The Future of Behavioral Sleep Medicine

Wilfred R. Pigeon, Ph.D.; Valerie McLaughlin Crabtree, Ph.D.; Michael R. Scherer, Ph.D.

Abstract: Behavioral Sleep Medicine is a relatively new discipline with roots in Behavioral Medicine and a specific focus on behavioral aspects of Sleep Medicine. While cognitive behavioral therapy for insomnia is most closely identified with Behavioral Sleep Medicine, the discipline and its practitioners offer a wider array of interventions for pediatric and adult sleep disorders. Despite the existence of these evidence-based behavioral strategies for the major sleep disorders, it is the exception, rather than the norm, when behavioral sleep medicine is fully integrated into a sleep medicine practice. A brief history of Behavioral Sleep Medicine, challenges to achieving greater integration, progress made to date, and suggestions for the immediate future are presented.

Keywords: behavioral sleep medicine, sleep medicine, sleep, treatment

Citation: Pigeon WR; Crabtree VM; Scherer MR. The future of behavioral sleep medicine. J Clin Sleep Med 2007;3(1):73-79.

In a recent special article, an important change for the field of sleep medicine was proposed. Dr. Lavie suggested that an alliance be formed between sleep medicine and family medicine, such that appropriately trained practitioners in a family medicine or primary care practice may diagnose, assess via home-based monitoring, and treat sleep apnea in collaboration with a supervising sleep center. These are important and timely considerations for the field to discuss.

We take this opportunity to address an equally important challenge for the field of sleep medicine: the integration of behavioral sleep medicine (BSM) services into the standard practice of sleep medicine. Currently, BSM services are available and effective for a variety of sleep disorders, and there are numerous isolated programs that integrate behavioral sleep specialists into sleep medicine programs or departments housing sleep practices. In the context of all existing sleep disorder centers, however, these examples of BSM being fully integrated into a sleep medicine practice represent exceptions to the rule. While BSM is uniquely situated for further integration with sleep medicine, as well as the integration into family medicine or other specialty practices, some tangible hurdles must continue to be addressed in order to usher the full promise of BSM into being.

Disclosure Statement

This is not an industry supported study. Drs. Pigeon, Crabtree, and Scherer have indicated no financial conflicts of interest.

Submitted for publication August 1, 2006
Accepted for publication October 18, 2006

Address correspondence to: Wilfred R. Pigeon, PhD, CBSM, Sleep & Neuropsychology Research Laboratory, Department of Psychiatry, University of Rochester, 300 Crittenden Blvd. Rochester, NY 14642; Tel: (585) 275-3374; Fax: (585) 273-3682; E-mail: Wilfred_Pigeon@urmc.rochester.edu

Journal of Clinical Sleep Medicine, Vol. 3, No. 1, 2007
Monroe and Hauri highlighted the psychophysiological nature of insomnia. Bootzin introduced the application of stimulus-control principles for insomnia. Hauri reintroduced sleep hygiene, Speilman and colleagues developed sleep-restriction therapy, and Ferber published his popular book on addressing childhood sleep problems. Later, Morin highlighted the use of cognitive therapy for insomnia.

Despite this historical backdrop, the recognition of BSM as a specific subspecialty is much more recent. In 2000, the American Academy of Sleep Medicine (AASM) established an ad hoc committee called the BSM committee to help formalize the role of behavioral sciences in sleep medicine; that body subsequently became a standing committee. Also in 2000, Stepanski and Perlis introduced BSM as a subspecialty in the Journal of Psychosomatic Research. These same authors later offered the following description of BSM:

The branch of clinical sleep medicine and health psychology that (1) focuses on the identification of the psychological (e.g., cognitive and/or behavioral) factors that contribute to the development and/or maintenance of sleep disorders and (2) specializes in developing and providing empirically validated cognitive, behavioral, and/or other nonpharmacologic interventions for the entire spectrum of sleep disorders.

