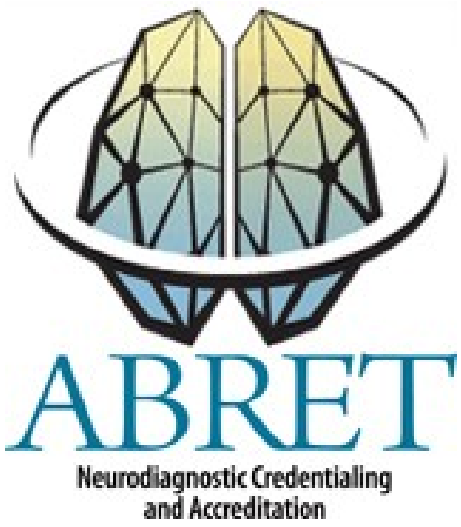
# Report of the 2023 ABRET-CLTM Job Task Analysis




Prepared for ABRET by
Professional Testing Corporation

PROFESSIONAL TESTING
CORPORATION

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# SURVEY BACKGROUND, PURPOSE, AND METHODOLOGY

In 2023, a job task analysis study was undertaken by ABRET with the assistance of the Professional Testing Corporation (PTC). The study was conducted by convening a task force to delineate the tasks, divided into domains, and knowledge areas involved in the profession of long term monitoring (LTM) technologists. The task force members rated the tasks for frequency performed and importance, the knowledge areas for importance, and the domains for frequency of performance and importance. A separate panel of independent raters validated the work of the task force by rating the tasks, knowledge areas, and domains.

The results will be used in the evaluation and revision of the content specifications for the Certification Examination in Long Term Monitoring (CLTM) examination. This process enhances the validity of the examination and the quality of the examination program for the CLTM credential.

## The Job Task Analysis Study

In May 2023, a Job Task Analysis (JTA) task force was appointed for the delineation of tasks, domains, and knowledge areas. The panel was composed of 10 long term monitoring (LTM) technologists representing a variety of practice settings (see Table 1).

**TABLE 1**
**Task Force Members**

| Name | Credentials Held | Years of Experience | Year Certified | Employer | State | Title |
|---|---|---|---|---|---|---|
| | R. EEG T., CLTM | 18 | 2011, 2020 | | | |
| | R. EEG T., R. EP T., CLTM | 18 | 2006, 2018 | | | |
| | R. EEG T., CLTM | 22 | 2004, 2018 | | | |
| | R. EEG T., CLTM | 7 | 2019, 2021 | | | |
| | R. EEG T., R. EP T., CNIM, CLTM, NA-CLTM | 17 | 2018, 2019, 2022 | | | |
| | R. EEG T., CLTM | 5 | 2019, 2022 | | | |
| | R. EEG T., CLTM | 12 | 2014, 2022 | | | |
| | R. EEG T., R. EP T., CLTM, NA-CLTM | 17 | 2009, 2011, 2013, 2021 | | | |

**TABLE 1**
**Task Force Members**

| Name | Credentials Held | Years of Experience | Year Certified | Employer | State | Title |
|---|---|---|---|---|---|---|
| | BS, R. EEG T., CLTM, CNIM | 16 | 2021, 2023 | | | |
| | R. EEG T., R. EP T., CLTM, NA-CLTM | 7 | 2016, 2021, 2018, 2022 | | | |

PTC staff who participated in the study included a Psychometrician, the Associate Director of Psychometric Services, and the Associate Director of Psychometric Services. These staff members facilitated the task force discussions that led to the delineation of the tasks, domains, and knowledge areas, analyzed the data collected from the task force and independent raters, and wrote the report and conclusions.

The task force was divided into two subgroups to facilitate discussions. The two subgroups began by reviewing the current test specifications and evaluated them against current, best practice. At each stage of the discussions, each subgroup reviewed and validated the work of the other subgroup before reaching a consensus on the domains, task statements, and knowledge areas. Two new domains were added, *Domain IV: Data and Equipment Management* and *Domain V: Ethics and Safety Issues*. The task statements and knowledge areas that were deemed applicable to current practice were edited for clarity and comprehensiveness. The task force also added new tasks and knowledge areas as necessary to accurately represent the current profession. The task force agreed upon 21 task statements (organized into 5 domains), and 55 knowledge areas to be rated.

The task force also set the scales for the survey. The frequency scale for the task statements was set at Rarely (Performed with fewer than 10% of patients), Occasionally (Performed with 10-49% of patients), Frequently (Performed with 50-90% of patients), and Abundantly/Continuously (Performed with more than 90% of patients). The importance scale was set at Very Important, Important, Somewhat Important, and Minimally Important. The knowledge areas were rated for importance with the same scale as used for the importance of tasks. The domains were rated for importance using the same scale as for tasks and knowledge areas. Raters also estimated the percentage of time they devote to tasks in each domain, to add up to 100%.

