3rd Pillar of Health

Shift Working: Exploring the health and performance implications and how you can tackle them by focusing on sleep

By
Marcus de Guingand
Managing Director,
Third Pillar of Health Ltd

www.thirdpillarofhealth.com

"Night shift workers in any occupation are 30% more likely to make a mistake than their day-shift counterparts."

Costa G. et al: Shift work and occupational medicine, *Occupational Medicine 2003; 55:83-88*

About this white paper

"Our people are our most important asset." You often hear it said and printed in company literature – especially recruitment literature. But after you've read this paper ask yourself how many organisations, which employ shift workers, can actually honestly and accurately make that claim? Can your organisation honestly make that claim?

Across the developed world roughly 15% of the working population are shift workers. It will come as no surprise that shift work is associated with tiredness and fatigue. But what might come as more of a surprise is the evidence which supports the extent of the health and performance consequences and the link to poor sleep in shift workers.

According to research conducted by NASA, 75% of shift workers report sleepiness on the job, with 20% having fallen asleep on the job in the last 12 months. 20% of shift workers report frequently or occasionally making errors due to sleepiness. 29% indicated that sleepiness interferes with daily work activities a few days a week and 68% of shift workers report sleeping problems a few days a week.

Working shifts severely affects family and social time and is disruptive to circadian rhythms. It is no surprise then that it is a common complaint of shift workers that they suffer frequent fatigue. Combine sleep deprivation with the psychological consequences of disrupted 'down time' and you can begin to build a picture of poor physical and mental health and workplace performance decline.

In this paper we will use recent studies to highlight the health and performance effects of shift working, the role that insufficient poor quality sleep plays in these effects, whether there are likely to be legal ramifications for organisations employing shift workers and what you can do to help your employees and your company overcome some of the 'inevitable' problems that frequently arise.

What are the effects on health of shift working?

From minor health conditions such as cold and flu, high cholesterol, nausea, anxiety, stomach complaints and memory problems through to more serious chronic conditions such as cancer, heart disease, obesity and diabetes a number of recent studies have linked shift work with poor health.

What evidence is there linking shift work to cancer?

The International Agency for Research on Cancer (IARC) has classified shift work that disrupts the body's circadian rhythm (body clock) as a cancer causing agent.

In a study published in the *American Journal of Epidemiology* in October 2012 researchers from the University of Quebec looked at whether night shift work raised the risk of cancer in 3,649 men.

They found that specifically working the night shift was associated with a:

- 2.8 times higher risk of prostate cancer
- 1.8 times higher risk of lung cancer
- 2.0 times higher risk of colon cancer
- 1.7 times higher risk of bladder cancer
- 1.3 times higher risk for non-Hodgkin's lymphoma
- 2.3 times higher risk for pancreatic cancer and a
- 21 times higher risk for rectal cancer

versus men who had never worked the night shift.

The specific link between shift work and prostate cancer

In 2006 the *American Journal of Epidemiology* published a study of 14,000 men in Japan. When monitored over (roughly) 8 years the study found that fixed night shift workers had a slightly greater chance of prostate cancer risk but those working rotating shifts were 3 times more likely to develop prostate cancer when compared with day workers.

In September 2013 a study by researchers from Harvard and Connecticut Universities, using data from the ongoing National Health & Nutrition Examination Survey showed that men working night shifts or rotating shifts were 2.5 times more likely to have a PSA level (prostate-specific antigen) which would be considered abnormal and often lead to further testing for prostate cancer.

But it's not just male shift workers where there is a correlation with higher risk of certain cancers.

The link between shift work and breast cancer

Several studies have explored the links between shift work and breast cancer in women.

In June 2012 a study undertaken by researchers in France and published in the *International Journal of Cancer* showed that working the night shift increased the risk of developing breast cancer by 30%, rising significantly in those who had worked for over 4 years in night shift work prior to their first pregnancy.

In a May 2012 study of 18,500 women in Denmark and published in the *Journal of Occupational & Environmental Medicine* revealed that women who worked the night shift were 40% more likely to develop breast cancer. This doubled in women who worked at least 3 nights a week for at least six years. Women who worked night shifts and described themselves as "morning" people were 4 times more likely to develop breast cancer versus those who didn't work night shifts.

A smaller Canadian study of 2,313 women across a wide range of occupations published in July 2013 in the *Journal of Occupational and Environmental Medicine* concluded that there was only an increased association between night shift work and breast cancer after thirty plus years of working night shifts, where the risk doubled.