The Current Practice of BSM

In the broader field of behavioral medicine, from which BSM is partly derived, practitioners are typically doctoral-level clinical psychologists who have received specialty training in behavioral medicine either at the predoctoral or postdoctoral level. Some clinical programs in psychology have specific clinical health psychology tracks from the outset. Other programs offer 1 or more courses in these subject areas and/or provide training opportunities through practical externships and predoctoral internship placement. Trainees typically have an interest in delivering cognitive-behavioral interventions for 1 or a large variety of medical disorders. Most clinicians have also completed postdoctoral fellowships with a predominate focus in behavioral medicine. Some fellowships may have a narrow focus on a specific subspecialty such as pain management or cardiac rehabilitation. A behavioral medicine specialist (or clinical health psychologist) may work in a stand-alone or group practice, a mental health agency, or a hospital or academic department or may be embedded in a variety of medical practices and clinic settings with a multidisciplinary approach to care.

BSM, the sleep-specific practice of behavioral medicine, is poised to follow a similar path in terms of its training, delivery, and practice, though it is at a more nascent stage of development. Initially, the typical BSM clinician was a psychologist who either helped to establish the field or trained with such individuals during their graduate or postgraduate education. Although this remains the case, BSM clinicians increasingly cross over from other behavioral medicine subspecialties or may be physicians (eg, psychiatrists) or nurse practitioners in sleep medicine who pursue additional training in BSM. What many of these clinicians have in common is the training and ability to assess, treat and manage the wide range of comorbid psychiatric conditions that so often present with sleep disorders. In addition, there are increasing numbers of nurses and other healthcare professionals at various levels of training who deliver some types of BSM interventions. Although such individuals can effectively deliver some treatments, it is important to remember that the majority of cases can be complex and often benefit from the knowledge and skill sets developed through the formal preparation to become a BSM specialist. One indicator of that preparation is the AASM certification in BSM (CBSM), which is currently available to PhDs, PsyDs and MDs with appropriate training in BSM who then pass a certification examination.

The Role of Evidence-Based Behavioral Interventions for Sleep Disorders?

The role of BSM services or their utility is usually not a subject of debate. Certainly, the delivery of cognitive-behavioral therapy (CBT) for insomnia, the most common sleep disorder in the United States, is well established as an evidence-based intervention, and this is underscored by the recent NIH State of the Science Conference. The meta-analyses demonstrate, and the consensus statement supports, the efficacy of CBT. Moreover, these and newer data support the assertion that CBT for insomnia is superior in safety and efficacy, as compared with pharmacotherapy.

In contrast, the role of BSM in other sleep disorders is less recognized. This, in itself, may contribute to an underappreciation of the full complement of BSM services, slowing the integration of BSM into individual sleep centers. The contribution of BSM to the treatment of sleep disorders other than the insomnias, therefore, is briefly reviewed below.

Sleep Apnea

Nasal continuous positive airway pressure (CPAP) represents an efficacious and effective treatment option for moderate to severe obstructive sleep apnea (OSA) in adults and for residual OSA following adenotonsillectomy in children. The primary barrier to CPAP treatment is noncompliance, which is often due to difficulties tolerating use. Adherence problems are well documented, with dropout rates ranging from 5% to 30% and average hours of use per night ranging from approximately 3.5 to 5.5 hours. Only approximately 50% of patients use CPAP for 4 or more nights per week or 6 or more hours per night. Moreover, recent work has failed to show any substantial increase in hours of nightly use when comparing standard CPAP to autotitrating CPAP, CPAP with heated humidification, or flexible CPAP therapy.

In contrast, significant increases in CPAP compliance from 5.2 ± 0.6 hours per night to 6.3 ± 0.6 hours per night and lower symptom-severity scores with significantly decreased symptoms of OSA and significantly improved mood have been demonstrated following supportive and educational interventions. Furthermore, those receiving intensive support have significantly greater usage of CPAP (5.4 ± 0.3 hours) than those receiving standard care (3.8 ± 0.4 hours). In addition, although the truly CPAP-phobic patient may be somewhat rare, approximately 30% of CPAP users anticipate or subsequently report sensations of claustrophobia. These patients can be treated with CPAP-desensitization protocols designed by a BSM provider, though no trials exist to corroborate these clinical findings.

Positional therapy is, we believe, an underutilized conservative approach to the management of OSA that is positional in nature. Positional alarms of varying types have been shown to reduce...
apnea-hypopnea index levels from the severe to mild range, or even normal range, for the majority of patients with positional OSA.\textsuperscript{42-44} In a randomized trial of non-CPAP treatment strategies, positional therapy as an adjuvant to an oral appliance reduced apnea-hypopnea indexes to below 5 in 11 of 15 subjects.\textsuperscript{45} Although many physicians describe, and may even suggest, the “tennis-ball technique,” it is not an intervention that is given much credence in terms of long-term effectiveness. To the extent that this statement accurately reflects assumptions held by sleep professionals, it is inconsistent with the available findings. Most of the empirical work in this domain has been carried out by BSM researchers and clinicians. Furthermore, the tracking and management of treatment adherence, in general, is a strength of BSM.

