

**Reducing burn-out in clinical laboratory shift
workers utilizing HFE techniques**

The goal of the clinical laboratory is to provide accurate and timely laboratory test results to physicians that aid in the correct diagnosis and treatment of disease. In order to accomplish this goal in a hospital setting, the laboratory must provide services 24 hours a day, seven days a week. There are several problems that arise from this requirement, most of which affect the employees who must supply coverage during the evenings and nights (shift workers). These negative aspects affecting the laboratory shift workers include a high level of stress, increased sick leave, high employee turnover, technical errors and accidents. The clinical laboratory is a dynamic work environment with many attributes that may cause employee discomfort, or even jeopardize employee safety. By utilizing human factors engineering techniques, these problems could be significantly reduced or even eliminated. A hospital organization would benefit from investment into preventative interventions by reducing errors, reducing money lost due to absences and non-productivity, and increasing employee satisfaction.

The facility this paper will utilize as a model is a University-affiliated, tertiary care medical center. It consists of 250 inpatient beds, an emergency room, a surgical unit that performs heart surgery, and an extremely large outpatient population. The outpatients are seen at the main campus as well as 5 geographically separated outpatient clinics. The laboratory serving these patients performs over 2.5 million laboratory tests per year, and is operational continuously. The clinical laboratory has approximately 120 employees. The laboratory is divided into discrete sections, based on the type of testing performed. Certain sections require 24-hour staffing, while others do not. Each position has unique responsibilities and duties, so are not all interchangeable. The most significant problem affecting this facility is a high rate of shift worker turnover, with errors and accidents not far behind. It is hypothesized that the problems are symptoms of employee burnout due to inadequate sleep and inability to adjust to shift work. Approximately 25 million Americans work regular or rotating hours outside the 9-to-5 daytime schedule. Studies indicate that 62% of shift workers suffer from sleep/wake disturbances, compared with the 20% of daytime workers. Sleep deprivation can have numerous detrimental consequences to personal health and safety, including poor mental performance, tension, fatigue, and gastrointestinal and cardiovascular problems.¹ The staffing challenges demonstrated by this laboratory are certainly not unique. Through informal discussions with similar size facilities, the parallels are striking. Because of the commonality of the problems encountered in shift work, this intervention model and recommendations could be applied in alternate settings, with few adaptations.

This laboratory currently has a total of 12 evening shift positions and 5 night-shift positions, although not all are fully staffed at any given time. The evening shift consists of 4 for hematology/blood bank coverage, 4 for chemistry coverage, 2 for microbiology coverage, and 2 for blood drawing. The midnights are organized to have 4 positions trained to work in all of the above sections and the fifth midnight person covers the blood drawing area. With a few minor exceptions, the evening shift is 3:30 pm to midnight and the night shift is midnight to 8:00 am. Because coverage is also required on weekends and holidays, the schedule constantly rotates.

The laboratory has had an extremely difficult time maintaining staffing in these positions, especially the midnight tour of duty. Since 1999, the four midnight positions have never been all filled. As soon as an individual is selected and fully trained, another individual leaves. The chronic shortage on midnights contributes to burn out because vacation time is challenging and extra hours are often required. The laboratory has lost nine people on midnights, since 1999. Most departed for daytime job opportunities and cited tiredness, stress, and discomfort working nights as the reason. Two individuals, of the nine, attempted suicide. Although it is not clear if depression is a symptom of sleep deprivation or if sleep deprivation is a symptom of depression, it appears that depression is often linked with inadequate sleep. According to Florence Cardinal, a free-lance writer, "There is a close relationship between depression and sleep deprivation. Sleep disorders such as insomnia, sleep apnea and delayed sleep phase syndrome rob you of sleep. Lack of sleep saps your energy, makes you irritable and sucks all the joy from your life. The result? Decreased productivity and an increased risk of mistakes or accidents can cost your employer hundreds of dollars. You could even lose your job because of it. Yet another reason for depression."² One individual, currently assigned to the evening shift had 6 months of medical leave due to stress caused by covering midnights. On the evening shift, 3 individuals have left since 1999, although there has been great stability in the last 18 months. This stability coincides with the implementation of an on-call system for last minute coverage requirements, and an adjustment in the way coverage's were handled. Prior to this time, individuals were asked to work a double shift, or come in on their days off for an additional 8 hours if midnight or evening coverage was required. The current coverage strategy only requires an individual to work an additional 4 hours, thus sharing between 2 people on different shifts. The staffing method utilized by this laboratory has undergone multiple modifications in an effort to minimize problems, including changing the supervisory staff and pay levels. Reorganization is a typical solution applied by management to alleviate issues; however, it is questionable if this solution truly addresses the root cause of the problem.

