West Virginia University School of Medicine
Office of Graduate Medical Education

Fundamentals of Fatigue Prevention, Identification, and Management in Graduate Medical Education

The Accreditation Council on Graduate Medical Education (ACGME) requires in the common program requirements that *"faculty and residents must be educated to recognize the signs of fatigue and sleep deprivation and must adopt and apply policies to prevent and counter it's potential negative effects on patient care and learning."*

At the center of these requirements is the safety of patients and resident physician well-being. Examples of such policies include, but may not be limited to, duty hour requirements such as a maximum of 80 duty hours per week, in-house call no more frequently than one in three nights, and a minimum of one 24-hour period off each week.

As the largest sponsor of graduate medical education specialty training in West Virginia, the WVU School of Medicine expects and monitors compliance with duty hour standards through its Graduate Medical Education Committee (GMEC) and the Office of Graduate Medical Education through the direction of the Designated Institutional Official (DIO). Residents and any member of the health sciences center team are urged to report any concern regarding duty hours, fatigue, orother issues related to mistreatment through the WVU GME Mistreatment reporting link (https://medicine.wvu.edu/graduate-medical-education/mistreatment-form/).

Parallel to the focus on "duty hours" are efforts to increase the awareness of fatigue's impact on trainee well-being, learning, and patient safety. These include dissemination of:

- evidence-based information regarding the prevention, recognition and management of fatigue,
- awareness of institutional sleep experts and options, and
- access to national and specialized resources.

Restricting duty hours *alone* does not preclude fatigue. Of particular concern, is that the very strategies that training programs may adopt in a good faith effort to adhere to these standards may result in unintended adverse consequences. Programs may feel their work is "done" if they demonstrate compliance with duty hours standards. Programs may miss identifying persistent fatigue. Although perhaps better rested, resident stress

may increase if residents are concerned about losing significant learning opportunities, procedural experience, and interaction with colleagues. Residents may feel trapped by competing demands between work hours and professionalism which dictate responsibilities to patients. They may feel support is lacking from senior residents and faculty who may have an inadequate understanding of this mandate and perhaps are resentful of restrictions on duty hours.

CAUSES OF FATIGUE

Fatigue, or "excessive daytime sleepiness", may be due to a variety of factors. These may exist singly or in combination and include but not be limited to:

- too little sleep,
- fragmented sleep,
- circadian rhythm disruption (such as occurs with night float work)
- primary sleep disorders, or
- other conditions that masquerade as fatigue.

Too little sleep

This may be the most common reason for sleepiness among medical trainees, occurring when residents get less sleep than optimal. Although there is individual variation, most adults require an average of 8 hours of sleep each night. Residents may not have developed "good sleep habits" in high school, college and medical school for adequate sleep even on their nights off.

Fragmented Sleep

Alternatively, the duration of sleep may be optimal, but the sleep itself is fragmented. Insufficient time may be spent in the "deeper, restorative" stages of sleep. Though "in bed", trainees may be interrupted by frequent phone calls, pages, the need to follow up on patients, or to supervise more junior trainees. Residents may also be interrupted by residents who share the same call space. Even the "anxiety" of call or anticipation of sleep interruption can impair sleep. Even call from home may still put residents at risk due to sleep disruption with frequent phone calls or the drive back and forth to the hospital.

Circadian Rhythm Disruption

Residency training may disrupt natural circadian rhythm. This problem may be exacerbated as programs implement solutions, such as "night floats" to adhere to duty hour requirements. Night float systems and shifts may put residents on duty during periods in which there are predictable mismatches between circadian and endogenous rhythms of asleep and awake. Energy lows, for example, characteristically occur around 3-7 AM and 3-5 PM. It is extremely difficult to adapt to "shift work", regardless of how it is scheduled or its duration. The majority of individuals never adapt and may be at risk for sub-optimal performance. Working more nights in a row, rather than acclimatizing someone to night work, almost always only makes someone more tired.

Primary Sleep Disorders
Finally, residents may have a primary, undiagnosed sleep disorder such as obstructive sleep apnea, narcolepsy, restless leg syndrome or insomnia.

Other Conditions Masquerading as Fatigue
Residents may also display symptoms of "fatigue" or attribute symptoms to fatigue when the etiology is in fact anxiety, depression, stress, thyroid disease, other medical conditions, medication side effects, burnout, or career dissatisfaction.

