



AMERICAN BOARD OF
NEUROPHYSIOLOGIC
MONITORING

American Board of Neurophysiologic Monitoring

Policy and Procedure Manual

Version 5.40

TABLE OF CONTENTS

- I. Background**
- II. Registration and Administration of the Written Examination**
- III. Requirements for Application**
- IV. Appeal Process for Adverse Decisions (Non-Ethics Related)**
- V. Examination Process**
- VI. ABNM Part I-Written Examination**
- VII. Examination Preparation**
- VIII. ABNM Part II-Oral Examination**
- IX. Design of the Oral Examination**
- X. Format of the Oral Examination**
- XI. Oral Exam Scoring**
- XII. Recertification**
- XIII. Disposition of ABNM Examination Results**
- XIV. Certification Status**
- XV. Ethics and Professionalism**
- XVI. Appeal Process for Adverse Decisions (Ethics Related)**

I. Background:

The development of the board certification process in neurophysiologic monitoring by the American Board of Neurophysiologic Monitoring (ABNM) was an outgrowth of the original goals of many individuals and societies to improve operative patient care through enhanced surgical, physiological and anesthetic management through electrophysiological monitoring. Many of these organizations had goals of fostering the growth and stature of the field of neurophysiological monitoring, developing unified standards for training and practice, promoting the highest standards of neurophysiological monitoring through research in clinical neurophysiology and neurophysiological monitoring in particular, and promoting education and the dissemination of knowledge in the field of neurophysiologic monitoring. Recognizing that setting standards and credentialing was a critical part of this, the ABNM was formed in 1995 by a group of individuals experienced in the field and committed to developing a process of credentialing for individuals that would set an appropriate standard of excellence in intraoperative neurophysiological monitoring. The ABNM endorses the concept of voluntary, periodic certification by examination in Neurophysiologic Monitoring. Board certification is highly valued and provides formal recognition of expertise in this important and expanding area of patient care. The ABNM is a legally independent organization with its Board of Directors being members of numerous organizations and representing several relevant fields of study. The original volunteer Board attempted to develop a credentialing process that would recognize qualified individuals in the field who come from a diverse background, yet remain of the highest professional standards. The ABNM endorses the examination of ABRET for certification at a technical level (CNIM) and has therefore focused on certification at a level which includes professional neurophysiologic data interpretation and technical supervision. The main objective of the ABNM is to promote enhanced delivery of competent patient care through the certification of qualified individuals deemed to be competent by:

1. Recognizing formally those individuals who meet eligibility requirements of the ABNM and pass both a Written (Part I) and an Oral (Part II) examination in Intraoperative Neurophysiologic Monitoring (IONM).
2. Encouraging continued professional growth in the practice of Neurophysiologic Monitoring.
3. Requiring continuing medical education in IONM for Diplomates seeking ABNM Recertification.
4. Establishing and measuring the level of knowledge and judgment required for certification of professionals practicing Neurophysiologic Monitoring.
5. Providing the standard of specialty practice deemed appropriate for professionals in Neurophysiologic Monitoring; thereby assisting the employer, public and members of the health professions in the assessment of these professionals.

The policies and procedures set forth in this Manual are applicable to all persons who tender an application for the ABNM certification examination, all ABNM Diplomates, all ABNM officers and all members of its Board of Directors.

II. Registration and Administration of the ABNM Examination:

The ABNM examination for Professional Certification in IONM is comprised of two Parts: the Part I-Written and Part II-Oral examinations. ABNM Certification requires both Parts to be successfully completed. Only candidates who have successfully passed the Part I-Written examination are eligible to submit for the Part II-Oral examination.

All applications for the ABNM examinations are handled by the designated testing agent of the ABNM, the Professional Testing Corporation (PTC), 1350 Broadway - 17th Floor, New York, New York 10018, (212) 356-0660. (<http://www.ptcny.com>). A separate application is required for the Part I and Part II examinations. Initially, individuals interested in ABNM Certification will submit the application for the ABNM Part I-Written examination to PTC. However, note that applicants to the ABNM for examination will be required to pay a combined fee of **\$1,600** for the ABNM Part I-Written Certification Examination in IONM **and** for the subsequent ABNM Part II-Oral Certification Examination in IONM at the time of initial application. Note that upon successful completion and passing of the Part I-Written examination, a separate application must be submitted for the ABNM Part II-Oral examination. No additional fee is incurred for a first application for the ABNM Part II-Oral examination.

Applicants who fail the ABNM Part I-Written examination will not be refunded the fee for the ABNM Part II-Oral examination. Should applicants who fail the ABNM Part I-Written examination wish to apply again for the ABNM examinations, a fee of \$1,000 will apply for all subsequent applications for the ABNM Part I-Written examination.

After successfully completing and passing the ABNM Part I-Written examination, candidates are deemed to be “In the examination process” and must apply separately for the ABNM Part II-Oral examination. Applications for the first attempt of the ABNM Part II-Oral examination do not incur a fee. Candidates who fail the ABNM Part II-Oral examination and who remain “In the examination process” and are eligible to apply again for the ABNM Part II-Oral examination must submit a fee of \$1,000 for all subsequent applications for the ABNM Part II-Oral examination.

PTC administers the Part I-Written examination twice a year at dates listed on the ABNM (<http://abnm.info>) web site. The ABNM Part I-Written examination can only be administered on these pre-established dates. The ABNM Part I-Written examination is conducted electronically via a computer interface and is now available at numerous testing centers across the United States and abroad, thus providing testing centers in convenient locations for most exam candidates. PTC can provide the locations of sites closest to your area, should there not be a local testing center.

The ABNM administers the Part II-Oral examination once per year, typically in the Spring but may, at the discretion of the ABNM, conduct a second annual Part II-Oral examination in the Fall. The Oral examination can only be administered on these pre-established dates and only at the examination site designated by the ABNM. All ABNM Part I-Written and Part II-Oral examination dates and application deadlines are listed on the ABNM (<http://abnm.info>) web site.

Any applicant requiring any reasonable accommodation when taking the examination, as contemplated under the Americans with Disabilities Act of 1990, as amended, is encouraged to

contact Sherry Frier at PCT at least 10 business days prior to the examination date to discuss the requested accommodation.

ABNM Part I-Written examination:

The initial application to the ABNM includes multiple requirements and several items of documentation that must all be submitted to PTC in a single packet, including the examination fee and the application packet must be post-marked by the examination application deadline. Included with the application is an ABNM application checklist that must be completed and signed by each applicant to attest to the fact that all required items are included in the application packet. After receipt of application packets, PTC will review and confirm the completeness of the application packet and incomplete application packets, which may include incomplete forms, will be returned as received to the applicant. PTC will not maintain partial or incomplete application packets and will not maintain applications from previous examinations. Upon return of incomplete applications, there will be an opportunity for applicants to provide the necessary documentation to complete their application. However, only complete applications will be accepted by PTC and all complete applications must be post-marked by the published application deadline, irrespective of whether or not an application was previously deemed incomplete and returned. A \$150 portion of the application fee for the ABNM examination is a non-refundable processing fee. Refund policies are at the discretion of PTC and the Board of Directors.

After successful completion of the application process, PTC will notify candidates approximately one to three weeks before the testing date of the ABNM Part I-Written examination. The final assignment of the selected testing center is documented by means of an Admission Notice showing the exact address to which candidates should report. This Admission Notice plus some other form of State or Federal photo identification must be presented in order to gain admission to the testing site. A candidate not receiving an Admission Notice at least one week before the test date should contact the Professional Testing Corporation by telephone at (212) 356-0660. Changes in assignments to testing centers can be made before the examination date but new appointments will be subject to availability. The same testing procedure occurs at all sites with candidates expected to report to the testing center by 8:30 AM with the examination beginning at 9:00 AM. Four hours is allowed for the examination with an approximate ending time of 1:00 PM. Latecomers will be admitted to the examination at the discretion of the exam proctor, but will NOT be permitted to write beyond the time scheduled for completion of the examination. PTC has established the following rules for the conduct of the ABNM Part I-Written examination. Hand-held battery or solar operated calculators are permitted, but no signaling devices, including pagers, alarms, cellular phones and wireless devices, may be operative during the examination. No books, electronic databases, or other reference materials may be taken into the examination room. Notes taken during the examination, e.g. of test materials, questions and/or answer options, may not be taken from the examination room. No questions concerning content of the examination may be asked during the testing period. The candidate should listen carefully to the instructions given by the exam proctor and should read carefully the directions of the test instructions. Candidates will be notified within six weeks whether they have passed or failed the examination. Scores on the major areas of the examination and on the total examination will be reported. The ABNM will release the individual test scores ONLY to the individual candidate. Any questions concerning test results should be referred to the Professional Testing Corporation. If there are questions about the overall process or problems that cannot be resolved with PTC, please contact the ABNM.