The link between shift work and ovarian cancer

In March 2013 a study of 3,300 women by researchers from the Fred Hutchinson Cancer Research Center in Seattle and published in the *Journal of Occupational and Environmental Medicine* set out to establish whether there was a link between night shift work and an increased risk of Ovarian Cancer.

The women aged between 35 and 74 were split into women with advanced cancer, borderline cases and a comparison group without ovarian cancer. The stint of night shift working averaged between 2.7 and 3.5 years. Working the night shift was associated with a 24% increased risk of advanced cancer and a 49% increased risk of early stage disease. The statistically significant increase in risk was in women aged 50 and above.

What evidence is there linking shift work to heart disease, obesity and diabetes?

Analysis of over a dozen studies conducted by the University of Queensland found that shift workers were more likely to snack on bad foods and spend less time exercising. As we are now very well aware inactivity and poor nutrition are risk factors for heart disease, obesity and diabetes.

The link between shift work and heart disease

A Harvard Medical School study found that the heart is particularly vulnerable during the night shift. Perhaps the most significant piece of research into the link between heart disease and shift working was published in 2012 in the *British Medical Journal*. A team of Canadian and Norwegian researchers looked at the results of 34 studies and calculated incidences of coronary events, heart attacks and strokes across more than two million employees.

They found that shift workers were more prone to cardiac disorders and strokes than any other group. Shift work resulted in a 23% increase in the risk of heart attack, a 24% increase in the risk of a coronary event and a 5% greater risk of a stroke. Furthermore they estimated that working the night shift could account for 7% of heart attacks, 1.6% of ischemic strokes and 7.3% of coronary events.

The link between shift work, obesity and diabetes

Night shift work could lead to lower levels of the hormone leptin (a hormone associated with regulating weight), affect blood sugar and insulin levels and these changes could lead to a higher risk of heart disease. These were the findings of a 2009 study published in the journal *Proceedings of the National Academy of Sciences.*

A small but interesting study conducted at the Brigham and Women's Hospital and reported in the April 2012 edition of the *Science and Transitional Medicine Journal* found that sleeping too little or against your natural body clock could increase the likelihood of developing diabetes and / or becoming obese.

Whilst only 21 participants the study was interesting because the scientists were able to control the environment, how much sleep they got and what time they were allowed to sleep. This meant they were able to mimic the sleep patterns of shift workers. By restricting sleep and disrupting the body clock the researchers found decreased metabolism in participants and a spike in blood glucose after eating. They suggested this could lead to an extra 10 pounds of weight a year and increased risk of diabetes.

Another study undertaken at Pittsburgh University and reported in the October 2013 *Journal of Biological Rhythms* found that retired female nurses who had worked the night shift had higher BMI rates and were 1.4 times more likely to have diabetes than former day workers, rising to 2 times in those with a higher BMI. The length of night shift work made no difference to the results.

What other health consequences of shift work have studies suggested?

Mental health: Numerous studies have suggested a link between shift work and poor mental health, especially anxiety and depression. In July 1997 a study of a relatively small sample of shift workers revealed increased rates of depression in shift workers *(International Journal of Occupational and Environmental Health)*. A 2008 study published in the *International Journal on Disability and Human Development* concluded that "shift work is suggested to increase the risk of developing or aggravating mood disorders at least in vulnerable individuals."

Brain damage: Research in March 2014 conducted at the University of Pennsylvania and published in the journal *Neuroscience* suggests that long-term sleep deprivation, even after days of recovery sleep could cause lasting brain damage. In the laboratory experiment on mice researchers mimicked shift working schedule and monitored nerve cells in a region of the brain associated with alertness and cognitive function.

In short term sleep restriction nerve cells in the brain make a protein to energise and protect them. However, after a few days of "shift working" this process shut down and the nerve cells started to die off at an accelerated rate.

Heavy drinking: A study from a team of researchers at Kanazawa Medical University in Japan in 2013 showed that male factory night shift workers who suffered from poor sleep were more than twice as likely to drink heavily compared to workers who slept well. The study found that 18% of night shift workers who experienced poor sleep drank heavily.

The NASA statistics we presented earlier revealed that 68% of shift workers report a sleep problem a few days per week. It's not particularly scientific but if we were to extrapolate those figures it suggests that potentially 12% of night shift workers may drink heavily. This in itself raises additional health, safety and productivity concerns in shift workers who do not sleep well.

