

# SLEEP 101: “THE ABC’S OF ZZZ’S”

Understanding When You Have A Sleep Disorder And  
What To Do About It

Shelli Cutting, RPSGT, RST, CSE

# DISCUSSION OVERVIEW

- Why do we sleep?
  - *The function of sleep on the body.*
- How do I know if I have a sleep disorder?
  - *Defining true pathology.*
- What is the most common sleep problem?
  - *Obstructive Sleep Apnea outlined and defined.*
- What do I do if I suspect a sleep disorder?
  - *How and when to seek treatment.*

“IF THE MANY HOURS OF SLEEP  
ACCOMPLISH NOTHING, IT IS THE  
GREATEST MISTAKE NATURE EVER  
MADE.”

*ALLAN RECHTSCHAFFEN, MD*

Why do we sleep?



# THEORIES THROUGH THE AGES..

- “The Philosophy of Sleep” Glasgow 1834; determined “sleep is a passive process when the brain is inactive.”
- 1907 Legendre and Pieron collected data to prove that “hypnotoxins” were the cause of sleep.
- “Sleep and Wakefulness” Kleitman 1939 proved that subjects who stayed up all night were less sleepy the next morning than in the middle of the night.

# COMMON BELIEFS

- To rest our muscles.
  - No evidence to support the need to rest muscles. The heart and diaphragm for example never rest.
- To rest our brain.
  - Not supported by the fact that during REM sleep our brains are more active than when awake.
- Because it feels good.
  - It feels good because our bodies are “wired” to sleep. All body functions are in synch with our sleep cycle and accommodate it.

# COULD IT BE....

- In infancy REM sleep plays a key role in development of the brain. Continuing to sleep is a “hangover” later in life.
- Some research suggests that we process our short term memories into long term memories during REM.
- Further research hypothesizes that we are physically recuperating during our “delta sleep”.