The ABNM Part I-Written Certification Examination in Neurophysiologic Monitoring may be taken as often as desired upon filing of a new application and completion of all application requirements in effect at that time and payment of any fee due at that time. There is no limit to the number of times the ABNM Part I - Written examination may be taken. The number of times the written examination has been taken and whether an individual has passed or failed the written examination will NOT be made available by PTC or the ABNM to anyone other than the individual candidate.

III. Requirements for Initial Application:

Candidates wishing to become Diplomates of the Board must complete a formal written application, which will be furnished by the ABNM on the ABNM website. To apply, a candidate must provide and meet **ALL** of the following requirements:

(1) A complete, up to date curriculum vitae or resume.

(2) Possess a minimum of an earned doctoral degree in a physical science, life science or clinical allied health profession, restricted to the following degrees: Ph.D., M.D., D.O., D.C., Au.D. and D.Pt., conferred by an accredited institution recognized by the U.S. Department of Education or, in the case of foreign medical graduates, the World Health Organization. Furthermore, the ABNM requires applicants with foreign Medical or foreign Doctoral degrees to have provided documentation of US education equivalence. The ABNM considers degrees to be foreign if not originating from approved institutions in either the USA or Canada. Applicants holding foreign Medical or Doctoral degrees (as appropriate) must provide documentation such as a Certificate of the USMLE Step 1, or, a Certificate of primary-source credential verification such as provided by the EICS (ECFMG International Credentialing Services), or, a certified Evaluation of a foreign educational program such as provided by the AACRAO (American Association of Collegiate Registrars and Admissions Officers), or, documentation from an equivalent verification service, that validates the foreign Doctoral degree program as having met equivalent standards and curriculum content compared to the USA. Applicants with a foreign medical doctoral degree must provide documentation showing that medical school where the degree was obtained is on the WHO list of medical schools - <http://avicenna.ku.dk/database/medicine>. On-line doctoral degrees will not be accepted. Proof of the degree i.e., a copy of the original degree or diploma must be provided with the application.

(3) Successful completion of two separate graduate level courses, one in neuroanatomy and one in neurophysiology, from an accredited institution with a passing grade. All ABNM required coursework must be taken in class or as an ABNM-approved distance learning course. At time of this version, there are no ABNM approved distance learning courses. Evidence of this information in the form of an original official transcript from the issuing institution must be provided with each application. The transcript must identify each course by name as neuroanatomy and neurophysiology. In the case of courses that have a different name, the applicant must complete a request for course equivalence that is a component of

the ABNM application checklist and provide the required documentation of the course number and title, the complete course syllabus, complete class schedule, number of academic credits and course faculty. This required documentation must be in print form and if not originally in English must include the original documentation AND an official translation of all original material into English provided by an official translation company. All material included in the application packet must be received at PTC by the application deadline.

(4) Submit 2 case logs (**Case Log I and Case Log II**) that log a minimum of 300 cases monitored where the applicant had primary responsibility for professional interpretation of data and technical supervision. Of these 300 logged cases:-

Case Log I.

- A minimum of 300 total cases must be logged in **CASE LOG I**.
- A minimum of 36 months must be logged with at least one case logged per month.
- The Case Log I must contain the date of each procedure, the type of surgery, the name of the responsible surgeon and the hospital where each procedure was undertaken.
- Months need not be contiguous.
- There is no limit to the number of cases that may be logged for each month.
- Months must be ordered consecutively starting with Month # 1, progressing through Month #36 and must end with at least Month #36. Additional months beyond the required 36 months may be added as necessary.
- The Case Category must be identified for all cases that are defined in the Table below and left blank for cases that are not defined in this Table.
- A minimum of 100 cases in which the applicant physically performed the majority of the technical aspects of monitoring must be logged.
- The log must indicate which cases were physically performed.
- Logs submitted with any patient identifiers included will be immediately disqualified.

Case Log II.

- From the cases that are logged in **CASE LOG I**, a minimum of 165 total cases must be logged in **CASE LOG II** distributed across six case categories, with the minimum numbers of cases logged by category, as follows:

#	Code	Category	minimum # of cases
I.	SPN	Spine	minimum of 45 cases.
II.	STL	Spine Tumors and Lesions	minimum of 15 cases
III.	CTL	Cranial Tumors and Non-Vascular Lesions	minimum of 45 cases.
IV.	INP	Interventional Neurophysiology	minimum of 10 cases.
V.	VAS	Vascular	minimum of 45 cases.
VI.	ENT	ENT	minimum of 5 cases.

- To arrive at a total of 300 cases, the balance of 135 cases (in addition to these 165 cases) may be listed under any case category or be any case with IONM.

- Case Log II must not provide any case details and is to be used to total the numbers of logged case by case category.
- Within each case category (I through VI), several sub-categories are listed. For the required 165 cases, only cases specified in this Table may be included in the case log.
- The required number of cases in each category may comprise cases listed combined from all subcategories, or, from only a single sub-category. For example, the 10 required cases in Category IV. Interventional Neurophysiology (INP) may be drawn from only one sub-category or from a mixture of any of the nine sub-categories.

Case Log II – continued.

ABNM CASE LOG		
Six case Categories with list of qualifying cases in each category and minimum numbers of cases that must be included in the official case log:		
Category	Surgical Procedure	Minimum # of Cases
I.	Spine	45
	1. Anterior Cervical Decompression/Fusion	
	2. Posterior Cervical Decompression/Fusion	
	3. Thoracic Spine Decompression/Fusion/Correction	
	4. Lumbar-sacral Spine Decompression/Fusion/Correction	
II.	Spine Tumors and Lesions	15
	1. Spinal cord – Extramedullary tumor/lesion	
	2. Spinal cord – Intramedullary tumor/lesion	
	3. Resection of Bone Tumors/Fusion/Correction	
	4. Release of Tethered Cord	
III.	Cranial Tumors and Non-Vascular Lesions	45
	1. Cerebral Cortex Convexity and/or Deep parenchymal tumor resection	
	2. Skull base and/or CP angle/post fossa (involving IOM of long tract pathways, cranial motor and cranial sensory nerves)	
	3. Chiari Malformation	
	4. Micro-Vascular Decompression of Cranial Nerves V, IX and/or X	
IV.	Interventional Neurophysiology	10
	1. Peripheral nerve – CNAP studies. (in person)	
	2. Brachial plexus mapping (in person)	
	3. Epilepsy/ ECoG (in person)	
	4. Micro-Vascular Decompression of Facial Nerve involving triggered EMG of “Lateral Spread”	
	5. Cerebral Cortex with direct cortical recording of SSEP Phase-Reversal	
	6. Cerebral Cortex with direct cortical surface motor mapping	
	7. Cerebral Cortex with direct cortical surface language mapping: Awake patient (in person)	
	8. Spinal cord stimulator in the cervical spine documented to involve spinal mapping with EMG and/or SSEP collision testing	
	9. Micro-Electrode Recording (in person)	
V.	Vascular	45
	1. Carotid Endarterectomy	
	2. Cerebral Aneurysm – open craniotomy	
	3. Cerebral Aneurysm – endovascular approach	
	4. Resection of spinal or cranial AVM	
	5. Cardio-Thoracic aortic aneurysm/dissection/grafting	
VI.	ENT	5

	1.	Thyroidectomy with IONM of CN X (free run and triggered EMG.)	
	2.	Tympano/Mastoidectomy with IONM of CN VII (free run and triggered EMG.)	
	3.	Implantation of Cochlear Implant.	
	4.	Parotidectomy	
	5.	Neck Dissection with IONM of sensory & motor CN's (free run and triggered EMG.)	
		Total minimum number of required cases in categories I-VI:	165

(5) Have at least thirty six months experience in the field of neurophysiologic monitoring as documented in CASE LOG I; the dates of the log must reflect work performed over a minimum of any 36 months with at least 1 case being monitored per month.

(6) Provide statements from two attending surgeons capable of attesting to the applicant's experience and expertise. The Review Committee of the Board, at its discretion, may require additional letters of support.

