

Report on the 10th European Examination for Young Neurologists.

Lisbon June 15th 2018

Preamble

The European Examination for Young Neurologists is an initiative of the UEMS-Section of Neurology (also European Board of Neurology, EBN) in cooperation with the European Academy of Neurology (EAN). The first Exam was taken in 2009 under the supervision of professor Wolfgang Grisold.

The aim of this EBN-Examination is to add a contribution to setting European standards for the training of medical specialists in the field of neurology.

Until now, there is still no legal status for European Board Examinations but in many countries these examinations are mandatory for completion of a specialist training. Especially anesthesiology and ophthalmology take an advanced position in this field.

The UEMS (Union Européenne des Médecins Spécialistes) supports the conferment of the title 'Fellow of the European Board' to those candidates who successfully passed the examination. This is why our successful candidates become fellows of the European Board of Neurology (FEBN). Although the European Board of Neurology is tightly cooperating with the EAN, passing the board exam does *not* allow candidates to bear the title FEAN.

In 2016, the EBN-Exam was accredited by the UEMS-Examination Board (CESMA).

Contents

The EBN-Examination does not principally aim at testing the ability of retrieval of knowledge but rather skills to use knowledge and to apply competencies. Therefore the Examination is a mixture of written tests and oral examinations. The written parts consist of questions to be solved with use of reference sources ('open book', about 70%) and questions to be answered without ('closed book', about 30%). For the preparation of the written Examination we recommend a textbook, specific EAN-guidelines and EAN electronic learning modules (e-Brain).

Questions are provided by EAN-members according to the contents of the EBN-core curriculum and reviewed by an EBN-committee.

For the oral examination the candidate is asked to write an essay on public/global health or on ethics in the field of neurology. Furthermore a scientific critical appraisal on a clinical topic is required.

These work-pieces should be prepared at home and sent in before the examination. The candidate may ask for help from the EBN-staff to achieve these tasks. All submissions are scanned for plagiarism and candidates may be requested to revise their CAT and/or essay. This was the case in about 20% of the candidates because not providing original work and just copying texts from the internet.

Exam Program

The whole exam is taken within one day at the site of the EAN-congress. We are looking for alternatives that make it possible to do a written exam on distance in a local center in the future. Three to four hours are scheduled for the written examination, about 30-45 minutes for the oral examination. Knowledgeable invigilators, to be consulted in case of uncertainty, are available for the written examinations. The oral examinations are taken by two examiners from the EBN simultaneously. Observers from the World Federation of Neurology and the EAN are around during the oral examinations.

By the end of the day, the results are processed and a final mark is calculated. We aim at handing the certificates to the successful candidates at the end of the examination-day. Afterward, all candidates get written feedback to their achievements (see appendix 4).

ICT-support

Our exam is supported by Orzone, a Swedish professional company specialized in transfer and analysis of exam-data. Nevertheless we keep escape-routes open for unforeseen disasters like failure of internet and candidates not well-equipped at the exam.

Data-processing

Data from the written tests are read by a data-analysis program. For each question the percentage of correctly answering candidates corrected for the level of guessing (Pc-value, $P_c = 0$ at the level of guessing) and the discriminating value in the whole test (RIT-value) are calculated. Questions with both a subliminal P-value and RIT-value are eliminated from the test before calculation of the marks: questions with a significantly negative RIT-value are eliminated in case of a $P_c < .85$, those without significant discriminating value in case of a $P_c < .25$, questions with a significant discriminating value only in case of a $P_c < .25$.

The passing limit for the written examination is set by a pre-test Angoff procedure¹ (about 10 reviewers) but in case of sufficient participants we finally use the post-test Cohen-procedure². Students performing at the passing limit level get 55 out of 100 points.

The oral examinations are graded with help of standard forms (2/3) and a global impression of the examiner (1/3). Both examiners give their marks independently. The passing limit for oral examinations is set to 55 out of 100 points.

Results of written (weight factor 0.8) and oral examinations (weight factor 0.2) are taken together to a final mark. Candidates with 55 or more points out of the maximum of 100 are considered successful.

¹Livingston SA, Zieky MJ. Passing Scores: A manual for Setting Standards of Performance on Educational and Occupational Tests (1982).

²Cohen-Schotanus J, Van der Vleuten CPM. A standard setting method with the best performing students as point of reference: Practical and affordable. Med teacher 2010; 32: 154-160.

Exam fees

European candidates have to pay 600 Euros for the whole enterprise, non-European candidates 750 Euros and students working in low-income countries had to pay 350 Euros. Handling fees is now done by Orzone and candidates only could be enrolled after paying their fees. We made arrangements with the EAN in order to enhance the participation of their young members.

Candidates

In 2018 89 candidates applied for the Examination, finally 74 showed up at the exam.

