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Rebecca, Clinical Research Scientist

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Garbage In, Garbage Out: Shining a New Light on a Major Discovery on Waste Management in the Sleeping Brain

By Brendan Duffy, CCSH, RPSGT

The question about whether a lymphatic system existed in the brain has been discussed for centuries. In 2017, Dr. Daniel Reich and his team at the National Institute of Neurological Disorders and Stroke (NINDS), discovered that there is indeed evidence of its existence.
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AAST THANKS ITS SUPPORTER MEMBERS
As market forces and technological advances continue to place pressure on sleep technologists to expand their role in the sleep center, evidence shows that the best response comes in the form of increased education.

But as we all know, the level of education within the sleep technologist community can be characterized as “varied” at best. As sleep technologists look to their future, the need for a higher level of education and skills to provide value to potential employers and be competitive in the job market remains apparent. For some, this will require extensive retraining, while for others, the requirement is focused on honing their skills in very specific ways.

The consensus is that new entrants to this profession should seek, at a minimum, an associate’s degree. Training should begin with technical skills and knowledge, but should also include communication and presentation skills; knowledge of cardiorespiratory systems and comorbidities associated with sleep disorders; critical thinking and adaptability.

I have been very excited about the changes that AAST has introduced this year to the online learning system. The delivery of these resources is much different than before. We have evolved past the static video and quiz formats to a more interactive experience where you are guiding the lesson based on certain preferences. We believe this is critical in your journey toward higher education, as the modules allow you to learn within your comfort zone.

Also, we continue working with BRPT to promote and support the role of sleep educator. We are supporting this credential with educational material — providing module-type education to assist technologists to gain the necessary skill sets. We have also developed a patient curriculum to provide consistently in education.

Another area I would like to highlight as it relates to our efforts around ongoing education is our content. If you haven’t had the chance to check out the AAST blog recently, I encourage you to do so.

Of particular note is a new series that we ran from April through May called “The Evolution of Sleep.” Throughout this special six-part blog series, AAST engaged professionals from across allied healthcare to address, from their perspective, the value of collaborating more closely with sleep technologists and/or incorporating the discipline into their area of health. Contributions came from professionals involved in the following areas:

- DME
- Nursing
- Sleep education
- Myofunctional therapy
- Dentistry

You can expect the conversation to continue at our inaugural AAST Annual Meeting, being held Sept. 28-30 in Indianapolis.

In all, there are many exciting developments occurring as it relates to advancing the sleep profession through education. One of our primary objectives as an association is to raise the level of professionalism in our field and, as such, we will continue working on all fronts to ensure that focus remains front and center to our members.
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From the President

Celebrating 40 Years Strong

By Rita Brooks, MED, RPSGT, REEG/EPT, FAAST

The year was 1978. "Grease" was dominating the box office, "Night Fever" was at the top of the charts and a little organization called the Association of Polysomnographic Technologists (APT) was just getting its start. The group only had 20 members in the beginning, but that number grew steadily over the years as the association evolved. Forty years later, the APT is now the American Association of Sleep Technologists (AAST) and has over 4,200 members committed to advancing the profession.

If you aren't familiar with the storied history of AAST, it's worth checking out on our website at aastweb.org/history. We've gone through many changes over the years, and we're proud that we now lead the way in providing professional opportunities for sleep technologists and help members of every experience level to succeed and grow within the field.

While 40 years is an exciting milestone, I'm also thrilled that, this year, AAST is holding its first independent annual meeting. This inaugural meeting, which is being held in the fall in Indianapolis, was developed with members’ interests top of mind. We’re currently putting together an outstanding forward-thinking program with some of the best minds in the industry. Many thanks to everyone who submitted an abstract this year. We received so many amazing submissions. If you were not chosen as a speaker this year, it doesn’t mean we aren’t interested in what you have to say. In fact, your content might be perfect for an article in this magazine. A2Zzz is always accepting article submissions. Just email A2Zzz@aastweb.org. You can find writers guidelines here: aastweb.org/publication-info.

In addition to rich education, the 2018 Annual Meeting includes plenty of time to meet and learn from our vendors and exhibitors. You’ll also be able to meet with and learn from your peers during networking opportunities, including social networking events.

So, if you haven’t already, be sure to register for this brand-new AAST meeting, being held Sept. 28-30. Early-bird registration is only $275 before July 26, 2018. After that, the rate jumps $50, so don’t wait! AAST member registration includes access to all education sessions and networking events, and also includes access to the pre-conference sessions. For more information on the 2018 Annual Meeting, visit aastweb.org/2018annualmeeting.

I hope to see you there!

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April 1998
The BRPT becomes a separate entity.

April 1992
The A2Zzz newsletter is launched.

955
APT gets its first website.

1978
The American Association of Sleep Technologists is born as the Association of Polysomnographic Technologists (APT).

2001
The APT establishes a CEC program.

2007
The APT changes its name to AAST.

2003
Polysomnography is recognized as an allied health profession.

2005
The first sleep technology licensure laws are enacted.

2012
The AAST Future of Sleep Technology Summit is held in Chicago.

2017
AAST changes management and moves to SmithBucklin.

2018
AAST holds its first independent meeting and celebrates its 40th anniversary.

March 2018
A2Zzz magazine gets a new look and feel.

September 2018
The first APT education course is held.

2001
The BRPT becomes a separate entity.

April 2018
The first AAST textbook, “Fundamentals of Sleep Technology,” is published.

A2Zzz magazine gets a new look and feel.
Instructions for Earning Credit

AAST members who read A2Zzz and claim their credits online by the deadline can earn 2.00 AAST Continuing Education Credits (CECs) per issue, for up to 8.00 AAST CECs per year. AAST CECs are accepted by the Board of Registered Polysomnographic Technologists (BRPT) and the American Board of Sleep Medicine (ABSM).

To earn AAST CECs, carefully read the four designated CEC articles listed below and claim your credits online. You must go online to claim your credits by the deadline of Sept. 1, 2018. After the successful completion of this educational activity, your certificates will be available in the My CEC Portal acknowledging the credits earned.

COST
The A2Zzz continuing education credit offering is an exclusive learning opportunity for AAST members only and is a free benefit of membership.

STATEMENT OF APPROVAL
This activity has been planned and implemented by the AAST Board of Directors to meet the educational needs of sleep technologists. AAST CECs are accepted by the Board of Registered Polysomnographic Technologists (BRPT) and the American Board of Sleep Medicine (ABSM). Individuals should only claim credit for the articles that they actually read and evaluate for this educational activity.

READ AND EVALUATE THE FOUR FOLLOWING ARTICLES TO EARN 2.0 AAST CECs:

Garbage In, Garbage Out: Shining a New Light on a Major Discovery on Waste Management in the Sleeping Brain

Objective: Increase the knowledge base about new and exciting developments and research as to how the brain utilizes a lymphatic system during sleep to carry out important cleaning and pruning functions.

Set Your Sleep Center Apart

Objective: Learn one of the fundamentals of marketing: brand messaging. Utilize it to develop a brand message to set your sleep center apart from others.

The Changing Face of Sleep Technology, Part II

Objective: This article will give the reader a basic understanding of the present state of sleep technology.

Problems of Using Actigraphy in People With Parkinson's Disease

Objective: Understand why actigraphy may not accurately reflect sleep/wake cycles in people with Parkinson's disease.