Seven of the task force members provided ratings of the tasks, domains, and knowledge areas. A separate panel of five independent raters who had not taken part in the discussions validated the work of the task force by individually rating the tasks, knowledge areas, and domains (see Table 2). Six task force members also used a matrix of domains and knowledge areas to indicate which domains draw upon which knowledge areas. The results of these ratings will be used as the basis for updating the test specifications for the CLTM examination and are included in this report.

**Table 2**
**Independent Raters**

| Name | Credentials Held | Years of Experience | Year Certified | Employer | State | Title |
|---|---|---|---|---|---|---|
| | | 29 | 1994, 2008 | | | |
| | R. EEG T., CLTM | 10 | 2014, 2015 | | | |
| | R. EEG T., CLTM | 5 | 2019, 2021 | | | |
| | R. EEG T., CLTM | 17 | 2008, 2014 | | | |
| | R. EEG T., CLTM | 15 | 2009, 2021 | | | |
| | R. EEG T., CLTM, EP | 26 | 2017, 2021, 2015 | | | |

# TASK STATEMENT RATINGS

There were 21 tasks categorized into 5 domains (see Table 3).

**TABLE 3**
**Domains and Number of Associated Tasks**

| Domain | Number of Associated Tasks |
|---|---|
| I: Preparation | 2 |
| II: Performing the Study | 10 |
| III: Post-Study Procedures | 3 |
| IV: Data and Equipment Management | 3 |
| V: Ethics and Safety Issues | 3 |

All statements were rated both as to frequency of performance of the task and importance of the task for competent performance. Frequency and Importance values are used because there might be tasks that are performed frequently but are not highly important for competent performance, while other tasks might be performed infrequently but are very important for competent performance. The rating scales were as follows:

| Frequency Ratings | Importance Ratings |
|---|---|
| How often is the task performed as part of the job?<br><br>4 = Abundantly/Continuously (Performed with over 90% of patients)<br>3 = Frequently (Performed with 50-90% of patients)<br>2 = Occasionally (Performed with 10-49% of patients)<br>1 = Rarely (Performed with fewer than 10% of patients) | How important is this task for competent performance?<br><br>4 = Very Important<br>3 = Important<br>2 = Somewhat Important<br>1 = Minimally Important |

## Average Ratings

The average frequency and importance ratings for the responses from the task force and the independent raters were calculated for each of the five domains (see Table 4). The ratings for the two groups combined also are shown. Based on the Combined Group, *Domain I: Preparation* received the highest average frequency rating and *Domain V: Ethics and Safety Issues* received the highest average importance ratings. A composite score (the average of the frequency and importance scores) gives the highest rating to Domain V, followed by Domain I. The domain with the lowest ratings was *Domain IV: Data and Equipment Management*.

**TABLE 4**
**Average Task Statement Ratings by Domain**

| Domain | Task Force | | Independent Raters | | Combined Group | | Combined Group Composite |
|---|---|---|---|---|---|---|---|
| | Frequency | Importance | Frequency | Importance | Frequency | Importance | (F+I)/2 |
| I: Preparation | 3.71 | 3.08 | 3.30 | 3.70 | 3.54 | 3.36 | 3.45 |
| II: Performing the Study | 3.19 | 3.34 | 3.34 | 3.52 | 3.25 | 3.42 | 3.34 |
| III: Post-Study Procedures | 3.10 | 3.05 | 3.40 | 3.40 | 3.22 | 3.19 | 3.20 |
| IV: Data and Equipment Management | 2.43 | 2.85 | 2.60 | 2.67 | 2.50 | 2.78 | 2.64 |
| V: Ethics and Safety Issues | 3.27 | 3.52 | 3.60 | 3.73 | 3.42 | 3.62 | 3.52 |

## Most Frequently Performed Tasks

There were three tasks that received frequency ratings over 3.5 by all task force members and independent reviewers:

Domain I: Preparation

B. Communicate the monitoring plan to patient/family/bedside caregivers in a manner consistent with their ability to understand to reassure the patient, establish rapport, elicit cooperation, and set expectations

Domain II: Performing the Study

D. Initiate recording, calibrate equipment, check impedances, troubleshoot equipment, and perform electrode integrity and signal quality tests, as per facility protocols

Domain V: Ethics and Safety Issues

A. Practice in a manner consistent with the ABRET Code of Ethics, ASET position statements, HIPAA/HITECH, and ACNS Guidelines

## Most Important Tasks for Competent Performance

There were five tasks that received importance ratings over 3.5 by all task force members and independent reviewers:

Domain II: Performing the Study

D. Initiate recording, calibrate equipment, check impedances, troubleshoot equipment, and perform electrode integrity and signal quality tests, as per facility protocols

E. Maintain integrity of study by documenting all stimulations performed (including provocation methods and bedside care), addressing technical and nontechnical issues that arise, identifying potential sources of artifacts, and conducting regular impedance checks

H. Document established critical values and communicate with reading physician and/or care team, providing technical description of events to ensure patient safety

Domain V: Ethics and Safety Issues

A. Practice in a manner consistent with the ABRET Code of Ethics, ASET position statements, HIPAA/HITECH, and ACNS Guidelines

B. Safeguard patient safety and self-safety in all aspects of practice

## Least Frequently Performed and Least Important Tasks

One task received a frequency rating of 1.85 by task force members and 2.0 by independent reviewers:

Domain IV: Data and Equipment Management

A. Ensure that scheduled maintenance of equipment is performed

None of the tasks received low ratings (<2.0) for importance.