Another issue affecting the shift worker in the clinical laboratory is technical errors and accidents. Although most errors encountered in this laboratory are clerical and not critical mistakes, it is important that they are tracked, corrected, and prevented. Of the last 100 errors made in the areas of hematology, chemistry and blood bank, shift workers made 60 percent. It is important to note that the shift workers comprise about 10 percent of the total workforce. It is apparent that this is an inordinately high amount of errors. Additionally, the shift workers suffered from a higher relative percentage of single-episode accidents. Conversely, the shift workers have a significantly lower amount of cumulative trauma disorders. Recent accidents include a blood spill/splash on a midnight technologist, and a puncture wound with a tainted needle in an evening shift employee. Both of these incidents involved the employee not paying close attention to what they were doing. In the splash incident, the employee did not wear the personal protective equipment according to regulations. It is possible that the absence of an on-site supervisor also contributed to this anomaly.

The final significant problem noted in staffing includes an increased amount of sick time taken. According to Dr. Katherine Albert, "Workers on unusual shifts average five or more absent days per year..."³ Since January 2003, one midnight employee has

taken 64 hours of sick leave (8 days) and one evening employee has taken 79 hours (almost 10 days). The newest employee, hired in late May, has already used 2 days. It is important to note that these numbers do not include any normal vacation time used for personal business and that sick leave taken to care for a family member was not counted. Not including family care, the entire workforce staffing the evenings and nights averages 2 sick days per month. The average on day shift is 1.2 sick days per month.

The causes of the above issues appear to be linked to lack of sleep and other detrimental effects of shift work. The body needs sleep to maintain its health and well being. Scientists have debated the exact purpose of sleep for years. At present, it appears that sleep – particularly the sleep-inducing hormone melatonin - plays a crucial role in keeping the brain free of free radicals and in stimulating the immune system. Studies prove that without sleep, the body would break down and die.⁴ The body operates utilizing specific cycles called circadian rhythms. Circadian rhythms are demonstrated by physiological changes in the human body. The best-known physiological variables are body temperature, heart rate, blood pressure, and the excretion of potassium. In the human being, the circadian rhythm is governed by the hypothalamus, and remains consistent even if one's daily activities change. The circadian rhythms run on a slightly-longer-than 24-hour cycle with specific times of alertness and fatigue. The circadian rhythm is triggered by light and the production of melatonin. This is what contributes to an individual feeling sleepiness at one particular time of day, and wide awake at others. Because it is partially governed by light exposure, most individuals are the most tired from about 2:00 am to 4:00 am. This phenomenon also explains why a midnight worker may be tired throughout the shift and then perks up on the drive home from work. Exposure to sunlight has reduced the melatonin, and the sleepiness disappears. It is important to note, however, that an individual can manipulate their circadian rhythm, to better agree with external cues such as travel or shift work, with a significant effort and consistency.⁵ It is the interruption of these rhythms that has many detrimental effects on employee health and safety.