STATEMENT OF EDUCATIONAL PURPOSE & OVERALL EDUCATIONAL OBJECTIVES

A2Zzz provides current sleep-related information that is relevant to sleep technologists. The magazine also informs readers about recent and upcoming activities of the AAST. CEC articles should benefit readers in their practice of sleep technology or in their management and administration of a sleep disorders center.

READERS OF A2ZZZ SHOULD BE ABLE TO DO THE FOLLOWING:

• Analyze articles for information that improves their understanding of sleep, sleep disorders, sleep studies and treatment options
• Interpret this information to determine how it relates to the practice of sleep technology
• Decide how this information can improve the techniques and procedures that are used to evaluate sleep disorders patients and treatments
• Apply this knowledge in the practice of sleep technology

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GARBAGE IN, GARBAGE OUT:

Shining a New Light on a Major Discovery on Waste Management in the Sleeping Brain

By Brendan Duffy, CCSH, RPSGT
he information you are about to read is new. As a matter of fact, this material is so new that many doctors are not yet aware of it. Unless they are graduating this year, physicians were taught in medical school that there are no lymphatic vessels inside the skull. Others may have assumed that there was some type of lymphatic style system in the brain but had not been taught about the definite existence of a cranial lymphatic system in humans. Much research on this issue has happened in the past five years. In fact, much has happened in the past five months.

Five years is eons when it comes to research, given the leaps and bounds that our modern technology now makes possible. Special cameras, filters and laboratory methods are rapidly allowing us to discover answers for questions that have long bewildered researchers and physicians alike. These questions included: How does the brain clear dead cells and waste products that build up between the cells? Is this process different when we are asleep? Can the information we gather assist in developing techniques to stall or reverse dementia illnesses like Alzheimer’s? And, most importantly, how does the brain do this without assistance from the lymphatic system?

The answer is it doesn’t do this without assistance from the lymphatic system. This was just recently discovered in October 2017 by Dr. Daniel Reich and his team at the National Institute of Neurological Disorders and Stroke (NINDS). They discovered that there is indeed evidence of a lymphatic system in the dura, the leathery outer region of the brain. This is a true game-changer.

An Age-Old Debate
The question about whether a lymphatic system existed in the brain has been discussed for centuries. Two centuries ago, anatomist Paolo Masgagni hired an artist to make full-body models that included a lymphatic system in the brain. His vision included a cranial lymphatic system, which was dismissed as an error. As a matter of fact, in a historical account in The Lancet in 2003, they wrote as follows, “Mascagni was probably so impressed with the lymphatic system that he saw lymph vessels even where they did not exist — in the brain.”

There is indeed evidence of a lymphatic system in the dura, the leathery outer region of the brain.

It turns out that Masgagni appears to have been correct with his anatomical models after all. Confirmation of a lymph system in the human brain was made possible in the past few months by the aforementioned Dr. Reich.

Dr. Reich, who is both a neurologist and a radiologist, and his research colleagues from the NINDS, started their research back in 2015. They were inspired by two major studies on mice. The first of these studies was cited in the medical journal Nature. That study was conducted at the University of Virginia and detailed research findings from experiments on mice that found a similar waste removal conduit in these mice. The study found lymphatic vessels lining the dural sinuses. The vessels were “able to carry both fluid and immune cells from the cerebrospinal fluid, and are connected to the deep cervical lymph nodes. The unique location of these vessels may have impeded their discovery to date, thereby contributing to the long held concept of the absence of lymphatic vasculature in the central nervous system.”

Flush the Toxins
How exactly does sleep clear the brain of the toxins? This was the question that Nedergaard appeared to begin to resolve with her research in 2012. One of the fascinating things about this work was that it appeared that the “brainwash” worked better and more efficiently during sleep to flush out waste and toxins. Studies have shown that levels of beta-amyloid decrease during sleep. This is very important, as a buildup of beta-amyloid can potentially neurotoxic waste products, including beta-amyloid.

Even prior to this, in 2012, researchers at the University of Rochester Medical Center, led by Maiken Nedergaard, discovered a macroscopic waste clearance system in mice that employed a very unique perivascular tunnel system. This tunnel system was dubbed the glymphatic system and was thought to play several roles in the brain. These included transport and elimination of soluble proteins and metabolites from the central nervous system. The abstract posted about this research in The Neurochemical Research of May 2015 states that it also was a thoroughfare for distributing “several compounds such as glucose, lipids, amino acids, growth factors and neuromodulators.” And the connection to sleep in the abstract that is of special note is as follows: “Intriguingly, the glymphatic system functions mainly during sleep and is largely disengaged during wakefulness. The biological need for sleep across all species may therefore reflect that the brain must enter a state of activity that enables elimination of potentially neurotoxic waste products, including beta-amyloid.”
of the blood vessels in a series of channels. Cerebrospinal fluid surrounds our brain and our spinal cord. Because it is managed by the brain’s glial cells, the team dubbed this clearing system the glymphatic system.

The researchers were very intrigued with the results showing an increased flow of CSF that ramped up only while the mice were asleep or anesthetized. They theorized that perhaps the space between cells during sleep was somehow increased and that this accounted for the increased flow volume and removal of toxins. Was this indeed how the brain cleaned and brushed the debris that accumulated during the day? Is this possibly a link into how beta-amyloid builds up in the brain if we do not get adequate or good quality sleep? When they explored this further, Nedergaard and her team were able to see how readily the flow could increase because the brain’s space between cells (i.e., extracellular volume actually increased by 60 percent). This allowed a powerful flow through the brain cells to wash, scrub and remove toxins as the mice slept. They performed more research that showed beta-amyloid was removed twice as fast in the brains of mice that were allowed to sleep as opposed to the awake group that were injected with it.

While it was already known that CSF played an important role in the provision of nutrients and the removal of waste, up until this study, the mechanism that showed this “fast flush” bulk flow system was not known to exist. Lead researcher Nedergaard stated in a University of Rochester story: “It’s as if the brain has two garbage haulers: a slow one that we’ve known about, and a fast one that we’ve just met. Given the high rate of metabolism in the brain, it’s not surprising that its mechanisms to rid itself of waste are more specialized and extensive than previously realized.”

Another interesting finding by Nedergaard’s team was that it appears the removal of waste via this glymphatic system seems to work best and most efficiently during sleep, but it also appears to be best for waste removal when the mice were in a lateral sleep position. Could this be the same for humans? Is the removal of the toxins from the brain most efficient during sleep in a side sleeping position? Is this also connected in humans with being most efficient during sleep as opposed to while awake?

Buoyed by the studies cited above, and having attended a lecture by Dr. Jon Kipnis of the University of Virginia team, Dr. Reich and his team reasoned that since CSF exists in humans, and that a lymphatic system had been discovered in the mice models, it seemed reasonable that there may also be a lymphatic pipeline conduit in a human brain. It took the team a few years and involved very complex physics calculations until they finally found the vessels that they were seeking. It was the moment that will change medical textbooks and teachings going forward.

The question was, how did these lymph vessels escape detection for so long? The vessels run alongside blood vessels that are much larger and also are housed inside the dura mater, which has a very tough leather-like consistency. The technology that was available for

This glymphatic system seems to work best and most efficiently during sleep, but it also appears to be best for waste removal when the mice were in a lateral sleep position.
visualization, such as an MRI, predominantly visualized the much larger blood vessels that hid them. And, as Dr. Reich bluntly stated in an article in *The Atlantic* in 2017, “And I mean, no one was looking for them.”

### Sleep Tools

What tools did Dr. Reich use to make this groundbreaking discovery?