The task force discussed the low frequency rating of the task "Ensure that scheduled maintenance of equipment is performed." They felt that many respondents might have understood this to mean that they themselves perform the maintenance, even though it was worded to include making sure that others perform the maintenance. As such, the task force decided that this task should remain in the test specifications.

# KNOWLEDGE AREAS

The task force and independent raters were asked to rate 55 knowledge areas as to how important each knowledge was to competent performance as a long term monitoring (LTM) technologist. The scale was the same as that used to rate importance of tasks. The task force also indicated which knowledge areas are drawn upon to support tasks in the different domains. These linkages are shown in Appendix A and are included in the content outline at the end of this report.

## Most Important Knowledge Areas for Competent Performance

There were 29 knowledge areas that were rated 3.5 or higher in importance to competent performance by either the task force or the independent raters (see Table 5).

**TABLE 5**
**Most Important Knowledge Areas**

| Knowledge Area | Mean | SD |
|---|---|---|
| 04. Neurological disorders (e.g., epilepsy, tumors, vascular disease) | 3.73 | 0.47 |
| 07. Head trauma and traumatic brain injury | 3.55 | 0.52 |
| 08. Activation procedures | 3.55 | 0.69 |
| 09. Medical contraindications to activation procedures | 3.64 | 0.50 |
| 10. LTM procedures (e.g., extracranial monitoring, intracranial monitoring, ICU recordings, epilepsy monitoring, functional mapping, ambulatory EEG) | 3.82 | 0.40 |
| 13. Elements of a patient history | 3.55 | 0.52 |
| 15. Effects of drugs on patients and recordings | 3.64 | 0.50 |
| 16. Electrographic correlates to clinical entities | 3.91 | 0.30 |
| 18. Localization principles and techniques | 3.64 | 0.67 |
| 20. 10-20, 10-10 international electrode placement systems and verification | 3.73 | 0.65 |
| 25. Age-specific criteria (e.g., patterns, recording parameters, disorders) | 3.64 | 0.67 |
| 28. Electrographic changes requiring provider notification (including critical values) | 4.00 | 0.00 |
| 31. Interictal and ictal patterns of extracranial EEG | 3.82 | 0.40 |
| 32. Interictal and ictal patterns of intracranial EEG | 3.55 | 0.52 |
| 33. Normal variants of extracranial and intracranial EEG | 3.64 | 0.67 |
| 34. Seizure precautions, response, and first aid (including cognitive and motor testing of patients during seizures) | 3.64 | 0.67 |
| 35. Seizure semiology and clinical events (e.g., changes in level of consciousness, body movements, and episodes) | 3.73 | 0.47 |
| 36. Artifact monitoring, identification, and mitigation | 3.73 | 0.47 |
| 42. Troubleshooting techniques | 3.73 | 0.47 |
| 43. Effects of instrument settings (e.g., filters, display gain, epoch) | 3.55 | 0.52 |
| 44. Impedance checks and their contraindications | 3.64 | 0.50 |
| 47. Awareness of keeping patient and environment safe (e.g., fall risks, restraints, sharps, cable management, bedrail pads) | 3.82 | 0.40 |
| 48. Skin safety (e.g., application techniques, allergies, sensitivities) | 3.64 | 0.50 |
| 40. Infection control/prevention | 3.73 | 0.47 |
| 50. ACNS Guidelines and Terminology | 3.91 | 0.30 |
| 51. HIPAA/HITECH Standards | 3.73 | 0.47 |
| 52. ABRET Code of Ethics | 3.73 | 0.47 |
| 53. SDS/OSHA standards | 3.55 | 0.69 |
| 54. Safety protocols (e.g., electrical, environmental, procedural) | 3.73 | 0.65 |

Members of the task force used a matrix to indicate the linkages between domains and the knowledge areas drawn upon to perform tasks in those domains. These linkages are presented in the full content outline at the end of this report.

### Least Important Knowledge Areas for Competent Performance

The lowest rated knowledge area was 40: Audio-video technology, which had an average rating of 2.09 across task force members and independent reviewers. The task force discussed this knowledge area and decided that it is becoming increasingly important in the field and so should remain as a knowledge area in the content outline.

## IMPORTANCE OF DOMAINS FOR COMPETENT PERFORMANCE

When asked to rate the importance of each domain for competent performance, *Domain II: Performing the Study* was rated the highest possible score (4.0) by both task force members and independent raters. The domain with the lowest importance rating (at 2.64 in the Combined Group) was the new *Domain IV: Data and Equipment Management*.