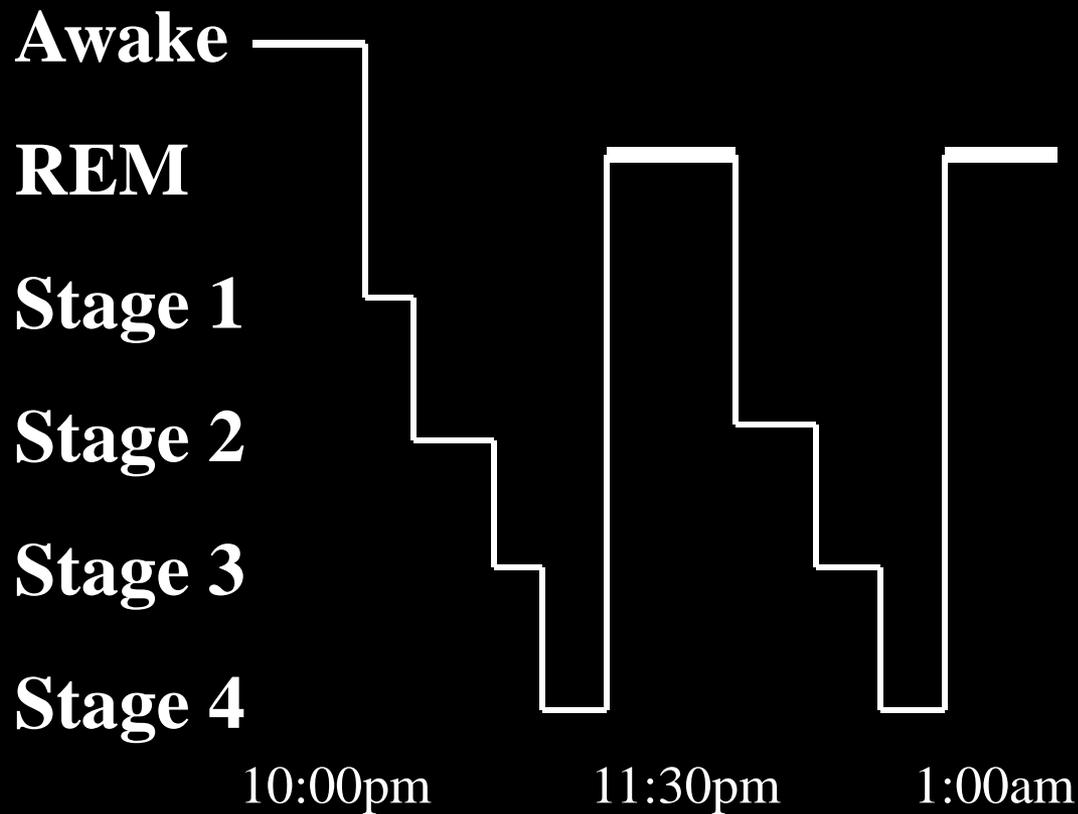


“MORE HAS BEEN LEARNED ABOUT SLEEP IN THE LAST 60 YEARS THAN IN THE PRECEDING 6,000. IN THIS SHORT PERIOD OF TIME, RESEARCHERS HAVE DISCOVERED THAT SLEEP IS A DYNAMIC BEHAVIOR. NOT SIMPLY THE ABSENCE OF WAKING, SLEEP IS A SPECIAL ACTIVITY OF THE BRAIN, CONTROLLED BY ELABORATE AND PRECISE MECHANISMS.”

*J. Allan Hobson, MD “Sleep 1989”*

# NORMAL SLEEP CYCLE

**Normal Adult Sleep - 90 minute cycles**







OVER MILLIONS OF YEARS, OUR BODIES HAVE  
DEVELOPED A REMARKABLY PRECISE  
BIOLOGICAL CLOCK THAT TICKS LIKE A  
METRONOME TO REGULATE SLEEPING AND  
WAKING.

...THE DAILY RISING AND SETTING OF THE SUN  
AND THE SEASONAL FLUX OF LIGHT'S TRANSIT  
INTO DARKNESS HAVE SHAPED THIS  
MOLECULAR TIMEPIECE...

