

The Future of Sleep Technology: Report from an American Association of Sleep Technologists Summit Meeting

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The American Association of Sleep Technologists (AAST) Board of Directors hosted a Sleep Technology Summit on September 21, 2013 with the goals of identifying changes in the delivery of diagnostic and treatment services to sleep disorders patients, predicting the impact on sleep technologists, identifying new roles for sleep technologists, and determining appropriate education to prepare technologists for the future. A carefully chosen panel of speakers focused on the business skills necessary to provide care cost effectively and the clinical skills that will be essential for the technologist of the future to help care for patients with sleep disorders. A group of selected leaders, educators, and industry professionals reviewed the current state of affairs and examined opportunities to sustain the profession and define the role of the sleep technologist of the future. Facilitated group discussions of these critical topics followed each session.

There was a clear consensus that regulatory and economic pressures are changing the way sleep disorders patients are diagnosed and treated. Private insurers are requiring pre-authorization for laboratory sleep studies and are incentivizing home sleep testing for most patients suspected of obstructive sleep apnea. Reimbursement for home testing will be lower than for laboratory testing, and further reductions in overall reimbursement are anticipated. These factors will almost certainly reduce the need for technologists to perform laboratory diagnostic studies and pressure sleep centers to reduce payrolls. Remaining laboratory patients will have more complicated sleep disorders, have more comorbidity, and require a higher level of care than most of the patients

currently tested in sleep centers. Testing these patients will require technologists with a higher level of training, experience, and sophistication.

A second area of consensus was that the focus in medicine is changing from diagnosis to outcomes. New models of integrated care will include an increased focus on patient education, monitoring, and follow-up. The most effective treatments will require an individualized, patient-centered approach. A workforce analysis shows that the number of trained physician specialists will be inadequate to provide this care. Well-trained sleep medicine practitioners at many levels will be needed to meet treatment goals, including some roles appropriate for sleep technologists.

These factors provide challenges and opportunities for sleep technologists. In order to maintain viability as an allied health profession, the majority of sleep technologists will need to be better educated and demonstrate competency in more roles than overnight monitoring and record scoring. Models for this transition already exist, with several programs moving technologists from night work to days and from diagnosis to patient education, provision of treatment, and monitoring of adherence. The challenge for the professional association is to define new roles for sleep technologists and provide the education that the membership will require to flourish in those new roles.

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The diagnosis of sleep disorders, especially obstructive sleep apnea, is expected to increase in coming years due to increases in rates of obesity¹ and other risk factors. Despite this trend, many surveys of sleep businesses indicate a decreasing need for sleep technologists.² The cause of this apparent paradox is a shift from traditional laboratory testing to home sleep testing using portable monitoring devices. Home testing is now reimbursed by Medicare, and an increasing number of private payers and is recognized as an alternative for diagnosis by the National Institutes of Health.³ Some estimates predict that as many as 70% of patients with obstructive sleep apnea could be accurately diagnosed using home portable monitoring devices.

The impact of this shift is expected to be a dramatic increase in patient throughput per technologist. Compared to American Academy of Sleep Medicine (AASM) requirements of

2 patients per technologist for laboratory testing,⁴ a single technologist can prepare and record 3 or 4 times more home sleep testing patients per night. Home sleep testing devices use limited channels and many systems use computer-assisted scoring, making preparation of studies for physician interpretation less labor intensive. Both factors will reduce demand for sleep technologists.

An additional trend in medicine is a shift from diagnostic testing to “integrated care.” At present, reimbursement incentivizes diagnostic testing and procedures. Regulatory and market forces are changing the focus to outcomes. An accountable-care model is developing that will shift incentives to promotion of adherence to treatment and long-term follow-up. As a result of these shifts, a reasonable prediction based on workload and reimbursement is that in the near future there will be a true

integration of pre-test evaluation, diagnostic testing, provision of care, follow-up, and long-term care.

Will these trends result in a progressive shrinking of the sleep technologist workforce, or will there be new opportunities for technologists in the integrated sleep center of the future? What skills and knowledge will make a technologist a valuable member of the sleep medicine patient care team? In an effort to answer these questions, the American Association of Sleep Technologists (AASST), which represents more than 4,200 members, hosted a Sleep Technology Summit on September 21, 2013, at the national office in Darien, Illinois. Key opinion leaders were invited to speak on the fluid business environment and the clinical activities that will be essential for the technologist of the future. A group of selected leaders, educators, and industry professionals reviewed the current state of affairs and examined opportunities to sustain the profession and define the role of the sleep technologist of the future.