**TABLE 6**
**Average Importance Ratings per Domain**

| Domains | Average Rating: Task Force (SD) | Average Rating: Independent Raters (SD) | Average Rating: Combined Group (SD) |
|---|---|---|---|
| I: Preparation | 3.00 (0.89) | 3.20 (0.45) | 3.09 (0.70) |
| II: Performing the Study | 4.00 (0) | 4.00 (0) | 4.00 (0) |
| III: Post-Study Procedures | 3.67 (0.52) | 3.40 (0.55) | 3.55 (0.52) |
| IV: Data and Equipment Management | 2.50 (1.05) | 2.80 (0.84) | 2.64 (0.92) |
| V: Ethics and Safety Issues | 3.67 (0.52) | 3.60 (0.55) | 3.64 (0.50) |

## PERCENTAGE OF TIME SPENT IN EACH DOMAIN

The respondents were asked to estimate how much of their work time is devoted to tasks in each of the domains (see Table 7). Based on the Combined Group, the domain with the highest percentage of time devoted to it was *Domain II: Performing the Study* (at 33.64% of time), while the domain with the lowest percentage of time was *Domain V: Ethics and Safety Issues* (at 9.55% of time).

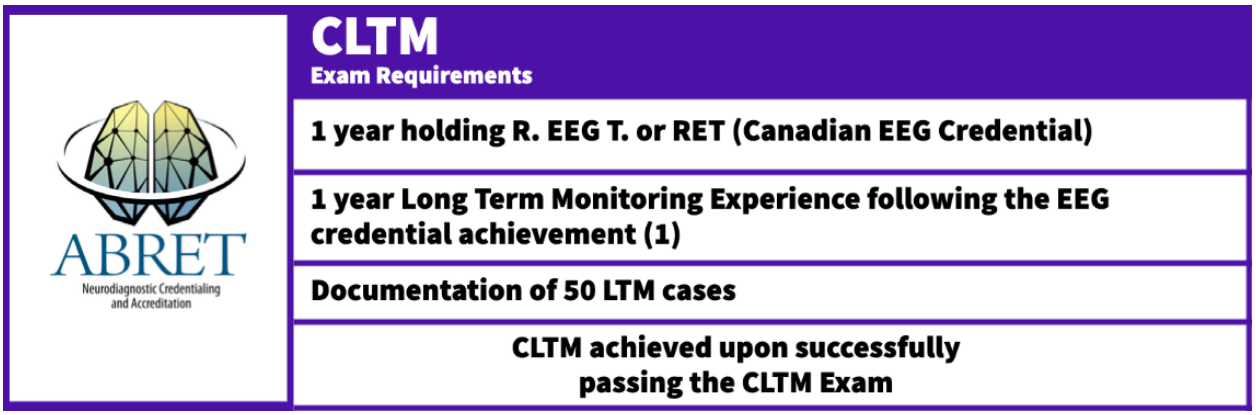
**Table 7**
**Average Percentage of Time per Domain**

| Domains | Percentage of Time Spent: Task Force (SD) | Percentage of Time Spent: Independent Raters (SD) | Percentage of Time Spent: Combined Group (SD) |
|---|---|---|---|
| I: Preparation | 16.67 (6.06) | 12.00 (5.70) | 14.55 (6.11) |
| II: Performing the Study | 36.67 (13.29) | 30.00 (14.58) | 33.64 (13.62) |
| III: Post-Study Procedures | 27.50 (10.37) | 32.00 (22.80) | 29.55 (16.35) |
| IV: Data and Equipment Management | 8.33 (4.08) | 17.00 (8.3) | 12.27 (7.54) |
| V: Ethics and Safety Issues | 10.83 (5.85) | 8.00 (2.74) | 9.55 (4.72) |

# ELIGIBILITY AND RECERTIFICATION REQUIREMENTS

The task force discussed the current eligibility requirements, which are:

CLTM Exam Eligibility Requirements




(1) Must include extensive experience and clinical knowledge of long term monitoring in epilepsy and in critical care ICU Monitoring. Additional experience and knowledge of ambulatory EEG monitoring, epilepsy surgery including functional mapping, is also expected.

Completion of Documentation Form

1. Cases must have been recorded within the last 5 years, with 10% (5) being recorded within the last 24 months.

2. No more than 10% (5) of the cases may be ambulatory monitoring. Each admission may only be counted as 1 case, regardless of the number of days of monitoring.

3. ABRET will accept documentation of up to three cases per day. Do not submit more than the requested number of cases.

4. Remote Monitoring LTMs must include a letter of recommendation from either a Physician or NA-CLTM technologist with documentation submission.

5. Documentation forms will be randomly audited which can delay or negate eligibility.

The CLTM credential is awarded for five years. See the options under Recertification.

After 3 unsuccessful attempts to pass the examination within a 2-year timeframe, candidates must wait 6 months and submit 10 hours of Continuing Education before again being eligible to test.