*William C. Dement, MD, PhD*  
*The Promise of Sleep*

# NORMAL SLEEP PHASE

6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10

---

**Midnight**

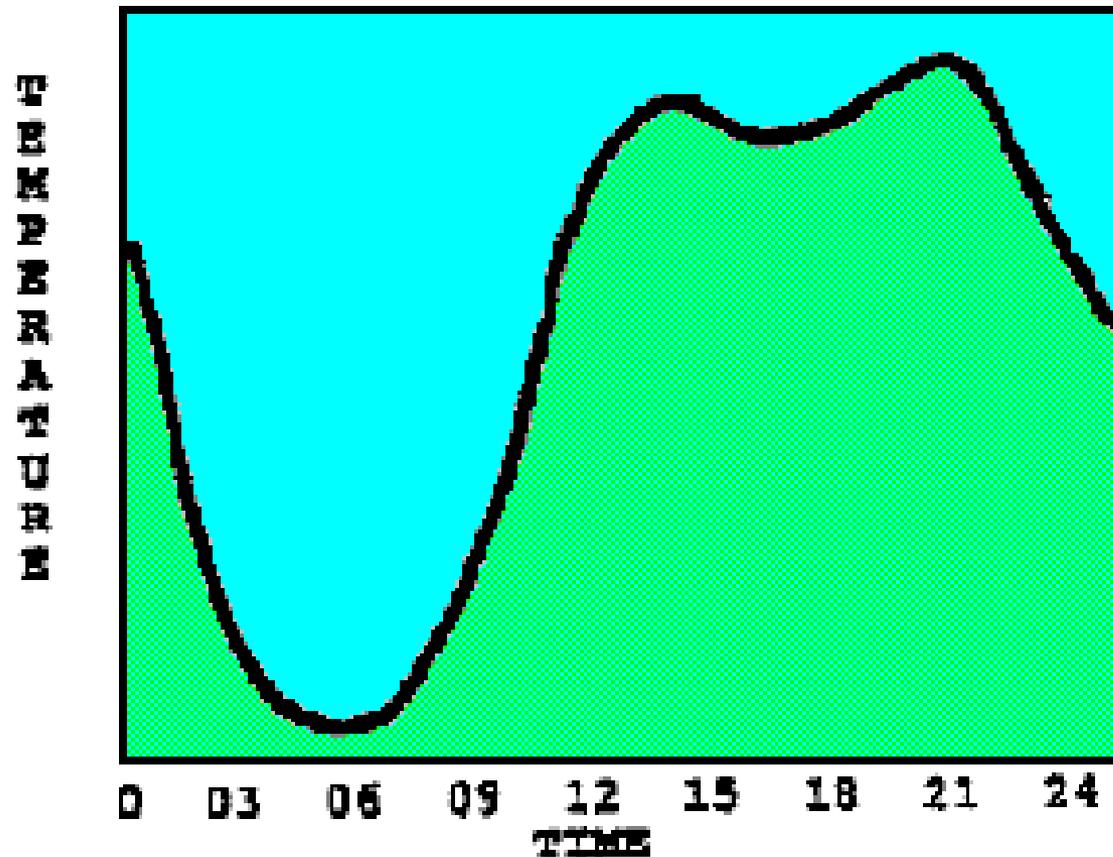
Typical Sleep Phase

**Sleepy**  
**Go to bed**

**Wake Up**

# 24 HOUR BODY TEMPERATURE CURVE

A TYPICAL CORE BODY TEMPERATURE CURVE



# ARE YOU A NIGHT OWL?

## Delayed Sleep Phase Diagram



**Midnight**

Delayed Sleep Phase

**Sleepy**  
**Go to bed**

**Wake Up**



# Advanced Sleep Phase Diagram



**Or A Lark?**





WE MAY NOT KNOW EXACTLY WHY  
WE SLEEP, BUT WE DO KNOW WHAT  
HAPPENS WHEN WE DON'T.

# THE DANGERS OF SLEEP DEPRIVATION

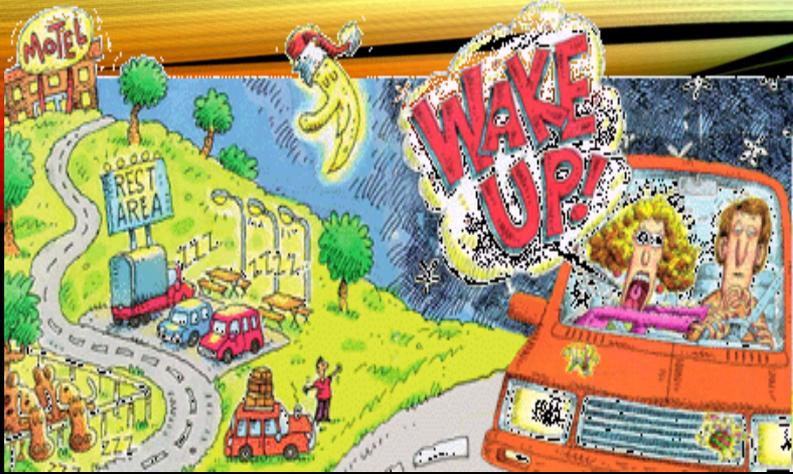
- 40% of adults report that they are so sleepy during the day that it interferes with their daily activities.
- Many report these symptoms a few days per month or more.
- One out of five (22%) experience this level of daytime sleepiness at least a few days per week or more.

*2011 Sleep In America Poll*

# SLEEP DEPRIVATION CONT.

- When adults are sleepy during the day, almost two-thirds (65%) say they are very likely to just accept their sleepiness and keep going.
- A significant proportion (43%) report that they are very likely to use caffeine when sleepy, and 5% report a high likelihood of using alerting medications.