So the big question…WHY does shift work give rise to serious health concerns?

The bottom line is no-one quite knows for sure. But to the extent there is any consensus on this then it revolves around the hormonal changes that occur when exposed to light at night leading to reduced production of the hormone melatonin.

Johnni Hanson, the author of the Danish breast cancer study (alluded to previously) makes the following suggestion:

"Night shift work involves exposure to light at night and decreases the production of the night hormone melatonin. In addition, light at night might introduce circadian disruption, where the master clock in the brain becomes desynchronised from local cellular clocks in different body organs. Repeated phase shifting may lead to defects in the regulation of the circadian cell cycle, thus favouring uncontrolled [tumour] growth. Also, sleep deprivation after night shift work leads to the suppression of the immune system, which might increase the growth of cancer cells."

Building on Jonni's theory a January 2014 study by Surrey University (published in the *Proceedings of the National Academy of Sciences* journal) found evidence of "profound disruption" to thousands of genes when volunteers were subjected to controlled shift working conditions.

The Surrey University study tested previously well-rested participants. Over the first three days the participant's sleep-wake cycle was shifted forward by 12 hours. They found that at the beginning of the experiment 1,396 genes rose and fell in line with a healthy circadian rhythm. By the third day this number had fallen to 40 with another 180 genes which usually remained constant starting to rise and fall.

In conclusion the researchers said, "sleeping at the wrong time is bad for you. We know it has a massive effect on the temporal organisation of the gene expression and that must link up with negative outcomes".

So it would appear that hormone imbalances and the effects on our genes is behind the resultant health risks associated with shift working.

What are the associated direct and indirect costs of cancer, heart disease, obesity and diabetes?

The research findings point to a correlation between shift working and increased risk of chronic health conditions. However, whilst the green shoots of economic recovery are starting to transform into visible seedlings we are perhaps still some way from reaping an abundant harvest. So I want to explore the cost implications to businesses of these major health problems.

According to the American Cancer Society noncommunicable diseases ("NCDs") like cancer, heart disease and strokes account for roughly 63% of deaths worldwide. It is estimated that they will cost the global economy $47 trillion, or 75% of global GDP, annually and health-related productivity losses will cost US employers $225.8bn annually.

By addressing health we can all reduce the risk factors that lead to NCDs and therefore the costs.

The American Cancer Society estimates that 1.6% of the workforce will be diagnosed with cancer each year. They estimate that total cancer care costs in 2012 were $264 billion which included direct healthcare costs and indirect costs of lost productivity. With roughly 130 million people employed in the US total annual costs are roughly $2,000 per employee per annum.

According to the American Heart Association cardiovascular disease ("CVD") cost US employers $448.5 billion in 2008 with $296bn direct medical costs and $152bn resulting from lost productivity.

Four of the top ten most expensive health conditions are direct risk factors for CVD. These include obesity, hypertension, smoking and angina. A study reported in the *American Journal of Health Promotion* in 2000 revealed that 25 to 30% of a company's annual medical costs were spent on employees with a major CVD risk factor.

Observational studies have shown that reductions in health risk factors are directly correlated to improved absenteeism and presenteeism. Two studies into health risks on absenteeism and presenteeism reported in the *Journal of Occupational and Environmental Medicine* in 2004 and 2006 found that individuals who reduce one CVD health risk factor decrease presenteeism by as much as 9% and absenteeism by up to 2%. Each risk factor increased or reduced had a corresponding effect on productivity of 1.9% with savings of $950 per employee for each year the health risk was reduced.

In 2005 there were 18.5 million Americans diagnosed with diabetes. In 2011 this had risen to 26m (or 8.3% of the population) and the numbers are expected to increase in the coming years. A study released in March 2013 estimated that the cost of diabetes in 2012 was $245bn - $176bn (or 72%) was direct medical costs and $69bn in lost productivity.

According to Diabetes America healthcare costs per employee with diabetes is $13,243 versus $2,560 for an employee without diabetes. What is more they estimate that men with diabetes take 11 more absences a year and women with diabetes 8.7 more versus employees without diabetes.

According to the Centres for Disease Control the cost of obesity, including medical expenses and absenteeism for a company with 1,000 employees will be $277,700 per annum.

I appreciate that not every country or organisation follows the US healthcare model. But even in countries where there is a greater reliance on a national health scheme the significant proportion of the total costs which are accounted for by absenteeism and presenteeism will be directly affecting your bottom line and so it makes sense to take action to help staff reduce health risk factors.