A task force member raised the issue of the pass rate, suggesting that increasing the minimum experience required from 1 year to 2 years (one year of which must be after attaining the R. EEG T. credential) would ensure that candidates are better prepared to take the certification examination. Another task force

member asked if it then would be appropriate to increase the required number of documented cases from 50 to 100. Another task force member stated that some candidates definitely are ready to take the examination after one year, while others are not, and that it should be the responsibility of the candidate to prepare for the examination. The task force came to a consensus that the requirements might be sufficient as they are but that the decision of whether to retain or modify the requirements is up to the ABRET Board. The task force requested that the pass/fail rates based on years of experience (1 or 2) be compared to assist in making the decision about potentially changing the minimum years of experience required.

*Of the candidates who took the examination in 2022, 3 had one year of experience (of which 33% passed and 67% failed) and 24 had 2-3 years of experience (of which 33% passed and 67% failed).*

The task force also discussed the recertification requirements, which are:

The CLTM credential is valid for a five-year period. To recertify, a technologist must submit 50 hours of continuing education by the end of the fifth year.

Alternatively, a technologist may select to retake the CLTM certification exam rather than submit continuing education hours. Those wishing to take the exam must apply prior to the end of their "in-Grace" status.

The task force agreed with current recertification requirements.

# DEVELOPMENT OF TEST SPECIFICATIONS

The method used to calculate the weightings for the domains in the updated test specifications is based on the task statement ratings for frequency and importance. The sum of frequency*importance products for each domain was divided by the grand sum of products for all domains to derive each domain's weight. The equation is as follows:

$$DW_j = \frac{\sum_{i=1}^{T} F_{ij} I_{ij}}{\sum_{j=1}^{D} \sum_{i=1}^{T} F_{ij} I_{ij}}$$

Where

i = a single task
j = a single domain
$F_{ij}$ = average frequency of task i under domain j
$I_{ij}$ = average importance of task i under domain j

When referring to the data for domains, the weightings based on task statements highlight the influence that the number of tasks per domain has on the relative weightings (see Table 8).

**TABLE 8**
**Weightings Based on Task Statement Ratings**

| Domain | Task Force Members | | Independent Raters | | Combined Group | |
|---|---|---|---|---|---|---|
| | Sum of task frequency * task importance | Weighting (%) | Sum of task frequency * task importance | Weighting (%) | Sum of task frequency * task importance | Weighting (%) |
| I: Preparation | 22.9 | 10.7 | 24.6 | 10.3 | 23.8 | 10.60 |
| II: Performing the Study | 107.0 | 50.0 | 118.6 | 49.5 | 111.9 | 49.71 |
| III: Post-Study Procedures | 28.6 | 13.3 | 34.5 | 14.4 | 31.0 | 13.77 |
| IV: Data and Equipment Management | 20.8 | 9.7 | 21.2 | 8.9 | 21.0 | 9.32 |
| V: Ethics and Safety Issues | 34.9 | 16.3 | 40.5 | 16.9 | 37.4 | 16.60 |

The task force discussed the calculated weightings and in general agreed that they are appropriate, with the exception of the weighting for *Domain III: Post-Study Procedures*. Given the importance of pattern recognition, which is covered by that domain, the task force decided to increase the weighting of *Domain III: Post-Study Procedures* to 15% (up from 13.77%). To compensate, they decided to round the percentages for the other domains so that *Domain I: Preparation* would round down to 10% (from 10.6%), *Domain II: Performing the Study* would round down to 49% (from 49.71%), *Domain IV: Data and Equipment Management* would round down to 9% (from 9.32%) and *Domain V: Ethics and Safety Issues* would round up to 17% (from 16.6%).

# CONCLUSIONS

## CLTM Examination

The current weightings for the test content specifications for the CLTM Certification Examination are:

| | | |
|---|---|---|
| I. | Pre-Study Preparation | 25% |
| II. | Performing the Study | 65% |
| III. | Post-Study Procedures | 10% |

The task force renamed the first domain as *Domain I: Preparation* and added two new domains as *Domain IV: Data and Equipment Management*, and *Domain V: Ethics and Safety Issues*. The names of the other two domains remained the same. They also added new tasks for a total of 21 tasks divided among the five domains.

The proposed weightings derived from the Combined Group weightings in Table 8 are shown in comparison with the current test specification weightings (see Table 9). The number of items is based on 180 operational items. The pre-test items per domain will have a proportional number based on the domain weighting.

**Table 9**
**Comparison of Current Test Specifications and Proposed Test Specifications for 2024**

| Domain | Current Title | Proposed Title | Current Weighting | Proposed Weighting | Number of Tasks | Current Number of Operational Items | Proposed Number of Operational Items |
|---|---|---|---|---|---|---|---|
| I | Pre-Study Preparation | Preparation | 25% | 10% | 2 | 45 | 18 |
| II | Performing the Study | Performing the Study | 65% | 49% | 10 | 117 | 88 |
| III | Post-Study Procedures | Post-Study Procedures | 10% | 15% | 3 | 18 | 27 |
| IV | | Data and Equipment Management | | 9% | 3 | | 16 |
| V | | Ethics and Safety Issues | | 17% | 3 | | 31 |

The ABRET Board considered these recommendations and approved them as the new test specifications for the CLTM certification examination.