SIGNS AND SYMPTOMS OF SLEEP DEPRIVATION

Disruption in sleep leads to a sleep debt. Performance can be impaired with two hours less sleep than "normal" per night. Significant sleep debt may occur if sleep is sub-optimal over as few as 2-3 nights. Adverse health consequences may occur if sleep debt is allowed to accumulate. Sleep debt requires several consecutive full nights sleep for adequate recovery, depending upon the number of days during which the sleep debt was accumulated as well as the individual's susceptibility and ability to "recover".

Though it is difficult to quantify what is "sufficient", the individual should feel "rested" after their recovery sleep. Psychomotor function after 24 hours without sleep is equivalent to a blood alcohol content of 0.08%, a level recognized legally as inebriation. As is true with alcohol, one cannot depend on the individuals to perceive their own degree of impairment. Studies confirm residents cannot adequately evaluate their own degree of sleepiness. The ability to recognize "sleepiness" declines the sleepier someone is.

Characteristic symptoms of sleepiness may be unrecognized. These include:

- repeatedly yawning and nodding off during conferences,
- "microsleeps"…a few seconds of "sleep" the "awake" resident may not even recognize,
- increased tolerance for risk,
- passivity,
- inattention to details,
- decreased cognitive functions,
- irritability,
- motor vehicle collisions (or near misses),
- increased errors,
- impact on sleep process itself,
- voluntary and involuntary latencies (the time to fall asleep) shorten,
- increased number of "microsleeps".

One of the first skills lost is the ability to do something quickly. If you slow down at a task, you may be able to compensate. But if the task requires a quick response, errors are more likely. Time pressure + fatigue equal a major risk.

Of particular significance for residents, perhaps, is **sleep inertia**, the confusion and dysfunction that occurs upon awakening from deep sleep during deep NREM sleep, sleep in the middle of the night, or following a period of sleep deprivation. This may occur after a brief an interval as 30 minutes of sleep. This disorientation may include a period of amnesia for the period of awakening. The impairment from sleep inertia may be greater than that from sleep loss. Opinions in the sleep medicine field differ on the significance of sleep inertia. The individual may have a feeling of grogginess and a decline in motor dexterity which could impede both mental and physical tasks.

Residents may be vulnerable to error when awakened during the night. Increased metabolic activity, such as exercise may minimize effects. Although the research evidence is inconsistent and people react with a great deal of individual variability, aware this phenomenon may occur and may color judgment and responses for the first 10 minutes (and up to 2 hours) following arousal.

ADVERSE EFFECTS OF SLEEP DEPRIVATION

Sleep deprivation results in adverse physiologic changes such as hypoxemia, insulin resistance, increased sympathetic activity, a blunted arousal response, immunologic changes, increased appetite, weight gain and diminished motor coordination. It impairs cognitive processes resulting in diminished attention, vigilance, decision-making, and memory. It increases tolerance for risk and decreases motivation for learning. Other professions, such as aviation and the military have previously recognized the potential impact of both acute and chronic sleep loss on job performance. Belenky, a psychiatrist who has studied sleep for the Army notes, "…If you're sleep deprived, you're not going to make good decisions." The same observation seems valid in other professions.

Fatigue has been linked to errors resulting in serious accidents (Exxon Valdez Bhopal, Chernobyl, and Three Mile Island). It is estimated to be responsible for 15-20 percent of transportation accidents, more than attributed to drugs and alcohol combined.

Governmental and Associations Recognition of Fatigue

The Institute of Medicine highlights the importance of medical errors as a major cause of mortality and morbidity. Fatigue probably contributes to at least some of these errors. The Joint Commission (JC) considers fatigue so important that it had health care worker fatigue in its draft 2007 Patient Safety Goals. Other western countries have substantially decreased the resident workweek and will potentially decrease hours even further. Denmark currently mandates a 37½-hour workweek compared to the Australian duty hour limit of 72 hours. The United Kingdom has adopted a 48-hour workweek for its residents.

Sleep Debt: Could you have one and not know it?

Most people don't accurately assess how sleepy they are. You may be chronically tired and not know it. The easiest way to determine if you have a sleep debt is to imagine what time you would wake up spontaneously if you were allowed to sleep in on a morning without an alarm clock, child, pet, etc. awakening. Would you sleep "past" your usual wake-up time on days you're working? If you slept two or more hours extra on

your days off compared to workdays, you're carrying some "sleep debt" and your body is trying to "recover" lost sleep.