ECONOMIC AND REGULATORY FACTORS

Dr. Stephen Plenzler, Senior Director of Program Operations of the Sleep Management Program at Care Core National, LLC, summarized the financial pressures on the business of sleep medicine from an insurer's perspective. He noted that the demand for sleep disorders testing has increased dramatically in the past decade. Insurers will work to reduce costs by turning to less expensive diagnostic alternatives, such as home sleep testing. At the same time, insurers recognize that adequate treatment of sleep apnea is consistently reported to decrease health care expenditures and provide long-term cost savings.⁵ Dr. Plenzler noted that, in comparison to other conditions, adherence with treatment of sleep apnea is considered to be low.⁶ As a result, increased treatment adherence is an outcome that will be increasingly incentivized by insurers. At present, these two factors are not in balance; the majority of expense is currently for diagnosis of sleep apnea rather than treatment.

Carolyn Winter-Rosenberg, Director of Coding and Compliance for the AASM, reviewed sleep medicine in the public sphere, including coding and regulatory changes. Sleep testing faces decreasing reimbursement and will need to adapt to an increasing percentage of home sleep tests. In one scenario, maintaining the revenue stream of a typical sleep center would require a doubling of patient volume to compensate for the impact of these factors. The high volume of sleep tests being performed in sleep centers has already resulted in more frequent audits and fraud investigations. Sleep centers performing an increased volume of home sleep testing as a result of these changes will need to develop internal auditing and quality assurance programs in response. Center managers will need to keep current with changing regulations, including the anticipated change from ICD-9 to ICD-10. These changes present challenges and opportunities for sleep technologists who decide to maintain their viability in the center by moving to managerial roles.

CHANGING TREATMENT MODELS

Dr. Patrick J. Strollo, Professor of Medicine and Clinical and Translational Science and Medical Director of the University

of Pittsburgh Medical Center Sleep Medicine Center and past president of the AASM, predicts that reimbursement for laboratory sleep studies will continue to decrease, and reimbursement for home sleep testing is likely to be "modest at best."⁷ Like many of the speakers at the summit, Dr. Strollo also noted that the focus in medicine is shifting from procedures to outcomes. This will require that the sleep center team integrate with other medical professionals, including primary care physicians, otolaryngologists, behavioral specialists, and dentists. Technologists included in this integrated care model will require a basic understanding of medical terminology and physiology in order to participate. Dr. Strollo predicts that improved patient monitoring technology and alternative therapies will become standard treatment for sleep apnea in the future. This, too, will require increased sophistication of all members of the sleep medicine team. Finally, development of an individualized, patient-centered approach will be a key to the success of this model. With respect to sleep apnea, pre-test evaluation of patients is likely to provide guidance in the type of treatment that will be successful, methods for preventing cardiovascular and endocrine consequences, and an individualized program of monitoring and intervention. The participation of a trained and educated sleep medicine workforce is anticipated. Sleep technologists will have an opportunity to advance into these roles.

ENVISIONING NEW ROLES FOR SLEEP TECHNOLOGISTS

Is there a need for highly trained technologists, and would employers be willing to pay well-trained applicants a premium? At least one employer says he is already doing so. John Mathias, President of Sleep Services of America, told the group that he is currently offering a premium for flexible, qualified technologists. Core competencies are necessary but are no longer sufficient to be competitive in the job market. Mr. Mathias is willing to pay more for technologists who are knowledgeable about all aspects of sleep medicine and can easily be cross-trained for similar allied health positions. He also values advanced knowledge of medicine and an ability to care for complex patients. He has been forced to let go of some technologists who have failed to obtain appropriate credentials or meet licensure requirements. He noted that entry-level positions are declining but envisions a favorable future for technologists who have skills that exceed the minimum.

Dr. Dennis Hwang, Co-chair Sleep Medicine at Southern California Permanente Medical Group and Medical Director of the sleep center at Kaiser Permanente Fontana Medical Center, has a perspective that is unique at present but may provide a model for future sleep centers. The Kaiser system has a large number of covered lives. They have implemented a program that includes home sleep testing and regional facilities that provide laboratory testing for complex patients. All patients receive education and follow-up care. His clinic has approximately 1,700 patient encounters per month, yet it is staffed by only two physicians. He has turned to sleep professionals to provide a variety of different services, and many of these are drawn from staff formerly devoted to performing overnight studies or from respiratory care. These higher level sleep technologists provide diagnostic services and contribute to the care of patients with

insomnia, restless legs syndrome, and narcolepsy, as well as obstructive sleep apnea. Specially trained sleep professionals manage the home sleep testing program and collect PAP downloads. Qualified personnel conduct individual and group education sessions, and participate in resolving individual treatment issues. The Kaiser system is a “closed” system, allowing Dr. Hwang access to comprehensive medical data for each patient, including costs. He is able to quantify the efficacy of changes to the treatment protocol not only in terms of adherence and outcomes, but also the cost of care to the insurer. Preliminary data have demonstrated a strong return on the investment of continuing contact with the patient after initiation of treatment.