In order to dampen the light from the blood vessels on MRI scans, Dr. Reich’s team used an approach called black-blood imaging to hide the blood vessels. They were able to finally see smaller vessels. They finally had located the elusive lymph vessels in humans, which were thought to not exist.

Now that these vessels have been confirmed, and the techniques of finding them have been freely shared, comparisons can be done among the researchers about how the brain and the immune system interact. This can be very instrumental in how brain disorders are treated and prevented. Comparisons of the cranial lymph system of healthy people versus those with brain disorders can be done and further research about how sleep impacts the waste clearance in the brain will continue to grow.

Perhaps ways to “prime the pump” for this waste management system will be one of the avenues that is reviewed. It most likely will encourage further research into how poor or insufficient sleep may impact the buildup of toxic waste materials in the brain, or the devastating amounts of beta-amyloid so often seen in Alzheimer’s patients.

Hopefully, this will lead to better understanding, treatment and preventing of MS, stroke, Alzheimer’s, Parkinson’s and perhaps other mental disorders of the brain. We also will continue to discover the role that sleep plays in clearing and protecting our brains.

Now that the research teams are no longer “blinded by the light” of the blood vessels that apparently hid the lymphatic system, the future looks very bright.

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### Additional Information

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ANNUAL MEETING
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SLEEP EDUCATION FOR THE SLEEP COMMUNITY

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When I started my sleep career, little did I know all the options that would become available to me. At the time, my belief was that there was the night technologist (me, who did all the work) and then there was a daytime scoring technologist (who did nothing but complain about how I did my job). When I moved into the daytime technologist role, I finally learned how much work that was. I later moved into the manager role, and I realized there were quite a few more jobs I had to cover. One of those jobs was getting patient referrals from physicians to fill the beds in the sleep center. I was told it was “marketing.”

As my career progressed, I moved into corporate sales, and eventually corporate marketing; this time it was for real. I learned there was a lot more to marketing than simply printing out flyers that I made on my computer. I learned that I needed strategies, tactics and a voice — a voice that would set you apart from your competition. This article will explore developing a voice for your sleep center.

Throughout my consulting career, I’ve found that many of my clients lacked a true voice for themselves. They could not establish a brand. They may have had a logo or a fancy name, but they did not have a brand message. They were not able to separate themselves from their competition. I walked them through an exercise to help them develop their own brand message, which is what eventually would help them develop their voice.

I know what some of you are probably thinking: “I have nothing to do with sales in my sleep center.” Well, I have some information for you. You can use this exercise to build your own personal brand message, particularly when you are looking for a new job, a promotion or a new position.

Let’s dig in. Pull out a pen and sheet of paper and answer the questions below. I’ll walk you through them, just like I’ve done with my clients.

**What results do you want to achieve in the next 12 months?**

Many of my clients had a bit of struggle here. They would often say, “We want more revenue!” But what did they mean by that? Everyone wants more revenue. The bigger question is around what they truly wanted. What did they want to achieve? For example, if it was more revenue, then we had to define how much revenue in 12 months.

Here are some examples to think about. What do you want to achieve for your center in 12 months? Do you want to have all beds filled five nights a week? Do you want to have a waiting list of patients two months long? Do you want to increase your revenue by 12 percent? Do you want your referrals to increase by 15 percent? Write down what results you would like to achieve in 12 months.

**What do you want to be known for?**

What do you strive to be? What do you want your center to be known for? One of my clients was stumped by this question. He answered, “We’re just like everyone else!” I told him that his answer was the wrong answer. We walked through their strengths, after which he came to the realization that their center was extremely accurate and precise in their scoring. He realized that is what he wanted his center to be known for.

Here are some examples to think about. Do you want your center to be known for being responsive to referring physicians’ needs? Do you want your center to be known for being...
Fill in the blanks to build your brand message.

We are (define your identity)

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

and want to be known (what do you wish to be known for)

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

so that we can deliver (what results do you want to achieve in 12 months)

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

If you need a little help, let’s fill in the blanks together. Below are some examples.

We are known for being part of a university and want to be known for having highly trained technologists so that we can deliver an increase in referrals of 15 percent.

We are known for specializing in elderly care and want to be known for being responsive to referring physicians’ needs so that we can deliver an increase in revenues of 12 percent.

especially helpful to its patients? Do you want your center to be known for having highly trained technologists?

Write down what you want to be known for.

What are you already known for?

How do you identify yourself? What are you currently known for? A client of mine once had an identity crisis. They had been in business for nearly 30 years. However, when I posed this question to them, they had no idea how to answer me. I gave them a week to think about it. A week later, we went through the exercise once again. They were very proud to tell me that they were known for being very active in the local community. We were then able to leverage that piece of information about them to develop their very own brand message.

Here are some examples to think about. Does your center specialize in women’s health? Does your center specialize in elderly care? Are you known for being involved involunteer work? Are you known for your affiliation to a larger hospital system or university?

Write down what you are already known for.

Now, put it all together. Build your brand message and try it out.

Make your brand messaging real: Live it!

This messaging should be real and living. It should not be static. As you live your message, you will learn how it actually works in the real world. You may learn that you need to make changes to your message. Maybe your referring physicians are not really concerned about you being so responsive. Maybe they want something else. Maybe you’ve already exceeded 12 percent revenue growth. If so, you many need to increase your goals further.

Your personal brand needs to be real and alive. Keep it moving. Keep it flowing. Live it.

You can now take your personal brand message and develop a value proposition from which you can develop a mission statement, a company motto or even a snappy tagline for your company’s brand. Go out and live your brand message!

Reference


DR. GERALD G. MANNIKAROTE (JERRY) is a sales and marketing professional with a niche in the healthcare space. Jerry has been in the healthcare field for over 20 years and in sales and marketing for over 10 years. He currently is the director of business development for dMann Training Technologies, a sales and marketing training company that specializes in working with small and mid-sized healthcare companies. He assists his customers to discover their own voice and message and to relay that message to their customers. If you have any questions about this article or need any further information, please contact jerrydmann@dmanntraining.com
This is the second in a series of articles dealing with the changing landscape of sleep technology. In this article, we’ll take a brief look at our present understanding of sleep as well as review some of the technology we use in our sleep centers.

Present Understanding of Sleep

What once was seen as a state of quiescence, similar to that of being in a coma, is now known to be a very active and essential state. As we look more closely at sleep, we see just how intertwined it is with our health and well being.

Here are a few critical things we know about sleep so far:

- Sleep is necessary for normal mental and emotional health.
- Sleep disturbances in early childhood make it more likely that person will have trouble with emotional stability, as well as attention and concentration as an adult.
- Sleep is essential for healing.

And while sleep medicine has come a long way in the last 20 years, much work is yet to be done. For example, the average medical student spends just under two hours learning about sleep. And most medical students that were surveyed said they had a rather poor understanding of sleep. In fact, some medical schools don’t have any formal training in sleep medicine.

In order to more fully appreciate what we know about sleep disorders, it’s imperative that we have a basic understanding of how the brain functions.

Basic Brain Function Review

The human brain is composed of approximately 100 billion neurons that serve as passageways for electrical signals that travel up to 200 miles an hour to and from the brain. These signals are transferred from neuron to neuron via chemical gaps called synapses, with each neuron containing 1,000 to 10,000 synapses.