The Literature on Sleep, Fatigue and Residents
Recent articles are referenced at the end of this paper.

Sleepiness
There is a considerable body of literature on fatigue and graduate medical education trainees. A multicenter survey of residents in a variety of specialties suggests that residents have Epworth Sleepiness Scale values comparable to patients with diagnosed sleep disorders such as sleep apnea and narcolepsy. This scale assesses an individual's tendency for dozing.

Epworth Sleepiness Scale

The Epworth Sleepiness Scale is used to determine the level of daytime sleepiness. A score of 10 or more is considered sleepy. A score of 18 or more is very sleepy. If you score 10 or more on this test, you should consider whether you are obtaining adequate sleep, need to improve your sleep hygiene and/or need to see a sleep specialist. These issues should be discussed with your personal physician.

Use the following scale to choose the most appropriate number for each situation:

0 = would *never* doze or sleep.
1 = *slight* chance of dozing or sleeping
2 = *moderate* chance of dozing or sleeping
3 = *high* chance of dozing or sleeping

Situation	Chance of Dozing or Sleeping
Sitting and reading	____
Watching TV	____
Sitting inactive in a public place	____
Being a passenger in a motor vehicle for an hour or more	____
Lying down in the afternoon	____
Sitting and talking to someone	____
Sitting quietly after lunch (no alcohol)	____
Stopped for a few minutes in traffic while driving	____
Total score (add the scores up) (This is your Epworth score)	____

In addition, daytime sleepiness may be the result of a medical condition such as sleep apnea. Your risk of obstructive sleep apnea may be assessed with the instrument in the table below.

Sleep Apnea Risk Assessment	**Answers**
A. How frequently do you experience or have you been told about snoring loud enough to disturb the sleep of others? 1. Never 2. Rarely (less than once a week) 3. Occasionally (1 - 3 times a week) 4. Frequently (more than 3 times a week) B. How often have you been told that you have "pauses" in breathing or stop breathing during sleep? 1. Never 2. Rarely (less than once a week) 3. Occasionally (1 - 3 times a week) 4. Frequently (more than 3 times a week) C. How much are you overweight? 1. Not at all 2. Slightly (10 - 20 pounds) 3. Moderately (20 - 40 pounds) 4. Severely (more than 40 pounds) D. What is your Epworth Sleepiness Score? 1. Less than 8 2. 9 -13 3. 14 - 18 4. 19 or greater E. Does your medical history include: 1. High blood pressure 2. Stroke 3. Heart disease 4. More than 3 awakenings per night (on the average) 5. Excessive fatigue 6. Difficulty concentrating or staying awake during the day	A. _____ B. _____ C. _____ D. _____ E. _____ If you answered 3 or 4 for questions A-D, especially if you have one or more of the conditions listed in question E, then you may be at risk for sleep apnea and should discuss this with your physician.

Attention Impaired

Sustained attention and vigilance to tasks were impaired equally when residents were exposed to a heavy call schedule versus light call schedule with a blood alcohol level of 0.04 – 0.05 g%. Yet another survey of internal medicine residents found that 64% were

chronically sleep deprived; many admitted to dozing while writing notes (69%), reviewing medication lists (61%), interpreting labs (51%), and writing orders (46%). In-service training exam scores among family practice residents correlated with their amount of “sleep” prior to the test. Internal medicine residents post-call were less accurate in ECG interpretation. Emergency room residents documented fewer components of a history and physical examination depending upon their shift. They also performed less well during a simulation of intubation skills.

Surgical residents demonstrated more errors and required more time than usual during simulations of common procedures. Measured postoperative complications increased by 45% for resident surgeons for those procedures they performed the day following their night on call.

Cognitive and procedural abilities decline

One study noted that residents working on a traditional schedule (>24 hours worked when on call) made 36% more serious medical errors and 6 times as many diagnostic errors as compared to their colleagues whose work hours were limited to 16 hours while on call. Twenty percent of anesthesia residents indicated that sleepiness prevented them from performing clinical duties and 12% attributed errors to fatigue. Another study of anesthesia residents found objective evidence of sleepiness when residents were tested after their “normal” (not post-call or on-call) sleep period. The same residents were tested again after allowing 2 extra hours in bed. The sleepiness improved and normal scores were obtained, implying that residents sleep deprive themselves even in a non-call situation.