Research has demonstrated serious health risks are linked with working shifts that are either non-traditional or rotating. According to Reuters Health, there are significant increases in heart diseases, probably due to development of a condition called premature ventricular complexes (PVC), which is associated with extra heartbeats. During one study, it was found that nearly half of the night shift workers demonstrated increased PVC's, while just more than one quarter of the day shift workers had PVC's.⁶ Additionally, there appears to be an increased risk of breast cancer in women who work unusual shifts. According to two different studies performed from Harvard Medical School, women who worked night shifts for 30 years or more had a 36% higher risk of breast cancer than those who did not. Researchers believe the link is related to the supply of melatonin, a hormone that helps to regulate the body's natural clock.⁷ Employee safety is also compromised when required to perform shift work. Actions such as driving or operating equipment may be dangerous to the sleep deprived individual. According to Dr. Albert, "What about chronic sleep deprivation – frequent sleepless nights or always getting just a few hours less sleep than you need? The effects of that pattern may come to seem like an illness – a feeling of listlessness, irritability, difficulty concentrating, impaired judgment. Your reaction time may be impaired...Some people have memory problems. Others become negative, hostile,

apathetic, or depressed.”⁸ Many shift workers suffer from problems relating to social or familial relationships. The shift worker will be forced to make a choice between sleeping during times normally set aside for socialization, or to sacrifice sleep in order to spend time with family and friends. As a result, shift workers may feel isolated and have relationship problems. Safety is an area also often affected by shift work. “Night workers are most susceptible to bouts of extreme sleepiness and inability to think clearly during the early morning hours (between 3 and 6 am)...It is at this point that bouts of irresistible sleep ('nodding off'), non-attentiveness, or errors in judgment or execution can result in anything from substandard quality product to a major industrial accident. Some of the most notorious industrial accidents (Three-Mile Island, Bhopal, Chernobyl, and the Exxon Valdez) occurred during these early morning hours, and human error and prior sleep loss played a key role in all of them.”⁹ The effect of shift work on safety is so important that the National Institute for Occupational Safety and Health (NIOSH) published a paper entitled “Plain language about Shift Work” to decrease the health and safety problems associated with working evening, night, or rotating hours. NIOSH is the only federal government organization mandated to conduct occupational safety and health research and training.¹⁰ When these types of incidents are reported in relation to shift work, it does not bode well for the clinical laboratorians who must perform testing that may affect the appropriateness of the medical treatment a critically ill patient may receive.

Another adverse affect on employees' health and sleep in the clinical laboratory environment is the potential exposure to electromagnetic fields (EMF). EMF's are a very low level type of radiation that is generated when electric currents flow through wire coils. The frequency at which an EMF is pulsed determines if it is harmful. One of the main reasons why medical professionals are concerned about EMF levels is that it has been demonstrated to have a negative impact on melatonin production, and therefore affects sleep.¹¹ Although the EMF levels in a household are generally extremely small, the clinical laboratory worker may be exposed to much higher levels for a constant and cumulative duration. Today's state-of-the-art analyzers are all made up of many sources of EMF's. In conclusion, it is apparent that research as well as common sense demonstrates that shift workers are more likely to suffer health and safety problems when compared to their day shift counterparts.

Through the use of human factors engineering techniques, many of the negative aspects of shift work can be reduced or eliminated. The recommendations included in this work encompass assessing the need for intervention, training for supervisors, facility improvements, schedule recommendations, and training for shift workers. It is a full scale approach that has the potential to reap many benefits in improving health, safety, and morale of shift workers. Additionally, it may provide a framework for organizations to improve quality, and reduce lost income due to Office of Workman's Compensation (OWCP) claims, sick time, and safety incidents. Improvements in the quality of life for shift workers will result in less staff turnover and the ensuing administrative costs associated with interviewing, selecting, and training new employees. Because there may be a cost associated with an intervention plan, the hospital senior management should be made aware of the problems and the recommended strategies to eliminate them. It is important for an organization to be

supportive of improvement measures, as changes in regulations, policies, and fiscal obligation may ensue.

The first process an organization should undergo includes a comprehensive assessment, or baseline, of the current practices and staffing issues. The laboratory management, in conjunction with supervisors, should identify coverage required, current shifts, and sleep related policies or regulations. A survey of the shift workers should be performed including questions regarding sleep practices and general emotional and physical wellness identifiers. A sample survey is attached at the end of this work. [See sample survey](#). The goal of the survey is not to diagnose sleep or health disorders, but to get a better idea if employees are having symptoms of inadequate sleep, and if interventions are merited. The sleep survey also provides a good basis to identify areas in which the shift workers need more education. After interventions are made by an organization, the same survey can be performed to verify appropriate measures were implemented.