Let’s break it down:

There are a group of cells within the hypothalamus called the suprachiasmatic nucleus (SCN). This group of cells receives information about the amount of light entering our eyes and sets our biological clocks. The SCN, in turn, sends signals to the pineal gland, increasing the production of melatonin when it gets dark.
The thalamus interprets information and processes memory from short term to long-term memory. Thalamic activity is quiet during non-REM sleep, allowing us to “tune out” the world. However, the thalamus becomes as active in REM sleep as it is during waking life. The amygdala processes emotions and also becomes active during REM sleep.

GABA is a neurotransmitter in the brain stem that inhibits other neurotransmitters in both the brain and muscles, resulting in our becoming sleepy. GABA also relaxes our muscles. This is especially important during REM sleep as it keeps us from acting out our dreams.

The glymphatic system serves as a waste removal system for the brain. While we sleep, our neural pathways are maintained. Astroglial cells within the brain literally shrink, opening up more space in the brain, which allows toxins to be flushed out. In fact, studies done on mice show that these brain cells shrink by as much as 60 percent during sleep. One of the toxins flushed out during sleep is beta-amyloid, a protein which causes cognitive deficits, such as Alzheimer’s. Interestingly, this toxic waste removal system is most efficient while sleeping in the lateral position.

Research is also underway to produce technologies that will map individual brain cells and capture complex neural circuit interactions in real time. This research will help us to gain a better understanding of the brain, with the goal of improving treatment for brain disorders such as dementia. The institutes presently doing this research are The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative and the Human Connectome Project.

And, of course, as research continues to advance, our recording equipment must adapt. With that, here’s a rather brief primer on digital recording.

**Evolving Sleep Lab Equipment**

Analog signals can be compared to a solid line on a graph, while digital signals would be points on a graph. An analog recorder captures the entire signal, whereas the digital recorder captures “bits” of the original continuous signal. In order to digitize analog signals, a sample of the signal is captured at regular intervals. This is known as the sampling rate and is expressed in samples per second or Hz.

The AASM has established sampling rates for acquiring sleep studies. For EEG, EOG, EMG and EKG, for instance, the desired sampling rate is 500 Hz, with a minimum of 200 Hz. According to the Nyquist theorem, which states you should have a sampling rate at least twice the highest frequency you wish to record, this sampling rate is more than sufficient to adequately record these signals, although the actual sampling rate is also limited to the number of pixels on your monitor.

For example, AASM recommends a monitor with at least a 15” screen and a minimum display of 1600 x 1050. The actual width of a 15” monitor is 13.1”, with 1,050 pixels running vertically across the screen. If you’re looking at a 30-second screen, that equates to roughly 80 pixels every 2.3 seconds, or a sampling rate of approximately 35. However, the fastest brainwaves we need to be concerned with are up to 13 Hz, so this should be at minimum sufficient for our needs.

It is crucial to precisely record signals so that an accurate diagnosis can be made, which brings us to the following rather brief perusal through some of the sleep disorders.

**Sleep Disorders**

At present, there are 74 identified sleep disorders listed in the ICSD-3, falling into the following categories:

- Circadian Rhythm Sleep-Wake Disorders
- Central Disorders of Hypersomnolence (Hypersomnias)
- Insomnias
- Parasomnias
- Sleep-Related Movement Disorders
- Sleep-Related Breathing Disorders

**A Few of the Many Treatments for Sleep Disorders:**

Insomnia – In some people with insomnia, the frontal cortex stays active, resulting in racing thoughts. Several devices are now available that cool the forehead, purporting to
reduce activity in the frontal cortex and reduce insomnia.

Hypoglossal Nerve Stimulation – This is a surgically implanted device that activates the hypoglossal nerve, which, in turn, stimulates the genioglossus muscle, which controls tongue movement, resulting in the tongue being pulled forward, thus opening the airway.

Negative air pressure – Known as CNEP (Negative External Pressure) or Continuous Negative Air Pressure (CNAP), there are different versions of this type of treatment. However, they all produce the same effect: opening the airway by using a gentle suction to pull the tongue forward.

Oral Appliances – Although CPAP remains the most effective way to treat sleep apnea, oral appliances have been proven to successfully manage OSA, as well. When compared with CPAP, oral appliances tend to cause more dental changes, though mild, whereas CPAP tends to cause symptoms such as nasal congestion, rhinorrhea and eye irritation.

REMEDE – This is a transvenous neurostimulation device for treatment of Central Sleep Apnea (CSA). It stimulates the phrenic nerve, which causes the diaphragm to move.

Of course, insurers will continue to be a major driver of healthcare. Therefore, I’ve included a brief summary of some of the more basic concepts of this rather complex system.

The Changing Face of Insurance

In the U.S., the insurance industry has been predominantly based on a fee-for-service payment system. However, this tends to raise healthcare costs. That’s because physicians receive a fee for each service they provide, resulting in a tendency to order more procedures than may be necessary. In fact, according to some reports, healthcare costs in the U.S. are about double what they are in other developed countries (although other factors play into this increased rate).

However, other types of insurance, such as the Affordable Care Act (ACA), are based more on a pay-for-performance approach, and therefore are more patient-focused. But while the ACA offers coverage to more Americans, it still leaves many without insurance; thus, is not true universal healthcare, which by definition covers everyone.

Then there’s the single-payer system, which is a system whereby all healthcare is covered by a single entity, as opposed to a multipayer system. Single-payer systems tend to be more cost effective than multipayer systems. There are many variations of single-payer systems, primarily in other countries.

In the sleep center, in an effort to keep medical costs down, home sleep apnea testing (or HSAT) is becoming more common. Therefore, I’ve included the following brief review of HSAT.

Home Sleep Apnea Testing (HSAT)

As you probably already know, there are different levels of HSATs based on the number of channels recorded. They are designated Type II, Type III and Type IV by the Center for Medicare & Medicaid Services (CMS), and standards and guidelines for their use are designated by the American Academy of Sleep Medicine (AASM).

However, these guidelines were established back in 1994; since then, there have been a number of new testing devices developed, many of which don’t fit within established criteria for the Type II, Type III and Type IV designations set by CMS. More recently, an evaluation system has been developed by the AASM that more closely matches the capabilities of present day equipment. This system is known as SCOPER (Sleep, Cardiovascular, Oximetry, Position, Effort and Respiratory) and is intended as a guide to evaluate equipment. There are also HSAT equipment guidelines and scoring and reporting parameters outlined in the current version of the “AASM Scoring Manual.”

In addition, research shows that portable monitoring using HSAT followed by auto-titration is a very efficient way to treat patients with obstructive sleep apnea. In fact, when compared with an in lab PSG and CPAP titration, HSAT followed by auto-titration gave similar results with only a few minor differences. However, HSAT does have limitations and therefore is not recommended for everyone. Let’s take a look at who does, and who doesn’t, qualify.

Patients with a low probability of OSA don’t qualify. This is because HSAT does not monitor sleep, and therefore could give a falsely low AHI. Also, patients with a high probability of OSA but with known or suspected comorbidities don’t qualify, for obvious reasons.

Patients who do qualify are those suspected of moderate to severe OSA without comorbidities, and those who can’t make it to an in-lab study because of immobility, safety or critical illness.

Research shows that portable monitoring using HSAT followed by auto-titration is a very efficient way to treat patients with obstructive sleep apnea.
Other limitations include not only variability in sensors, but also variability in defining apneas and hypopneas. Additionally, HSAT equipment is not standardized. The technology has also become available to many physicians who are not trained in sleep. Ideally, HSAT should only be used and interpreted by sleep medicine physicians.

In addition, compliance with today’s treatment options is low. So, although patient education is important and effective, we will need to come up with more efficient, cost-effective treatment options that patients will use.

