

So Now You're in Charge of Sleep

by Karen J. Stewart, MS, RRT, LRTR

There seems to be a great deal of interest currently in the addition of sleep labs and centers in hospitals and, in some cases, private outpatient facilities. The statistics indicate that as much as 40 percent of the general population report difficulty with sleep. Many sleep disorders may lead to serious health complications.

While inpatient care is decreasing, we are seeing increases in ambulatory and outpatient care for these disorders. The ambulatory care in many areas is providing some good sources of revenue for today's hospitals. With the trend toward the outpatient services, you may find you have been selected to begin a new service. Sleep disorders appear to be an area of interest for respiratory therapists, and you may suddenly be asked to set up a lab or center. In that scenario, you will probably wonder where to start. This article

takes you through those steps and gives information to help the respiratory care manager start up this kind of service.

Center versus lab

There is a difference between the sleep center and the sleep lab. A laboratory is just a diagnostic testing facility whose key role is to perform tests to evaluate sleep-related breathing disorders. A center, on the other hand, typically offers a more comprehensive complement of services. The center may include a clinic, provide biofeedback testing, or operate an insomnia program. This operation is typically larger than the diagnostic laboratory.

One of the initial steps for beginning such an endeavor is determining which services will be offered. Decisions that need to be made cover hours of operation, days of operation, bed

capacity, personnel needs, equipment and supply costs, and space needs. These factors are important when you think about what you need in the way of purchasing equipment for the service.

Standards and guidelines

Standards for sleep services have been established by the American Academy of Sleep Medicine (AASM). If you wish to pursue accreditation, building your lab or center based on the standards will put you in good position for the future. The AASM recommends the center be easy to find and easily identified. There should be good signage directing the patient to the center. Comfort of patients is also a high priority. The patient should be provided a comfortable private bedroom.¹

Polysomnographic equipment should record a minimum of 10 channels per bedroom. Also

a center must have the ability to record all-night oxygen saturation. Audio and visual monitoring and recording equipment must be present in each room. It is imperative that all equipment meets hospital safety standards.

A second excellent resource is the "AARC APT Clinical Practice Guideline – Polysomnography." The guideline, developed jointly by the AARC Cardiopulmonary Diagnostics CPG Focus Group and representatives from the Association of Polysomnography Technologists, addresses the variables that should be monitored, device limitations, and quality issues.²

The standard bedroom

The sleep study patient should experience testing in an environment as close to that of the home as possible. The room designated as the sleeping area should be a single bedroom with a comfortable environment. The room should be decorated like you would have decorated a bedroom in your home, and

lighting and temperature should be controlled by the patient. The room should be located away from traffic areas. It should also be large enough for the patient to have an easy chair, and it should accommodate the equipment necessary to record sleep activity.

Using beds designed for the home rather than hospital beds is wise. For patients who are in the system for night-time and Multiple Sleep Latency Test (MSLT) studies, including a TV and/or radio for entertainment is a nice addition. Lighting should be achieved with incandescent lamps rather than fluorescent. Equipment in the bedroom should blend in with the décor and meet the needs of the center.

A center that desires accreditation should have at least a single bedroom and a centralized control area for the recording equipment and for staff to monitor the study. Bedrooms should be soundproof.

Clinicians should be able to observe patients while they are sleeping. Use a low-light or infrared camera that will provide a good image with little or no light. A method for audio recording should also be in the room.

Typically, this equipment is connected to a VCR for recording and a monitor at the central control station for direct observation during the study.

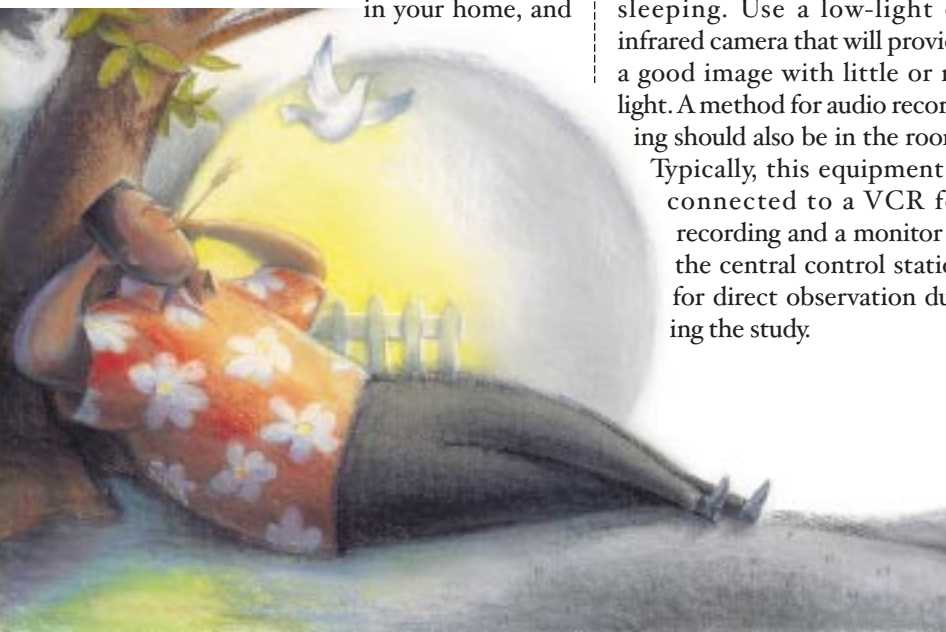
Monitoring equipment

The AASM's "Manual for Accreditation—Equipment Standard" states, "10 channels of polygraphic capability per bedroom is the norm. However more channels will be needed for all-night clinical recording."¹

There are a number of recordings and measurements that are taken during a sleep evaluation. A complete evaluation records electroencephalographic activity (EEG) for sleep staging, electrocardiogram (EKG), electro-oculogram (EOG), electromyographic activity (EMG) oxygen saturation, respiratory effort, nasal and/or airflow, body position, and limb movement. These measurements are usually recorded via polygraph or a computer-aided data acquisition system. Some equipment, such as oximetry, will need to interface with the system you select.