(7) Provide a completed and signed statement from a qualifying, Training Neurophysiologist describing the training in the interpretation of neurophysiological data provided to the applicant during the applicant's three years' experience, or, the required 300 cases.

(a) For USA/Canada trained applicants, a qualifying Training Neurophysiologist is either an individual with Board Certification from the American Board of Neurophysiologic Monitoring (ABNM) or, a licensed physician who is Board Certified in Neurology (ABPN), Clinical Neurophysiology (ABCN) or Physical Medicine and Rehabilitation (ABPMR), or, by another medical Board specialty deemed appropriate by this board. A licensed physician who is Board certified in Neurology, Clinical Neurophysiology or Physical Medicine and Rehabilitation, must submit their Curriculum Vitae and proof of Board Certification with the statement. A licensed physician certified by a Board other than Neurology, Clinical Neurophysiology or, Physical Medicine and Rehabilitation, may be considered to be eligible to qualify as a Training Neurophysiologist by submitting their Curriculum Vitae, proof of Board Certification, and documentation of their training and experience in clinical neurophysiology, with the Statement.

(b) For foreign (i.e., non USA/Canada) trained applicants, a qualifying Training Neurophysiologist is either an individual with Board Certification from the American Board of Neurophysiologic Monitoring (ABNM) or, a neurophysiologist with a Ph.D. degree, or, a licensed physician who is Board Certified in their home country in a sub-specialty that is approved and recognized to provide interpretation of clinical neurophysiological data in the applicant's country. Examples may involve sub-specializing in Neurology, Clinical Neurophysiology or Physical Medicine and Rehabilitation, or, by another medical Board specialty deemed appropriate by the ABNM. In all cases, the proposed Training Neurophysiologist must submit a Curriculum Vitae, proof of Board Certification where appropriate, documentation of who trained them and documentation of their training and experience in clinical neurophysiology, with the Statement. The ABNM requests the submission of documentation that is as complete and comprehensive as possible. The ABNM reserves the right to verify all

information provided and to reject applications that fail to fulfill the Board's requirement of an appropriate and qualified Training Neurophysiologist.

In all cases, the Training Neurophysiologist must provide evidence of a minimum of 5 years' experience in intraoperative neurophysiological monitoring (IONM) including at least 2 years of supervisory experience in IONM. An individual who functions in the capacity of a "reading neurologist", or "billing provider" or "remote neurologist" or any similar capacity and who otherwise has not provided training to the applicant in the interpretation of neurophysiological data, **does not** qualify to be the applicant's Training Neurophysiologist.

Finally, the statement from the Training Neurophysiologist must attest to the fact, and provide documentation of, at least 25 monitored cases in which training was provided by the Training Neurophysiologist, where the Training Neurophysiologist conducted training of the applicant in person and on-site with the applicant/trainee, either together in the operating room or together at a site providing remote IONM services. None of the required training between trainer and trainee for these 25 cases may be provided either indirectly or remotely or on-line. The form to be used for this statement from a qualifying, Training Neurophysiologist is provided with the application form and must be completed by the Training Neurophysiologist and returned directly to the applicant and included in the application packet submitted to the testing service by the application deadline. Acceptance of the Training Neurophysiologist's statement will be at the discretion of the Board and must occur for the applicant's application to be deemed complete. Applicants may provide official statements from multiple Training Neurophysiologists. The ABNM reserves the right to verify all information provided.

(8) The current application and examination fee.

(9) A completed ABNM application checklist (in Application Materials) signed and dated by the applicant.

(10) Be in good standing with the ABNM and in compliance with all ABNM Policies and Procedures for Ethics and Professionalism.

Notes:

Incomplete application packets that may include incomplete forms will be returned. All material submitted with every complete application packet will be formally reviewed by the Review Committee and a recommendation concerning eligibility made to the Chairman of the Board.

There were specific reasons for each of these required criteria that revolved around aspects of professional development and experience. The acquisition of an advanced doctoral degree indicates the demonstration of cognitive, analytic and data interpretational skills and the mastery of an advanced knowledge base that distinguishes the individual at a professional level. Since some candidates may not have completed a recognizable training program in neurophysiological monitoring that can certify the individual's competence in the field, the criteria developed for the Training Neurophysiologist will serve as a substitute (i.e. direct and on-site training by a

qualified and experienced Training Neurophysiologist as well as peer recognition of competence through participation in monitoring teams). The Board decided to approach this peer recognition using documentation of substantial experience in monitoring with the recognition that a sufficient and varied case load with minimum numbers of required cases in each of six surgical categories should signal professional growth and maturation in the skills necessary for the comprehensive practice of IONM. The attestation statement of two surgeons is used to confirm the level of professional maturation by this experience. This is congruent with the only published evidence that relates to competency that shows case experience correlates positively with patient outcome. As such, a minimum of 300 cases for which they had personally interpreted neurophysiological data is required with the additional requirement that their experience extended over a minimum of thirty six months. The Board's requirement for in person training by a qualified and experienced training neurophysiologist is intended to facilitate interaction, training, education and mentorship to assure that some component of the applicant's professional training was received from a qualified individual.

Upon acceptance of a candidate's application to become a Diplomate of the Board, the Board or its authorized agent will notify the candidate that their application has been approved and if requested, furnish a list of the times and places of the next scheduled ABNM Part I-Written examination. Proof of such approval shall be required for the candidate to register to sit for the examination. Any and all questions concerning eligibility should be made directly to the Chairman of the ABNM Board, or via the email link (info@abnm.info) at the ABNM website.

IV. Appeal Process for Adverse Decisions (Non-Ethics Related):

A candidate who has received an adverse decision affecting **their application to the ABNM**, for reasons other than a violation of the Ethics and Professionalism Standards, may request reconsideration by the Review Committee. Should the Review Committee affirm the adverse decision, the candidate may appeal the decision to the Board of Directors. A decision by the Board of Directors to affirm, reverse, or modify the original adverse decision shall constitute the final decision of the Board on the matter. A candidate who has received an adverse decision affecting **their application to the ABNM**, for reasons of a violation of the Ethics and Professionalism Standards, may request an appeal of such a decision as set forth in Section XVI, below.

V. Examination Process:

Diplomate candidates who pass the ABNM Part I-Written examination shall be considered "In the Examination Process" for a period of up to three years. Each candidate "In the Examination Process" will have the opportunity to take the ABNM Part II-Oral examination up to a maximum of three times during this period. If the earliest date for the third ABNM Part II-Oral examination is after the end of the three year period, or if a candidate fails the ABNM Part II-

Oral examination after a third attempt, or if a candidate does not take and pass the ABNM Part II-Oral examination within this three year period, the candidate will no longer be designated as “In the Examination Process” and will be deemed to be “Not Certified” and must apply for, retake, and pass the ABNM Part I-Written examination. All previous and newly adopted ABNM examination and application requirements in effect at the time of the new ABNM examination application must be fulfilled.

A candidate who fails to pass the ABNM Part I-Written examination or who is retaking the ABNM Part I-Written examination after having lost the status of being “In the Examination Process” or after a time lapse in ABNM eligibility, must resubmit a formal request to the Board to sit for the ABNM examinations and must submit a new and **complete** application packet. Only after successfully passing the ABNM Part I-Written examination will a candidate be designated “In the Examination Process”.

Individuals who pass both the ABNM Part I-Written and the ABNM Part II-Oral Examinations shall be deemed to be "Board Certified" by and Diplomates of, the ABNM, for a period of ten years.

VI. ABNM Part I-Written Examination:

The Board feels strongly that two examinations are essential to evaluate the knowledge and skills required for certification because of the varied academic backgrounds of applicants and the paucity of certified training programs in IONM. A written exam is used to identify an adequate knowledge base, followed by an oral exam to identify adequate judgment skills. The Board believes that the extra burden of an oral examination insures that individuals who are certified have the ability to meet the dynamic challenges of data interpretation and supervision that occur in the operating room. The Board spent a substantial amount of time developing the written exam to insure that it represents a wide cross-section of material and does not represent any one group’s viewpoint. Not unexpectedly, the questions for the examination are in constant evolution as the knowledge base shifts and new questions replace older questions. In order to insure a comprehensive evaluation of the knowledge base, a content outline was developed to indicate the material to be covered by the examination. Further, in order to clarify the relative importance of these aspects, category weightings were developed. These weightings are used to distribute the questions on the examination are shown below.