An article from the Sleep Research Society (SRS) states that while sleep centers have quadrupled, most patients with sleep apnea are neither diagnosed nor receiving treatment. This could mean that current testing equipment and treatment options may not be sufficient. At the same time, however, these very services are being targeted for budget cuts by CMS.

The future of sleep medicine will be interesting indeed.

**In Summary**

In our first article, we looked at the history of sleep medicine. This article focused on where we are presently with sleep medicine. In my next article, I’ll take you on a trip into the future and show you what a sleep study might look like sometime soon.

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**KENT CAYLOR**, RPSGT, has been performing sleep studies since May 2006. He works for Precision Diagnostic Services, located in Fargo, North Dakota. He has a blog called Kents Sleep Blog and is also an active contributor to the American Sleep Apnea Association.

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Emerging Technology History in Sleep: The Evolution, Part I

By Joseph W. Anderson, CCSH, RPSGT, RST, RPFT, CRT-NPS

Over three and a half decades ago, I made my entrance into the world of “allied health” after graduating school in south Florida and becoming a respiratory therapist. At that time, I was told that I was coming into the field of respiratory healthcare on the cutting edge of technology, technology that would revolutionize the field of respiratory care.

I remember feeling so lost in the technology of that time. New mechanical ventilators, new blood gas syringes with dry heparin, disposable supplies, HIV/AIDS fears, turf wars between nurses and RTs, rumors of impending licensure laws, new medications and medication delivery methods, and an industry within allied health that seemingly had unlimited growth potential.

I had to wear business casual clothing along with a lab coat and a tie. No one wore scrubs unless you were working in the ER or OR. There were no HIPAA laws. We had to purchase our own malpractice insurance. All the patient charts were paper. CDs and VCRs were just becoming popular. Remember Betamax?

I am still good friends with the sales rep who sold me a handful of these systems to start the franchise business. He is still in sleep to this day. Unfortunately, my business partner was killed in a plane crash before the company sold its first franchise. That’s when I went to work as a tech trainee in a sleep lab.

In that trainee role, I learned how to apply electrodes with collodion. We recorded on Grass paper recorders, and we did all the report calculations by hand. One of my jobs was to load the ink wells and calibrate everything for the next night. This was the cutting-edge technology of its time.

One of the things we did not do back then was issue and manage PAP machines. That was always done by a home medical equipment company. And, of course, our mask and equipment choices were minimal at best.

After several years there, I added RPSGT to my name. I had to travel a great distance to sit for my boards. They were only given at certain times and in certain places. My BRPT number is 1754, and I remember at that time how high that number was. I knew, and still do know, other techs with double and triple-digit numbers.

Let’s fast forward again. This time, let’s go forward about five years to the late 1990s. I found myself in Southern California working as a trainer and a product manager for a company that was transitioning their sleep acquisition system from analog to digital. The digital world had finally caught up to the sleep world, or is it the other way around? I remember giving a training class on how to operate a “mouse.”

No Microsoft, Apple, Google, Amazon, Facebook or Myspace. No digital cameras, thumb drives, satellite radio or OnStar. And very few sleep techs in the world.

There was no internet. No cellphones. But we did have pagers and pager codes. No personal computers, unless you count the Tandy 1000 or the Commodore 64. No Microsoft, Apple, Google, Amazon, Facebook or Myspace. No digital cameras, thumb drives, satellite radio or OnStar. And very few sleep techs in the world.

Now fast forward about 10 years, and we find ourselves in yet another technological revolution. I personally had made the migration from respiratory to sleep medicine. Once again, I was told I was entering an allied health field “at the cutting edge of technology” and that it was an unlimited horizon of opportunity.

I partnered with a VP of a major hotel chain, and together we were going to franchise home sleep testing using the newest and greatest device made by a company called Healthdyne Technologies. The system was called the NightWatch Apnea Sleep Monitor. It was actually an eight-lead home-style sleep recorder in an aluminum suitcase with a dial-up modem. The modem could be pre-programmed to call my office at a set time so I could see the data and make any needed acquisition changes. This was assuming the leads were still attached to the patient.

I am still good friends with the sales rep who sold me a handful of these systems to start the franchise business. He is still in sleep to this day. Unfortunately, my business partner was killed in a plane crash before the company sold its first franchise. That’s when I went to work as a tech trainee in a sleep lab.

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Although the processors were slow and the hard drives small, we were collecting, processing, scoring and reporting data in a digital environment. Because of the small hard drives, most of the data still had to be removed from the systems and stored on tape drives like zip drives, or the “cutting-edge technology” of CD-ROM. And we were still recording most of the video on VHS tapes because of the small hard drives of that time. And “networking” systems together brought a big learning curve for all of us.

In the early 2000s, after we all survived the dreaded millennium, I moved to Virginia and became vice president of sales and marketing for a sleep sensor company. Paper recorders became increasingly harder to find in sleep labs, although they were still common in EEG labs. Most systems in the sleep labs, now often called “centers,” were digital and networked together. And most systems recorded and stored the collected data through the network on some type of local server. Files were often still considered too large to send through a network off-site, and these pesky HIPAA laws were making everybody nervous when it came to moving around data.

These fancy new types of phones called BlackBerrys were making it much easier to communicate with each other. Many of the pager stores were switching over to selling phones. The term “social media” was becoming common through a platform called Myspace. It allowed us to connect with friends both current and past. Was this new social media experience actually making us less social in certain ways? And this man called Bill Gates was becoming extremely wealthy with software that everybody wanted for their home personal computers as well as in the office.

So, let’s move forward to today. Myspace is essentially gone and has been replaced by Facebook, and another billionaire is made. Most BlackBerrys have been replaced by Apple or Android platform phones. Encyclopedias are gone because we can look anything up that we need on the internet. You can call ahead and have your groceries ready for you for curbside pickup. And you can have a package delivered by a drone through Amazon.

Our cellphones, or should we call them handheld computers or communicators, connect us to the world, including our sleep center, its patients and their patient data. There is more processing power in a single smartphone than the rooms of computers needed to land on the moon. Add to that our tablets, and what you have is a world where we can access data with tremendous speed and quality. Sleep studies and the recorded video and reports can be made available to anybody in the world in just seconds. This was a mere dream only a few decades ago.

Even though some of the data we collect in a sleep study is analog data (i.e., EEG), essentially all sleep studies are now recorded in digital format. We store this data either locally or throughout the world on internal and external drives, servers and media that can contain thousands of sleep studies. Much of this data is available to those that need access to it from their office, their home or even while sitting on the beach in Belize.

Is this the “cutting edge of technology” once again that I have heard about for my three and half decades in this world of allied health? The technology we have available to us today will certainly be replaced again in the not-so-distant future. Just like it has been for many decades. And it brings opportunities to those of you who recently have entered the field. These opportunities will continuously evolve.

In a growing number of states and countries, you now need a license, in addition to your credentials, to practice sleep. The importance of education has given birth a new life with the sleep tech of yesteryear now having to become more clinically focused than ever before. We are expected to be more educated ourselves, and we are expected to have the knowledge and skill sets to educate our patients. We even have a new credential to help validate this knowledge base: the Certified Clinical Sleep Health (CCSH) educator credential.

Do you want to take bets that soon there will be a registry version of this credential? However, opportunity also brings challenges. The biggest challenge I see is where will today’s sleep techs be in 10 years?