Residents self-reported deterioration of professionalism, empathy, and attentiveness to patient well-being when tired. A national sample of first and second year residents correlated working more than 80 hours per week with a greater likelihood of personal accident or injury, serious conflict, significant medical error, significant weight change, increased use of alcohol and other medications “to cope”. Residents reported sleeping on average fewer than six hours per night.

Well Being

Several studies have examined the relationship between sleep deprivation and fatigue to the well-being of the health care provider. Needle stick accidents increase by 50% at night (compared to the day), increasing the risk of exposure to blood borne pathogens. A study performed with surgical residents after implementation of the new work hour rules suggested that there were less mood disturbances than prior to the new rules.

Motor vehicle collisions increase

Pediatric residents were more likely than faculty to fall asleep while at the wheel either while driving or stopped at a traffic light (49% of the residents vs. 13% of the faculty) and more likely to have a motor vehicle accident (20 vs. 11). Most incidents occurred post-call. Nearly 60% of ER residents reported a near miss motor vehicle collision, 80% of which followed their work on a night shift. The risk increased with the number of night

shifts they worked per month. Another study found that residents who worked longer than 24 hours were 2.3 times more likely to have a motor vehicle accident.

Mixed Effects on Patient Care

It should be noted that since the institution of the duty hour regulations by the ACGME, not all aspects of medical education and patient care have improved. Many studies have noted that residents' satisfaction with their jobs, personal lives, well-being, and overall quality of life is better. However, the effects on patient care appear to be mixed. Whereas some studies have not noted any compromise in patient care, others have noticed an improvement and still others deterioration. Studies in which patient care appears to have suffered due to the duty hour regulations is usually due to inadequate communication and signoff between residents.

PREVENTION/TREATMENT/MANAGEMENT OF FATIGUE

It is probably inevitable there will be some sleep loss and fatigue in the course of medical training. However, it must be managed so it does not interfere with patient care and safety, education, and resident well-being. Developing strategies to minimize the effects of sleepiness in physicians is paramount. Learning to recognize and manage fatigue is essential. Anecdotal and empirical evidence suggest that limits on work hours in and of themselves do not guarantee well-rested and optimally functioning residents. Work hour limits are difficult to enforce, particularly if residents have workaholic tendencies or if faculty does not support work hour restrictions. In addition, resident behavior outside of the workplace is difficult to govern (i.e. moonlighting activities, home responsibilities). Residents are adults who cannot be "forced" to be adequately rested.

The prevention, treatment and management of resident fatigue are therefore a shared responsibility of accrediting bodies, the sponsoring institution, participating hospitals, programs, faculty and residents.

Accrediting bodies

The ACGME has set "the rules." These should be construed as minimums. Some states have additional regulations.

Programs/Institutions should:

- Adhere to duty hour requirements and specialty-specific duty hour requirements (whichever is the more stringent),
- Minimize prolonged work (> 24 hours of clinical duties),
- Protect periods designed to address sleep debt (i.e. the minimum of at least 24 hours off each week free from all clinical responsibilities),
- Reduce non–essential tasks and enhance learning during clinical time,
- Reduce non-essential interruptions (i.e. added ancillary services, triage of phone calls by charge nurse, etc.),
- Assist residents to identify co-existent medical issues which impair their sleep (i.e. undiagnosed sleep disorder, depression, stress),
- Educate regarding awareness and management of fatigue,

- Critically appraise the best way to implement shift work,
- Provide napping resources,
- Explore options with residents to return home safely.

WVUH provides a conducive rest environment that includes a lounge and private rooms for naps and nighttime sleeping. If there are difficulties with this area, contact the GME office at 304-293-0672 or WVUH Medical staff affairs at 304-598-6324**.**

Night float systems are increasingly used to comply with duty hours. It takes at least a few “nights” to adjust to the night float schedule and another few nights to adjust to a return to “routine hours.” Individuals on Night Float should consider keeping their Night Float sleep-wake schedule on their days off and adhere to this schedule for the duration of their rotation. Over 90% of individuals never habituate to night float even if they work them chronically. When night floats are used, they should be designed to take advantage of the fact that it is easier to change rotations from days to evenings, rather than vice versa.

