

# Sleep HealthCenters® Newsletter

Lawrence J. Epstein, MD, Editor ..... July 2006

Dear Colleague,

In this issue of the Sleep HealthCenters® Newsletter, Dr. Douglas Kirsch addresses the relationship between sleep and diabetes.

In the CEO Corner, we are pleased to announce the relocation of our Newton clinic to a larger and more accommodating site at 1505 Commonwealth Avenue in Brighton, as well as the opening of a new center at 125 Newbury Street in Framingham.

We are proud to announce two new affiliations. Sleep specialists from the UMass Memorial Medical Group will be working with Sleep HealthCenters® at our new Worcester site. Sleep HealthCenters® will also be opening a new center in Stoughton in conjunction with New England Sinai Hospital and Rehabilitation Center.

On July 3rd, we welcomed the first two fellows into the Brigham and Women's Hospital new ACGME accredited Sleep Medicine Fellowship Program, run in association with Sleep HealthCenters®. This program provides comprehensive sleep training for qualified physicians interested in becoming sleep specialists.

Dr. David White, previously our Corporate Medical Director and Editor of this Newsletter, is still a member of our Sleep HealthCenters® clinical staff but splits his time with his new position as the Chief Medical Officer of Respironics.

As you can see, we have a variety of exciting events occurring this summer. If you have any questions about sleep disorders, our services, our affiliations, or our locations, please feel free to contact us.



Sincerely,

Lawrence J. Epstein, MD  
Medical Director  
Sleep HealthCenters® LLC

  
**Sleep HealthCenters®**  
*Better Sleep. Better Health.*

**1-877-SLEEPHC**  
**1-877-753-3742**

## Sweet Dreams: Relationships Between Sleep and Diabetes

By Douglas B. Kirsch, MD

Dr. Kirsch is the medical director of the Sleep HealthCenter® in Beverly. He is board certified in Neurology and Sleep Medicine. Dr. Kirsch completed a Sleep Medicine Fellowship and was an Assistant Professor at the University of Michigan. Dr. Kirsch is currently a Clinical Instructor in Medicine at Harvard Medical School.



Patients and physicians frequently think of sleep disorders as being a world unto themselves; however, new data has demonstrated that sleep may play a significant role in many medical disorders. For instance, studies have been published associating obstructive sleep apnea (OSA) with an increased risk for high blood pressure, heart disease, and strokes. More recently, several authors have explored the relationship between sleep disorders and diabetes mellitus (DM), two areas which at first glance may not appear obviously connected.

### Diabetes Mellitus and Amount of Sleep

Voluntary sleep loss is common among the US population. Data has been published from the National Sleep Foundation "Sleep in America 2005" poll that adults currently average about 6.9 hours of sleep (40% getting less than 7 hours per weekday night), significantly less than the average of 8 hours demonstrated by research performed in 1959. Though increasingly common sleep disorders, such as insomnia, could account for some of this change, it is more likely that many people restrict their sleep in order to complete work or for entertainment.

One small study of young adults has demonstrated that voluntary sleep restriction to four hours per night over six nights resulted in impaired glucose tolerance (IGT); this laboratory finding resolved after one week of increased sleep. The Nurses Health Study of over 70,000 subjects found that people who slept less than 5 hours per night were more prone to developing diabetes; however, when adjusted for body mass index (BMI), the association vanished. This evidence therefore supports a link between short sleep latency and BMI, and increased BMI has been associated with development of diabetes.

Evaluation of the Sleep Heart Health Study population (over 2000 patients, ages 53-93) indicated that short sleep time was significantly associated with increased risk for diabetes mellitus and IGT. This relationship remained significant even after adjusting for diabetes risk factors and was independent of the presence of insomnia or sleep apnea symptoms. This association may suggest why patients with shorter mean sleep times are more prone to myocardial infarctions and death. Reasons why short sleepers are at higher risk for glucose regulation problems are unclear, but some scientists postulate that changes to the sympathetic nervous system and the pituitary hormonal system may account for the connection. The authors suggest that these findings lend credence to recommendations for people to get seven to eight hours of sleep per night and propose that adequate nocturnal sleep may be a helpful non-pharmacologic adjunct in treatment of DM.