In part two of this series, we will investigate in more detail the role of tomorrow’s sleep tech both in the clinical skill sets required to take care of our patients and in the education we receive and deliver. We will also look at some of the tools available to us today to meet the needs of our patients and of our industry.

JOSEPH W. ANDERSON, CCSH, RPSGT, RST, RPFT, CRT-NPS, is a certified clinical sleep health educator, supervisor with Integrated Sleep Disorders Center, McGuire Veterans Hospital in Richmond, Virginia.
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Problems of Using Actigraphy in People With Parkinson’s Disease

By Regina Patrick, RPSGT, RST

The advent of actigraphy in the 1990s made it possible to indirectly record a person’s sleep-wake cycles based on the person’s activity level, with increased activity indicating wakefulness and decreased activity indicating sleep.1,2 In actigraphy, a device — an actigraph — which is typically worn on the wrist, continually records movement data over a prolonged time — one week or more.3 The collected data is relayed to a computer and analyzed. It is then presented in a histogram that shows sleep and wake characteristics such as total sleep time, percent of time spent asleep, total wake time, percent of time spent awake and number of awakenings. Algorithms (i.e., specialized mathematical formulas) used in actigraphs are well-suited to measure the activity level of healthy or young people. However, the algorithms may not accurately detect sleep and wake disturbances in people with Parkinson’s disease.

Dysfunctional motor activity in Parkinson’s disease such as dyskinesia (i.e., impaired voluntary movement), bradykinesia (i.e., slow movement) and abnormal motor activity during sleep such as rapid eye movement (REM) sleep behavior disorder, can be misinterpreted by an actigraph. Some recent research indicates that using immobility (i.e., low activity) rather than activity level may more accurately assess certain aspects of sleep and wake in people with Parkinson’s disease.4-6

Parkinson’s disease is a neurodegenerative brain disorder in which certain dopamine-containing cells at the base of the brain, which are involved in movement, are progressively destroyed. Why this destruction occurs is unclear. The initial symptoms of Parkinson’s disease are muscle rigidity, akinesia (i.e., loss of voluntary movement or reduced ability to make voluntary movement) and a tremor that initially affects the fingers of one hand. Other symptoms that occur as the disease progresses are dyskinesia, walking in a stooped position, walking with a shuffle, festinating gait (i.e., brief episode of involuntary short rapid shuffling steps), freezing (i.e., momentary inability to initiate voluntary movement), an expressionless (i.e., “mask-like”) face with a stare, difficulty in enunciation, difficulty swallowing, excess saliva production and voice problems such as speaking in a low voice because of weakness of the muscles involved in speech.

People with Parkinson’s disease can have disrupted sleep due to degenerative brain changes or comorbid conditions, such as periodic leg movements or REM sleep behavior disorder. As a consequence, a person may struggle with excessive daytime sleepiness. The latter can also result from a drug effect (e.g., levodopa).

An actigraph contains sensors that detect the acceleration or movement of an object and converts the movement into a signal (measured in volts). An actigraph can be sensitive to vertical movements (i.e., uniaxial), sensitive to vertical and horizontal movements (i.e., biaxial), or sensitive to vertical, horizontal and anteroposterior motion (i.e., triaxial). Data collected by an actigraph is measured in one of three ways. The “zero crossing” method counts the number of times a signal’s voltage rises above or falls to zero volts in an epoch; this method measures the frequency of a signal but not its intensity. The “time above threshold” method measures the length of time within an epoch that a signal’s voltage is above a set threshold; this method does not measure the intensity of the signal. The “proportional integrating measure” method measures the length of time a signal is above a set threshold, as well as its amplitude (i.e., strength). Once the movement data in an epoch are collected, the algorithm is used to determine whether the epoch indicates wake or sleep and whether the person is in bed or out of bed.

Assessing sleep disturbances in people with Parkinson’s disease can be problematic when using actigraphy because algorithms ... may misinterpret dysfunctional motor activity.

Assessing sleep disturbances in people with Parkinson’s disease can be problematic when using actigraphy because algorithms in current use may misinterpret dysfunctional motor activity such as tremors, bradykinesia, dyskinesia, and restricted arm movement during walking or drug-induced hypermotility. For this reason, scientists have worked to develop an actigraph that can more accurately assess sleep-wake cycles in people with Parkinson’s disease.

For example, in a 2013 study comparing actigraphy and PSG in patients with mild to moderate Parkinson’s disease, researcher Maglione and colleagues found that, when
using the actigraph manufacturer’s threshold settings of 20, 40 or 80 (i.e., the number of activity counts within an epoch; values above the threshold indicate wake and values below the threshold indicate sleep), no setting was ideal for determining the time in bed, total sleep time, wake after sleep onset and sleep efficiency. The researchers further found that when they changed from the manufacturer’s threshold of 10 immobile minutes or 10 mobile minutes as an indicator of sleep onset or wake, respectively, to five immobile minutes and five mobile minutes, they could estimate sleep onset in these patients. Based on these results, Maglione proposed using a low-activity threshold to assess sleep parameters in patients with mild to moderate Parkinson’s disease.

In 2012, Griffiths and colleagues4 reported developing an algorithm that detected bradykinesia and dyskinesia in patients with Parkinson’s disease. The algorithm is used in the Parkinson’s KinetiGraph (Global Kinetics Corporation, Melbourne, Australia), which is a device worn on the wrist like an actigraph. The Parkinson’s KinetiGraph has shown promising results in studies.

In 2014, Kotschet and colleagues5 were the first scientists to report using the Parkinson’s KinetiGraph to detect bradykinesia and dyskinesia to assess daytime sleepiness in people with Parkinson’s disease. The Parkinson’s KinetiGraph is an actigraph-like device that detects bradykinesia as movement with low acceleration and amplitude and a long interval between movements, and detect dyskinesia as movement with a normal amplitude and normal acceleration but short period without movement. The device produces a bradykinesia score (BKS) every two minutes, which corresponds to four 30-second polysomnograph epochs. A score less than 80 indicated the person was most likely awake and a score greater than 80 indicated sleep.

In the Kotschet study, healthy individuals without Parkinson’s disease (i.e., controls) and individuals with Parkinson’s disease wore the device continually for 10 days. The proportion of time immobile during the daytime was higher in patients with Parkinson’s disease than in the controls (i.e., the patients were experiencing sleepiness during the daytime). The researchers further found that, in 53 percent of patients, the proportion of time immobile increased within 30-60 minutes after they took their daytime dose of levodopa, which indicated that treatment increased daytime sleepiness.

Sarah McGregor and colleagues7 used the Parkinson’s KinetiGraph to assess immobility and sleep stages during nocturnal sleep. They used a BKS less than 80 as an indicator that a person was awake or in N1 sleep and a BKS greater than 110 as an indicator that a person was in N2, N3 or REM sleep. Study participants without Parkinson’s disease underwent simultaneous PSG and Parkinson’s KinetiGraph recordings. A comparison of PSG epochs with the BKS (two-minute epoch) revealed that a BKS less than 40 indicated a person was awake, a BKS of 40-80 indicated a person was between wake and N1 sleep, a BKS of 80-111 indicated a person was between N1 and N2 sleep, and a BKS greater than 110 indicated a person was in N2 sleep.