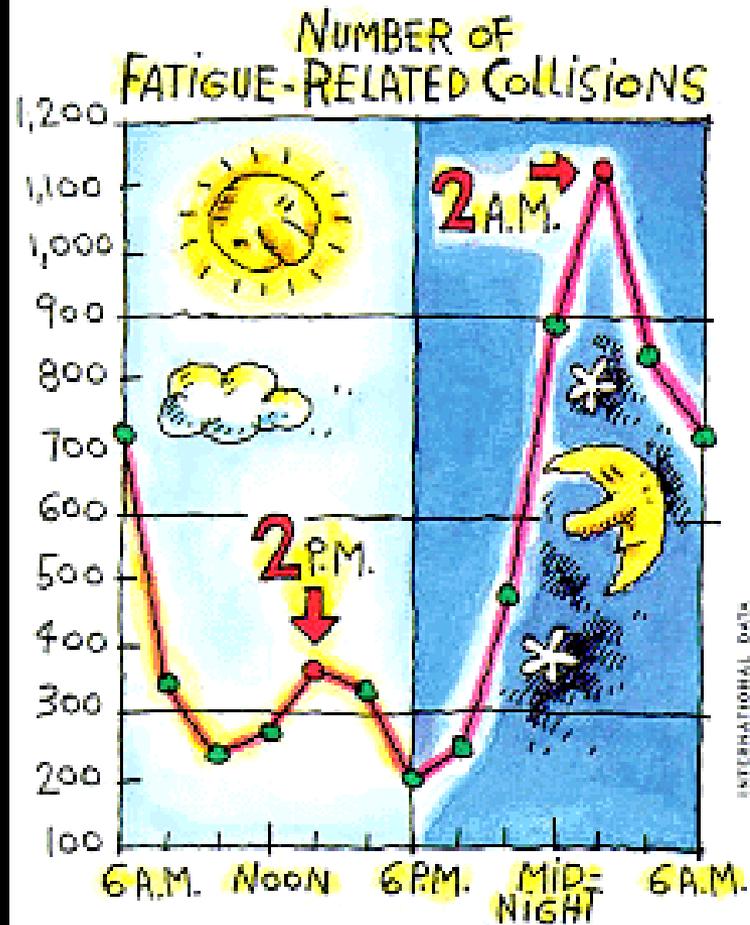




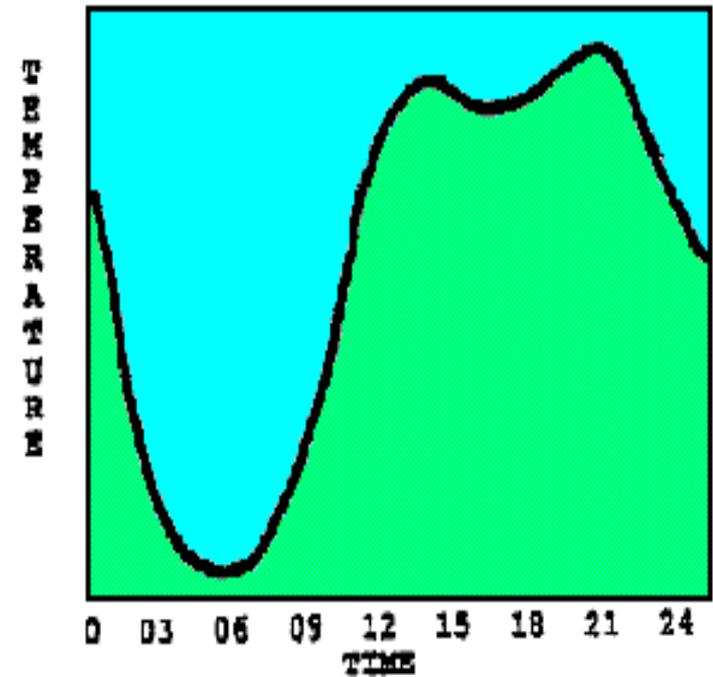
# DROWSY DRIVING

- More than one-half of adults in the U.S. (53%) report that they have driven while drowsy in the past year.
- One out of five (19%) have actually dozed off while driving.
- 1% claim they have had an accident while driving because they were too tired or they dozed off.