Program Director Responsibility

Program directors should directly ask residents and faculty about issues pertaining to getting adequate sleep, resident safety issues such as post-call driving, and resident concerns about the balance between professionalism and work hour restrictions. When an individual program has particular issues with fatigue, enlist residents in developing particular program solutions.

Driving home post-call is a particular concern for the safety and well-being of residents. It takes 4 seconds to drive off the road and have a motor vehicle collision. Four-second “microsleeps” are common in sleepy residents. Some states (NJ) have adopted laws which now make a criminal, not just civil, offense for motor vehicle collisions following 24 hours without sleep. Other states may follow. Trainees may want to live close enough that they do not have a long drive post call. Residents who are too fatigued to safely drive home should request safe transportation from a rested family member, colleague or faculty, which may include arrangements for a cab ride coordinated by the training program leadership. For many physicians, the ability to manage fatigue will be a necessary life-long skill and should be role modeled, demonstrated and encouraged by the faculty.

Recognize vulnerability and symptoms in residents and colleagues

Although there is individual variation, most adults need ~ 8 hours of sleep per night. The impact of too little sleep is cumulative. You cannot “will yourself” to act against the neurobehavioral effects of sleep loss. Sleepiness is affected by the amount of time since you last slept, whether or not you have any preexisting sleep debt, as well as the time of day reflecting circadian rhythm. People typically under-estimate their degree of sleepiness. So, as with alcohol, by the time you think you are sleepy you are probably profoundly affected. Your performance level will fall especially with tasks that require a great deal of attention. Even if you feel you are not at risk, consider that your colleagues may be. Watch out for your fellow residents.

It is not normal to fall asleep in a lecture
If it is a boring lecture, noted author Dinges says, “You’ll be awake and annoyed but not asleep.” If you are nodding off or falling asleep this is a major symptom that you are too fatigued. You are experiencing “microsleep.” Your system is making you sleep without you being able to control this phenomenon. This makes you extremely vulnerable for diminished attention and cognition. You can more easily make poor judgments medically and/or cause a motor vehicle collision when you’re driving home post-call.

Residents must set priorities for “time off”
Residents should be careful stewards of their time off. There is a temptation to cram way too much into the hours free from programmatic responsibilities. Off hour pursuits include professional reading, family and friends, hobbies, and spiritual and community connections. Although all of these are important, protect your recovery time.

You should practice setting reasonable priorities, especially if this is something that you have not had sufficient practice with during your years in college and medical school. It will be an important habit for the rest of your career. Excessive fatigue can affect every facet of your life. Try to be appropriately selfish about your needed sleep time. You can honestly never, for instance, read enough. Do not shortchange your sleep to try to “read it all.” Sometimes you are approached about making a swap of schedules and you certainly want to accommodate a colleague. But consider your own need for sleep as part of this decision; you may need to consult with a chief resident or program director to see if you’re the best person to meet this need.

Moonlighting
Of particular concern is moonlighting. Residents and program directors need to carefully evaluate moonlighting opportunities so as not to compromise their limited time to obtain rest missed as a part of residency training. Nighttime moonlighting in particular may not be appropriate given its likely contribution to sleep debt.

Report duty hours honestly
WVU School of Medicine expects residents to report daily duty hours through E*Value and directly to the ACGME during site visits and the annual online resident survey. Our requirement is to be accurate and honest. Your program and the institution need to

know where there are potential issues, or patient volume or acuity that may keep you here over hours. This documentation is necessary to advocate for additional resources to help all of us care optimally for patients in a safe environment. If you are working > 80 hours and not informing us, you keep us from having the documentation needed to justify additional resources, improve your well-being, and keep our patients safe. This is part of your professional responsibility and monitored as part of the professionalism competency. Please answer honestly to all duty hour surveys. If you believe your honest answers regarding duty hours may lead to retaliation or mistreatment in any way, please consider reporting anonymously through the WVU GME Professionalism/Mistreatment form (https://medicine.wvu.edu/graduate-medical-education/mistreatment-form/) or discussing it with the DIO. (304-293-0672).

Practical Strategies to Improve Alertness

To minimize the impact of Fatigue:

- Develop healthy sleep habits,
- Protect sleep time on your days "off"; engage your family/housemates in your need for protected sleep time,
- Nap 20-30 minutes every 12 hours or so; the earlier in a period of sleep deprivation "on call" the better,
- Drive safely; consider nap before drive home, or use a carpool,
- Consider the use of *prophylactic* caffeine,
- Avoid or be judicious regarding other medications that may lead to sleepiness,
- Pay particular care with hand offs; "a standardized process" seems to work best,
- For sleep inertia: Anticipate it, get out of bed, stand up, turn on the lights.