A second aspect of Dr. Hwang’s presentation was recognition that the patients that are sent for laboratory testing are increasingly complex and require a higher level of expertise for an adequate study. Technologists need to respond to CPAP failures by implementing treatment with more sophisticated PAP platforms or other alternatives. Technologists must understand complicated PAP devices and the effects of changes to the settings. This requires a working knowledge of respiratory physiology and pathology. A broader and more challenging task for the sleep technologist of the future is an understanding of comorbid disorders common to sleep center patients and how these comorbidities affect the sleep study and treatment options.

Kevin Asp, President of the Alaska Sleep Clinic, Inc., spoke to the group about including the provision of durable medical equipment, such as PAP machines and consumables, as an integral part of the sleep center of the future. Regulatory issues, primarily with Medicare, have caused many centers to shy away from this aspect of sleep medicine. He argued that therapeutic issues are best resolved by competent sleep center staff. New technologies allow for accurate real time monitoring of patient adherence to treatment, which facilitates rapid intervention in patients who need it. In addition, internet, and cell phone communication with patients can provide timely intervention and support to improve patient adherence to treatment, reminders for replacement of disposables, and improve customer service. Mr. Asp feels that continuity of care will be a focus in the future, and well-trained sleep technologists who are adept at using new technologies will be at the center of that care.

OPTIONS FOR THE FIELD OF SLEEP TECHNOLOGY

A clear consensus at the conference was that maintaining the *status quo* is not a viable option. The technologist whose skill set begins and ends with performance of an adequate overnight sleep study will not be able to compete in the job market of the near future. Two options emerged from the presentations and discussion: broaden the skill set of the sleep technologist to include other allied health care tasks such as EEG, respiratory care, or ECG technology, or encourage technologists to become proficient in all aspects of sleep disorders care and become a valuable member of an integrated sleep care model. The first option is only possible in centers that offer a variety of diagnostic services, such as a hospital-based facility. Technologists following this pathway will need to seek training from allied health education programs. For those seeking to expand their skills in sleep medicine, few educational opportunities exist currently.

Integrated sleep medicine care includes pre-test evaluation, diagnostic testing, provision of care, follow-up, and long-term care. Today the typical sleep technologist focuses almost entirely on the diagnostic testing portion of this process. The future will almost certainly provide a more balanced approach to the care of patients with sleep disorders. **Table 1** provides a list of potential roles for technologists in each of these areas. A common career pathway for sleep technologists has been to work nights for several years, become proficient in scoring, and then move to a day shift role. Some technologists progress into management roles and take a more diverse position in the sleep center. This diverse position will, in the estimation of many summit participants, become the entry point for many technologists in the future. The tasks are both technical and cognitive. Technologists will need to collect pre-test evaluation data, learn to monitor more complicated parameters during sleep studies, and become facile with data collection and management of databases. Technologists will also need an in depth understanding of sleep disorders and comorbidities to enable them to interact with patients, insurers, and other health care professionals in a meaningful way.

NEED FOR ADVANCED EDUCATION

Auburne Overton, President of the Board of Directors of the Committee on Accreditation of Polysomnographic Technologist Education (CoA PSG), argued that a higher level of education for all technologists is essential. Currently, most CoA PSG programs provide a certificate, with some providing an associate’s degree. There was a consensus among the participants that the educational entry level for sleep technologists needs to move to an associate’s degree level in the near future. There is also now growing support for a requirement that entry-level sleep technologists hold a bachelor’s degree. In a recent survey of educators, 83% of responders endorsed “agree” or “strongly agree” for the statement, “Education requirements for sleep technologists will increase in the next 5-10 years.”⁸ In addition, 83% endorsed, “An advanced educational degree in sleep technology will increase professional competence.” In order to expand the educational opportunities available for new and current sleep technologists, there is a great demand for the development of more Associate Degree programs at institutes of higher education nationwide. The CoA PSG is dedicated to assisting sleep technologists when speaking to the administration of their local colleges about developing those programs, as well as assuring that those programs provide the quality and content necessary for the future of sleep medicine through participating in the program accreditation process.

Cindra Altman, President of the Board of Registered Polysomnographic Technologists, concurred with a corresponding need to increase educational requirements for eligibility for registration examinations. There was support at the conference for a joint committee of all stakeholders to begin work on a plan of action that would require professional level training of sleep technologists to meet the needs of physicians, employers, and educators.