*2011 Sleep In America Poll*



A TYPICAL CORE BODY TEMPERATURE CURVE



# DANGER SIGNALS FOR DROWSY DRIVERS

- Your eyes close or go out of focus by themselves.
- You can't stop yawning.
- You have wandering, disconnected thoughts.
- You don't remember driving the last few miles.
- You drift between lanes, tailgate, or miss traffic signs.
- You keep jerking the car back into the lane.
- You have drifted off the road and narrowly missed crashing.





WHAT CAUSES  
SLEEP DEPRIVATION?

“THE CONSCIOUS DECISION OR BEHAVIORAL IMPERATIVE TO SACRIFICE SLEEP HAS EXISTED SINCE ANIMALS FIRST BEGAN TO SLEEP. HUMAN BEINGS WERE INITIALLY PROTECTED FROM EXCESSIVE LOSS OF SLEEP BY HAVING LIMITED VISION AT NIGHT. THE ADVENT OF ELECTRICITY, WHILE PROVIDING MANY BENEFITS, HAS ALSO PROVIDED SIGNIFICANT CHALLENGES TO THE SLEEP SYSTEM.”

*Principles and Practice of Sleep Medicine  
– Third Edition*

# SOCIAL “NORMS”

- Society tells us we are “lazy” or unmotivated if we are taking the time necessary to sleep. We feel guilty for “wasting time”.
- 24 hour work schedules force people to constantly challenge their “natural” rhythm.
- In order to get everything in that we want to do we “burn the candle at both ends”.

# ENTRAINED CIRCADIAN RHYTHMS

- Those with a very regular sleep cycle find it impossible to “sleep in” after having gone to bed late.
- If that same person “misses” their usual bedtime they are unable to fall asleep.
- Entrainment often comes from external sources and sleep deprivation is an unwanted byproduct.



# TECHNOLOGY

- Cell phones, pagers, internet, coupled with increasing stress add to our sleepless nights.
- Watching TV, using the computer, doing paperwork are activities that are best left outside the bedroom.

# INTERNET USAGE

- In general, the more often an adult uses the Internet, the less likely they are to get eight hours or more of sleep on weekdays.
- Adults who are light or heavy users of the Internet are more likely than those who rarely or never use the Internet to have driven while feeling drowsy.
- Adults who rarely or never use the Internet tend to allot more hours for sleep each day than those who go online.



How do I know if I have a sleep disorder?



IN GENERAL A PERSON SHOULD BE ABLE TO MAINTAIN COMPLETE ALERTNESS DURING NORMAL WAKING HOURS AT ALL TIMES. THIS INCLUDES WHILE DRIVING, SITTING IN A MEETING OR LECTURE, READING AND OTHER SEDENTARY ACTIVITIES.

# SNORING

- Snoring is the most common symptom of by far the most frequently diagnosed sleep disorder: Obstructive Sleep Apnea.
- Factors that influence snoring are:
  - anatomic factors
  - functional factors
  - sex
  - Hormones
  - Drugs
  - smoking
  - genetic factors

# SNORING CONT...

- Primary snoring can be treated in a number of ways, but a determination can't be made without sleep testing.
- Weight loss, abstinence from alcohol and sedative drugs are most commonly recommended for treatment.
- In some cases UPPP surgery may be indicated.

