MCHC July Quarterly Meeting: Sleep Safely, Sleep Soundly: Best Practices for Safe Sleep

Daniel Shippy B.S., RPSGT
Lead Polysomnographic Technologist
The University of Kansas Health System

Audience Poll

- How many hours of sleep do you get on average?
  - More than 8 hours
  - 7-8 hours
  - 6-7 hours
  - Less than 6 hours

Audience Poll

- How do you feel right now?
  - Wide awake
  - Somewhat tired
  - Very sleepy

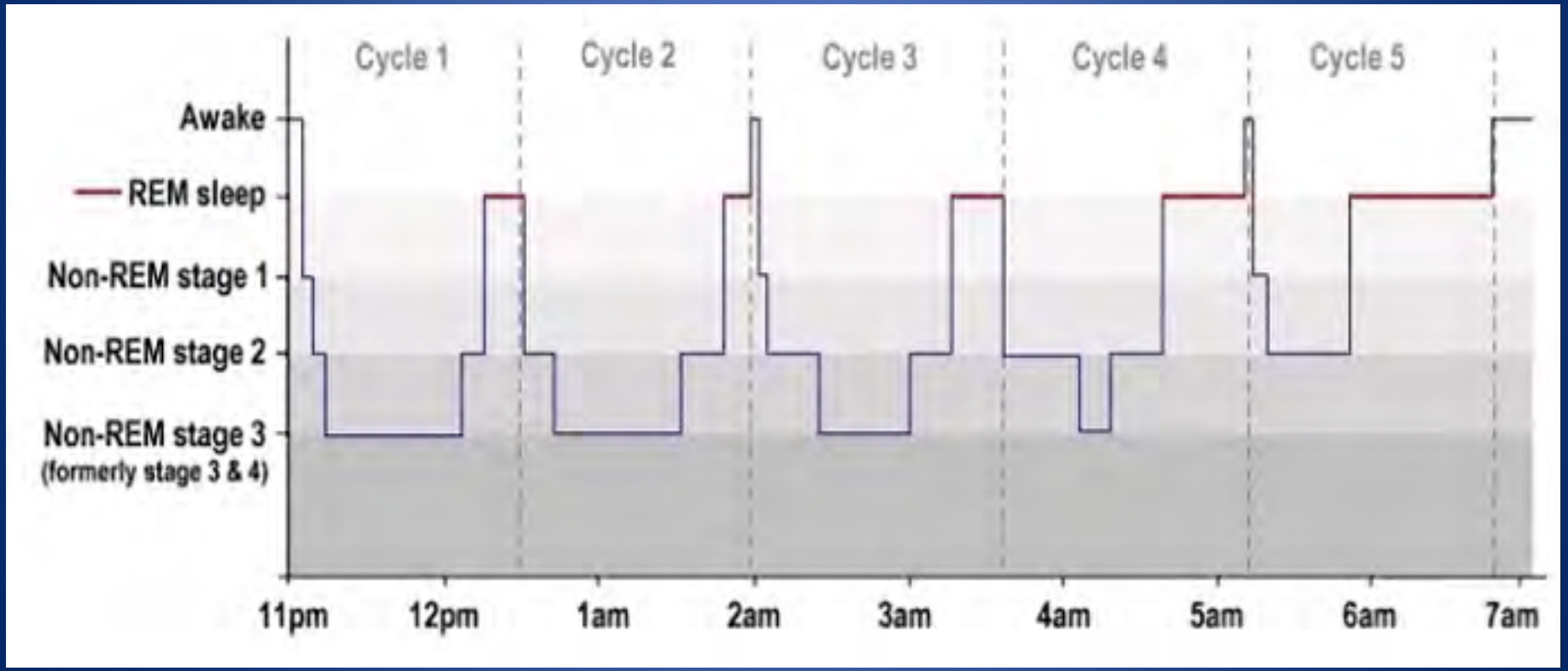
National Sleep Foundation's sleep time duration recommendations: methodology and results summary

Max Hirshkowitz, PhD, Kaitlyn Whiton, MHS, Steven M. Albert, PhD, Cathy Alessi, MD, Oliviero Bruni, MD, Lydia DonCarlos, PhD, Nancy Hazen, PhD, John Herman, PhD, Eliot S. Katz, MD, Leila Kheirandish-Gozal, MD, MSc, David N. Neubauer, MD, Anne E. O'Donnell, MD, Maurice Ohayon, MD, DSc, PhD, John Peever, PhD, Robert Rawding, PhD, Ramesh C. Sachdeva, MD, PhD, JD, Belinda Setters, MD, Michael V. Vitiello, PhD, J. Catesby Ware, PhD, Paula J. Adams Hillard, MD

Summary:

Age	Recommended	May be appropriate	Not recommended
Adults *26-64 years*	7 to 9 hours	6 hours 10 hours	Less than 6 hours More than 10 hours
Older Adults *≥ 65 years*	7 to 8 hours	5 to 6 hours 9 hours	Less than 5 hours More than 9 hours