Healthy Sleep Habits

Healthy sleep patterns are more likely if you develop a healthy sleep routine. Some of these seem obvious but deserve a reminder:

- Aim for 7-8 hours of sleep per night. This is especially true if a period of sleep loss, such as a busy rotation, is anticipated,
- On the days following your time "on-call" and particularly your 24-hour period off per week, make sure you're getting sufficient catch up sleep; at least enough to feel "rested" when you wake up. It's tempting to try to "make up" everything you haven't been able to accomplish due to your busy professional schedule, but make rest a priority,
- Keep to a routine when possible. Going to bed and arising about the same time may help,
- Get adequate exercise but avoid it directly before sleep,
- Eat right. Try not to go to bed hungry; however, eating a large meal within 3 hours of sleep may keep you awake,
- Avoid the use of alcohol, caffeine and tobacco right before sleep time. These chemicals may disrupt a normal sleep pattern,
- Make the bedroom comfortable with appropriate mattress, pillow, cooler temperature, sound and lighting level,
- Develop relaxation rituals before sleep such as reading, meditating, or listening to music. Your workday may have been extremely intense. You may come home

to additional responsibilities, even enjoyable ones, such as spending time with a significant other or children. Decompressing helps sleep.
- Protect sleep time. Turn off the phone. Ask your family/significant others, friends to help you. Try not to incur a sleep debt from non-work activities.
- Get light exposure when you are awake.

Naps

Naps can prevent and ameliorate *some* degree of fatigue. However, there are some caveats that should be observed.

- Brief (1-2 hours) napping ***prior*** to prolonged period of sleep loss, such as 24 hours on call, can enhance alertness. Consider a two-hour nap prior to a 24-hour period of expected wakefulness.
- To be therapeutic during a shift, naps should ideally be frequent (every 2-3 hours) and brief (15-30 minutes);
- Naps work best the "earlier" they are in a period of sleep deprivation. If you can pick just one nap, get it as early in the period of sleep deprivation as possible. Better to "top off the tank early than wait till very fatigued.
- Time naps during circadian window of opportunity, between 2-5 a.m. and 2-5 p.m.
- Longer naps, such as those more than 30 minutes duration *may* be counter-productive in terms of "sleep inertia" but may be better than "no nap". Instead know how to counter sleep inertia: get moving, get upright, bright lights, consume some caffeine, etc.
- Utilize quiet, environmentally comfortable locations for naps, ideally where there are no other interruptions such as colleagues dictating or using the computer.
- Use the resident lounge or sleeping rooms. Hand over beepers and clinical responsibilities to another colleague when possible.
- Recognize these are general guidelines and there is a great deal of individual variability to napping.

Safe Driving

Driving can put you and others at risk. Motor vehicle collisions increase with fewer than 5 hours of sleep. The first ethical principle of physicians "primum non nocere" (first, no harm) applies to all we do as physicians, including driving. It takes 4 seconds to run off the road. Signs of drowsiness include difficulty focusing on the road or keeping your eyes open, nodding off, yawning, drifting from one lane to another, missing exits, and amnesia for some period of the drive.

- Consider how close you should live to the hospital. It may be appealing to live 30-40 minutes away, but this may increase your risk of driving home post call.
- Avoid driving if you're tired.
- Chewing gum, loud music, opening the windows…these strategies do not work to keep you "awake at the wheel" if you're tired. Instead, don't drive!
- Realize you may not perceive just how tired you are. Even if you feel perfectly well, you are still vulnerable

- Consider getting a ride home with a friend, use public transportation (when available) or even a taxi. Your program director or chief resident can help you arrange for a taxi.
- Consider taking a nap before driving home post call; 20-30 minutes may be very helpful.
- Strategically use caffeine.
- Immediately stop driving if you find yourself becoming drowsy. Find a safe location and nap.