What are the effects on performance of shift working?

Alongside the additional health risks associated with shift work there are also considerable performance consequences arising from: insomnia, fatigue, poor memory, headaches, difficulty concentrating, irritability and depression. As we will explore later there is a significant correlation between the adverse performance effects of shift working and difficulty obtaining sufficient good quality sleep.

It is fair to say that some industries have taken a more proactive approach to tackling fatigue as a performance and safety issue. However, too often companies follow “hours of service” legislation as the benchmark for their fatigue management programmes. This is not a sensible approach – especially not for shift workers.

Imagine a multi-national company working across the globe and with different local hours of service legislation. It may be the case that operations in developing countries have different hours of service legislation that enable employees to work longer hours. But why would the standard in one country not also be applicable across the organisation? Policies and procedures need to be consistent.

There is perhaps more onus on industries such as transport, oil and gas, aviation and healthcare to take a deeper look at the effects of tiredness and fatigue on performance. But as the brief examples below illustrate there appear to be sizeable gaps in what is probably best described as "token" fatigue management initiatives.

Perhaps the industry where the most amount of research has been carried out is the Healthcare industry. A study, appearing in the November 2007 issue of *The Joint Commission Journal on Quality and Patient Safety*, reported that nurses who work more than 12 hours in a shift were involved in three times more fatigue-related preventable adverse events than those working 8-hour shifts. This raises an important additional point around the effects of shift scheduling.

For those of you who read our 'Examining the need for programmes to tackle tiredness and fatigue in safety-critical operations' presentation you will have seen numerous examples of where tiredness and fatigue led to major accidents and incidents. There have been other recent incidents which highlight the issue of tiredness and fatigue in shift workers.

Chicago Transit rail crash: At 03:00 on 24th March 2014 a Chicago Transit train failed to stop at the last station causing it to mount the platform and barrel up an escalator. 32 people were injured and taken to hospital. The investigation found that the driver, who was employed on a "fill-in" basis to cover "whatever shift needed covering" fell asleep at the controls and only woke up as the train left the rails. This was the second time this driver had had a fatigue-related incident in 3 months.

MetroNorth rail crash: On 1st December 2013 a MetroNorth commuter train hit a curve in the track with a 30 miles per hour speed limit at 82 mph. The train derailed and careered down an embankment stopping just short of a river. 4 people were killed and 70 injured. The driver, who had recently moved from late night to early morning shifts said he felt strangely dazed just before the crash. A medical examination after the crash also found the driver to have severe (undiagnosed) sleep apnoea.

Three Rivers bus crash: In January 2014 a passenger van transporting oil field workers back from a 24-hour shift slammed into a school bus in the early morning. Seven of the twelve school children were taken to hospital and treated for their injuries. Three of the passengers in the van died. Police said there was no sign the driver made an attempt to stop and that driver fatigue was the likely cause. Police said companies need to educate staff on the dangers of driving after a shift.

The Office for Road Safety in Western Australia says that shift workers are six times more likely to be involved in a fatigue-related accident. In particular they point out that the most dangerous time to drive is immediately after the night shift. The example above illustrates what happens when employees make poor choices – largely because they are ill-informed of the potential dangers.

To learn more you can download our white paper: 'Drowsy Driving: How and why should your organisation take a more proactive approach to tackling this costly problem?'

A study by researchers at the University of British Columbia and published in the *Scandinavian Journal of Work, Health & Environment* in 2011 revealed that night shift workers and rotating shift workers were twice as likely to suffer a workplace injury than day workers. The researchers suggested that "the disruption of normal sleeping patterns due to shift work can cause drowsiness or fatigue which can lead to workplace injuries."

In light of these recent incidents does your accident and near-miss reporting include fatigue as a specific cause or contributory factor and how is it recorded? Does your reporting note whether the employee is a shift worker, the time of day of the incident and which day in a particular shift cycle the incident occurred on? It should do!

So where exactly does sleep deprivation fit in?

One theme that has frequently recurred so far is that night shift and rotating shift workers who have to sleep during the day will suffer from considerable circadian disruption and will find it particularly difficult to obtain sufficient good quality sleep. The consensus is that this is due to light exposure and hormonal changes which come as a result of circadian disruption.