Finally, in terms of OSA, weight loss is a potentially, highly effective remedy for a large preponderance of patients. It is widely encouraged by sleep specialists to their patients with OSA. In general, both patients and physicians recognize the seemingly futile nature of weight loss without subsequent weight gain. Compared with the bariatric operations that lead to dramatic weight reduction, single-method behavioral approaches to weight loss are not only daunting, but have limited support for their long-term success.\textsuperscript{46,47} There is some support that multicomponent weight-loss programs combining diet, exercise, and behavior therapy can be effective in the long term.\textsuperscript{48} Given the reversal of OSA with weight loss and the stepwise reduction in the apnea-hypopnea index associated with reduction in weight, this approach is alluring. Some BSM specialists, from their training in more general behavioral medicine, have experience in developing and/or administering such programs (eg, smoking cessation, weight loss, cardiac rehabilitation).

**Pediatric Sleep**

As many as 46% of infants and one third of young children have difficulty initiating or maintaining sleep,\textsuperscript{49,50} and a “sleepless” child has far-reaching impact on the entire family system. In fact, parents’ report of their children’s difficulty initiating or maintaining sleep is one of the most common complaints presented to pediatric sleep medicine centers, and pharmacologic management of this sleep disruption should be a last resort.\textsuperscript{51} Disorders of initiating and maintaining sleep in children are rarely a result of pure physiologic disturbance and, oftentimes, are either purely learned or an interplay between behavior and physiology.\textsuperscript{51}

In treating pediatric sleep disturbances, although certainly more large-scale studies are needed, several interventions have empirical support as “well-established,” “probably efficacious,” or “promising” treatments (for a complete review see \textsuperscript{52,53}). Specifically, for difficulty initiating and maintaining sleep, the application of the behavioral principles of extinction and graduated extinction, which involve the systematic ignoring of the inappropriate target behavior or behaviors, are “well established.” Scheduled awakenings, meanwhile, are “probably efficacious.” In fact, use of graduated extinction for infant nighttime settling has been associated with significant improvements in infant sleep and significant reductions in maternal depression.\textsuperscript{49} Use of extinction with parents present and positive routines with faded bedtime have both been labeled as “promising” interventions.

Perhaps the pediatric BSM intervention with the longest history is the treatment of nocturnal enuresis with a urine alarm device.\textsuperscript{54} This behavioral approach has been effectively utilized for nearly 70 years with significant reductions in episodes of bedwetting. In a series of studies, use of a urine alarm has been shown to produce significant reductions in bedwetting over pharmacologic treatment both immediately following treatment (66% vs 40%-46%) and 1 year later (51% vs 17%-22%).\textsuperscript{55} More specifically, although the use of desmopressin has been shown to have a more immediate effect on increasing numbers of dry nights, urine alarms have been superior to the use of tricyclic antidepressants in immediately treating enuresis. Furthermore, after discontinuation of treatment, urine alarms have shown a significantly reduced relapse rate in comparison with medications. This represents an important treatment for children who may be able to avoid the expense and potential side effects of medications such as desmopressin, imipramine, and anticholinergic agents.\textsuperscript{56}

In treating sleep terrors and somnambulism, use of scheduled awakenings is a “promising intervention.” Introducing and continuing optimal CPAP treatment in children poses an additional venue for the BSM practitioner to address. In a recent trial of 29 children introduced to CPAP, one third had discontinued treatment by 6 months.\textsuperscript{57} In those children continuing treatment, parents significantly overestimated actual nightly use, which averaged 5.3 hours per night. In an intervention trial of behavioral modification for CPAP initiation and compliance in children, an 82% rate of established CPAP use was achieved with mean daily use of 6.3 hours on days when CPAP was used at follow-up time points ranging from 3 to 46 months.\textsuperscript{58}

Finally, nonspecific advice and support alone have not been shown to significantly improve behavioral sleep disturbances in young children.\textsuperscript{59} As with many disorders of childhood, no single approach works for every child. Given these realities, a substantial time commitment is often required of the therapist and family on an ongoing, albeit generally brief, basis to develop and implement an individually tailored treatment plan. This investment of time must be measured against the goal of alleviating the impact of the sleep disturbance on the patient and their family. Overall, pediatric BSM is a growing field of its own, with a forthcoming standards of practice paper.