Caffeine

Using caffeine, a central nervous stimulant, "strategically" can help manage fatigue. **It is not a sleep substitute**. Tolerance quickly develops. If you intend to use caffeine to counteract fatigue, minimize the regular social use of caffeine so that it will be more effective when consumed. Caffeine may modulate symptoms but does not substitute for sleep. The effects of caffeine generally occur within 15-30 minutes. If you use it just before you drive home its stimulant effects may not kick in until you are home and ready to go to sleep. Avoid regular caffeine use (the social use of caffeine) if you plan to use it to abate sleepiness. Instead use it when you are on call only.

- 400-600 mg (3-4 cups of brewed coffee) is a usual dose, but some individuals may be overly sensitive to this amount.
- Useful only for temporary relief of sleepiness. (The benefit typically lasts 3-5 hours so do not let your use of caffeine stop you from a good sleep and replenishing your sleep debt).
- Adverse effects include disruption in sleep quality, tolerance, diuresis and irritability.
- Can minimize sleep inertia symptoms.

Substance Caffeine from Center for Science in the Public Interest
http://www.cspinet.org/new/cafchart.htm

- 12 ounces cola ..... 36 mg
- 12 ounces diet cola .....47 mg
- 8 ounces brewed coffee…..... 133 mg
- 12 ounces ice tea .....26 mg
- 1.45 ounce dark chocolate ..... 31 mg
- Excedrin, 2 tablets..... 130 mg
- No Doz maximum strength tablet ….200 mg

Other medications/drugs

It is important for residents to avoid self-medicating or prescribing casually for colleagues. Physicians should not be self-prescribing or prescribing for a friend/colleague outside of an established doctor-patient relationship. It is far better for residents, as for patients, to have a regular physician who coordinates their care.

- Sleep medications to increase sleep (sedative hypnotics) or stimulants should be used only **after** a complete medical/sleep consultation.
- Melatonin induces sleep onset and may be used for circadian rhythm

disturbances. There are few data available to evaluate its use for residents.

- Sedative hypnotics such as zolpidem (Ambien) and zaleplon (Sonata) and/or behavioral therapy may be prescribed for certain sleep disorders, and the military is testing these products for settings of sleep deprivation. They are not indicated for chronic use.
- Adverse medication effects are common and include headache, drowsiness, disorientation, GI disturbance and dizziness.
- Alcohol should not be used to enhance sleep and disrupts optimal sleep quality.
- Avoid the use of over-the-counter stimulants.
- Stimulants such as methylphenidate (Ritalin), dextroamphetamine (Dexedrine), modafinil, and pemoline should not be used unless prescribed by one's own personal physician for an appropriate medical condition.
- Alcohol is a drug with documented sleep effects. Try to avoid or minimize. Realize the impact of fatigue and alcohol on performance and driving are cumulative.

Hand-Offs and Transitions of Care

One theory for why patient outcomes are not clearly "improved" with the duty hour regulations is that there are more patient hand-offs from one clinician to the other with the potential for not clearly communicating "enough" or "the right" information. Programs should design a standard methodology for hand-offs and monitor their effectiveness. Residents' ability to provide and receive information during hand-offs must be part of their performance evaluations.

WVU School of Medicine GME Office wishes to acknowledge our GME colleagues at Duke University for their permission to use their version of this statement as a template for ours.

Updated: April 2025
Updates approved by GMEC Taskforce: April 3, 2025
Drafted: July 2010
*Adopted by GMEC Taskforce: September 9, 2010, March 6, 2024, ****
(put date of update here) Adopted by the GMEC: September 10, 2010,

References

Arora VM Georgitis E Woodruff JN Humphrey HJ Meltzer D. Improving Sleep Hygiene of Medical interns: Can the sleep, alertness and fatigue education in residency program help? *Arch Int Med* 2007;167(16):1738-44

Choby B Passmore C. Faculty perceptions of the ACGME resident duty hour regulations in family medicine*. Family Medicine* 2007;39(6);392-8

Horwitz LI Kosiborod M Lin Z Krumholz HM Changes in Outcomes for Internal Medicine Inpatients After Work-Hour Regulations. *Annals of Internal Medicine* 2007;147:97-103
Kusuma SK Mehta S Sirkin M Yates AJ Templeton MT Friedlaender F Measuring the attitudes and impact of the eighty hour workweek rules on orthopaedic surgery residents. *J Bone & Joint Surgery* 2007'89(3):679-85

Mitchell CC Ashley SW Zinner MJ Moore FD Jr. Predicting future staffing needs at teaching hospitals: use of an analytical program with multiple variables Arch Surgery 2007;142(4):329-34

