



## NATIONAL COMPETENCY SKILL STANDARDS FOR POLYSOMNOGRAPHY STUDIES

The American Society of Electroneurodiagnostic Technologists, Inc. [ASET] presents this document to provide national criteria for evaluating the competencies needed by technologists to perform Polysomnography Studies [PSG]. These national competencies were established following the analysis of survey data collected in the fall of 2005. The tabulation was completed by ASET staff and the PSG Task Force, according to nationally recognized and accepted criteria. ASET also recognizes the review and valued input by the Board of Registered Polysomnographic Technologists [BRPT].

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### SECTION I - GENERAL COMPETENCIES FOR POLYSOMNOGRAPHY

#### The technologist prepares for the study by:

- assessing the physician's order to assure appropriateness in conjunction with reviewing of the patient's medical records;
- interviewing the patient to obtain any additional information;
- determining and accommodating the patient's age-specific needs, disability and/or other special needs;
- providing appropriate patient and family education including expectations of technical procedures;
- answering questions related to sleep disorders testing;
- determining the need for additional physiological monitors; and
- determining the possible need for emergency intervention.

#### The technologist prepares a worksheet that includes:

- patient demographic information (name, age, gender, ID number, referring physician, reason for referral, etc.);
- procedure information (procedure type, procedure number, date of test, technologist name, recording time, etc.);
- chief complaint, relevant medical history and clinical findings specific to procedure;
- sleeping medications taken or administered during the study; and
- any special circumstances necessitating changes in usual protocols.

#### The technologist verifies the integrity of the PSG recording equipment by:

- performing an all-channel and montage calibration;
- recognizing and correcting recording equipment malfunction observed during calibration, including Polysomnography amplifiers, ancillary equipment and audiovisual equipment;
- performing a post-calibration procedure to verify the integrity of recorded data; and
- maintaining documentation of required safety equipment checks.

#### The technologist follows a method of electrode and sensor application that includes:

- identifying the appropriate method of electrode application;
- determining setup and recording protocols including montage derivations;
- using standard precautions during patient preparation;
- measuring the patient's head according to the International 10/20 system of electrode placement;
- cleaning patient's scalp and skin prior to electrode application;
- following established protocols for placement of ECG, EMG, EOG and other recording electrodes and sensors used in polysomnography, i.e., nasal/oral airflow, effort devices and oximeter sensors;
- utilizing additional electrodes or modified placements based on the patient's history or medical needs;
- ensuring security and integrity of electrodes for an extended period of time; and
- verifying and documenting electrode impedances are balanced and below 10,000 ohms.

#### The technologist obtains an accurate patient recording by:

- acquiring, verifying and documenting biological calibrations prior to "lights out" to document integrity of the physiological monitors;
- recognizing and minimizing artifacts so that sleep stages and all monitoring channels are clearly visible throughout the recording;
- recognizing and documenting relevant data such as body position changes, life-threatening events, EEG and ECG abnormalities, etc.;
- documenting routine changes periodically throughout the recording to include notes on observed behavior, parasomnias, notations of montage and equipment settings; and
- recognizing the need for clinical interventions (Oxygen, Positive Airway Pressure titration, CPR, etc.) and performing them according to established guidelines.

#### At the end of the PSG recording, the technologist:

- performs a post-calibration following "lights-on" to document integrity of the recording;
- removes electrodes and sensors from the patient;
- documents a summary of the Polysomnography and clinical observations in order to assist with the interpretation (estimated apnea-hypnea index, estimated Periodic Limb Movement Apnea Index, clinically significant behavior, significant cardiac arrhythmia, lowest oxygen desaturation, etc.);
- prepares patient data and chart for scorer;
- performs transfer of data or data backup in accordance with department specific protocols; and
- cleans and disinfects electrodes and other reusable equipment according to manufacturer's guidelines and/or established department protocols.

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**The technologist identifies and provides a comprehensive report to the physician that includes:**

- review of computer generated scoring report to assure accuracy;
- sleep stages scored in accordance with Rechtschaffen and Kales criteria;
- respiratory events as defined by established guidelines and/or laboratory policy (apnea, hypopnea, hypoventilation, upper airway resistance syndrome, etc.);
- periodic limb movement events as defined by AASM practice parameters;
- arousal events as defined by AASM practice parameters;
- sleep latency, REM latency, total sleep time, total REM time, sleep efficiency and percentage of sleep stages;
- respiratory event counts by type with indices;
- periodic limb movement count with indices;
- arousal count with indices;
- differentiation between potentially lethal and non-lethal ECG patterns with documentation;
- documentation of relevant sleep/wake behaviors; and
- summary of therapeutic intervention.

**The technologist provides education and support for sleep disorders patients by:**

- following departmental protocols to assist the patient in receiving follow-up care;
- providing positive airway pressure support and education on equipment as needed to patients;
- providing a community support group (A.W.A.K.E.) where patients can interact and get information;
- maintaining ongoing contact with the referring physician when his/her positive airway pressure patient is seen for issues with treatment;
- recognizing the role of the technologist versus the role of the physician in the treatment of the positive airway pressure patient and knowing when to refer the patient back to the physician; and
- participating in community awareness health and education programs to provide information on sleep disorders.