Summit participants also agreed on the need to offer practicing technologists an opportunity to build on their knowledge and experience to prepare for changing roles. This effort might

Table 1—New opportunities and educational needs for sleep technologists

	Roles for Technologists	Educational Needs
Pre-Test Evaluation	<ul style="list-style-type: none"> • Vital signs • Blood glucose testing • Pulmonary function tests • Screening tests • Pre-test risk assessment • Patient education 	<ul style="list-style-type: none"> • Clinical evaluation skills • Risk factor analysis • Monitoring and interpretation of blood glucose testing • Assessing results of pulmonary function and screening tests • Documentation requirements
Diagnostic Testing	<ul style="list-style-type: none"> • Out of center testing • Actigraphy • CO₂ monitoring • Evaluation of high risk patients 	<ul style="list-style-type: none"> • Home sleep testing provision and interpretation • Actigraphy monitoring and interpretation • Age appropriate care • Evaluation and management of comorbidities
Provision of Treatment	<ul style="list-style-type: none"> • Mask fitting • Patient education • Advanced PAP platforms • Appropriate use of oxygen • Alternative therapies 	<ul style="list-style-type: none"> • Basic pulmonary physiology • Ventilation • Cardiac physiology and arrhythmias • Goals of therapy • Evidence based medicine • Critical care pathways • Practice parameters
Follow-Up	<ul style="list-style-type: none"> • Monitoring adherence • Behavioral and motivational therapies 	<ul style="list-style-type: none"> • Monitoring techniques • Basics of health psychology • Group and individual patient education methods
Long-Term Care	<ul style="list-style-type: none"> • Equipment monitoring • Compliance and outcomes tracking • Replenishment of consumables 	<ul style="list-style-type: none"> • Understanding chronic care models • Health maintenance • Age appropriate care • Database management • Coding and billing

include workshops, conferences, and continuing education programs that focus on several key areas:

1. **Core competencies** including medical terminology, basics of physiology, and pathophysiology of sleep disorders. The technologist of the future will need to interact on a professional level with physicians, other healthcare professionals and patients. Evidence-based research skills and written and oral communication skills will be essential in developing professionals prepared for interdisciplinary healthcare. Medical literacy, including an ability to explain complex medical issues to patients, will be part of the required skill set.
2. **Disease management** including pulmonary and cardiovascular comorbidities, endocrine disorders and obesity, and management of pediatric and elderly patients. Many sleep patients will follow critical pathways that include home sleep testing and PAP titration. Patients requiring laboratory testing will be complex, with multiple comorbidities or treatment failures. The sleep technologist will need to recognize and react to difficult situations and provide care that is more sophisticated than simple continuous PAP.
3. **Patient education** including individual and group sessions, self-directed care and motivational enhancement. As the focus in medicine shifts from diagnosis to adherence, technologists will need to become competent in health psychology methods. These methods have established efficacy and have been learned by a variety of health care professionals during relatively brief training sessions.

4. **Sleep center management** including billing and coding, quality assurance, and interaction with insurers. A technologist can bring valuable patient care experience to management positions. Acquiring skills in budgeting and development of business proposals will be important in this transition. Technologists will need to be trained to manage and motivate center personnel.

To this point, technologists who have developed expertise in these areas have relied, for the most part, on on-the-job training. Few training programs for sleep technologists currently offer an associate's degree, let alone a bachelor's degree. The key areas listed above may provide a road map for the development of higher education in sleep technology. As an intermediate step, the AAST and other stakeholders can fill the gap by broadening educational offerings. Rather than focus on electrode application and sleep study scoring, programs should focus on patient evaluation and long-term care. Diverse courses, seminars, workshops, and remote learning opportunities can focus on individual aspects of integrated sleep care; educational materials from these programs can provide the basis for a comprehensive curriculum.

CONFERENCE CONSENSUS

The AAST Board of Directors convened the Future of Sleep Technology Summit to explore the forces spurring change and provide participants with diverse views of the future of sleep medicine. There was a broad consensus that the technologist of the future will need a higher level of education and skills

to provide value to potential employers and be competitive in the job market. As a result of the Summit, the AAST Board has a better understanding of the market forces and probable future of sleep technology. The Board plans to work with stakeholders to develop job descriptions that encompass these new roles, educational programs to meet changing workforce needs, and curriculum for associate's and bachelor's degree programs in sleep technology. The Board hopes to serve its members by exploring new opportunities for education to help sleep technologists grow and adapt to new roles and realities.

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