Owens JA Sleep loss and fatigue in healthcare professionals. *J Perinatal & Neonatal Nursing* 2007:21(2):92-100 and 101-2

Reed DA Levine RB Miller RG Ashar BH Bass EB Rice TN Cofrancesco J Effect of Residency Duty - Hours Limits: Views of Key Clinical Faculty *Arch Intern Med* 2007;167(14):1487-1492

Salim A Teixeira PGR Chan L Oncel D Inaba K Brown C Rhee P Verne T. Impact of the 80-Hour Workweek on Patient Care at a Level 1 Trauma Center *Arch Surg* 2007;142(8):708-714

Shetty KD Bhattacharya J Changes in Hospital Mortality Associated with Residency Work-Hour Regulations. *Annals of Internal Medicine* 2007;147:73-80

Surani S Subramanian S Aguillar R Maqsood A Varon J. Sleepiness in medical residents: Impact of mandated reduction in work hours. Sleep Medicine 2007;8:90-93
Whalen TV Duty Hours Restrictions: How will this affect the surgeon of the Future? American Surgeon 2007;73(2):140-2

Vanderveen K Chen M Scherer L. Effects of residenty duty-hours restrictions on surgical and nonsurgical teaching faculty*. Arch Surgery* 2007;142(8):759-64
Veasey SC ACGME housestaff duty hours: enforced, yet not delivering rested physicians in training. *Sleep Medicine* 2007;8(1):10-1

Vidyarthi AR Auerbach AD Wachter RM Katz PP The impact of duty hours on resident self reports of errors. *J Gen Int Medicine* 2007;22(2):205-9

Veasey SC ACGME housestaff duty hours: enforced, yet not delivering rested physicians in training. *Sleep Medicine* 2007;8(1):10-1

Volpp KG Rosen AK Rosenbaum PR Romano PS Even-Shoshan O Wang Y Bellini L Behringer T Silber JH Mortailaty Among Hospitalized Medicare Beneficiaries in the First 2 Years following ACGME resident Duty Hour Reform JAMA 2007;298(9):975-983

Volpp KG Rosen AK Rosenbaum PR Romano PS Even-Shoshan O Canamucio A Bellini L Behringer T Silber JH Mortailaty Among Patients in VA Hospitals in the First 2 Years following ACGME resident Duty Hour Reform JAMA 2007;298(9):984-992

Interns Compliance with Accreditation Council for Graduate Medical Education Work Hours Limits *JAMA* 2006 ; 296 :1063-1070

http://www.hourswatch.org/images/2006%20Landrigan%20et%20al%20Intern%20Compliance%20JAMA.pdf

Extended Work Duration and the Risk of Self-reported Percutaneous Injuries in Interns *JAMA 2006 ;296 :1055-1066* http://jama.ama-assn.org/cgi/content/abstract/296/9/1055

Interns' Compliance with Accreditation Council for Graduate Medical Education Work-Hour Limits *JAMA.* 2006;296:1063-1070. http://jama.ama-assn.org/cgi/content/full/296/9/1063

Sleep Loss and Performance in Residents and Non Physicians. *Sleep* 2005;28(11):1392-1402 http://www.hourswatch.org/images/Philibert%20-20Sleep%20metaanalysis%20MDs%20and%20non-MDs.pdf

Sleep and Motor Performance in On Call Internal Medicine Residents *Sleep* 2005;28(11):1386-91 http://www.hourswatch.org/images/Philibert%20-%20Sleep%20metaanalysis%20MDs%20and%20non-MDs.pdf

Sliding Down the Bell Curve Effects of 24 hours work shifts on Physicians' Cognition and Performance (editorial) *Sleep* 2005 http://www.hourswatch.org/images/Landrigan%20-%20Sleep%20editorial%20Nov%202005.pdf

For additional information, consider

1. The SAFER (Sleep, Alertness and Fatigue Education in Residency) program developed by the American Academy of Sleep Medicine (AASM) with representatives from the ACGME and AMA. They have (for purchase) an educational module designed to increase knowledge and awareness about sleep and fatigue among the medical community which includes a slide set, syllabus, and pre and post tests. http://www.aasmnet.org/safer.htm

2. Dr. David Dinges Presentations for ACGME and AAMC. These are available through their respective web sites: www.acgme.org & www.aamc.org.