Idealized Sleep Histogram



Consequences of insufficient sleep

- Human performance declines, leading to
  - drowsy driving
  - industrial/workplace errors
- Increased risk of disease
  - obesity, Alzheimer's, cancer, etc.
  - hypertension and heart failure (especially with untreated OSA)

Sleep-deprived motor vehicle operators are unfit to drive: a multidisciplinary expert consensus statement on drowsy driving☆

Charles A. Czeisler, PhD, MD, FRCP, Emerson M. Wickwire, PhD, Laura K. Barger, PhD, William C. Dement, MD, PhD, Karen Gamble, PhD, Natalie Hartenbaum, MD, MPH, Maurice M. Ohayon, MD, DSc, PhD, Rafael Pelayo, MD, Barbara Phillips, MD, MSPH, FCCP, Kingman Strohl, MD, Brian Tefft, Shantha M.W. Rajaratnam, PhD, LLB(Hons), Raman Malhotra, MD, Kaitlyn Whiton, MHS, Max Hirshkowitz, PhD

Summary:

"Drivers who have slept for two hours or less in the preceding 24 hours are not fit to operate a motor vehicle."

Panelists further agreed that most healthy drivers would be impaired with only 3 to 5 hours of sleep during the prior 24 hours.

National Highway Traffic Safety Administration (NHTSA) statistics on drowsy driving:

- Drowsy drivers are 3.5x more likely to crash
  (based on a study following drivers with in-vehicle video cameras and sensors)
- Cost to Americans is estimated at $109B per year
  (estimate based on the number of drowsy driving-related crashes each year and the annual societal costs of traffic crashes)
- Estimated lives lost range from >800-6,400 per year

Industrial/workplace errors partially attributed to insufficient sleep:

- Space Shuttle Challenger explosion
- Exxon Valdez oil spill
- American Airlines Flight 1420

Sleep deprivation impairs memory, tau metabolism, and synaptic integrity of a mouse model of Alzheimer's disease with plaques and tangles

Antonio Di Meco, Yash B. Joshi, Domenico Praticò

Department of Pharmacology, Center for Translational Medicine, Temple University School of Medicine, Philadelphia, PA, USA

Summary:

Sleep-deprived mice had a significant decline in their learning and memory compared with those in the control group.

Phosphorylation of tau protein was decreased, leading to a significant increase in the amount of insoluble tau (a precursor to tangle formation).

Amyloid-β Dynamics are Regulated by Orexin and the Sleep-Wake Cycle

Jae-Eun Kang,[1] Miranda M. Lim,[1] Randall J. Bateman,[1,2,3] James J. Lee,[1] Liam P. Smyth,[1] John R. Cirrito,[1,2] Nobuhiro Fujiki,[5] Seiji Nishino,[5] and David M. Holtzman[1,2,3,4,*]

[1] Department of Neurology, Washington University, St. Louis, Missouri, 63110, USA
[2] Hope Center for Neurological Disorders, Washington University, St. Louis, Missouri, 63110, USA
[3] Alzheimer's Disease Research Center, Washington University, St. Louis, Missouri, 63110, USA
[4] Department of Developmental Biology, Washington University, St. Louis, Missouri, 63110, USA
[5] Sleep and Circadian Neurobiology Laboratory, Department of Psychiatry and Behavioral Sciences, Stanford University, Palo Alto, California, 94304, USA

Summary:

Amyloid-beta plaques develop more quickly in the brains of sleep-deprived mice.

Sleep and obesity

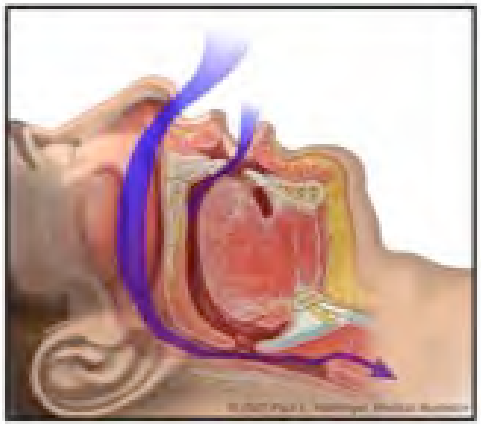
Guglielmo Beccuti[a,b] and Silvana Pannain[a]

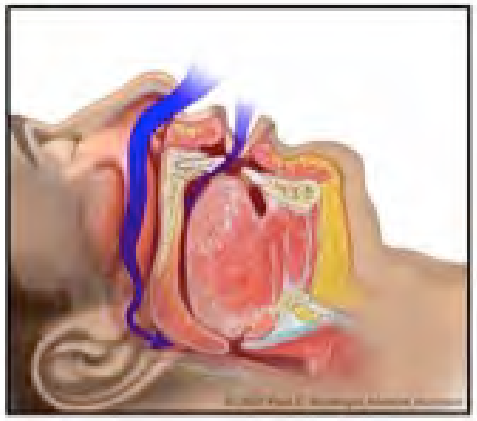
[a]Department of Medicine, University of Chicago, Chicago, USA
[b]Department of Internal Medicine, University of Turin, Turin, Italy
Correspondence to Silvana Pannain, MD, Department of Medicine, Section of Endocrinology, The University of Chicago, MC 1027, 5841 S. Maryland Ave., Chicago, IL 60637, USA Tel: +1 773 702 3275; fax: +1 773 702 7686; spannain@uchicago.edu