Based on the information obtained in the organizational assessment, the manager should compile an action plan to improve the weak areas which have been identified. One of the priorities should be comprehensive training for all supervisory staff. The training should have several objectives as follows;

- Supervisors will be able to identify signs and symptoms of sleep deprivation in shift workers.
- Supervisors will be able to generate a schedule that interferes as little as possible with the normal circadian rhythm of shift workers.
- Supervisors will be able to make recommendations to subordinates on healthy lifestyle choices and helpful hints on improving quality and quantity of sleep.
- Supervisors will be able to recognize warning signs of potential accidents, errors, or health risks due to insufficient sleep.
- Supervisors can refer employees to appropriate organizations for care and treatment of sleep related problems.

Additionally, all supervisors should be empowered to relieve an employee if sleepiness is affecting their personal health or safety or the health or safety of others. This is especially important in fields such as healthcare, transportation, and technical or heavy equipment operations. Resources are available to provide training to any organization, or a facility may choose to create their own program. The clinical laboratory has an advantage because many medical facilities have sleep specialists assigned that can provide the training at little or no cost. If an organization is not able to provide training internally, Circadian Technologies, Inc. (www.circadian.com) is a company that provides on-site, workshop type training as well as seminars, and web based training. They provide a newsletter and personal interaction with company representatives. Even utilizing the web site provides much information to the layman with little knowledge in the management of shift workers.¹² Circadian Technologies, Inc. appears to be a forerunner in the study of, and training for shift work. Another organization, Shift Work, LLC. also offers training and assistance to facilities wanting to improve the effectiveness of shift work.

Next, the organization should address any physical improvements which may be required in the work areas. Adequate bright lighting is a must, and all areas in which

the employees reside should remain lit throughout the shift. A level of at least 2000 lumens is adequate, but brighter light (as long as there is not excessive glare) may be appropriate. For the organization which is truly dedicated to improving the health and safety of shift workers, high-tech computer aided lighting technology is available. This technology includes extremely bright lights which are programmed to change levels of illumination to set employees circadian rhythms correctly. "SRI is a leader and innovator in the area of optimizing working environment for shift work operations. SRI has obtained an exclusive license for the United States and Canada for a patented technology for improving employee alertness and performance on night shifts. This technology, which is referred to as **Circadian Lighting Technology**, is based on recent medical research showing that much brighter lighting in the workplace, when timed appropriately, can reduce night shift sleepiness, improve performance and mental alertness, and reduce problems associated with changing to and from night shifts. The lighting hardware (primarily fluorescent lighting with solid state dimming), electronic controls, and control software offered by SRI for specialized use in 24-hour workplaces, particularly those in which it is critical to have alert, optimally performing employees, are collectively called the **Circadian Lighting System (CLS)**."¹³ Additionally, the facility should have an area available for an employee to exercise. Often organizations are challenged by space requirements, and may not be able to install a gymnasium for exercise. In these cases, the supervisor should simply provide recommendations for ways to get exercise using what is available. An employee could climb stairs for 15 minutes, or take a brisk walk in the hall. Another way of obtaining exercise is utilizing a private room to perform calisthenics, stretches, or aerobic activity. The organization could provide posters or booklets on exercises in the private area to aid in motivation. It is important, however, for the facility to provide adequate lighting in these areas as well. It is useless to provide specialized lighting in a work area, and have employees spend time jogging in the dark. The clinical laboratory should also research the amount of EMF exposure and implement any physical or work practice engineering to reduce the levels at each workstation. A final recommendation for having a "shift-friendly" workplace is to design a napping area for designated napping. Napping is one of the most effective alertness strategies shift workers can employ. Yet this is a very contentious issue both among employees and managers. The prevailing view is that you're being paid to work and not sleep and as long as you are at your job, you should be awake. Yet every shift work employee can attest to sleeping while at work and most managers either know or have found employees sleeping while at work. In some workplaces, this results in dismissal or at least discipline of the employee. What goes on in many organizations is "random napping," that is, employees who are extremely fatigued or who cannot overcome the strong physiological need to sleep, will simply fall asleep at their station or find a quiet spot where they can get a nap without anyone knowing. This presents several problems, not the least of which is that they may injure themselves and others. Certainly productivity suffers. Some organizations, however, have recognized the pitfalls of random napping and have instituted "controlled napping" instead. They have done this because they understand the value of napping in increasing employee alertness and productivity and decreasing the potential for errors and accidents. They have taken a proactive stance and determined how they can incorporate napping in an appropriate way.¹⁴ Because the circadian rhythm is partially