**Other Sleep Disorders and Other Contributions**

Although utilized less often, behavioral interventions also exist for other sleep disorders. With respect to delayed and advanced sleep phase disorders, bright-light therapy is an effective intervention within the BSM repertoire that has more support than when used for the treatment of shift work and jet lag.\textsuperscript{60} Furthermore, there is some empirical support for delivering bright-light therapy in phase-delayed sleep-onset insomnia.\textsuperscript{61} With respect to the behavioral management of narcolepsy, scheduled naps are suggested but only as part of a comprehensive treatment plan. The utility of BSM services for narcolepsy may be greater in terms of (1) measuring or treating associated mood disturbances, (2) assisting the patient in coping with the disorder and the treatment, (3) addressing sleep-hygiene issues, and (4) assessing and managing circadian or insomnia disorders. The above roles for BSM would also apply with respect to restless legs syndrome and periodic limb movement disorders. In addition, there is 1 preliminary unreplicated study demonstrating that CBT for insomnia improved sleep and reduced the periodic limb movement–related arousals in patients with comorbid insomnia and periodic limb movement disorder.\textsuperscript{62}
Finally, as suggested in the above paragraph, beyond providing evidenced-based interventions, the BSM practitioner is also trained to (1) help patients manage other sleep disorders not reviewed (eg, rapid eye movement behavior disorder, bruxism); (2) assess and manage (or appropriately refer patients with) a wide range of psychiatric disorders that may be comorbid with a sleep disorder (eg, depression, generalized anxiety, posttraumatic stress disorder); (3) deliver interventions to help patients manage chronic medical conditions, many of which present as sleep disorders related to medical conditions (eg, diabetes, chronic pain, myotonic dystrophy); and (4) deliver and interpret an equally wide range of instruments as either diagnostic tools or outcome measures.

**Summary of BSM Treatments**

There are a number of validated behavioral interventions for sleep disorders beyond the well-recognized cognitive-behavioral strategies for insomnia. Behavioral interventions for the treatment of OSA (and/or for CPAP compliance) as well as for pediatric sleep disorders represent the most well-validated sets of treatments. Given the high prevalence of these conditions, increased integration of BSM practices in sleep centers would provide added benefits in terms of patient care, sleep physician time and resources, and public health. Similar points have been made elsewhere in the recent past. To the extent that BSM services may be rendered in family medicine (and other) practices, these benefits may extend to those patients not assessed or managed in the sleep-center environment.

**The Problem With Delivering BSM Services**

The utility of all the BSM interventions reviewed above, while perhaps not widely recognized, are not necessarily in question. The problem, as has often been stated, is one of supply with proportionally few professionals trained and available to deliver treatment. Simply put, there are not enough certified BSM providers or American Board of Sleep Medicine diplomates with the time and interest for every sleep center to provide BSM services to those patients seeking it, let alone needing it. Perhaps because of this real and perceived issue, BSM remains out of the clinical core of sleep medicine.

**Reimbursement: A Related Problem**

Reimbursement of BSM services by third-party payors represents another challenge to delivering BSM and to further integration of BSM services in sleep centers. It may also indirectly limit the number of providers willing to deliver such services. Until recently, providers of behavioral interventions to patients with physical health diagnoses had no straightforward way to bill for services under the Current Procedural Terminology, coding system. These included any services provided for sleep disorders (including insomnia). This changed in January 2002, when 6 new codes for “health and behavior assessment and intervention services” for the “prevention, treatment or management of physical health problems” went into effect.

The establishment of these health-behavior codes paved the way for future progress, although that progress has been slow for all behavioral health providers, including those in BSM. Currently Medicare, but few other insurers, recognize and reimburse for these codes. Still, there are an increasing number of regional success stories arising from the advocacy at institutions and by individual clinicians and organizations.