I.	BASIC NEUROSCIENCE.....	30%
II.	SIGNAL ACQUISITION AND PROCESSING	8%
III.	ELECTROENCEPHALOGRAPHY (EEG).....	8%
IV.	SENSORY EVOKED POTENTIALS.....	24%
V.	MOTOR POTENTIALS	22%
VI.	EFFECTS OF ANESTHESIA	8%

Thus the basic neuroscience section is weighted 30% and will have 30% of the questions on the examination (since some questions may overlap sections, each question was designated to the

section of primary importance for the question). It should be noted that the content outline is a working document and evolves each year representing the evolving spectrum and importance of the knowledge base important to the field. Hence, the outline and weightings shown above represent the content and weightings at the time of this writing. The questions for the current examination were derived by current and former ABNM Directors. All current questions were contributed from ABNM Directors who designed questions to insure adequate coverage of the outline. After insuring accuracy, the questions were then evaluated for psychometric factors by the testing agency. Finally, the initial Board conducted focus groups (including practicing individuals and non-Board members) in several locations around the country to study accuracy, timeliness and regional variations in opinion and practice. The question set used for the examination is regularly updated, reviewed and selected by the Board from the question set to adequately cover the outline. The Board has chosen to maintain the DABNM as a comprehensive certification in IONM and not to certify in specific modalities in recognition that the qualities of supervision and judgment transcend the boundaries between modalities. The written examination consists of 250 multiple choice questions where there is one correct answer. All are of the A type (pick the one best answer from the 4 or 5 possible answers) and there are no “K” type questions (answer (a) if 1, 2, 3 are correct, (b) if 1, 3, etc). Some questions are simple recognition of knowledge and others are scenario based (i.e. questions revolving around a short case presentation). As noted above, each question is allocated to the content outline in one area and the question distribution reflects the percentages of weighting in the outline.

Example Written Examination Questions:

1. What is the most prominent EEG characteristic of isoflurane at low-moderate concentrations?
 - a. Isoelectricity
 - d. Selective delta loss
 - c. Burst-suppression activity
 - d. Power peaks within the 8-12 Hz band (correct)

2. The ascending fibers of the cuneate nucleus and gracilis nucleus cross over in the medulla to form what structure?
 - a. Internal capsule
 - b. Lateral lemniscus
 - c. Medial lemniscus (Correct)
 - d. Superior colliculus

3. Which of the following anesthetic agents can increase SEP amplitudes?
 - a. Etomidate (Correct)
 - b. Isoflurane
 - c. Midazolam
 - d. Nitrous oxide

4. When stimulating the median nerve, an electrode placed at Erb’s point will record activity generated from
 - a. cauda equina
 - b. lumbar plexus

- c. brachial plexus (Correct)
- d. thalamocortical radiations

5. Quantization error resulting in the failure to resolve the true primary complex of the evoked response is due to

- a. sampling too slow a rate
- b. using too narrow a bandwidth
- c. using too low a gain for the system's A-to-D input (Correct)
- d. using too high a gain for the system's A-to-D input

6. What is the proposed generator of Wave I of the BAEP?

- a. Superior olive
- b. Inferior colliculi
- c. Auditory cortex
- d. Distal auditory nerve (correct)

7. The facial nerve is being monitored during an operation for an acoustic tumor by recording EMG potentials from electrodes on the face placed at long distance from each other. The surgeon is probing the surgical field with a monopolar handheld stimulating electrode. Clear responses are observed from one location and a clear response from another but no response from other locations of the surgical field. The latency of the EMG response is different, short when one location is stimulated and long when the other location is stimulated. From where do these responses most likely come?

- a. Both responses from the facial nerves
- b. Both responses from the trigeminal nerve
- c. The response with the long latency from the facial nerve and the response with the short latency from the trigeminal nerve (correct)
- d. The response with the short latency from the facial nerve and the response with the long latency from the trigeminal nerve

8. The P100 from the visual evoked potential stimuli is generated by the

- a. retina.
- b. optic nerve.
- c. optic chiasm.
- d. occipital cortex. (Correct)

VII. Examination Preparation:

Preparing for the examination is made challenging by the nature of the question development process since the material does not come from one specific source. Although each question's author was asked to provide a reference for the question origin (and to verify the correct answer), the wide and diverse capture of questions from numerous individuals in the field has led to an enormous database of question references. Further, since the questions went through a thorough and rigorous editing and updating process, many of these references have changed to more current references that reflect the changing nature of the field. Further, the exam is continually updated so that each examination will add new questions to stay current and accurate with the

scope of monitoring practice. As such, no single reference can be used to prepare for the examination, but instead the Board recommends the following set of textbooks and journals as references for preparation. Note that journals will help fill the gap from knowledge contained in textbooks and though more specific in nature will be more current.

Textbooks (alphabetical order by author):

1. M. J. Aminoff, *Electrodiagnosis in Clinical Neurology*, 5th Edition, Elsevier, 2005.
2. D.L. Beck, *Handbook of Intraoperative Monitoring*, Singular Publishing Group, Inc., 1994.
3. E.E. Benarroch *Medical Neurosciences: An Approach to Anatomy, Pathology, and Physiology by Systems and Levels*, 4th Edition, Lippincott Williams & Wilkins Publishers, 1998.
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21. M.V. Simon, *Intraoperative Neurophysiology*, Demos Medical Publishing, 2010.

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23. L. Wilson-Pauwels, PA Stewart, E.J. Akesson, *Cranial Nerves*, BC Decker, Inc., 1998.
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Suggested Journals (alphabetical order):

1. American Journal of Otology
2. Clinical Neurophysiology
3. Journal of Clinical Neurophysiology
4. Journal of Neurophysiology
5. Journal of Neuroscience
6. Journal of Neurosurgery
7. Neurosurgery
8. Spine
9. Spine Journal

Other than these suggestions, the ABNM currently does not endorse any particular review course or study guides. Further, other than reviewing the publicly available material (such as this information sheet), the active directors of the ABNM Board have agreed to refrain from participating in courses specifically designed to review or prepare for the examination.

VIII. ABNM Part II-Oral Examination:

The oral examination was developed because the Board felt that a written examination was insufficient to test the qualities of an individual it felt should be certified for aspects of monitoring beyond the technical level of knowledge and conduct of monitoring. It was felt that issues of interpretation, supervision, application of relevant anatomy and physiology and other issues would best be assessed by allowing candidates to verbally interact with examiners. More importantly, the reasoning and development of judgment as it relates to these aspects could be presented in an oral format that could not be tested adequately by a written examination. Further, the adaptability of a candidate to a changing environment such as occurs in the operating room is better tested in an oral format where a sudden change in the monitoring equilibrium can be introduced for the candidate to discuss. Finally, along with all these good reasons, the Board acknowledges the absence of unified standards for professional training in IONM and that a written examination alone cannot establish the competency of an individual.

As potential leaders in the field, candidates for examination are also required to have a broad understanding of the relevant scientific literature upon which intraoperative monitoring is based. It is not adequate to justify monitoring decisions by saying, "This is the way our service has always done it". Instead, recommendations and decisions must be supported by reference to the clinical neurophysiology literature and/or to evidence-based medicine. The oral format has worked well in many certifying Boards where these aspects of judgment and adaptability are important components of the clinical responsibilities. The Board recognizes that the oral format

is logistically awkward and inherently subjective. However, by preparing question topics before the exam and attempting to target judgment issues rather than knowledge issues, the Board believes the process is consistent, effective and fair. Further, the scoring process is designed to remove the possibility of one examiner unduly affecting the outcome of an examination (see below). It is anticipated that all individuals who demonstrate sufficient knowledge to pass the written examination and have sufficient experience in the operating room will have either faced the issues they will be asked or will have sufficient knowledge to present a well reasoned answer. In essence, preparation for the oral examination is in the daily experiences faced in the operating room. After successful completion of the written examination, registration for the oral examination is not automatic and one needs to apply specifically for the oral exam. However, the application is otherwise minimal as the candidate has already completed the application materials for the written examination and is “In the Examination Process”. The application may only be completed for the specific date of the next oral examination that is convenient for the candidate and the examination is offered once per year and may, at the discretion of the Board, be offered twice a year. Please note the assignment of the examination time will be based on a first come, first served basis, so please apply early if time constraints are a problem. Generally, the examination is held on a Saturday or Sunday and emphasizes scheduling exams in the morning to allow travel in the afternoon. The Board has developed the format below to make this process as effective and fair as possible.