affected by temperature, the laboratory temperature should be comfortable and slightly on the cool side. Many laboratory equipments generate a large amount of heat, so supervisors should monitor temperature in several areas of the lab. The sound in the laboratory is also conducive to sleep. The low humming of refrigerators and centrifuges can lull a sleepy worker to sleep. Policies should allow the playing of music to continue to motivate employees. Many of these physical improvements can be performed with little cost to the organization. By including the shift workers in making recommendations for improvements, supervisors may learn some creative ways to improve the physical atmosphere in the clinical laboratory.

The shift coverage schedule is often extremely challenging in the laboratory setting. Often workload is unpredictable. For example, one section in a clinical laboratory is transfusion medicine. This section is responsible for providing blood to patients which have excessive bleeding. In the model hospital, there may be no work in transfusion medicine for 3 nights in a row. On the fourth night, a patient can come in with internal bleeding and require numerous units of blood and emergency surgery, requiring the assistance of two medical technologists in one section. Because of this unpredictability, supervisors must staff for the worst case scenario, which may lead to some nonproductive time on the midnight tour of duty and contribute to sleepiness during the work shift. While every laboratory is unique in the services provided to the patients and healthcare providers, there are several general recommendations that can be made. The most important aspect of scheduling for shift coverage is to remain as consistent as possible. It is recommended that individuals employ one of two strategies; either remain on the same shift continuously or rotate only 1 night shift and return to a day cycle.¹⁵ Rotating shifts prevent employees from adjusting to any particular schedule and may cause insomnia. Additionally, if an employee can plan on regularly scheduled off time, they are more able to maintain an appropriate social and family life, thus reducing the amount of staff turn over. If an employee must rotate or change shifts, they should move forward on the clock rather than back. For example, a day shift employee should cover for evenings, and evenings for nights. Moving forward seems to affect the circadian rhythm least, when moving forward. Night shifts and evening shifts should be as short as possible. The savvy manager may be able to find employees wanting to work part-time that could cover evening and midnight shifts in smaller increments. One sample set up would be to have 4 part-time employees work 4 hour shifts, as opposed to 2 employees covering a 16 hour period. There are many scheduling combinations available, and the internet is a great source for sample schedules to work from. One web site which can be used is <http://www.shift-work.com/shift-schedules/archives.htm>. Additionally, there are commercial shift work and scheduling packages that can be purchased. Often working with the individuals working the shift will aid in improving the morale of employees. "As you know, having support from the workforce is vital to the success of any new shift schedule. While this page focuses on the shift schedules themselves, **these schedules will probably fail without the support of the shift workers.** In fact, the easiest part of implementing a new shift schedule is usually the schedule design step itself."¹⁶ Another crucial scheduling technique is to minimize overtime. Overtime is costly to an organization, not only in actual dollars spent, but in the cumulative effect on the employee. An employee working overtime is not only staying awake more hours and becoming more sleep