The test specifications are shown in Table 10. The items allocated per domain are based on a total number of 200 items, of which 180 are operational items and 20 are pretest items.

**TABLE 10**
**Proposed Test Specifications for the ABRET CLTM Examination**

| Domain | Number of Associated Tasks | Weighting (%) | Total Operational Items | Total Pretest Items |
|---|---|---|---|---|
| I: Preparation | 2 | 10% | 18 | 2 |
| II: Performing the Study | 10 | 49% | 88 | 10 |
| III: Post-Study Procedures | 3 | 15% | 27 | 3 |
| IV: Data and Equipment Management | 3 | 9% | 16 | 2 |
| V: Ethics and Safety Issues | 3 | 17% | 31 | 3 |

The full test specifications, including content outline and associated knowledge areas, are shown below:

## Proposed Test Specifications for the ABRET CLTM Certification Examination

### *Domain I: Preparation (10%; 18 operational and 2 pretest items)*

A. Plan recording strategy by reviewing long term monitoring orders, extracting relevant patient health information from medical records, and obtaining additional information from patient/family/bedside caregivers to avoid adverse effects
B. Communicate the monitoring plan to patient/family/bedside caregivers in a manner consistent with their ability to understand to reassure the patient, establish rapport, elicit cooperation, and set expectations

Tasks in this domain draw upon the following knowledge areas:

K01, K02, K03, K04, K05, K06, K07, K09, K10, K11, K12, K13, K14, K15, K17, K19, K20, K21, K23, K24, K25, K26, K30, K34, K35, K46, K47, K48, K49, K50, K51, K52, K53, K54, K55

### *Domain II: Performing the Study (49%; 88 operational and 10 pretest items)*

A. Select appropriate equipment pertinent to the study to be performed
B. Securely apply and/or connect electrodes
C. Select and/or create montages and recording parameters
D. Initiate recording, calibrate equipment, check impedances, troubleshoot equipment, and perform electrode integrity and signal quality tests, as per facility protocols
E. Maintain integrity of study by documenting all stimulations performed (including provocation methods and bedside care), addressing technical and nontechnical issues that arise, identifying potential sources of artifacts, and conducting regular impedance checks
F. Modify the recording strategy and/or instrument parameters as needed based on the assessment of data to ensure a complete and comprehensive study
G. Document potential sources of effects on EEG (including medications in use and dosages, alternative electrode placement, skull defects, and/or modifications to hook up)
H. Document established critical values and communicate with reading physician and/or care team, providing technical description of events to ensure patient safety

I. Document communication, events, EEG changes and abnormalities, neuro assessments, and skin assessments, as per monitoring protocols
J. Annotate EEG during monitoring/review

Tasks in this domain draw upon the following knowledge areas:

K01, K02, K03, K04, K05, K06, K07, K08, K09, K10, K11, K12, K13, K14, K15, K16, K17, K18, K19, K20, K21, K22, K23, K24, K25, K26, K27, K28, K29, K30, K31, K32, K33, K34, K35, K36, K37, K38, K39, K40, K41, K42, K43, K44, K45, K46, K47, K48, K49, K50, K51, K52, K53, K54, K55

### *Domain III: Post-Study Procedures (15%; 27 operational and 3 pretest items)*

A. Analyze, prepare, and process patient data and prepare technical report for physician review, as per facility protocols and ACNS Guidelines
B. Remove and clean electrode sites and assess patient scalp, as per facility protocols
C. Follow ASET Guidelines concerning proper infection prevention procedures for all equipment and supplies (including electrodes and cables)

Tasks in this domain draw upon the following knowledge areas:

K01, K02, K03, K04, K05, K06, K07, K08, K09, K10, K11, K12, K13, K14, K15, K16, K17, K18, K21, K22, K23, K25, K27, K28, K29, K30, K31, K32, K33, K34, K35, K36, K38, K39, K40, K41, K43, K44, K45, K47, K48, K49, K50, K51, K52, K53, K54, K55

### *Domain IV: Data and Equipment Management (9%: 16 operational and 2 pretest items)*

A. Ensure that scheduled maintenance of equipment is performed
B. Prepare data files for pruning/clipping and archive as per facility protocols/state regulations
C. Ensure appropriate storage and disposal of equipment and supplies

Tasks in this domain draw upon the following knowledge areas:

K10, K19, K23, K39, K40, K41, K45, K50, K51, K52, K53, K54

### *Domain V: Ethics and Safety Issues (17%: 31 operational and 3 pretest items)*

A. Practice in a manner consistent with the ABRET Code of Ethics, ASET position statements, HIPAA/HITECH, and ACNS Guidelines
B. Safeguard patient safety and self-safety in all aspects of practice
C. Utilize appropriate ICD-10 billing codes and ethical billing practices