As far back as 1980 Professor Czeisler and colleagues ran an objective study (via EEG) which showed that rotating shift workers obtained between 1 and 4 hours less sleep when sleeping during the day than when they slept at night.

More recently data presented by the Centres for Disease Control, from the 2010 National Health Interview Survey found that 44% of night shift workers obtained less than 6.5 hours of sleep a night. This rose to 70% in transportation and 52% in healthcare workers. 32% of those working 'other' shift patterns, including rotating shifts, sleep less than 6.5 hours a night.

According to a comprehensive piece of work entitled "Therapy in Sleep Medicine" (J Burkoukis et al., Elsevier Saunders, 2012) workers on the permanent night shift can expect to average 6.6 hours of sleep a day – though just 5.9 hours between successive night shifts. Workers on slow rotating shift patterns can expect to achieve 6.4 hours of sleep between night shifts, falling to 5.7 hours between night shifts for those on fast rotating shift patterns.

Sleeping for between 3 and 7 hours a night for seven consecutive nights (or days) affected alertness and sleepiness, frequency and duration of lapses and feelings of fatigue and stress, equivalent to levels observed after two nights of total sleep deprivation.

These statistics should concern every shift worker and every employer. Most leading sleep scientists recommend we obtain 7 to 8 hours of good quality sleep every night. Below 7 hours and more so as sleep duration falls even lower our alertness becomes impaired. This is compounded when unable to obtain sufficient good quality sleep over two or more consecutive days.

As we will illustrate below – on its own shortened sleep duration has been linked to significant health and performance impairment.

The relationship between poor sleep and poor health

A study published in the *Archive of Internal Medicine* in 2009 found that those who slept 8 or more hours a night were 3 times less likely to catch a cold versus those who slept less than 7 hours a night. The study examined sleep duration and sleep efficiency (percentage of time in bed asleep) records of 153 men and women over a 14 day period prior to administering a cold virus via nasal drops.

Cancer: In January 2014 researchers from Chicago and Louisville Universities found a link between sleep disturbance and cancerous tumour growth in animals. Mice who did not sleep through the night developed bigger and more aggressive tumours than those who did sleep through the night.

They found that lack of sleep affected crucial tumour-associated macrophages (TAM) immune cells which help fight cancer. In well-rested mice these TAMs worked inside the tumour to eliminate cancerous cells. Where sleep was fragmented the TAMs worked on the edge of the tumour and ended up promoting blood vessel growth, allowing the tumour to expand and spread

Heart disease: Dr Paul Zollinger-Read, BUPA's Chief Medical Officer, has called poor sleep the forgotten risk factor for heart disease. Pointing to a 10 year study of 14,000 participants in the Netherlands he cited the significant risk reduction in those sleeping more than 7 hours a night.

Other studies have shown that poor sleep 3 nights a week is linked to a 98% increase in heart disease risk and having 3 symptoms of insomnia triples heart attack risk. A study by Warwick and UCL universities into 10,000 civil servants found that reducing sleep time from 7 to 5 hours a night doubled the risk of dying of heart disease.

Obesity: Data from the US National Health and Examination survey revealed that those sleeping less than six hours a night increased their risk of obesity by 23% versus 7 to 8 hour sleepers. This rose to 50% in five hour sleepers and 73% in 4 hour sleepers.

Diabetes: A study by Boston University School of Medicine found that sleeping for less than 5 hours a night increased the risk of developing diabetes by two and a half times. A 2012 study published in the *Annuls of Internal Medicine* may help explain the link between poor sleep and diabetes.

Researchers monitored participants over 8 days starting with 4 days of good sleep and followed by 4 nights where sleep was restricted to 4.5 hours. They found that after 4 nights of sleep restriction overall insulin sensitivity dropped by 16%. However, insulin sensitivity in fat cells fell by 30% - placing participants in a range normally seen in obese and diabetic patients. Senior author Matthew Brady said this was the same as metabolically aging someone by 10 to 20 years in just 4 nights.

The relationship between poor sleep and performance

When we are tired we suffer from numerous physical and cognitive impairments which can lead to poor performance and human error.

When tired our reaction times diminish, we have difficulty concentrating, our memory suffers, we find it more difficult to cope with tasks, our ability to think logically and creatively is diminished, we find it difficult to assimilate new information and our decision making becomes impaired. Our speech becomes slurred and our vocabulary suffers leading to poor communication. Our mood also falters.