Summary:

Sleep deprivation has been shown to result in
- decreased glucose tolerance
- decreased insulin sensitivity
- decreased levels of leptin
- increased levels of ghrelin
- Increased evening levels of cortisol

Obstructive Sleep Apnea (OSA)





Journal of the American College of Cardiology
Volume 57, Issue 2, January 2011
DOI: 10.1016/j.jacc.2010.08.627

Obstructive Sleep Apnea and Heart Failure
Pathophysiologic and Therapeutic Implications

Takatoshi Kasai, T. Douglas Bradley

Summary:

Various effects of OSA have been studied and have been found to contribute to the development of hypertension and eventually heart failure.

- oxidative, inflammatory, and vascular endothelial effects
- arrhythmogenic effect.

Treatment of OSA with via CPAP therapy reverses these effects.

Obstructive sleep apnea and the prevalence and incidence of cancer

Tetyana Kendzerska, MD PhD, Richard S. Leung, MD PhD, Gillian Hawker, MD MSc, George Tomlinson, PhD, and Andrea S. Gershon, MD MSc

Institute of Health Policy, Management and Evaluation (Tomlinson), University of Toronto; Institute for Clinical Evaluative Sciences (Kendzerska, Hawker, Gershon); Women's College Research Institute (Kendzerska, Hawker), Women's College Hospital, University of Toronto; Department of Medicine (Kendzerska, Leung, Hawker, Gershon), University of Toronto; Department of Medicine (Leung), St. Michael's Hospital; Department of Medicine (Tomlinson), University Health Network and Mount Sinai Hospital; Department of Medicine (Gershon), Sunnybrook Health Sciences Centre, Toronto, Ont.

Correspondence to: Tetyana Kendzerska, tetyana.kendzerska@mail.utoronto.ca

Summary:

1. Hypoxia has been shown to cause upregulation and overexpression of a number of genes related to biological behaviors of cancer cells, including apoptosis, metastasis, and angiogenesis, which renders the cancer cells more aggressive and resistant to therapy.
2. Intermittent hypoxia has been shown to accelerate cancer progression in a mouse model of sleep apnea.
3. The level of oxygen desaturation (but not the apnea/hypopnea index) was associated with smoking-related cancers.

More research is needed!

Establish Good Sleep Hygiene Practices

Sleep hygiene:

doing those things that promote good sleep.

Establish Good Sleep Hygiene Practices

- Establish and maintain a daily schedule of activities
- Keep a regular bedtime each night and wake time each morning
- Limit naps during the day
- Keep active – exercise!
- Approach bedtime as relaxed as possible
- Establish a routine transition period
- Stay away from electronics/screens
- Most important - Get 7 or more hours of sleep

Establish Good Sleep Hygiene Practices

- A cool sleep environment is preferred
- Comfortable bed that you associate with sleep
- Fresh air
- Free from interruptions
- Dark bedroom (room darkening shades/eye shades)
- Minimize noise (wear ear plugs, white noise, communicate with family members)

Establish Good Sleep Hygiene Practices

- Avoid using the bedroom for other activities
- Avoid eating heavy meals 3 hrs before bedtime
- Avoid taking any stimulants before bedtime
- Avoid taking sleeping medications
- If you cannot fall asleep easily (within 20 minutes), get out of bed and do something different (but non-stimulating)

Case Study #1

A 25 year old female is complaining that she's very tired during the day, despite being in bed for almost 8 hours every night. She typically does a workout video in her bedroom in the evenings and then catches up with friends on social media for about 45 minutes while laying in bed. What could she do better?

Case Study #1

1. Stop exercising in her bedroom
2. Avoid the use of electronics with bright screens before bed or at the very least use a “night” filter.

Case Study #2

A 53 year old obese man with high blood pressure is complaining of sleepiness and fatigue during the day. His wife says he snores and seems restless while sleeping. What should they do to address his sleep problems?

Case Study #2

- Get a sleep study! It sounds like he might have sleep apnea.

Case Study #3

A 71 year old retired female goes to bed anywhere from 11 p.m. to 1 a.m. and wakes up at 6 a.m. She often lays awake for over an hour before falling asleep, but reports she may be awake in bed for two or three hours on occasion. She's tired during the day and usually takes a nap around 11 a.m., then takes another nap around 7 p.m. She sleeps with several lamps on in her bedroom and often falls asleep watching movies on a portable DVD player. What could she do better?

Case Study #3

1. Set a regular bedtime.
2. Get out of bed and do something different if she's still awake after 20 minutes.
3. Restrict naps as much as possible.
4. Turn off the lamps. Bedrooms should be dark!
5. Try to stop watching movies right before bed, and especially IN bed.

Thank you!