IX. Design of the Oral Examination:

In total, each candidate will have two 30 minute oral exam sessions with a 15 minute break between the sessions. Each session will be conducted and examined by 2 individuals who are current ABNM Directors and are DABNM certified. Thus, a total of 4 different ABNM Directors will examine each candidate. The Board will attempt to assign examiners for each candidate such that no conflict of interest with the individual candidate being examined will exist. Most specifically the examiners cannot have participated in the training of the candidate and should not be employed by the same, or competing, institutions and should be able to be unbiased in their examination. Preferably the examiners should not know the candidate, but this is unlikely to occur in all situations. Since the goal of the oral exam is to assess judgment of the kind needed in the operating room during monitoring, the format will involve questions similar to those that could occur during a surgical procedure. Although they will inevitably involve knowledge of anatomy, physiology, anesthesia and surgery, the questions will focus more on the application of this knowledge in a surgical case and **the interpretation of clinical neurophysiological data**. It is important to stress that the oral examination is not only a test of knowledge; each candidate has sufficient knowledge as demonstrated by having passed the written examination. The oral examination questions will seek to assess judgment, appropriateness of the monitoring approach, interpretation of data and application of monitoring and will assess adaptability when problems occur. The focus of questioning will frequently revolve around the reasoning and thoughts involved in arriving at an answer or resolution of the problem. **A requirement of the oral examination** is that the candidate must be able to justify and explain decisions **by referring to published literature and/or evidence-based medicine**. Occasionally the questions may border on controversial areas where the answer may be “gray” or not firmly established. In essence, the exam will specifically test those aspects of data interpretation that extend beyond the technical aspects of monitoring and determine if the

candidate has developed sufficient reasoning power and has a command of the relevant literature to make informed, intelligent decisions and **to properly interpret neurophysiological data**. To accomplish this, the first 30 minute test period will revolve around a presented, real surgical case and the second 30 minute test period will deal with a hypothetical surgical case, respectfully. To make this most effective, the candidate will submit a case they have monitored in person or remotely in the capacity of the interpreting neurophysiologist, for the first examination period – termed the presented case. The applicant **must document** in the Case Report and demonstrate in the Data Records of the presented case, the occurrence of significant events that occurred during the surgery and associated communication that occurred between the neurophysiologist and the surgical and/or anesthesia teams. These events must be represented by significant changes in the neuromonitoring, i.e., electrophysiological, data and must not represent routine, drug-induced neuromonitoring data changes. Furthermore, a low threshold from stimulation of a spinal pedicle screw does not qualify as a significant event. The examiners will review the submitted case prior to the examination period so as to allow the candidate a maximal opportunity to demonstrate the insight and judgment requested. In addition, the submitted case allows the candidate to demonstrate the quality of their data and documentation as well as their professionalism. A hypothetical case will be provided by the Board for the second 30 minute examination period. The two examinations will involve two different types of cases and/or monitoring. For the purposes of the examination, the Board has generally divided monitored surgical cases into the four broad categories (I – IV) shown below. The candidate will choose to be examined in two of these categories. The case chosen to be presented by the candidate will define the category of the first examination. The candidate will then choose the category that they prefer to be examined for the second examination of a hypothetical case.

The categories and cases used for the oral examination are:

I. Spine

- A. Scoliosis
- B. Thoracic Stabilization
- C. Instrumented Lumbosacral Fusion
- D. Cervical Fusion
- E. Spinal Cord Tumor
- F. Tethered Cord

II. Vascular

- A. Carotid Endarterectomy
- B. Intracranial Aneurysm
- C. Thoraco-Abdominal Aortic Aneurysm

III. Intracranial

- A. CP Angle/Post Fossa Tumor
- B. Large Skull Base Tumor
- C. Pituitary Tumor
- D. Intracranial Lesion/Tumor
- E. Micro-Vascular Decompression of a Cranial Nerve

IV. Intraoperative Diagnostics

- A. Brachial Plexus/Peripheral Nerve
- B. Epilepsy/Electrocorticography
- C. Functional Neurosurgery

Presented Case: As one example, if a candidate should choose to present a case involving spinal surgery (category I), then they must choose a case for the second hypothetical examination from one of those listed in categories II, III, or IV. The candidate should not only specify the category (e.g. II, III, or IV), but should also specify which type of case in the sub-category (e.g. A, B, C, etc). Furthermore, candidates repeating the ABNM Part II-Oral exam cannot choose to present a case from the same sub-category that was previously selected. For example, if the candidate had

previously chosen to present a Spine case involving a cervical fusion (Category 1, Sub-category D), future exam selections for the presented case must exclude Category 1, Sub-category D.

Hypothetical Case: A candidate who chooses to present a Carotid Endarterectomy case (category IIA) must choose a case for the second examination from categories I, III or IV since the carotid surgery is in category II. The choice of the category and type of case (A-C or D) for the second “hypothetical” examination should be made at the time that the materials for the first, presented case, are submitted to the Board on the form that will be provided. A brief case scenario from the chosen second category for the examination will be provided by the Board within the category and case chosen by the candidate. Furthermore, candidates repeating the ABNM Part II-Oral exam cannot choose a hypothetical case from the same sub-category that was selected for a previous oral examination.

The case presented by the candidate is extremely important, not only for setting the framework for the first examination, but also as a means of demonstrating the professional nature of their monitoring. This case should be sent to the ABNM Chairman in print form and also in a digital PDF format, at least two weeks prior to the examination so the examiners have time to review the presentation. In all material included in the presented case, a font size of 12 point or larger must be used for all text. No hand-written notes will be accepted. As discussed below, the first examination will be a short presentation of the case followed by directed questions about the case or judgment aspects involved in that case, or one similar to it. Finally the type of case will serve as the framework for “what if” questions that will complete the first examination.

The real case presented by the candidate should include several basic essential elements. During the first few minutes of the first examination period the candidate will be asked to describe the operative procedure used, to describe the IONM modalities chosen for the case and to describe the significant event that occurred. Therefore it is recommended that a one page overview of the case be included in the materials. Such a report might give a brief description of the patient (i.e. age, relevant medical problems and neurologic symptoms and findings), the proposed surgical procedure, the monitoring modalities used and the anesthetic management requested. Further, all significant intraoperative IONM events must be noted in the overview. This serves as an excellent means of summarizing the case for the purpose of the initial case presentation to the Board. The presentation must provide all data / waveforms obtained in the case and show the OR record keeping, documentation as well as the interpretation of the case as a whole. The data / waveforms should serve to demonstrate the quality of the monitoring data as well as all of the monitoring modalities used. As significant changes in the electrophysiological data must be included in the presented case, the relevant tracings/waveforms/data should be identified so they can be a focus for discussion. It is highly recommended that the waveforms chosen comply with the individuals institutions’ Policies and Procedures for IONM and also represent the highest degree of quality possible as these will reflect the professionalism of the candidate. The candidate should also include the report they wrote after the case for the purposes of their own records and any documents placed in the patient’s medical record. The ability to make a succinct presentation within a few minutes is important for demonstration of the ability to highlight the salient aspects of the case. It is important to note that to maintain patient confidentiality the candidate **MUST** remove all patient, surgeon and hospital identifiers from all materials brought to the examination and failure to do so will result in material being disqualified. The case chosen

to present need not be a particularly complicated case or a case where some unusual aspect makes it special. Some candidates feel that it is important to bring an “interesting case” or a case where they did some unusual form of monitoring. Actually, to the contrary, since the case demonstrates the professionalism of the candidate, the case and its documentation should showcase the very best data and professional documentation of the candidate. Hence, unusual or interesting cases do not improve the presentation, and may actually raise issues of documentation or practice that may work against the candidate. The candidate should also choose the presented case based on the category in which they wish to be tested and one where the documentation and waveforms demonstrate the highest professional standards as well as a thorough knowledge of the pertinent literature.