According to the Harvard Business Review sleeping 4 to 5 hours a night for a week impairs performance to the same extent as being legally drunk. A study undertaken at Pennsylvania University found that after 2 weeks of sleep restriction those restricted to 6 hours of sleep a night made eleven times more errors in tests throughout the day at the end of the two weeks than when they were well rested. This rose to fourteen times in those restricted to 4 hours sleep.

So for those organisations who run seven day (plus) shift cycles – are you asking your staff to perform the same tasks, particularly tasks which require sustained vigilance, on the final day of their shift as were required on the first day of their shift?

Three separate studies between 2007 and 2014 looked at the specific effects of sleep deprivation in nurses – who can average barely 5 hours of sleep a night on consecutive night shifts.

In January 2014 the *Journal of Nursing Administration* published a study of the relationship between sleep deprivation and patient care errors in (289) nurses who worked the night shift. The study found that over half of the nurses reported being sleep deprived and that sleep-deprived nurses made more patient care errors.

A second study (The effects of fatigue and sleepiness on nurse performance and patient safety, 2008) found that nurses who reported making an error on their shift had slept for 30 minutes less in the previous 24 hours than nurses who did not report any errors.

An explanation for the increase in errors might be found in a third study (Sleep loss and fatigue in healthcare professionals, 2007) which identified that a lack of sleep can have a number of consequences including reduced attention span, reaction time and impaired memory. It also found that sleep-deprived nurses were less able to empathise with patients and co-workers and, as a result, had less patience in listening and responding to concerns.

However, in reality sleep deprivation as a result of shift working does not only affect those in healthcare – they just seem to be a popular group to research. But what about the tired banker who types one too many zeros into a trading platform or the control room worker who misses a vital warning signal or the construction worker in charge of a digger or the forklift truck driver in a warehouse – the list could go on. In all these cases impaired alertness can have serious consequences.

A study from the journal *Workplace Health & Safety* found a strong link between police officers working the night or evening shift and getting fewer than 6 hours of sleep a night. Furthermore those officers sleeping less than six hours a night were also twice as likely to suffer from poor quality sleep – a double whammy.

A study by Bryan Vila (Tired Cops: Balancing Social and Workplace Justice) found that 53% of US police officers get less than 6.5 hours of sleep a night and 93% of Canadian and US officers report being routinely fatigued with 14% tired at the start of a shift.

But what are the performance consequences – at least in police officers?

A case study on policing the Montreal tuition fee riots found that intense periods of operations made it difficult to rest and recharge. When tired the ability to make decisions, perceive what was happening around them, deal with conflict and control emotions diminished. When tired officers felt more threatened. All together this made the balance between restraint, controlled force and cessation of controlled force more difficult to achieve.

Should organisations be wary of legal ramifications?

This is an interesting area of debate. There are two cases worth highlighting which would suggest that there are increasingly going to be legal ramifications associated with tiredness and fatigue, especially as a result of shift work.

Back in 2007 the World Health Organisation ("WHO") outlined the carcinogenic consequences of working the graveyard shift. The International Agency for Research on Cancer went as far to deem the effects of shift work to be similar to the effect of industrial chemicals.

Following the release of the WHO findings the carcinogenic link was deemed to be so strong that the Danish government started paying compensation to female night-shift workers who developed breast cancer.

Does this mean that there is going to be a flood of claims against public services and other organisation which operate shifts? Perhaps not immediately but the foundations have been laid.

Another interesting case comes from the US in late 2013. A wrongful death lawsuit was issued after the tragic death of a healthcare worker in Ohio. The worker died driving home after the latest in a series of extended shifts when she fell asleep behind the wheel and hit a tree.

The lawsuit alleged that the hospital was aware that its nursing department was understaffed and overworked resulting in extended shifts, being called in on rest days, not being able to take scheduled breaks and sometimes not having time to eat. The lawsuit alleges that the hospital failed to act upon the staffing issues and implement more rigid working schedules or policies on working hours.

It has not been determined whether the case will be treated as a worker's compensation issue or a personal injury / wrongful death case. Even without any legal qualifications you can understand why the case was bought and could argue a pretty strong case in favour of the family of the worker. Whilst there's been no deluge of similar legal action it is easy to imagine that this may change.

Think for a minute. Let us assume that in our evermore litigious world we will see more actions and claims upheld. Can your company demonstrate how you have helped staff to overcome the health and performance implications of shift working? What would the cost be (including management time and lawyers fees) to your organisation of a single or more wide scale action?