Tasks in this domain draw upon the following knowledge areas:

K04, K05, K06, K07, K08, K09, K10, K19, K20, K21, K23, K24, K28, K30, K34, K35, K36, K47, K48, K49, K50, K51, K52, K53, K54, K55

## ABRET CLTM Knowledge Areas

K01 Structural and functional neuroanatomy
K02 Principles of neurophysiology
K03 Medical terminology
K04 Neurological disorders (e.g., epilepsy, tumors, vascular disease)
K05 Psychiatric disorders
K06 Toxic/metabolic disorders and infectious diseases
K07 Head trauma and traumatic brain injury (TBI)
K08 Activation procedures
K09 Medical contraindications to activation procedures
K10 LTM procedures (e.g., extracranial monitoring, intracranial monitoring, ICU recordings, epilepsy monitoring, functional mapping, ambulatory EEG)
K11 Neuroimaging procedures (e.g., MRI, CT scans, SPECT, PET)
K12 Surgical treatments (e.g., resection, laser thermal therapy, neurostimulation)
K13 Elements of a patient history
K14 Elements of a neurological examination
K15 Effects of drugs on patients and recordings
K16 Electrographic correlates to clinical entities
K17 Comorbidities (e.g., cardiac, autoimmune, psychiatric)
K18 Localization principles and techniques
K19 Electrode types (disc, web, needle, grids/strips, depth)
K20 10-20, 10-10 international electrode placement systems and verification
K21 Barriers to and modifications of electrode placement
K22 Montage modifications
K23 Invasive and non-invasive electrode application or connection techniques (e.g., paste, collodion, needle electrodes, grids/strips, stereo-EEG; securing, providing strain relief)
K24 Effects of indwelling and external devices
K25 Age-specific criteria (patterns, recording parameters, disorders)
K26 Cognitive limitations/developmental delay
K27 Basic cardiac rhythms and rhythms associated with EEG changes
K28 Electrographic changes requiring provider notification (including critical values)
K29 Extracranial and intracranial waveform identification
K30 Intraoperative ECoG/stereo-EEG recording (including integrity, reliability and safety procedures, ground and reference electrode positions)
K31 Interictal and ictal patterns of extracranial EEG
K32 Interictal and ictal patterns of intracranial EEG
K33 Normal variants of extracranial and intracranial EEG
K34 Seizure precautions, response, and first aid (including cognitive and motor testing of patients during seizures)
K35 Seizure semiology and clinical events (e.g., changes in level of consciousness, body movements, and episodes)
K36 Artifact monitoring, identification, and mitigation
K37 Differential amplifier (e.g., gain, polarity, CMRR)
K38 Digital analysis (trending, spike and seizure detection etc.)
K39 Computer knowledge related to LTM devices, databases, and networks
K40 Audio-video technology

K41 Digital instrument concepts (e.g., reformatting, sampling rate, post-acquisition review)
K42 Troubleshooting techniques
K43 Effects of instrument settings (e.g., filters, display gain, epoch)
K44 Impedance checks and their contraindications
K45 Data management and storage
K46 Techniques for establishing rapport
K47 Awareness of keeping patient and environment safe (e.g., fall risks, restraints, sharps, cable management, bedrail pads)
K48 Skin safety (e.g., application techniques, allergies, and sensitivities)
K49 Infection control/prevention
K50 ACNS Guidelines and Terminology
K51 HIPAA/HITECH Standards
K52 ABRET Code of Ethics
K53 SDS/OSHA standards
K54 Safety protocols (e.g., electrical, environmental, procedural)
K55 Current applicable ICD billing codes and ethical billing practices [including waste, fraud, abuse, and monitoring ratios/timing (continuous, intermittent, unmonitored)]