In specific regard to the BSM community, initial remedial steps were begun in 2005 to 2006 by a work group within what is now the Insomnia Section of the AASM. The list of new Current Procedural Terminology codes will be disseminated to section members with guidelines for their application, and a survey of code utilization was undertaken. The AASM Board has recognized the importance of this issue and asked the Health Policy Committee and the BSM Committee to work together in developing recommendations to address the problem on a broader scale.

**Remedial Steps to Solving the Supply Problem**

Some very concrete steps have been taken to address matters related to BSM as a whole. As noted in the history section, AASM recognized the importance of addressing and highlighting BSM issues with the formation of an ad hoc committee on BSM that became a standing committee and subsequently supported several initiatives of that committee. The BSM exam was designed and introduced in 2003. To date, 95 sleep professionals have passed this exam and received certification in this specialty.

The AASM has established accreditation guidelines for training in BSM in doctoral programs, predoctoral internship or residency programs, or postdoctoral programs (http://www.aasnet.org/FellowshipTraining.aspx). The goal is to develop accredited BSM training programs that provide adequate practicum and didactic preparation, typically over the course of a full year, that lead to competent practice in the specialty area of BSM and qualification to take the BSM certification examination. There are currently 3 such accredited training sites (Rush Presbyterian-St. Luke’s Medical Center, Stanford University, and the University of Rochester). Applications for additional sites are accepted on a rolling basis. There are also 32 sites that provide BSM training to graduate students, each of which will be encouraged to develop its programs and to apply for accreditation if it have not already done so. In addition, the AASM Board of Directors recently approved a request for the formation of a mini-fellowship in BSM (http://www.aasnet.org/BSMComm.aspx). This fellowship is structured along the lines of the AASM international fellowships, consisting of a 3-week training at any site with a certified BSM specialist or an AASM diplomate with BSM expertise, followed by attendance at the annual sleep meeting.

There are now several AASM-sponsored courses, 1 BSM focused, 1 insomnia focused, and a third focused on pediatric sleep disorders. These offerings have been well attended. In addition, the field has a journal and 2 textbooks dedicated to BSM, as well as several treatment manuals for the delivery of CBT for insomnia.

Finally, the last year has seen the formation of a BSM Task Force charged by the AASM Board with developing recommendations for increasing the number of clinicians who can provide BSM services for the treatment of insomnia in particular. Final recommendations from this Task Force were presented to the Board following the Sleep 2006 meeting. These recommendations take the form of several suggested large-scale initiatives designed to populate the field with increasing numbers of qualified practitioners. As an initial step, the AASM Board has asked the BSM Committee to survey individual sleep centers with respect to their experience with the delivery of and/or referral for CBT for insomnia.
SUGGESTIONS FOR INTEGRATING BSM SERVICES INTO SLEEP CENTERS

There are several reasons why sleep centers may wish to more actively establish BSM services. These include (1) the provision that services for addressing the psychological and/or psychiatric aspects of sleep disorders be available to patients presenting to accredited sleep disorders centers, (2) the patient population typically treated by BSM clinicians comprises those who are perceived to be more problematic and/or time consuming and do not fit as easily into the patient flow of most practices, (3) the possibility of increasing CPAP compliance through more intensive and evidence-based programs, (4) improving patient satisfaction and health outcomes for those patients for whom CPAP is effectively treating apnea but in whom comorbid insomnia is discovered after CPAP therapy, and (5) because of the high prevalence of comorbid OSA and insomnia, attracting insomnia referrals may, as a consequence, increase the number of patients being assessed for sleep apnea, who may not have otherwise pursued such assessments.

We recognize that, although the accreditation process for sleep disorders centers includes the demonstration of the provision of BSM services, the availability of BSM providers is an ongoing constraint. Until greater numbers of BSM-certified individuals are available as a result of the existing and planned initiatives reviewed, one starting point is for individual centers to systematically assess available resources and plan for their utilization. The following is intended to serve as a guideline for that process.

When implementing BSM services, 2 dimensions should be considered. First, sleep centers must consider whether services will be provided in house or through referral. This dictates the extent to which a sleep center can coordinate and integrate treatment and clinical information. Second, the level of training attained by identified BSM providers will dictate the role of the sleep center in ensuring that appropriate behavioral sleep services are provided through supervision.