X. Format of the Oral Examination:

Two weeks prior to the oral examination, the candidate should send two printed copies bound only by a clip of their case presentation and also send one digital / scanned copy of the exact same case materials in PDF format. The candidate will be provided both a postal mailing address as well as an email address, respectfully, for delivery of these materials. Candidates will also be provided with a form on which they will select the “hypothetical” category for their second oral examination. A general information notice and the case selection form will be sent to the candidate at the time of the application deadline with information concerning when and where to send this information. On the day of the examination, each candidate will be asked to report approximately 15 minutes before their examination is to be conducted. It is highly recommended that the candidate wear good professional attire, such as a suit (and tie for men) as recognition of their professionalism. Prior to beginning, the format of the examination and the issues discussed in this memo will be reiterated. Just prior to the first examination, the candidate will then proceed to the room for the first examination session. The 30 minute period starts with the candidate making the brief summary discussed above of the case they have brought to present at the examination. After this, the two examiners will then ask questions about the case, testing the judgment and adaptability of the candidate and expertise in interpreting neurophysiological data. Aside from specific questions about the materials brought, the general question categories to be asked will be predefined by the Board. Some of these questions may revolve around aspects that actually happened within the specific presented case, and other questions will be hypothetical in nature (What if ... happened?). Again, the major reason for the candidate to bring and present a case is to insure the candidate has a maximal opportunity to feel comfortable in the discussion of the case in what is an artificial environment.

The focus of questions that might be asked about the cases includes attempts to deal with the following situations and issues:

- preoperative considerations
- outcome data and value of monitoring, based on peer-reviewed published literature
- why and when to monitor
- anesthesia choice

- identify critical areas of the surgical procedure and basic operation sequence and procedures
- knowledge of risks and benefits of surgery
- choice of modality (rational for specific types of monitoring in this specific case)
- evidence in support of chosen modality/modalities
- waveform interpretation
- technical problems
- trouble shooting and machine problems
- dealing with deteriorating responses
- decision making without adequate data
- notifying the surgeon when problems arise
- appropriateness of networking
- supervising multiple rooms with concurrent IONM cases
- remote monitoring versus in-person monitoring
- when should you be directly involved in communicating with the surgeon
- IONM technologist supervision
- qualifications
- medico-legal issues
- documentation and ethics

Examples of the types of specific questions that might be asked, for example, for a scoliosis case might include:

- Of transcranial motor, SSEP or spinal stimulated responses, which test is the most useful? Why?
- If you could only monitor one IONM modality, which would it be? Why?
- If you chose lower extremity SSEPs, would posterior tibial nerve or common peroneal nerve be best? Why?
- If the surgeon requested that you used these, what are your responsibilities for informed consent?
- What should the patient be told and by whom?
- If you chose to place an epidural recording catheter for these responsibilities, what should the patient be told?
- Does the actual surgical procedure or instrumentation make a difference in your monitoring choice?
- Would an anterior procedure be monitored differently than a posterior procedure? Cite literature to support your decision
- How would monitoring be different if pedicle screws were used rather than sublaminar wires?
- Assuming a posterior procedure with rods, hooks, sublaminar wires and pedicle screws, what do you tell the anesthesiologist about your needs in the operating room?
- If muscle recordings are planned, what are the needs regarding muscle relaxation?
- Are these needs different for monitoring pedicle screws as opposed to transcranial motor evoked responses?

- It is important to note that some questions will involve problems during the case (whether they actually happened or not)?

The ability to respond to the following example questions will assist in assessing the “adaptability” of the candidate. Examples of questions include:

- During the surgical release of ligaments, the amplitude of the cortical SSEP becomes reduced over a 20 minute period. How much amplitude reduction is safe?
- How could you determine if this problem was related to anesthesia agents?
- Would median nerve SSEP have any value here? Why?
- Does it matter if the latency is unchanged or prolonged?
- When do you notify the surgeon?
- Would your concern be different if the response change occurred over 3 minutes rather than 20 minutes?
- During placement of sublaminar wires a sudden, complete unilateral loss occurs in the cortical SSEP. How would you localize the level of the SSEP conduction loss?
- When told, the surgeon is convinced that they have done nothing unusual and wants you to recheck. What do you do if the problem is persistent and the surgeon refuses to change his procedure?
- What do you document and what traces should you save?
- Should you continue monitoring?

After the completion of the first 30 minute examination, the candidate will be given a case scenario from the category and case type they have chosen for the hypothetical case and will have a 15 minute break to collect their thoughts about this case scenario. At the appointed time they will be invited to the examination room where the hypothetical examination will revolve around the case scenario provided by the Board. This scenario will include a short description of the case but neither includes a great deal of detail or actual data. In fact, the case will be hypothetical in nature and allow discussion of preoperative planning of a consultant nature. The discussions can then move to a discussion of monitoring and problems that might occur during monitoring.

An example of such a case could include:

Scoliosis: A 24 year old woman presents for posterior instrumentation and correction of idiopathic Scoliosis. She has developed weakness in her left leg prior to surgery and has limited exercise tolerance due to shortness of breath.

The questioning format for the second examination is similar to the questions listed above with the specific questions molded to be relevant to the specific case type and category. Obviously there is no real case or tracings (like the presentation brought by the candidate) so all of the questions will be of the “what if” type. Within each examination session, the questioning will be divided between the two examiners as the examiners feel appropriate. The question categories and examination format will be pre established by the Board so as to provide consistency between the examinations. As such, the first examiner will ask the first question and then

continue asking related questions until the answer to that first category is sufficiently explored. In general, the examiners will likely have some minimal expectations for how a good candidate should respond to each question, although the reasoning is more important than the answer as often no single clear answer will be apparent. The candidate can provide the best answer by listening to the question and simply answering that question without trying to guess what the question is about. In general, the most important aspect of the answer will likely be why the response given was chosen and how this is justified based on published literature and evidence-based medicine. In other words, in giving the answer the candidate should “think out loud” to show their reasoning and refer to specific sources and literature. Although the aim is to ask questions that assess the judgment and adaptability of the candidate, it is inevitable that some knowledge questions must be asked as the specific knowledge relevant to the question will form the basis of why the specific recommendation or judgment was rendered. In order to cover a maximal amount of material, it is important that the candidate’s answers be succinct. The ability to keep the answers short and to the point will demonstrate the ability of the candidate to readily focus on the important aspects. This will also allow the examiners to move on to other aspects of the questioning as it is important for the examiners to comprehensively cover a large number of questions during the examination (but not necessarily all the questions). If the candidate is unable to answer a question, it is best for the candidate to say they cannot answer that question to allow the examination to move on to different questions that they can answer. Although not answering too many questions will cause the examiners to down grade the candidate, an occasional non-answer is to be expected due to the artificial nature of the examination. During the examination it is important to recognize that the examiners will be taking notes. These notes will be used at the end of the examination to render a score by evaluating the importance of each question to the overall score (i.e. heavily weighting important aspects and down playing aspects of lesser importance).

In both oral examinations, the candidate should be aware that a third (or more) ABNM Director will be in the examination room to act as the official Board “observer”. The Board observer will keep time for the examination and will evaluate the performance of the examiners to insure quality and consistency between examinations. The Board observer will not contribute directly to the examination process and the candidate should ignore their presence. The Board implements the observer policy to insure a high quality examination is provided to all candidates. Though the Board observer will not interrupt or participate in the examination, each observer will render their opinion about the quality and fairness of the examination process at the Board Meeting Certification of Examination results.

In both 30 minute examinations, a five (5) minutes remaining warning will be announced by the Board Observer at the 25 minute point in each examination. The end of the first 30 minute examination period will be signaled by the Board Observer. Even if in mid-sentence, the candidate should politely cease the conversation and will be escorted outside the examination suite to the waiting area. During this time they will be presented with their hypothetical case and can begin to prepare. Also during this time the examiners that have just completed the first oral examination will conduct their scoring. Each examiner will conduct the scoring independent of the other examiner in the 15 minutes between examinations. Examination scoring is a complex weighting of the different components of the oral examination, with certain aspects having more importance than others. The examiners will not discuss the exam or candidate until after

rendering their score. When the time for the second examination arrives, the candidate will be invited to return to the examination room. The second examination will be similar to the first except that the case scenario will be chosen by the Board for the case type and category chosen by the candidate. The candidate will be given the short scenario to review at the start of the examination prior to questioning. Also similar to the first examination, the questioning will be divided approximately equally between the two examiners and also follow question categories established by the Board. The five (5) minutes remaining warning and the end of the 30 minute examination period will similarly be signaled by the Board Observer following which the candidate is free to leave. At the conclusion of both Oral examinations, each candidate will have been given four independent examination scores.