deprived, but the overtime is taking away from the off days. This negatively impacts their social interactions and disturbs the time needed to relieve their sleep debt. Sleep debt is a term applied to the accumulation of lost sleep time over a period. It is much like a monetary debt, which must be paid back. For example, if an individual gets only 4 hours of sleep in one period, they must "pay-back" the 3-4 hours on another night. The accumulation of sleep debt contributes to sleepiness and increased accidents.¹⁷ An employee, who works overtime, is accumulating sleep debt and is unable to pay it back. An alternative for the use of overtime is temporary employees or per diem employees. Per Diem employees are those that work only when needed. The negative aspect of utilizing per diem is there is often a high turnover rate among this group as well. A potential benefit, however, is the per diem employee is trained and may fill a permanent full-time position when available. While an organization is examining the scheduling mechanisms, it may also be effective to research workload and duty assignments. Adding more physical work to evening and night shifts will prevent sleepiness, especially if performed during the low hours of 2 to 4 am. Avoiding boring or repetitive tasks during these hours is also recommended. It may be the supervisors' responsibility to provide more structured duty assignments for evening and night shifts. Additionally, mandatory training and meetings should be scheduled during the regularly worked shift. Evening and midnight employees should not have to interrupt their routine by coming in during day shift hours for training and meetings. By improving the schedule, reducing overtime, and adjusting workload, the quality of work performed, and the quality of life for employees, may be greatly improved.

The final suggestion in reducing burn-out for shift workers in the clinical laboratory is to provide education to the staff on working shifts. Depending on fiscal constraints, the education can be provided by supervisors, commercial organizations, hospital sleep experts, or self guided. The training should include information regarding the circadian rhythm and recommendations for maintaining these rhythms. Simple suggestions such as having night shift employees wear dark glasses on the drive home, to avoid exposure to sunlight, may have profound effects on their ability to sleep during the day. Education on proper nutrition, healthy food choices, avoidance of stimulants, and exercise is also imperative. For the clinical laboratory, hospital dietetics is a resource which could be utilized to provide training at little or no cost. Employees should be alerted to danger signs of sleepiness and preventative measures, such as power napping before driving, or asking for assistance from coworkers. Staffs need to be educated on resources available for assistance in dealing with sleep related issues, such as stress and depression. Recommend the employees keep a sleep diary for a period of time to identify areas for improvement. The model hospital, and many others, has employee assistance programs available at no cost for counseling and referrals. Involving the employees, including questions and answers, should be a part of the training. One note of caution, the organization should provide the training during the appropriate evening or night shift. Management needs to be aware of the danger of not practicing what is being taught. If the employees are being educated regarding the importance of not working overtime and maintaining their circadian rhythms, it becomes ineffective if the shift worker must come in during the day for the training. Training of new shift workers is important, as it may take up to one month to adapt to the new schedule.

In identifying the investment in effective interventions to improve shift work issues, the laboratory management should provide a thorough cost analysis to hospital administration. The model hospital is spending over \$7,600 per year in administrative costs for each staff turn-over. New staff training and orientation amounts to \$20,000 of training time for each new employee. One employee taking medical leave costs the organization their full salary, the salary of the replacement, and medical costs. This can amount to as much as \$15,000 per month of time off. A needle stick injury costs the hospital \$26,000 in medication, testing, and counseling. If a disease is acquired through the injury, costs can skyrocket to the hundreds of thousands. It should be apparent why intervention is needed. For the model laboratory the following specific suggestions are made;

1. Hire a contract company to provide supervisory training regarding shift work and scheduling. Cost is approximately \$10,000, which includes creating an improved schedule.
2. Make physical improvements to facility. Purchases include a recliner, a treadmill, and increased lighting. Cost in energy and direct purchases are approximately \$5,000.
3. Train the shift workers utilizing supervisors, sleep experts in the hospital, and nutritionists. Cost in lost time for training is about \$100 per employee. Total cost for model hospital is about \$1,500.
4. Reduction of overtime saves facility about \$1,000 per pay period.

The figures demonstrate that if the intervention saves one employee from leaving the shift, money is saved. These solutions are long term, which can continue to pay off for many years. The fiscal return on preventing an employee accident or patient compromise is priceless. Overall, these interventions are likely to improve morale among the shift workers and improve the awareness among hospital administrators and supervisors.