Interestingly, it appears that long-sleeping patients (sleeping nine or more hours per night) may also have similar increases in risk for DM. This finding was observed in both the Sleep Heart Health Study and the Nurses Health Study. However, research on young patients with enforced increased time in bed did not demonstrate impairment in sugar metabolism. Theories as to the causes of the increased diabetic risk in long sleepers are more speculative, but could include reduction in physical activity, diminished cortisol levels (which may also be associated with depression), potentially increased alcohol usage, or the presence of sub-clinical inflammatory processes. (continued on page 2)

  
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**Sleep HealthCenters®**  
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## In this issue of the Sleep HealthCenters® Newsletter...

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  - Newton site relocation to Brighton
  - New site opening in Framingham
  - New affiliation with UMass Memorial Medical Group in Worcester
  - New affiliation and new site at New England Sinai Hospital and Rehabilitation Center, including sleep specialist Dr. Alex White
  - Members of the UMass Memorial Medical Group are now also members of the Sleep HealthCenters® medical staff: Stacia Sailer, MD; Steve Davis, MD; Ursula Anwer, MD; and Lourdes Flaminiano, MD
  - Brigham and Women's Hospital ACGME accredited Sleep Medicine Fellowship Program starts at Sleep HealthCenters®
  - AASM accredited A-STEP training program for sleep technologists
- ▶ Research Activities

Sleep HealthCenters® is a network of sleep medicine centers staffed by experts in the field of sleep medicine. Our integrated care system provides all the services needed to diagnose and treat patients with the entire array of sleep disorders including obstructive sleep apnea, insomnia, narcolepsy and restless legs syndrome. Sleep HealthCenters® has locations throughout eastern Massachusetts and is affiliated with the Beth Israel Deaconess Medical Center, Brigham and Women's Hospital, Faulkner Hospital, Hallmark Health, McLean Hospital, New England Sinai Hospital and Rehabilitation Center and UMass Memorial Medical Group.

Sleep HealthCenters® locations include Bedford, Beverly, Boston, Brighton, Framingham, Jamaica Plain, Malden, Newton, Stoughton, Weymouth and Worcester.

For more information, please contact us at: 1-877-SLEEPHC (1-877-753-3742) or visit our website at [www.sleephealth.com](http://www.sleephealth.com).

Requisition forms are available on our website.

# Sleep HealthCenters® Newsletter

(continued from page 1) The effect of DM on sleep time should also be considered. The Sleep Heart Health Study did not show a link between insomnia symptoms and DM/IGT. However, anecdotally, patients with DM may be at higher risk for symptoms that disturb sleep: painful neuropathies, nocturia, and restless legs syndrome. These sleep disruptors may be potential causes for sleep loss.

## Diabetes and Obstructive Sleep Apnea

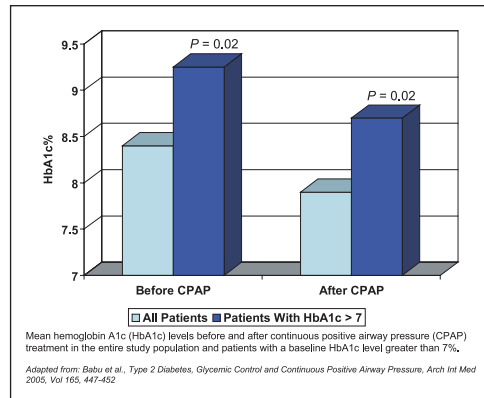
Another active area of research has been the relationship between obstructive sleep apnea and diabetes. Men ages 30-69 who were habitual snorers, a group at high risk for OSA, were demonstrated to have an increased incidence of DM. Further evaluation of patients with hypertension provided evidence that those subjects with OSA had higher fasting blood glucose, fasting serum insulin and hemoglobin A1C levels when compared to patients without OSA.

More recent studies have examined the relationship between sleep-disordered breathing and insulin resistance. Research on 150 mildly obese men without overt diabetes demonstrated that worsening OSA correlated with higher results on glucose tolerance testing. Remarkably, there was a two-fold increase in insulin resistance with an AHI > 5. Further research on 185 subjects found to have OSA on polysomnography, but without a history of diabetes, demonstrated that AHI and minimum oxygen saturation were independent determinants of insulin resistance. A recent study (June 2006) of 394 patients showed that those who spent 2% or more of the diagnostic sleep study below an oxygen saturation of 90% were at least twice as likely to have impaired glucose tolerance.

As OSA and DM have been linked, the next step for researchers was to explore whether treatment of OSA improves diabetic control. An early study of 10 sleep apneics found improvement in insulin resistance with 4 months of CPAP treatment. A follow up study with 40 subjects found that non-obese patients had improved sugar control within 2 days compared to 3 months for obese patients. However, other studies have not clearly demonstrated that CPAP consistently improves metabolic values.

