along with workplace improvements may be an effective way of managing the effects of unusual working hours. New technologies could also play a key role, but are not yet widespread.
- The Government is working to improve urban environments outside of normal hours, improve road safety and work-life balance, and give strategic guidance to employers and local authorities.

Endnotes

- ¹ *The Shape of things to come*, The Future Foundation, August 2003
- ² Trish McOrmond, 'Changes in working trends over the past decade', *Labour Market Trends*, Jan 2004, pp26–35
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- ⁴ HSL, *Working Long Hours*, HSL/2003/02
- ⁵ House of Lords European Union Committee, Social and Consumer Affairs (Sub-Committee G), Ninth Report of Session 2003-04, *The Working Time Directive: A Response to the European Commission's Review*, HL Paper 67
- ⁶ Russell G. Foster, Katharina Wulff, *The rhythm of rest and excess*, *Nature Reviews Neuroscience*, Vol 6, No 5, pp 407–414
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- ⁹ House of Commons Home Affairs Committee, Fifth Report of Session 2004-05, *Anti-Social Behaviour*, Vol 1, HC80-I
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- ¹¹ *Labour Market Trends*, National Statistics, May 2005, Vol 113, No 5

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