The clinical laboratory has a critical mission to serve the patients and their families by providing timely and accurate laboratory testing. A mistake in the laboratory made by a tired shift worker can be life threatening to a patient. A laboratory shift worker, suffering from depression or stress due to lack of sleep, has the potential to harm themselves or others. Many workers are alert to these dangers, and leave the shift before it is too late...what about those that do not? It is the responsibility of every organization to ensure the shifts required are managed in the most effective way possible to optimize the quality of work and the health and safety of the workers.

Sample Survey for Laboratory Shift Workers

[\(Back\)](#)

1. On a normal workday, what time do you usually fall asleep after work?
2. On a normal workday, what time do you usually wake up?
3. Do you sleep soundly during this time?
4. What interrupts your sleep the most?
5. On a normal off day, what time do you usually fall asleep? What time do you wake?
6. During your shift, how often do you feel sleepy?
 - a. 1-2 times
 - b. 3-5 times
 - c. more than 5
7. How often do you notice having problems with safety or performance due to sleepiness?
 - a. Never
 - b. 1 time per week
 - c. 2-5 times per week
8. How would you rate your sleep schedule?
 - a. Regular
 - b. Fairly irregular
 - c. Irregular
9. In the last year, how has your sleep pattern changed?
 - a. Not at all
 - b. Slightly
 - c. Significantly
10. Do you feel well physically?
 - a. Most of the time
 - b. Some of the time
 - c. Little of the time
11. Do you feel socially isolated because of your schedule?
 - a. Most of the time
 - b. Some of the time
 - c. Little of the time
12. Do you eat regular meals of healthy foods?
 - a. Most of the time
 - b. Some of the time
 - c. Little of the time
13. Have you experienced any life changes that may be a by product of work related stress?
14. Do you like the shift you are on?
15. What changes or recommendations would you recommend for your schedule?
16. Do you know what a circadian rhythm is?
17. Do you know what causes you to feel sleepy?
18. Do you know ways to prevent sleepiness?
19. Do you know who to call in the event you need help or support?
20. Does your supervisor care about your sleep?

Note: Questions contained in this survey are sample questions only. Survey should be tailored to meet the needs of the individual organization. Questions contained herein are from information in multiple sources as outlined in the footnotes of this work.

¹ Herbert Ross, et al. Sleep Disorders, Clinically Proven Alternative Therapies to Help You Get a Good Night's Rest. (California, AlternativeMedicine.com, Inc. 2000), 125.

² <http://sleepdisorders.about.com/library/weekly/aa122799a.htm>

³ Katherine A. Albert, M.D. Get a Good Night's Sleep. (New York, Simon and Schuster, 1996). 26.

⁴ Herbert Ross, et al. Sleep Disorders, Clinically Proven Alternative Therapies to Help You Get a Good Night's Rest. (California, AlternativeMedicine.com, Inc. 2000), 17

⁵ Karl Kroemer, et al., Ergonomics, How to Design for Ease and Efficiency, 2nd Ed. (New Jersey, Prentice Hall, 2001) 295.

⁶ <http://www.heartcenteronline.com/myheartdr/home/research-detail.cfm?reutersid=600>

⁷ <http://www.intelihealth.com/IH/inhtIH/WSIHW000/333/24644/337039.html>

⁸ Katherine A. Albert, M.D. Get a Good Night's Sleep. (New York, Simon and Schuster, 1996). 32.

⁹ <http://www.shiftwork-resources.com/>

¹⁰ <http://www.cdc.gov/niosh/shift.html>

¹¹ Herbert Ross, et al. Sleep Disorders, Clinically Proven Alternative Therapies to Help You Get a Good Night's Rest. (California, AlternativeMedicine.com, Inc. 2000), 177-181.

¹² <http://www.circadian.com/home>

¹³ <http://www.shiftwork-resources.com/>

¹⁴ http://www.shift-work.com/information/increase_alertness.htm

¹⁵ Karl Kroemer, et al., Ergonomics, How to Design for Ease and Efficiency, 2nd Ed. (New Jersey, Prentice Hall, 2001) 314.

¹⁶ <http://www.shift-work.com/shift-schedules/index.htm>

¹⁷ William Dement, M.D., The Promise of Sleep. (New York, Delacorte Press, 1999), 60.