A 2005 study evaluated 25 patients with type 2 diabetes and moderate-severe OSA, before and after CPAP use. The study demonstrated significant improvement in post-prandial

glucose and hemoglobin A1C with CPAP use, particularly in obese patients. This study also examined CPAP compliance, which was not measured in prior studies, finding a significant improvement in glucose control in patients who used CPAP for more than four hours per night, compared to those who used it less than four hours per night. The authors suggest that CPAP may have a significant benefit on glucose metabolism in type II diabetic patients with comorbid OSA.



## The Metabolic Syndrome and OSA

More provocatively, some scientists have begun to examine whether in fact the metabolic syndrome (hypertension, abdominal obesity, dyslipidemia, problems with glucose intolerance, pro-thrombotic state, and pro-inflammatory state) might play a significant role in causing or worsening the symptoms of sleep apnea. The authors of a recent article suggest that the metabolic activity in the visceral adipose tissue in the abdomen may worsen sleep apnea over time, rather than the physical presence of the adipose tissue in the oropharynx. Moreover, excessive sleepiness associated with OSA may be related to the obesity, insulin resistance, and ongoing inflammation beyond the sleep disruption and hypoxemia related to OSA. By providing an antagonist to one cytokine (TNF-alpha), the authors demonstrated an improvement in both apnea-hypopnea index and daytime sleepiness. Overall, the authors propose that insulin resistance and OSA potentiate each other, particularly in obese patients; the metabolic syndrome worsens sleep apnea, the sleep apnea then increases inflammatory cytokines and exacerbates the metabolic syndrome in a vicious cycle.

## Summary

Current research indicates a relationship between sleep and diabetic control.

Appropriate amounts of sleep on a nightly basis and good sleep habits may help glucose regulation. As well, recent evidence suggests that appropriate control of obstructive sleep apnea may improve glucose metabolism. Links between the metabolic syndrome and OSA have been postulated; however, further research is required.

## Suggested Reading:

Schultes B, Schmid S, Peters A, et al. Sleep Loss and the Development of Diabetes: A Review of the Clinical Evidence. *Exp Clin Endocrinol Diabetes* 2005; 113: 563-567

Babu A, Herdegen J, Fogelfeld L, et al. Type 2 Diabetes, Glycemic Control, and Continuous Positive Airway Pressure in Obstructive Sleep Apnea. *Arch Intern Med*. 2005; 165:447-452

Vgontzas A, Bixler E, Chrousos G. Sleep apnea is a manifestation of the metabolic syndrome. *Sleep Medicine Reviews* (2005) 9, 211-224



## CEO Corner

Paul S. Valentine  
President and Chief  
Executive Officer

Sleep HealthCenters® continues to expand and care for patients across Massachusetts. We are excited to announce the relocation of our Newton clinic to 1505 Commonwealth Avenue in Brighton effective July 31, 2006. This new facility allows us to expand our clinic space and incorporate our new sleep medicine fellowship program. We are also excited to announce our newest site opening later this summer in Framingham at 125 Newbury Street. This facility will offer clinic services and an eight-bed sleep lab. Between these two new sites, we will be able to offer more clinic and lab space in and west of Boston, making Sleep HealthCenters® more accessible to our patients.

We are pleased to announce our new affiliation with UMass Memorial Medical Group in Worcester, with Dr. Stacia Sailer as the Medical Director and Dr. Steven Davis as Associate Medical Director of our recently opened facility at 385 Grove Street, Worcester. Dr. Sailer is board certified in Sleep Medicine, Internal Medicine, Critical Care Medicine, and Pulmonary Medicine. Dr. Davis is board certified in Internal Medicine and Pulmonary Medicine. Both Dr. Sailer and Dr. Davis currently serve as Clinical Associate Professors

## Case Study

A 64-year old woman with a history of inconsistent diabetic control was seen in sleep clinic due to difficulty with sleep fragmentation and snoring. Her snoring was loud, occasionally causing her husband to move to another bedroom. Her husband has also noted occasional periods of irregular breathing. She had increasing daytime sleepiness over the last 18 months and had a near-miss motor vehicle crash due to drowsiness. Given her frequent nocturnal wakings, she estimated sleeping approximately 4 hours per night out of 7 hours in bed (11 p.m. to 6 a.m.). Nocturia occurred 2-3 times per night. She noted that her physician was considering institution of insulin injection therapy for her diabetes, as her sugars had been high, even with appropriate oral therapy.