Summary of the paper so far

So what have we learnt? We know that shift workers find it especially difficult to obtain sufficient good quality sleep. We know that the most likely reason for this is circadian disruption. We also know that sleep duration falls in those working shifts with a significantly higher proportion of shift workers sleeping for periods of time that are associated with negative health and performance outcomes.

We know that insufficient poor quality sleep is associated with significant adverse health and performance consequences. We also understand that there are negative health and performance affects associated with working shifts.

Let's refer back to some of the costs. For the moment let's focus on Cardiovascular disease ("CVD") alone! We learnt that (according to the American Heart Association) CVD costs the US economy £448.5bn annually - or roughly $3,450 per employee per annum.

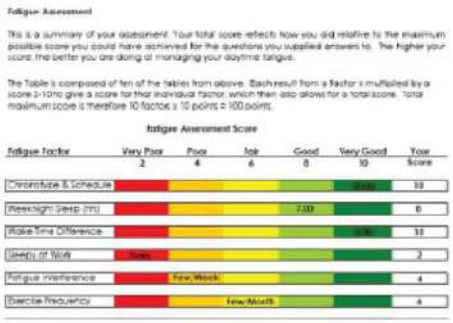
Taking the figures from the two studies reported in the *Journal of Occupational & Environmental Medicine:* 34% of CVD costs relate to lost productivity ($1,173 per employee per annum) and reducing just one CVD risk factor led to an annual saving of $950 per employee per annum.

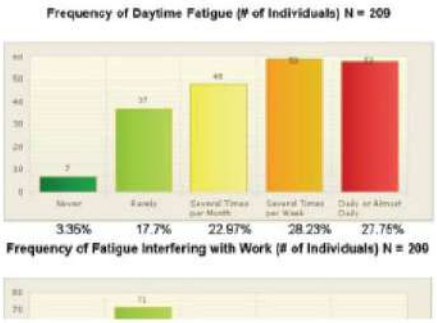
Dr Paul Zollinger-Read - the Chief Medical Officer at BUPA - calls poor sleep the hidden heart disease risk factor. The studies around insufficient sleep and increased heart disease would certainly suggest that this is the case.

Even for companies which do not offer healthcare the costs which relate to lost productivity will be affecting your bottom line. So whether you offer healthcare / health insurance ($950 loss) or you rely on a state health scheme ($323 productivity loss) it would appear to make considerable sense spending $30 to $60 per employee reducing the health risk factor that comes from poor sleep.

Not only will you benefit from the cost savings and improved productivity associated with CVD but also savings from all the other health and performance consequences associated with poor sleep (and shift working).

Now we'll explain how you can create a comprehensive programme to alleviate some of the (previously) "inevitable" health and performance consequences associated with shift working.





So how should a comprehensive fatigue management programme for shift workers look?

We believe that there 4 key elements to a programme which tackles common issues in shift workers.

1. Awareness – raising awareness amongst key management personnel
2. Policies and procedures review – with a specific focus on your industry
3. Train-the-trainer – engaging key management, health & safety and training personnel
4. Education – educating staff from the top down using a variety of media on an ongoing basis.

Awareness

The key to tackling any business issue is to understand the extent, impact and causes of the problem.

Third Pillar of Health has worked with leading sleep research scientists in the US and UK to put together an assessment which can be completed online or in a paper-based format. Our programme has been accredited by the International Institute of Risk and Safety Management ("IIRSM").

On completion of the assessment each individual receives their own report detailing areas where they can make adjustments to improve their night time sleep and personal energy during the working day. We also provide the organisation with a composite report detailing the extent, impact and causes of tiredness and fatigue.

This composite report is crucial in raising awareness of the problem amongst key management personnel. The results from the assessments will also enable us to scope, suggest and ultimately build interventions which target the actual issues within the business.

Policies and procedure review

The first step in the review of policies and procedures is to share the findings from the assessments with the group leadership team. This will provide a solid base, founded on actual evidence, on which to build policies and procedures which address the problems in the business.

Any policies and procedures will include best practice as well as specific local elements. Policies and procedures in respect of fatigue management should at least contain sections on:

- Legislative frameworks pertaining to tiredness and fatigue
- Working hours – by industry / job role as well as best practice
- The roles and responsibilities of staff at each level of the company structure
- Maximum shift lengths and duration and minimum rest breaks
- Identification / control of fatigue factors
- How to report incidents and near misses
- Training / Education and induction in respect of tiredness and fatigue
- Communication & consultation in respect of tiredness and fatigue and subsequent policy revisions
- Self-assessment methods
- Supervisor / peer observation
- What to do if you / a member of staff is too tired to continue their job safely.