XI. Oral Exam Scoring:

For both Oral examinations, scoring is completed immediately after each examination so that four independent scores are rendered by four examiners. Each examiner will render a “pass” or “fail” score recognizing that the goal is to pass all reasonable and competent candidates. The final score is then determined at the Board Meeting Certification of Examination Results. At this meeting, each of the two candidate’s examinations will be discussed by the examiners with input from the official Board observers. The rendered scores will stand unless there is a very compelling argument, documented and presented by the Board observer and approved by the Board, to change a rendered score. A failure by one examiner is insufficient to fail an otherwise passing candidate. Receiving two or more scores of “fail” will cause an overall score of a fail. Pass and fail will be rendered solely on the basis of the score from the four examiners subject to final Certification by the Board. Candidates will be notified with their results as soon as is administratively possible.

All information discussed and or any disclosures made during the oral board examination will be held in complete confidentiality of the current ABNM Board of Directors. This confidentiality applies not only to the examination itself but also to the results of the examination as well as the discussion of said results. Results and pursuant discussion will only be disclosed and had with the candidate and not with any other person or persons.

XII. Recertification:

PTC administers the ABNM written Recertification examination twice a year at dates listed on the ABNM (<http://abnm.info>) web site. The Recertification examination can only be administered on these pre-established dates. The ABNM Recertification examination is conducted electronically via a computer interface and is now available at numerous testing centers across the United States thus providing testing centers in convenient locations for most exam candidates. PTC can provide the locations of sites closest to your area, should there not be a local testing center.

The current fee for the ABNM – Written Recertification Examination in Neurophysiologic Monitoring is \$650.

Diplomates may apply for recertification within two years prior to the expiration of their certification period by completing an application for recertification. Such application shall be provided by the Board upon request to any Diplomates in good standing at the time of the request. Any certification granted under this process will be for a period of ten additional years beyond the initial certification period.

The recertification process will entail:-

1. Retaking a written examination consisting of general questions on topics within specialties chosen by the ABNM.
2. Effective January 17, 2014, documentation of a minimum of 45 Continuing Medical Education (CME) Credits in the completed “ABNM Record of CME in Clinical Neurophysiology”.
3. CME credits must be obtained during the five year period prior to the month and year of the recertification examination being applied for. CME credits obtained prior to the specified five year period will not be accepted.
4. CME credits may be obtained at any time during this five year period but must total 45.
5. Approved areas for CME credits. **All** of the 45 required CME credits must be in the area of Clinical Neurophysiology. Approved CME courses in Clinical Neurophysiology include all courses provided by the ASN, ACNS, ISIN and IFCN . Clinical Neurophysiology CME credits obtained as part fulfillment of other courses, such as AAN, ASSFN, AANS, etc., will also count.
6. Non-approved areas for CME credits. Candidates are **required** to include a brief statement describing how CME credits obtained in unapproved venues not **listed herein** in section 5, relate to the practice of IONM.
7. Copies of CME certificates must be provided for all 45 required CME credits. CMEs must be awarded by approved educational institutions.
8. The acceptance or denial of all CME credits submitted with an application for ABNM Recertification will be at the discretion of the ABNM and may not be appealed.
9. Submission of the Recertification examination fee of \$650.

The ABNM recertification exam will contain 250 questions. The passing score will be 70% or 175 correct answers of the 250 questions in the examination. The recertification examination will be administered at the same dates and locations as the current ABNM Part I-Written examination is offered. Information concerning examination sites should be obtained from PTC.

Persons losing their certification by allowing the application window to elapse and/or without successful completion of the ABNM credentialing examination for Recertification, will be listed with the Certification Status of “Not Certified” and will be required to complete the original (i.e. to sit and pass Part I-Written and Part II-Oral examinations) ABNM examination process anew and all application/eligibility requirements at the time of the re-application will apply.

XIII. Disposition of ABNM Examination Results:

A candidate, who has received a failing result from either the ABNM Part I-Written examination, or, the ABNM Recertification examination, may request a review of their final score by PTC. Should PTC identify an inaccuracy in the initial scoring of the ABNM Part I-Written or the ABNM Recertification examination results, then the corrected score will stand and be considered final by the Board of Directors.

A candidate who has received a failing result from the ABNM Part II-Oral examination may not appeal their final score. The decision of the two examiners for each of two Oral examinations, once validated by the Board Observer in each examination and certified by the full Board, will stand and be considered final by the Board of Directors.

XIV. Certification Status:

In addition to providing the ABNM Certification, the purpose of the ABNM also includes serving to improve and safeguard the public health and reporting the ABNM Certification status of ABNM Diplomates to appropriate health-care professionals and health-care institutions. This policy defines the status of individuals with regards to ABNM certification. The information will be made public by the American Board of Neurophysiologic Monitoring on the ABNM website and per request by health-care agencies and institutions, regarding candidates and Diplomates.

The ABNM considers the personal information and examination record of an applicant, candidate or Diplomate to be private and confidential. When an inquiry regarding an individual's certification status with the ABNM is received, a general statement is provided indicating the person's current status in regard to ABNM certification, along with the individual's certification history.

The current status of an individual with the ABNM will be reported using one of three designations:

- **Certified:** The individual is currently certified by and in good standing with the ABNM, designated through the use of the title "Diplomate of the ABNM" or "DABNM"
- **Not Certified:** The individual is currently not certified by the ABNM. Such individuals may have allowed their time-limited certification to expire, were admitted to the certification process but never became certified, were admitted to the certification process but have yet to pass the ABNM Part I-Written examination, were never admitted, or never applied.
- **In the Examination Process:** The individual has an approved application for certification and has not yet successfully passed all required ABNM examinations, but has remaining examination opportunities.

The ABNM no longer uses the term "Board Eligible" and will neither affirm nor deny such status as it is indefinable. The ABNM will, however, use the designation "In the Examination Process" to indicate that an individual has been admitted to the ABNM examinations but has not yet passed all required examinations. The ABNM does not define an individual with an approved application to the ABNM examinations as being "In the Examination Process" as those

individuals may fail and are permitted to retake the ABNM Part I-Written examination, without limitation.

The following terms may also be listed if applicable to the individual's current status.

- **Suspended:** The individual is not certified as the individual's certificate has been indefinitely suspended. The certificate may be reinstated if certain requirements are fulfilled.
- **Revoked:** The individual is not certified as the individual's certificate has been permanently revoked. The certificate may not be reinstated.

An individual's certification history will also be publically reported, with all successful certifications and recertifications and their relevant start and end dates. Current ABNM policy is that all certificates are valid for a period of ten years, beginning with the date all ABNM examination requirements are completed and successfully passed.

Section XV. Ethics and Professionalism:

In order to fulfill its public obligations and in order to protect the integrity of the ABNM Certification, ABNM Diplomates are held to a minimum standard of ethical and professional conduct. The ABNM believes that its certification carries an obligation for ethical behavior and professionalism in all conduct. The exhibition of unethical behavior or a lack of professionalism by an applicant, candidate, diplomate or Director of the ABNM may therefore prevent the initial certification or recertification of the applicant or individual, or may result in the suspension or revocation of certification. All such determinations shall be at the sole and exclusive discretion of the ABNM.

Scope of Disciplinary Policy

Unethical and unprofessional behavior is denoted by any dishonest behavior, including, but not limited to: cheating; lying; falsifying information; misrepresenting one's educational background, misrepresenting one's certification status and/or misrepresenting one's professional experience; and failure to report misconduct. Unethical behavior also includes the possession, reproduction or disclosure of materials or information, including examination questions or answers or specific information regarding the content of the examination, before, during or after the examination. This definition specifically includes the recall and reconstruction of examination questions by any means.

The ABNM may impose sanctions upon persons who engage in unethical conduct and unprofessional behavior related to ABNM certification. These sanctions may include: non-scoring of or a failing grade on an examination; exclusion from taking certification examination(s); refusal to recertify; being barred from taking future certification examinations; revocation of certification; referral of matters to appropriate authorities, including state medical boards; and other actions that the ABNM believes to be warranted in order to protect third parties, the public, or the ABNM.

A certificate is issued by the ABNM with the understanding that it remains the property of the Board. Any certificate issued by the ABNM may be subject to sanction such as revocation or suspension at any time that the Board shall determine, in its sole judgment that the Diplomate holding the certificate was in some respect not properly qualified to receive it or is no longer properly qualified to retain it.