Based on the polysomnography findings, the sleep studies were classified as “normal” (i.e., normal sleep study), “normal minus” (i.e., normal sleep study with increased leg movements, changes in oxygen saturations, or sleep fragmentation) or “abnormal” (i.e., abnormal sleep study). Bradykinesia scores indicating wake and sleep were used to estimate a person’s percent time awake, percent time asleep, percent time immobile, sleep quality and median fragment length. The BKSS revealed no differences between normal and abnormal sleep when assessing each of these parameters separately. However, compared with polysomnographic data, the sum of the BKSs of three parameters — percent time sleeping, percent time immobile and sleep quality — allowed the researchers to distinguish between normal and abnormal nocturnal sleep.

Accurate information regarding a patient’s sleep and wake cycles can be used to determine treatment response, the best time to administer a medication and whether changes in symptoms are occurring. Objective information provided by a device such as the Parkinson’s KinetiGraph would be particularly useful in patients who may not recognize a change in symptoms has occurred (e.g., increased daytime dozing) and therefore may not communicate this to a clinician. For now, scientists continue working to improve the technology.

References

REGINA PATRICK, RPSGT, RST, has been in the sleep field for more than 20 years and works as a sleep technologist at the Wolverine Sleep Disorders Center in Tecumseh, Michigan.
What did you want to be when you grew up?
I didn’t have one particular profession in mind growing up. What I did know is that I love people. I knew I would end up in a profession that I would be able to help people in some way, and this profession has far exceeded my dream of what I wanted to be growing up.

Why did you decide to become a sleep technologist?
I was managing a bank in my early 20s and going to college, and I didn’t feel fulfilled with my career choice at that time. I was approached by my sister-in-law for a sleep lab position, and it sounded so fascinating to me. I came into the lab to job shadow for a couple nights, and I loved it. I worked the night shift for eight years and took a break instead look at them as opportunities to improve our business. I let my staff know “if you come to me with a problem, try to bring a solution with that problem.” It’s the best way to learn, and we will work on it together.

What is the most challenging part of your profession?
As a supervisor of the DME & Sleep Lab, most days can be a bit challenging, but I try to not to view them as challenges and instead look at them as opportunities to improve our business. I let my staff know “if you come to me with a problem, try to bring a solution with that problem.” It’s the best way to learn, and we will work on it together. Two brains are better than one, and we are all in this together, for the patient.

Why did you become an AAST member?
I feel that it’s important in my career to be on the forefront of what’s happening and changing in the sleep field. What better way than to be a member of the American Academy of Sleep Technologists?

Who has had the greatest influence on your career?
Laura Linley and Debra Borgeson were both previous managers of mine; they allowed me the opportunity to cross-train in the sleep business. It’s been a great asset to my career to know how the business operates from night shift to daily operations with the setup. I was lucky to have that opportunity at the start of my career.

What is the biggest change you have seen in the profession since you started?
That’s what I find so fascinating about this profession: It’s always changing. We’ve tried to stay competitive with the changes. We’ve hired an insurance verifier who helps capture insurance denials early that will move to HSTs; two sleep schedulers on staff to assist with the schedule; a board certified sleep dentist on site for oral appliances; our own DME operations; and a sleep navigator in our hospital system.

What do you like most about your profession?
I love working with people and helping them. It’s very rewarding to see a patient from the beginning (in the sleep lab) and have them still in our facility on the DME side after years of therapy. I truly enjoy my profession, and I hope my drive and passion motivates my staff. It doesn’t feel like work most days, but rather a time to make a difference in this sleep field and the community.

Any words of advice for people who are new to the profession?
Network, and get involved with the profession as early as you can in your career. I have learned so much, met some wonderful people and made great connections in the sleep profession.

What are you professional goals in the next five years?
I envision being on the AAST Board of Directors within the next five years. Really continuing to grow the DME & Sleep business and promote sleep health wellness in the community. Obtain the CCSH credential, and continue to be involved and educate patients of the importance of sleep as much as I can. Help my teams grow, and provide them the tools and education they need to get them where they want to be in their career.
Effective May 1 – New RPSGT and CPSGT Exam Blueprints

New forms of the RPSGT and CPSGT exams will take effect May 1. All exam candidates sitting for either exam on or after May 1 are strongly encouraged to review the new exam blueprints, which can be found at www.brpt.org.

While the biggest change to both blueprints was a reorganization of the information, there were some content changes. For example:

- The CPSGT exam now includes pediatric recording and scoring; the titration section now includes adult CPAP and bilevel therapy.
- The RPSGT exam now includes a section on sleep disorders — not simply sleep disordered breathing; included in the procedures and practice guidelines is the addition of PAP-NAP for both adults and pediatrics; scoring now includes pediatrics and infants.

A top priority for the BRPT is to maintain, update and validate its credentialing exams. The process by which this is done is very thorough and strictly complies with best practices in the credentialing industry. An important element of this process is to conduct a Job Task Analysis (JTA) survey approximately every five years. The survey examines the current state of the sleep technology profession — the responsibilities and the knowledge and skills required to fulfill those responsibilities — and provides a benchmark for updating the exams.

A JTA was recently conducted for both the RPSGT and CPSGT exams. The results of the 2017-2018 Job Task Analysis surveys, conducted in partnership with PearsonVUE, BRPT’s test development partner, confirms the RPSGT and CPSGT exams continue to measure important knowledge areas relevant to sleep technologists, in both of these capacities, and is still doing a good job of testing the pertinent information needed to be a strong, practicing RPSGT and CPSGT.
From the Chair

By Laree Fordyce, RPSGT, RST, CCSH

While this is an event dedicated solely to sleep technologists, we also realize the value of including the voices of those across allied healthcare into the discussion. We are engaged with physicians and other disciplines across healthcare to share their knowledge with attendees.

We envision AAST as a resource for these professionals, and we believe that by including their perspectives in the event, we open the door for deeper collaboration, and ultimately a higher level of education for attendees.

Leadership:
Central to the evolving role of the sleep professional is the idea that we are taking on a new level of leadership. As such, we need to refine our skills to be the very best we can be. Expect some very powerful sessions focused on both the strategic and tactical methods of being an effective leader.

I am proud to say that the makeup of the 2018 Annual Meeting will be unlike any you have ever experienced as a sleep professional. We will continue to communicate developments with you through our blog, social media channels and A2Zzz. In the meantime, be sure to make your plans to be with us in Indianapolis, Sept. 28-30, and experience all that we have in store!

Behind the Scenes:
Planning for the 2018 Annual Meeting

Have you circled Sept. 28-30 on your calendar yet? If not, you will want to make arrangements to be in Indianapolis for the AAST Annual Meeting, as we host the only event dedicated solely to sleep technologists.

That’s right, it’s the first independent event from AAST, and we couldn’t be more excited for what’s in store!

I know what you may be thinking, “But AAST has hosted an event in the past. In fact, I even attended.” You’re right … well, partially. For the past 39 years, AAST has been co-locating educational sessions within the broader SLEEP conference. That all changes this year. With this marking the 40th anniversary of our organization, what better way to celebrate such a milestone than with the unveiling of a dedicated AAST event?

As the Program Committee chair, I am fortunate enough to be front-and-center on the planning and strategy that goes into making such a significant event happen. I can tell you that a lot of thought and effort has gone into the makeup of this event, with careful consideration to how we are structuring our content. After all, we know there are multiple events vying for your attention these days. So, we are shaping the agenda to be focused solely on the content that matters most to the changing demands you are experiencing on a daily basis.

We have also made it so sleep technologists can justify attendance with their supervisors. AAST has created a downloadable justification letter that you can use to proactively begin conversations with your supervisor to discuss your attendance.