The points below delineate the 2 dimensions along which BSM services can be planned. The most desirable option is presented on the top of each list. The lower the rung within each dimension, the more important it is for a sleep center to assume an additional role in monitoring treatment, structuring follow-up communication, and advocating for further education to ensure quality of treatment.

IN-HOUSE VERSUS REFERRAL

a) Integrated BSM services with on-site staff providing coordinated evaluation and treatment services.
b) Referral to clinicians outside the sleep center but within the larger organization to the extent that this is available (eg a psychologist in the psychiatry department of a medical center)
c) Referral outside the organization to a local academic psychology or psychiatry department. (As an external resource, academic departments may offer providers with greater specialization, are more likely to take an interest in establishing a BSM specialization, and may be more able to treat patients free of financial constraints)
d) Referral outside the organization to private individual or group psychotherapy practices contracted with a sleep center and with some degree of treatment integration and follow up.
e) Referral outside the organization without contractual arrangement but with some understanding of what type of patient follow up is expected.

Level of BSM Specialization

We note emphatically that, in some cases, specialization may not be reflected by the degree held by a practitioner but, instead, by the level of specialized training the clinician has undertaken.

a) BSM-specialized staff with BSM certification. Such individuals are listed on the AASM website (http://www.aasmnet.org/BSME.aspx).
b) BSM-specialized staff without BSM certification (with encouragement for such practitioners to pursue BSM certification through the AASM and provision of a concise synopsis of what BSM eligibility consists of).
   a) Psychologists trained in behavioral medicine and/or CBT but with little or no experience in BSM (with encouragement to receive additional training in order to be able to deliver services).
   b) Master-degree level providers or nurse practitioners with behavioral medicine or CBT experience. (Such individuals should be supervised by a BSM-certified individual; sleep centers should carefully review training and implement protocols for addressing treatment needs of individuals in whom BSM needs are in addition to primary psychiatric or psychotherapeutic needs.)
c) General psychologist or counselor (same conditions as expressed in levels c. and d. above).

As noted above, for services for which the sleep center is providing a referral or for which practitioners are not specialized in the provision of BSM services, the sleep center should consider a supplemental role in treatment-outcome monitoring and follow up in cases in which these are not provided by the practitioners. Similarly, it may be worthwhile for sleep centers to take an even more proactive role in developing sleep specialization among local behavioral medicine specialists. This could take the form of advocating, supporting, or even organizing educational opportunities for BSM training as well as suggesting the pursuit of BSM certification (http://www.aasmnet.org/PDF/BSME ExamReqAndApp.pdf).

CONCLUSION

BSM is a discipline that includes the delivery of many empirically validated interventions for a variety of child and adult sleep disorders. Beyond the success of “CBT for insomnia,” there are several BSM approaches to the treatment and management of other major sleep disorders, especially with respect to OSA and to pediatric sleep disorders, that deserve greater attention from the field of sleep medicine. Finally, BSM specialists are particularly skilled in the assessment of psychiatric issues and the treatment of other quality-of-life issues, which so often occur in tandem with many chronic conditions, including the many disorders of sleep.

In addition, although there is indeed a shortage of trained BSM providers, sleep medicine must move beyond the sometimes ingrained sense that the shortage is insurmountable, because such perceptions can lead to a sense of resignation and complacency. Instead, we wished to highlight (1) the increase in certified BSM
providers over the recent past, (2) the growing number of resources available to train more individuals in BSM, and (3) the organizational support of the AASM to take additional steps to further address the supply problem and the issue of reimbursement.

Finally, we, of course, encourage the field as a whole and individual sleep centers on their own to become engaged in the process of making sleep medicine an even more integrated discipline than is currently the case. The future of BSM will be one of ongoing integration into sleep centers as well as into other medical practices such as family medicine. How soon that future can be realized will rely in large part on how the field addresses the issues raised in the present.

ACKNOWLEDGEMENTS

WRP and VMC are members of the American Academy of Sleep Medicine’s Behavioral Sleep Medicine Committee; the authors wish to thank the committee for reviewing the manuscript and providing feedback.

REFERENCES

38. Chasens ER, Pack AI, Masiolin G, Dinges DF, Weaver TE. Claustrophobia and adherence to CPAP treatment. Western J Nursing Res

41. Edinger JD, Radtke RA. Use of in vivo desensitization to treat a patient’s claustrophobic response to nasal CPAP. Sleep 1993;16:678-80