## SECTION II- POSITIVE AIRWAY PRESSURE [PAP] TITRATION

**The technologist will perform a POSITIVE AIRWAY PRESSURE titration by:**

- assuring the positive airway pressure device is calibrated appropriately and interfaced properly to the Polysomnography recording equipment;
- explaining the positive airway pressure procedure to the patient during the setup process and answering any questions;
- sizing the patient with a mask and allowing the patient to adjust to wearing it while awake and sitting up prior to starting the recording;
- understanding the contraindications and complications of positive airway pressure therapy;
- identifying when to adjust the pressure to achieve optimal delivery (snoring, arousals, desaturations, etc.) and providing documentation and reasons for changes in positive airway pressure pressure;
- verifying optimal pressure during REM and supine sleep if possible;
- identifying and correcting factors that may compromise delivery of effective positive airway pressure pressures, i.e. substantial mask leakage or mouth breathing;
- recognizing the need to change to Bi-Level positive airway pressure if needed;
- recognizing when to contact the medical director; and
- maintaining proper cleaning and disinfection and maintenance of the positive airway pressure device.

## SECTION III- OXYGEN TITRATION

**The technologist will perform oxygen titration by:**

- ensuring that a physician's order is obtained prior to administration;
- determining the need for supplemental oxygen by following established laboratory protocols for oximetry;
- assuring proper function of equipment providing oxygen delivery;
- recognizing contraindications for supplemental oxygen;
- properly fitting and adjusting the nasal cannula for oxygen delivery with or without positive airway pressure and humidification devices;
- understanding the use of positive airway pressure and combined oxygen supplementation;
- identifying when to adjust supplemental oxygen to achieve an optimal saturation level;
- identifying signs that the patient's drive to breathe is reduced and making appropriate adjustments; and
- documenting changes in oxygen saturation on the PSG and the technologist summary report.

## SECTION IV – MULTIPLE SLEEP LATENCY TEST [MSLT]

**The technologist performs the MSLT by:**

- verifying and documenting use and/or discontinuation of all prescription medications, over-the-counter medications, herbal and dietary supplements, other substances and/or activities which would affect sleep or wakefulness.
- documenting by Polysomnography the previous night's sleep to verify the appropriateness of the Multiple Sleep Latency order;
- removing recording sensors used for the Polysomnography, but not needed for the Multiple Sleep Latency;
- allowing the patient to dress in street clothes;
- obtaining a urine drug screen test if ordered;
- following established guidelines for the performance of the Multiple Sleep Latency procedure;
- administering questionnaires as required; and
- providing documentation and reports as required by lab protocols for interpretation.

## SECTION V – MAINTENANCE OF WAKEFULNESS TEST [MWT]

**The technologist performs the MWT by:**

- verifying a drug history was obtained and any medications discontinued for two weeks prior to testing as deemed necessary by the referring physician;
- documenting by Polysomnography the previous night's sleep to verify the appropriateness of the Maintenance of Wakefulness Test order;

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- removing recording sensors used for the PST, but not needed for the Maintenance of Wakefulness Test;
- allowing the patient to dress in street clothes;
- obtaining a urine drug screen test if needed, as ordered;
- following established guidelines for the performance of the MWT procedure;
- administering questionnaires as required; and
- providing documentation and reports as required by lab protocols for interpretation.

## SECTION VI – KNOWLEDGE STATEMENTS IN POLYSOMNOGRAPHY

### The technologist understands:

- the principles of polysomnography and the clinically relevant questions to be answered for each individual patient;
- medical terminology and accepted abbreviations in sleep disorders medicine;
- basic electricity and electrical concepts of analog and digital equipment;
- anatomy and physiology, especially cardiopulmonary and neurology;
- basic safety issues with multiple equipment interfaces to the patient;
- polysomnographic patterns correlating with specific disorders;
- basic breathing mechanisms and airway physiology;
- current medications and their effects on the recordings;
- therapeutic modalities (mechanical, pharmacological, surgical, etc.);
- infection control procedures; and
- ethics and appropriate professional behaviors.

### The technologist can identify indications for sleep studies:

- International Classification of Sleep Disorders;
- signs and symptoms for adult sleep disorders;
- signs and symptoms for pediatric sleep disorders;
- seizure manifestations and classifications; and
- psychiatric and psychological disorders.

### The technologist maintains and improves knowledge and skills by:

- reviewing the recordings with polysomnographers on a regular basis;
- reading journal articles;
- attending continuing education courses in polysomnography or sleep medicine;
- studying textbooks related to sleep medicine;
- participating in hospital in-service and departmental conferences on sleep disorders or sleep disorders patients;
- participating in quality improvement activities and reviews; and
- actively participating in professional organizations in the field of polysomnography or sleep medicine.

### The technologist understands details of polysomnographic instrumentation:

- computer operation, including file organization and storage;
- various types of recording and storage media;
- basic concepts of digital recording, including sampling rates, reformatting, aliasing, amplitude and horizontal resolution, digital video, VCR interfaces, etc.;
- interfacing and calibration of ancillary equipment;
- effects of recording parameters on waveforms (i.e., filter settings, sensitivity settings);
- electrical safety issues;
- limitations of automated scoring modules;
- technique for re-referencing and use of a system reference; and
- audio/video instrumentation, including digital video technology.

### The technologist can perform duties specific to polysomnography:

- securing and protecting sensors and cables for extended monitoring;
- cleaning and sterilization procedures on reusable laboratory equipment based on established guidelines;
- reviewing, analyzing and extracting clinical events from recorded data;
- adjusting video recording system and troubleshooting problems; and
- adjusting ancillary recording equipment and troubleshooting problems.

### The polysomnography technologist understands the use of the following electrodes and sensors:

- respiratory inductance plethysmography;
- Piezo belts;
- nasal/oral thermistor;
- nasal/oral thermocouple;
- nasal pressure transducer;
- POSITIVE AIRWAY PRESSURE/Bi-Level flow;
- snore microphone;
- pulse oximetry;
- end-tidal CO<sub>2</sub> monitor;
- transcutaneous CO<sub>2</sub> monitor;
- gastroesophageal reflux monitor; and
- esophageal pressure monitor.