Past medical history included hypertension, diabetes for 6 years, coronary artery disease with a myocardial infarction in 1999 and coronary artery bypass graft x 3 in 2000. Her medications included metformin, lisinopril, atenolol, glipizide.

On examination, she was obese with a body-mass index of 33. Her blood pressure was mildly elevated at 138/92 and her neck circumference was 16 inches. She had a crowded

oropharynx with a long soft palate. No other physical examination findings were notable.

The patient was referred for two nights of polysomnography. The diagnostic polysomnogram demonstrated an apnea-hypopnea index of 35 events/hr and a minimal oxygen saturation of 82%. The patient spent 3.5% of the night below a 90% oxygen saturation. The continuous positive airway pressure (CPAP) titration demonstrated that a pressure of 9 cm of water was effective. The patient received a CPAP machine and met with a respiratory therapist to explain its use.

After having difficulty using the machine for the first three weeks, the patient's tolerance of positive pressure therapy improved. She was able to use it 7/7 nights, for 6 hours/night. In follow up 6 months later, the patient had significant subjective improvement in her daytime sleepiness, was able to drive without becoming drowsy, and had diminished nocturnal arousals with the nightly use of CPAP. She noted improvement in her glucose control with oral hypoglycemic medications and CPAP, and she was pleased that her endocrinologist had chosen to continue oral therapy rather than begin insulin injections.

at UMass Medical School. Drs. Ursula Anwer and Lourdes Flaminiano of UMass will also be participating in clinical activities at our Worcester facility.

We are also pleased to introduce our recent affiliation with New England Sinai Hospital and Rehabilitation Center (NESH) in Stoughton. In the late summer, we will be opening a new center at NESH offering diagnostic, clinical, and CPAP treatment services. Dr. Alex White, a sleep specialist and Chief of Pulmonary Medicine at NESH, will be the medical director of the new facility.

In order to continue developing and maintaining physician relationships, we are pleased to introduce our new Physician Liaison, Stan Vogt. Mr. Vogt's experience in healthcare marketing makes him a great fit for our company.

We recently welcomed two new fellows into the Brigham and Women's Hospital ACGME accredited Sleep Medicine Fellowship Training Program. Our medical director, Lawrence Epstein, MD, is the new Program Director of the Fellowship Program. This cutting-edge training program demonstrates our leadership

role in basic and clinical research, as well as product research and development. Our clinical staff has the opportunity to be part of training the next generation of health care professionals and future leaders in sleep disorders medicine and providing continuing education on sleep subjects to other health care professionals.

Finally, we are proud to announce our AASM accredited A-STEP training program for sleep technologists. According to AASM standards, technologists who participate in A-STEP emerge better-prepared for their professional positions as sleep technicians. Sleep HealthCenters® is one of only nine AASM accredited programs and we are pleased that we were the first facility in the nation to produce technologists who have completed Step 1 of the two-step program. This required at least 80 hours in a didactic program and qualifying scores on an AASM exam.

Thank you for allowing us to play a role in the care of your patients. Please contact us if there is anything we can do for you.

## Research Activities

Sleep HealthCenters® is proud to work with some of the premier sleep researchers in the country. The following research studies are currently underway in conjunction with our partners:

**Apnea Positive Pressure Long-Term Efficacy Study (APPLES)** The Sleep HealthCenter® associated with Brigham and Women's Hospital is conducting a NIH-funded study that examines the long-term effects on quality of life, neurocognitive function, sleepiness and mood by using Continuous Positive Airway Pressure (CPAP) to treat sleep apnea.

**Restless Legs Syndrome** The Sleep HealthCenter® associated with Brigham and Women's Hospital is conducting a research study that tests a new drug (in the form of a patch) for Restless Legs Syndrome (uncomfortable sensations in the legs accompanied by the urge to move, which generally start during periods of rest and are worse at night).

**Positive Airway Pressure Device** As part of Sleep HealthCenters® commitment to long term success of therapies to treat sleep disorders, we are currently investigating a standardized clinical program to help patients adjust to their initial experience with CPAP therapy to treat obstructive sleep apnea.

**Operation Healthy Sleep** This innovative research project is funded by the National Institute of Justice and is designed to examine and evaluate the impact of sleep disorders and treatment of sleep disorders on the safety, health, and performance of Massachusetts State Police and the City of Philadelphia Police.

**Sleep and Menopause** This unique study concentrates on understanding the role that hot flashes and sleep disruption play in the effect of estrogen replacement therapy on mood in perimenopausal and post-menopausal women.