# SLEEP APNEA

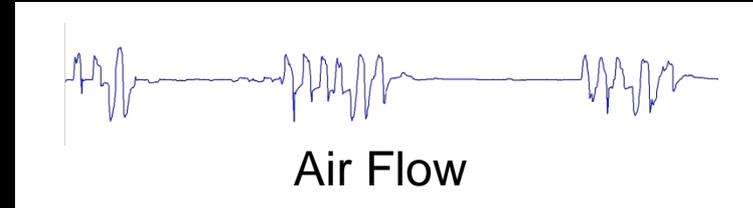
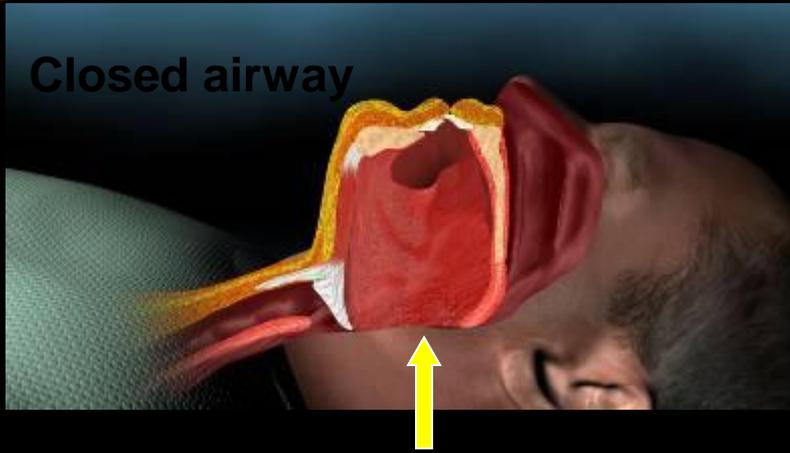
- There are three types of apnea. Obstructive (OSA), Central (CSA) and Mixed (MSA).
- OSA and its variations are by far the most common.
- CSA is neurological condition that causes complete loss of respiratory effort.

# OBSTRUCTIVE SLEEP APNEA

- Patients with OSA experience brief episodes of asphyxia during sleep, punctuated by periods of hyperventilation.
- During the period of obstruction the oxygen saturations steadily fall while carbon dioxide levels rise.
- Patients are often worse in certain sleep stages or in sleeping positions making it almost impossible in some cases to get the full benefits of these sleep stages.



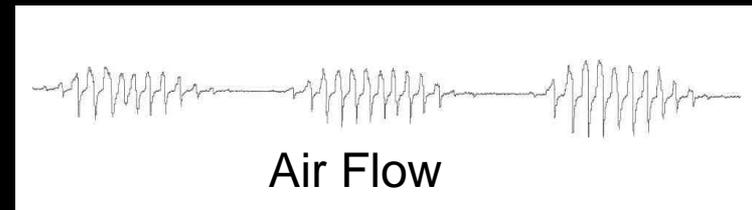
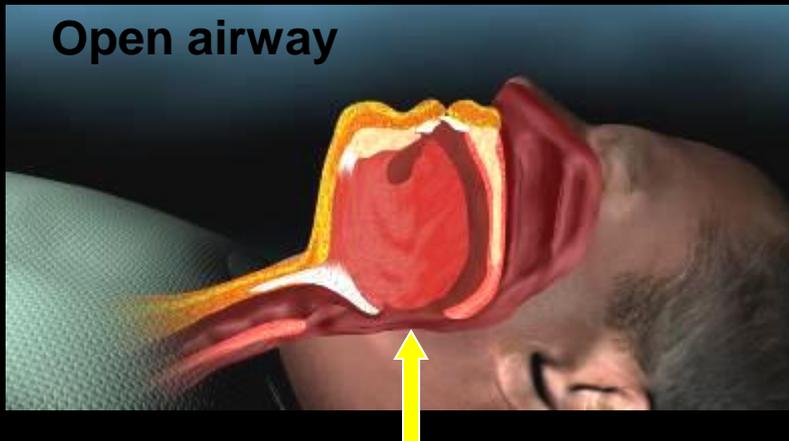
# OBSTRUCTIVE SLEEP APNEA (OSA)