There should be appropriate output from the unit to the recording device. Output should include, at minimum, a single RS232 output port that is used for calibration purposes. If you make the decision to computerize the recordings of sleep disorders, there are a number of manufacturers that offer this kind of system. Everything from software to full systems is available.

To maintain standards for accreditation, the computerized system must have a resolution equal to paper recordings. The system should be able to support scoring in 30-second epochs. Real-time data collection should equal 60 seconds per page, allowing ease in calibrating continuous positive airway pressure (CPAP). The raw data must be available for review. Systems that are consid-



references

1. American Academy of Sleep Medicine. (1999). *AASM center accreditation package* [On-line]. Available: <http://www.aasmnet.org>.
2. American Association for Respiratory Care. (1995). AARC-APT clinical practice guideline: Polysomnography. *Respiratory Care*, 40(12), 1336-1343.

ered "black boxes" with output of processed information only (based on preestablished interpreted data where the raw data is not available to the person completing the interpretation) are not acceptable for accreditation.

Some systems sell an automated scoring system, but hand scoring remains the standard. Although some computer-assisted scoring systems are acceptable, a study totally scored by a computer is unacceptable. Automated scoring should be used as an assistant tool together with a trained technologist.

When selecting a computerized system, consider the type of recordings desired, storage medium, ability to reproduce recording, report generation, and client-friendly interface. The preferences of the technologist who is monitoring the sleep study should also be considered.

Some computerized systems provide a split monitor screen for operation of two beds on a single monitor. Although larger monitors are the norm, many technologists find it difficult to concentrate with so much information on a single screen. Technologists in my department prefer a monitor for each bed rather than the split screen.

Apnea equipment

Managers should also make sure equipment is available for treatment of patients who experi-

ence apnea. CPAP units and/or bi-level devices should be the same type as those the patient would be using at home. They should have remote controls so the technologist can change settings during sleep without disrupting the patient. Using the same equipment as that which is prescribed allows the clinician to introduce and provide some preliminary education to the patient before they order home equipment.

Polygraph equipment

The old standard is certainly acceptable and is an option for the recording of sleep disorders. The equipment is very reliable and can be less expensive than a computer acquisition system.

One of the major concerns for a center that generates a large volume of studies is record storage. Records are larger than normal 8 1/2 by 11 sheets and are frequently several hundred pages long. One can easily run into storage problems. In our experience, the cost of storage became a factor in determining the switch to computerization. The cost of paper will also be a surprise; electronic storage media is now less expensive than paper.

Control area

One of the other areas that requires consideration is the control area. Remember that the staff doing the monitoring will be working this area for a minimum of eight hours, so you should use good ergonomics when designing the work area. Equipment should be placed where it is comfortable to the user. Adjustable chairs and keyboards are essential.

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Polysomnograph Manufacturers

The following list of polysomnograph manufacturers may help you with your search for sleep-related equipment but is, by no means, totally inclusive of all manufacturers offering sleep products. Also refer to the "1999 Buyer's Guide of Cardiorespiratory Care Equipment & Supplies" in the July issue of *AARC Times*.

Bio-logic Systems Corp.
Cadwell Laboratories, Inc.
Collins Medical, Inc.
Compumedics Sleep Pty. Ltd.
DigiTrace Care Services, Inc.
Grass Instrument Division of
Astro-Med, Inc.

La Mont Medical, Inc.
Mallinckrodt, Inc.
Medcare Diagnostics
Medical Graphics Corporation
Mini-Mitter Co., Inc.
Network Concepts
Nicolet Biomedical Inc.
Nihon Kohden America, Inc.
Oxford Instruments, Medical
Systems Division
ResMed Corp
Respironics, Inc.
SensorMedics
Sleeptrace/International
Biomedical, Inc.
TeleDiagnostic Systems
Telefactor Neurophysiologic
Instrumentation

Other options

There are some companies that are selling a turnkey operation. When you consult with them, they offer to provide everything you need to set up your center. For those of you who wish to go it alone, it's a good idea to obtain "Starting a Sleep Disorders Program" from the AASM. You can order directly from them at (507) 287-6006 or www.aasmnet.org. I always found that part of my learning process was gaining experience and information by doing all the background work. For the respiratory care manager, the challenge of setting up a sleep center is one that can easily be met with a little research and networking. Good luck! 🧠

Karen Stewart is director of respiratory care and sleep disorders at Charleston Area Medical Center in Charleston, WV. She has also served as chair of the AARC's Management Section.

See the "Tools of the Trade" column in this issue for additional resources on this topic.