# Report of the 2023 ABRET-CLTM Job Task Analysis Appendix

Appendix A: Linkages

Presented to:
**ABRET**

PROFESSIONAL TESTING CORPORATION

# Appendix A – Linkages

| Knowledge Area/Domain | Domain I: Preparation | Domain II: Performing the Study | Domain III: Post-Study Procedures | Domain IV: Data and Equipment Management | Domain V: Ethics and Safety Issues |
|---|---|---|---|---|---|
| 01. Structural and functional neuroanatomy | X | X | X | | |
| 02. Principles of neurophysiology | X | X | X | | |
| 03. Medical terminology | X | X | X | | |
| 04. Neurological disorders (e.g., epilepsy, tumors, vascular disease) | X | X | X | | X |
| 05. Psychiatric disorders | X | X | X | | X |
| 06. Toxic/metabolic disorders and infectious diseases | X | X | X | | X |
| 07. Head trauma and traumatic brain injury (TBI) | X | X | X | | X |
| 08. Activation procedures | | X | X | | X |
| 09. Medical contraindications to activation procedures | X | X | X | | X |
| 10. LTM procedures (e.g., extracranial monitoring, intracranial monitoring, ICU recordings, epilepsy monitoring, functional mapping, ambulatory EEG) | X | X | X | X | X |
| 11. Neuroimaging procedures (e.g., MRI, CT scans, SPECT, PET) | X | X | X | | |
| 12. Surgical treatments (e.g., resection, laser thermal therapy, neurostimulation) | X | X | X | | |
| 13. Elements of a patient history | X | X | X | | |
| 14. Elements of a neurological examination | X | X | X | | |
| 15. Effects of drugs on patients and recordings | X | X | X | | |
| 16. Electrographic correlates to clinical entities | | X | X | | |
| 17. Comorbidities (e.g., cardiac, autoimmune, psychiatric) | X | X | X | | |
| 18. Localization principles and techniques | | X | X | | |
| 19. Electrode types (disc, web, needle, grids/strips, depth) | X | X | | X | X |
| 20. 10-20, 10-10 international electrode placement systems and verification | X | X | | | X |

| Knowledge Area/Domain | Domain I: Preparation | Domain II: Performing the Study | Domain III: Post-Study Procedures | Domain IV: Data and Equipment Management | Domain V: Ethics and Safety Issues |
|---|---|---|---|---|---|
| 21. Barriers to and modifications of electrode placement | X | X | X | | X |
| 22. Montage modifications | | X | X | | |
| 23. Invasive and non-invasive electrode application or connection techniques (e.g., paste, collodion, needle electrodes, grids/strips, stereo-EEG; securing, providing strain relief) | X | X | X | X | X |
| 24. Effects of indwelling and external devices | X | X | | | X |
| 25. Age-specific criteria (patterns, recording parameters, disorders) | X | X | X | | |
| 26. Cognitive limitations/developmental delay | X | X | | | |
| 27. Basic cardiac rhythms and rhythms associated with EEG changes | | X | X | | |
| 28. Electrographic changes requiring provider notification (including critical values) | | X | X | | X |
| 29. Extracranial and intracranial waveform identification | | X | X | | |
| 30. Intraoperative ECoG /stereo-EEG recording (including integrity, reliability and safety procedures, ground and reference electrode positions) | X | X | X | | X |
| 31. Interictal and ictal patterns of extracranial EEG | | X | X | | |
| 32. Interictal and ictal patterns of intracranial EEG | | X | X | | |
| 33. Normal variants of extracranial and intracranial EEG | | X | X | | |
| 34. Seizure precautions, response, and first aid (including cognitive and motor testing of patients during seizures) | X | X | X | | X |
| 35. Seizure semiology and clinical events (e.g., changes in level of consciousness, body movements, and episodes) | X | X | X | | X |

| Knowledge Area/Domain | Domain I: Preparation | Domain II: Performing the Study | Domain III: Post-Study Procedures | Domain IV: Data and Equipment Management | Domain V: Ethics and Safety Issues |
|---|---|---|---|---|---|
| 36. Artifact monitoring, identification, and mitigation | | X | X | | X |
| 37. Differential amplifier (e.g., gain, polarity, CMRR) | | X | | | |
| 38. Digital analysis (trending, spike and seizure detection, etc.) | | X | X | | |
| 39. Computer knowledge related to LTM devices, databases, and networks | | X | X | X | |
| 40. Audio-video technology | | X | X | X | |
| 41. Digital instrument concepts (e.g., reformatting, sampling rate, post-acquisition review) | | X | X | X | |
| 42. Troubleshooting techniques | | X | | | |
| 43. Effects of instrument settings (e.g., filters, display gain, epoch) | | X | X | | |
| 44. Impedance checks and their contraindications | | X | X | | |
| 45. Data management and storage | | X | X | X | |
| 46. Techniques for establishing rapport | X | X | | | |
| 47. Awareness of keeping patient and environment safe (e.g., fall risks, restraints, sharps, cable management, bedrail pads) | X | X | X | | X |
| 48. Skin safety (e.g., application techniques, allergies, and sensitivities) | X | X | X | | X |
| 49. Infection control/prevention | X | X | X | | X |
| 50. ACNS Guidelines and Terminology | X | X | X | X | X |
| 51. HIPAA/HITECH Standards | X | X | X | X | X |
| 52. ABRET Code of Ethics | X | X | X | X | X |
| 53. SDS/OSHA standards | X | X | X | X | X |
| 54. Safety protocols (e.g., electrical, environmental, procedural) | X | X | X | X | X |

| Knowledge Area/Domain | Domain I: Preparation | Domain II: Performing the Study | Domain III: Post-Study Procedures | Domain IV: Data and Equipment Management | Domain V: Ethics and Safety Issues |
|---|---|---|---|---|---|
| 55. Current applicable ICD billing codes and ethical billing practices [including waste, fraud, abuse, and monitoring ratios/timing (continuous, intermittent, unmonitored)] | X | X | X | | X |