In the case of a sanction to revoke or suspend certification, the directors of the ABNM may consider and approve sanction for just and sufficient reason, including, but not limited to, any of the following:

Reasons for Sanction

- The Diplomate did not possess the necessary qualifications nor meet the requirements to receive the certificate at the time it was issued; falsified any part of the application or other required documentation or made any material misstatement or omission to the ABNM, whether or not such deficiency was known to the Board.
- Any dishonesty or misconduct in connection with applying for or taking the ABNM examinations.
- False or misleading representation or reporting with respect to ABNM examination status and/or examination scores.
- False or misleading representation or reporting with respect to ABNM certification status.
- The Diplomate engaged in irregular behavior in connection with an examination of the ABNM. Examples of irregular behavior may include, but are not limited to, copying answers from or knowingly giving answers to another individual, using notes during an examination, copying or distributing examination questions, or reproducing and distributing examination materials from memory.
- The Diplomate made a material misstatement or omission of material fact to the Board.
- The Diplomate misrepresented or engaged in improper conduct related to his or her status with regard to board certification, including any misstatement of fact about being board certified in any personal documentation, credentialing documentation, public media or public record, or in any communication.
- The Diplomate engaged in conduct resulting in a revocation, suspension, qualification or other limitation of his or her license, or appointment to practice, or his or her Certification by any other Board, or failed to inform the ABNM of any such imposed sanction.
- The Diplomate engaged in conduct that violated the moral or ethical standards of medical practice accepted by organized medicine in the locality where the Diplomate is practicing, resulting in a revocation, suspension, qualification or other limitation of his or her license to practice medicine, or the expulsion, suspension, disqualification or other limitation from membership in a local, regional, national or other organization of his or her professional peers.
- The Diplomate engaged in conduct resulting in the expulsion, suspension, disqualification or other limitation from membership in a local, regional, national or other organization of his or her professional peers.
- The Diplomate engaged in conduct resulting in revocation, suspension or other limitation on his or her privileges to practice in a health care institution.

- The Diplomate failed to respond, or respond timely, as required, to inquiries from the ABNM regarding his or her credentials, or to participate in investigations conducted by the board.
- The Diplomate failed to provide an acceptable level of care or demonstrate sufficient competence and technical proficiency in the treatment of patients.
- The Diplomate failed to maintain ethical, professional and moral standards acceptable to the ABNM.

Procedures

Any person may register a complaint against an applicant, Diplomate, or a person claiming to be a Diplomate (hereinafter referred to as the “Affected Individual”). The complaint must be in writing and signed and/or arise through routine discovery of the Board. If the ABNM receives complaints or other information indicating that an Affected Individual may have violated these guidelines, the matter shall be referred to the ABNM Ethics Committee. The Ethics Committee shall obtain available information and determine whether the matter warrants further review. If the Ethics Committee decides that further review is warranted, it shall make a recommendation to the ABNM Chairman who will then bring the matter before the full Board. The ABNM Board may request the Affected Individual to authorize release of relevant information from appropriate persons and agencies. Failure to authorize such release, or to respond timely, as required, to a request for a release, may be considered as one factor in determining the appropriateness of sanctions.

The ABNM Board shall consider all available information and after reviewing such information, the Board shall vote to approve an appropriate sanction, if any. If the Board decides to sanction the Affected Individual, the Board at its sole and exclusive discretion shall decide the appropriate sanction to impose from the range of sanctions available to it as set forth above. Any ABNM Director shall withdraw from participation in any matter in which his or her objectivity reasonably might be questioned because of a substantial personal, professional, or other relationship with the Affected Individual or any material witness. If an Affected Individual withdraws from the certification process, or voluntarily relinquishes certification, during the pendency of charges under these guidelines, the ABNM may at its discretion, terminate the matter or continue it and render a decision.

Notification

The Affected Individual will be given written notice of the reasons for his or her sanction, the right to appeal the Board’s decision and a summary of the appeal procedures, by express letter courier, or, certified mail, to the last address that the Affected Individual has provided to the ABNM. Subject to the rights to appeal the disciplinary action, sanction is final upon the mailing of the notification.

Upon revocation or suspension of certification, unless the Diplomate exercises his or her right to appeal, timely, as set forth below, the Diplomate shall:

1. immediately cease and desist from representing himself or herself as a Diplomat, Certified by the Board;
2. return the ABNM certificate and other evidence of certification to the Chairman of the Board;
3. have his or her name removed from the list of certified Diplomates; and
4. have his or her certification status listed as either Suspended or Revoked, as the case may be.

If a Diplomat exercises his or her right to appeal, timely, as set forth below, the Diplomat shall not be required to take any of the foregoing actions, and shall not have his or her name removed from the list of certified Diplomates or certification status altered until the results of his or her appeal.

XVI. Appeal Process for Adverse Decisions (Ethics Related):

Right of Appeal

Individuals sanctioned by the ABNM may appeal the adverse decision by submitting a request for reconsideration, in writing and by registered mail or courier, to the ABNM, or to the individual representing the interests of the ABNM, within 10 business days from the date of the notification from the ABNM of the sanction in question.

Appeal Process

The request for reconsideration of an adverse decision against a Diplomat or applicant will result in a hearing between the Executive Committee of the ABNM and the Affected Individual. The appeal hearing must occur within one calendar month from the date of the receipt by the ABNM Board of Directors or by the individual representing the interests of the ABNM of the Affected Individual's notice of request for reconsideration, and on a date that is agreed upon by both the ABNM and the Affected Individual. The location of the meeting will be decided by the ABNM. The hearing will convene with both the ABNM Executive Committee and the affected individual present and may not be rescheduled. Legal counsel or other representatives of the Affected Individual are not permitted to attend or participate. Failure of the affected individual to attend the scheduled hearing will result in dismissal of the appeal.

At the hearing, the Affected Individual will have the opportunity to present new material, previously undiscovered material and/or all and any material deemed pertinent to the appeal to the ABNM. Discussion will permit both the ABNM and Affected Individual to establish any revision to or new facts pertinent to the request for reconsideration. No decisions will be made at the hearing. Following the hearing, the ABNM Chairman will present a review of the hearing to the ABNM Board who may decide to confirm or to modify the original sanction against the Affected Individual. All such determinations shall be at the sole and exclusive discretion of the ABNM.

Alternatively, the request in writing for reconsideration of the adverse decision may waive the right of a hearing. In this case, the Affected Individual may choose to submit all materials relevant to the appeal in writing to the ABNM, or, to the individual representing the interests of the ABNM, within 30 calendar days from the date of the notification from the ABNM of the sanction in question. Failure of the Affected Individual to submit any materials in writing within 30 calendar days from the date of the notification from the ABNM of the sanction in question will result in dismissal of the appeal.

Final Decision and Notice

The Affected Individual will be notified in writing of the final decision by the Board of Directors within 10 business days from the date of the hearing, or, the date of receipt of a written appeal. The decision of the Board of Directors shall be final, conclusive and binding upon the Affected Individual, and shall be incontestable by the Affected Individual. The Affected Individual shall have no further appeal from the final determination of the Board of Directors.

Certificate Reinstatement

Suspension

Should the circumstances that justified suspension of certification be corrected, the Board of Directors of the ABNM, at their sole and exclusive discretion, may, but shall not be required to, approve reinstatement of the certificate after appropriate review of the individual's eligibility using the same standards as applied to applicants for recertification **and** after a certain discretionary period of time that the individual's status of "Suspended" has elapsed. All such determinations shall be at the sole and exclusive discretion of the ABNM.

An individual whose certification has been suspended and has received the Board of Directors' reinstatement approval, regardless of their initial certification status or prior dates of certification, will be required to take and pass the next recertification examination to reinstate their certification. Upon passing the recertification examination, that individual will be awarded a new, time-limited certificate and will be listed by the ABNM as having a reporting status of ABNM "Certified".

Revocation

Should the circumstances that justified revocation of certification be corrected, the Board of Directors of the ABNM at their sole and exclusive discretion may, but shall not be required to, approve the application for new certification after appropriate review of the individual's eligibility using the same standards as applied to applicants for certification that are in effect at that time **and** after a certain discretionary period of time that the individual's status of "Revoked" has elapsed. All such determinations shall be at the sole and exclusive discretion of the ABNM.

An individual whose certification has been revoked and has received the Board of Directors' approval to apply for new certification, regardless of their initial certification status or prior dates of certification, will be required to take and pass the next available ABNM Part I-Written examination and will then be required to immediately take and pass the next available ABNM Part II-Oral examination, to establish a new certification. Upon passing both Part I and Part II examinations, that individual will be awarded a new, time-limited certificate and will be listed by the ABNM as having a reporting status of ABNM "Certified".

END