As such, allow me to present to you three high-level areas of focus that you can expect in Indianapolis:

Education: First and foremost, education remains right at the heart of what the AAST is all about. Sleep technology is changing, and sleep technologists are expanding into new roles. In response, sleep technologists will need to improve their skills, knowledge base and education in order to provide a higher level of care in sleep centers that are testing and treating more complicated patients.

With that in mind, you can expect educational topics similar to those you have come to expect from AAST in the past — along with some new ones that coincide with the changing landscape of the industry. What will be different is the structure of how this education is presented. New speakers, varying degrees of format and plenty of opportunities for you to go hands-on with new tools and techniques. Consider it your time to roll up your sleeves and become immersed in what’s next.

Collaboration: AAST believes that sleep technologists need to consider expanding their constituency to include other roles within the sleep arena, such as sleep educators, medical assistants, dental assistants and hygienists, respiratory therapists and nurses, and to provide targeted sleep education for these many new participants.

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2018 ANNUAL MEETING
SEPTEMBER 28-30 | INDIANAPOLIS, IN
AAST
A Community for Sleep Health Professionals

Quarter Two 2018
During my travels to many of the state sleep meetings this spring, I have been asked to help decipher the education requirements for working in an accredited sleep facility with specific concerns identified surrounding the 2016 American Academy of Sleep Medicine (AASM) requirements and limitations for the non-registered sleep technologist. I will do my best to review and provide comment on the personnel requirements as they pertain to not only the AASM standards, but for Accreditation Commission for Health Care (ACHC) and The Joint Commission (TJC) as well.

All the accrediting bodies recognize that sleep technologists are allied health professionals who work as part of a team under the general supervision of a licensed physician to assist in the education, evaluation, treatment and follow-up of sleep disorders patients of all ages. The sleep technologist scope of service requires documentation of specialized training and competence to perform polysomnography and other tests used by a physician to diagnose and treat sleep disorders. All the accreditation guidelines mandate that properly credentialed staff are on staff and list the acceptable credentials. The exception to this is that AASM does drill down to what education programs they will accept for the non-registered sleep technician. The AASM does not recognize the STAR programs provided by the BRPT as evidence of completion of appropriate education for non-registered technicians. In order to meet AASM accreditation standard B-10, all non-registered sleep technicians must be enrolled in and complete the A-STEP self-study modules within two years, or be enrolled in or complete an accredited CAAHEP or CoARC program with the Polysomnography option. To view information on the RPSGT recertification process, including an application and a recertification handbook, visit the BRPT website.

The chart on the next page compares the standard expectation for personnel education, credentialing, competence evaluation and ongoing education. Compliance to personnel standards is mandatory at the time of application and throughout the accreditation period. It is important to look at the standards and reference national standards. There is help in implementation of these standards. The AAST is ready to help! Job descriptions focus on qualifications for each position and the education and skills required to move to the next level. All levels of technologist practice are under supervision of the sleep center’s medical (facility) director or designee (MD, PhD, DO). The following job descriptions have been ratified by the Boards of Directors of AAST, AASM, BRPT and ASET.

All accrediting bodies expect that staff competence is assessed during the onboarding process and use a recommended schedule to reassess competence. The AAST Standards and Guidelines Committee in association with the AAST Board of Directors has developed a series of core competencies to ensure quality and consistency in the sleep technology profession. AAST encourages sleep centers and sleep technologists to use these competencies for education and evaluation purposes; these are available for both members and nonmembers. Accessing competence requires both observed practice and evaluation of the core knowledge of facility policy and procedure. These worksheets are developed to allow you to comment and document an employee improvement plan if needed.

- **Sleep Health Educator**
- **Polysomnography**
- **Scoring Sleep Stages and Clinical Events in Polysomnographic Technology**
- **Home Sleep Apnea Testing (HSAT)**
- **PAP Titration in Sleep Technology**
- **Age Specific Care and Evaluation**
- **Supplemental Low Flow Oxygen and Titration**
- **CO2 Monitoring**
- **Monitoring Pulse Oximetry**
- **Maintenance, Cleaning and Safety Precautions in Polysomnographic Technology**
- **Patient Assessment and Vital Signs Measurement and Documentation**

The AAST has many products that will assist technologists with meeting the continuing education requirements for all the accrediting bodies. Membership benefits include access to two free CECs every month and discounted continuing education; check out the AAST’s Online Learning Center.

In summary, all accrediting bodies have adopted standards that mandate that properly educated and credentialed technologist are on staff, and continuing education is to be completed regularly along with documentation of job competence. It is important to be aware of the specific accrediting body requirements as this may impact your staff and thus your choice of accrediting body.

**References**

### Sleep Trainee

**AAST Job Description:**
High school diploma or GED plus six months of direct patient care experience or one year of postsecondary education. OR Current enrollment in an accredited educational program leading to a certificate or associate degree with an emphasis in sleep technology.

**The Joint Commission (1):**
All staff that provide patient care, treatment, or services possess a current license, certification or registration, as required by law and regulation. Staff who provide patient care, treatment, or services practice within the scope of their license, certification, or registration and as required by law and regulation. Staff oversee the supervision of students when they provide patient care, treatment, or services as part of their training.

**AASM Accreditation Standards (2):**
All technologists and technicians conducting sleep testing who are not registered by the ABSM, BRPT, or NBRC:
1. Must be enrolled in or have completed the A-STEP Online Self Study Modules. Non-registered technologists and technicians must complete A-STEP Online Self Study Modules within two years of enrollment. OR 2. Must be enrolled in or have completed training in polysomnography in a program accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) or a Commission on Accreditation for Respiratory Care (CoARC) program with the polysomnography option.

### Sleep Technician

**AAST Job Description:**
Successful completion of a sleep technology program, associated with a state licensed and/or a nationally accredited educational facility. OR A minimum of six months of experience as a sleep trainee with documented proficiency in all required competencies. OR Holds a Certified Polysomnographic Technician (CPSGT) credential or equivalent.

**The Joint Commission (1):**
The organization defines the competencies it requires of its staff who provide patient care, treatment, or services. An individual with the education background, experience, or knowledge related to the skills being reviewed assesses competence. Each sleep technician and technologist must have valid CPR certification that includes skills training.

**AASM Accreditation Standards (2):**
All technologists and technicians conducting sleep testing who are not registered by the ABSM, BRPT, or NBRC:
1. Must be enrolled in or have completed the A-STEP Online Self Study Modules. Non-registered technologists and technicians must complete A-STEP Online Self Study Modules within two years of enrollment. OR 2. Must be enrolled in or have completed training in polysomnography in a program accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) or a Commission on Accreditation for Respiratory Care (CoARC) program with the polysomnography option.

### Sleep Technologist

**AAST Job Description:**
Successful completion of an accredited educational program leading to a certificate or associate degree with an emphasis in sleep technology. OR Successful completion of a sleep technology program associated with a state licensed and/or a nationally accredited educational facility or equivalent experience and documented proficiency for all competencies required of a sleep technician. AND Certification by a nationally recognized certification board and holds either the Registered Sleep Technologist (RST), Registered Polysomnographic Technologist (RPSGT), or Sleep Disorders Specialist (SDS) credential.

**AASM Accreditation Standards (2):**
At least one member of the technical staff of the sleep facility must be registered by or accepted to sit for a registration examination by the: 1. American Board of Sleep Medicine (ABSM) 2. National Board for Respiratory Care (NBRC) 3. Board of Registered Polysomnographic Technologists (BRPT) 4. Another organization that offers an equivalent examination accepted by the AASM.