-Cessation of inspiratory flow  $\geq 10$  seconds often associated with a substantial  $O_2$  desaturation

-Severity measured as an Apnea Hypopnea Index per hour of sleep (ie AHI= 40)

# Central Sleep Apnea (CSA)



-Cessation of inspiratory flow  $\geq 10$  seconds with *no respiratory effort*

-Severity measured as a Central Apnea Index per hour of sleep (i.e. CAI  $\geq 15$ )

# WARNING SIGNS OF OSA

- Snoring
- Pauses or gasping at night
- Excessive Daytime Sleepiness
- Obesity
- Trouble concentrating
- Forgetful, irritable, anxious or depressed
- Wake up frequently at night. Sometimes report symptoms of Insomnia.
- Morning Headaches

# EFFECTS OF UNTREATED OSA

- Cardiovascular problems
- High blood pressure
- Inability to lose weight
- Heart attack, stroke
- Chronic hypertension
- Excessive sleepiness dangers
- Chronic mood and personality changes
- Memory impairment

# OSA PREVALENCE & MORTALITY

- Studies indicate that 2-5% of the population meet the minimal diagnostic criteria and 2% of women and 4% of men between 30-60 are affected by OSA.
- Conclusive studies are yet to be published but OSA is being linked in preliminary findings to 37,000 heart attacks annually.

# APNEA IN OLDER PEOPLE

- The prevalence of apnea rises when we get older.
- Tissue flabbiness and hormonal changes contribute to the problems
- Doctors don't identify the problem. Just think "patient is getting old".
- Untreated OSA causes other problems to be worse.

# SLEEP, LONGEVITY AND THE IMMUNE SYSTEM

- Strong evidence to support that sleep is the primary factor for how long someone lives.
- Quality of sleep before infection is a factor in determining how sick a person gets and how much mucus they produce. A person who maintains a good sleep regimen will usually be sick less.
- Interleukins signal the brain when they are turned on by an invading virus and create the urge to sleep.

# MOOD AND VITALITY

- Sleep sets us up for daytime arousal, a heightening of the senses and motivation, a feeling so good that people seek it out, either from a good night's sleep or a few cups of coffee.
- The human organism is wired to be energetic when faced with challenges. We need to be fired up to best accomplish life's basics. Vitality, this feeling of mental and physical energy, is also a key ingredient of motivation, the internal psychological push that drives us toward a goal.

# CREATIVITY, PRODUCTIVITY AND LEARNING

- Sleep deprivation impairs the ability to learn.
- REM sleep encourages the transfer of short term memory into long term memories dumping what is useless.
- Creativity can be directly related to the amount of REM sleep a person gets.
- Many examples of problem solving in REM sleep.



# SLEEP HYGIENE

- Sleep only when you are drowsy.
- If you are unable to fall asleep or stay asleep, leave the bedroom.
- Maintain regular rise times and sleep times.
- Avoid napping during the day.
- Learn how to distract your mind.
- Avoid caffeine, nicotine close to bedtime.
- No alcohol within four hours of bed.
- Avoid large meals two hours before bed.
- Avoid strenuous exercise within six hours of bed.
- Minimize light, noise and extremes in temperature.

# CONCLUSIONS

- Sleep touches on nearly every aspect of our physiology and psychology and our interaction with the world and with others.
- It may be that sleep's original purpose is no longer its most important one.
- Hundreds of biological processes go on during sleep, making it impossible to separate sleep from the process of living.
- Whether we theoretically need sleep or not, for the foreseeable future we will need to work within the boundaries built by our need for sleep.

# QUESTIONS?

***For more information about sleep disorders:***

- [www.sleepnet.com](http://www.sleepnet.com)
- [www.sleepfoundation.org](http://www.sleepfoundation.org)
- [www.apneanet.org](http://www.apneanet.org)
- [www.rls.org](http://www.rls.org)
- [www.osleepworks.com](http://www.osleepworks.com)