Third Pillar of Health has worked with leading companies in the past to help formulate policies and procedures which work for those particular organisations. We are happy to either provide you with a framework or to work within your existing framework.

Policies and procedures should be communicated to local management with time set aside for reflection prior to a process of discussion and amendment to ensure complete buy-in from local management.

Train-the-trainer

Following the awareness phase and completion of policies and procedures the next stage of the programme will be to educate local senior management, health & safety and training personnel. This programme will include relevant information on the extent of sleep deprivation, the effects of fatigue (on health, safety and performance), local legislation and working standards, company policies and procedures, roles and responsibilities, how to spot the signs of fatigue, best practice in dealing with fatigue (prior to and during a shift) as well as how to raise issues with staff and management.

As part of the programme we also provide training personnel with reference notes to use when discussing the subject with their staff and “bite-sized” reference cards for the members of staff themselves to ensure the issue stays at the forefront of their mind. We will also introduce the trainers to the educational content that will be used in the immediate future and on an ongoing basis so they are familiar with the content and timeframe.

Education

Once senior global and / or local personnel have been educated the next phase is to roll out a comprehensive programme of education to the staff working on the ground.

There will be aspects of the education programme which are generic and aspects which should be tailored to the specific audience. The delivery of the content should also be tailored to different groups. The key to engaging different staff groups is to communicate with them in way they are most comfortable.

Video training content that we have discussed in the past includes (but is far from limited to):

- Introduction to sleep and fatigue – de-mystifying sleep and allowing staff to make informed decisions daily
- Coping with shift work – Additional hints and tips for shift workers to help them cope with shift work
- Shift working for shift workers families – Educating those close to shift workers to create understanding
- Drowsy driving – a hard-hitting video exploring the consequences of drowsy driving with real personal relevance.

We have also created ongoing weekly / monthly campaigns focused on specific topics. These campaigns enable us to go into more detail on certain aspects of managing fatigue. We know from experience that detailed information on topics such as alcohol, caffeine, the sleep cycle, sleep debt, sleep hygiene and napping (amongst other topics) are well received and that even small changes based on education on these topics can have real positive outcomes and can be put into practice that very same day.

We can also adapt the format of the delivery to best suit the needs of the different worker groups. These may be one or a combination of emails, posters, podcasts, CDs and intranet pages.

What next?

We hope that this paper has provided sufficient evidence for why a programme tackling tiredness, fatigue and sleep deprivation in shift workers will yield significant dividends in terms of health, performance, safety and ultimately your organisation's finances.

We would like to discuss how a programme might look for your organisation. If this is not directly within your remit please pass it on to the relevant member of your organisation.

For a no obligation conversation and a guarantee of no pushy sales people, please contact us:

Email: info@thirdpillarofhealth.com

Telephone: +44(0)845 686 0022

Website: www.thirdpillarofhealth.com

Request more information: http://www.thirdpillarofhealth.com/pages/contact_us

Request a call back: Feel free to email us at the above address and request that we call you back

Twitter: @3rdPillarHealth

LinkedIn: http://www.linkedin.com/groups/Employee-Energy-4644422? trk=myg_ugrp_ovr

Other papers you may be interested in:

- Why should you put Employee Energy at the forefront of your staff health and wellbeing strategy?
- How and why should you tackle the growing issues of stress, burnout and sleep deprivation in staff?
- Drowsy Driving: How and why should your organisation take a more proactive approach to tackling this costly problem?
- Examining the need for programmes to counter tiredness and fatigue in safety-critical industries.

IIRSM
– Approved Centre –
21 September 2013 to 20 September 2015

IIRSM
RECOGNITION
INFORMATION
SUPPORT
ENHANCEMENT

International Institute of Risk and Safety Management

This is to certify that

Enhancing Employee Energy and Managing Fatigue

is now accepted as an accredited e-learning course from

21 Sept 2013 to 20 Sept 2015

on behalf of

The International Institute of Risk and Safety Management established to advance public education in accident prevention and occupational health

IIRSM
– Approved Course –

Peter Hall
Chairman
Board of Council

IIRSM, Suite 77a, 77 Fulham Palace Road, London W6 8JA United Kingdom