<u>European</u>		<u>Non-European</u>	
Austria	1	Azerbaijan	1 (-1)*
Belgium	12	Bahrain	1
Croatia	2	Egypt	7 (-1)
Denmark	5	India	3 (-1)
France	4	Iraq	2 (-1)
Germany	2	Morocco	4 (-1)
Italy	9	Pakistan	1
Luxemburg	1 (-1)	Paraguay	1
Malta	1	Saudi Arabia	11 (-5)
Portugal	3	Singapore	1
Slovenia	1 (-1)	Syria	1 (-2)
Spain	2	UAE	1
Sweden	1		
Switzerland	2		
Turkey	6 (-1)		
United Kingdom	3		
	---- +		---- +
	55		34

*Numbers of candidates canceled or not showing up

The Exam

The examination board reviewed 160 questions for a previous exam. 100 of these have been taken into the exam: 20 EAN-guidelines closed book, 20 general neurology closed book and 60 general neurology open book.

The distribution of questions in the written examination according to the EBN core curriculum can be found in appendix 1.

All candidates have submitted two contributions for the oral examination (Appendix 2). At the examination, the essay about public health or ethics was introduced with a powerpoint-presentation. Thereafter the topic was discussed in English. French, Turkish, Spanish, Italian or German candidates could get some support from the examiners. The critical appraisal of a topic was discussed without introduction. The examiners filled their scoring-forms (Appendix 3) independently to get to a mark.

Guidelines to be studied

- Mild traumatic brain injury.
European Journal of Neurology 2012, 19: 191–198.
- EFNS guidelines on the Clinical Management of Amyotrophic Lateral Sclerosis (MALS) – revised report of an EFNS task force.
European Journal of Neurology 2012, 19: 360–375.
- EFNS-ENS Guidelines on the diagnosis and management of disorders associated with dementia.
European Journal of Neurology 2012, 19: 1159–1179.
- EFNS-ENS guidelines for the use of PCR technology for the diagnosis of infections of the nervous system.
European Journal of Neurology 2012, 19: 1278–1297.
- European guidelines on management of restless legs syndrome: report of a joint task force by the European Federation of Neurological Societies, the European Neurological Society and the European Sleep Research Society.
European Journal of Neurology 2012, 19: 1385–1396.
- Summary of the recommendations of the EFNS/MDS-ES review on therapeutic management of Parkinson’s disease.
European Journal of Neurology 2013, 20: 5–15.
- EFNS/MDS-ES recommendations for the diagnosis of Parkinson’s disease.
European Journal of Neurology 2013, 20: 16–34.
- EFNS review on the role of muscle biopsy in the investigation of myalgia.
European Journal of Neurology 2013, 20: 997-1005.
- EFNS/ENS Consensus on the diagnosis and management of chronic ataxias in adulthood.
European Journal of Neurology 2014, 21: 552–562.
- EFNS/ENS Guidelines for the treatment of ocular myasthenia.
European Journal of Neurology 2014, 21: 687–693.
- EFNS-ENS/EAN Guideline on concomitant use of cholinesterase inhibitors and memantine in moderate to severe Alzheimer’s disease.
European Journal of Neurology 2015, 22: 889–898
- A consensus review on the development of palliative care for patients with chronic and progressive neurological disease.
European Journal of Neurology 2016; 23: 30-38
- Mechanical thrombectomy in acute ischemic stroke: Consensus statement ESO/EAN.
Int J Stroke 2016; 11: 134-147
- EAN guidelines on central neurostimulation therapy in chronic pain conditions.
European Journal of Neurology 2016; 23: 1489-1499

Results

Four out of 100 questions (4%) have been skipped because of relatively unreliable statistics. The mean difficulty is expressed in mean Pc; the lower Pc, the more difficult the test.

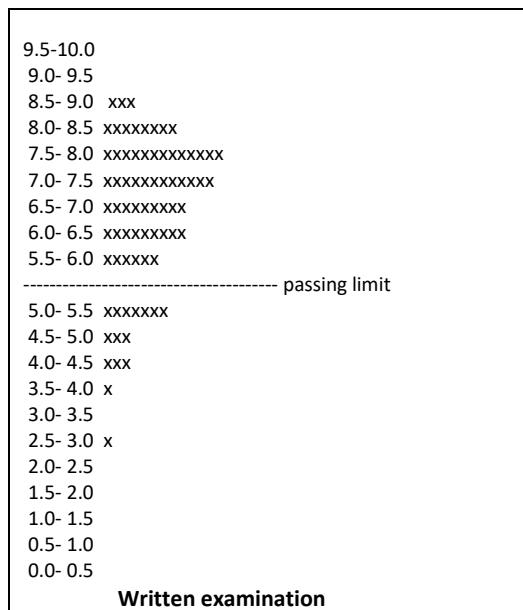
Pc > .80 is easy, Pc between .70 and .80 is moderate, Pc < .70 is difficult.

In the 2018 Exam the mean Pc was .65, which was comparable to values found in the previous Exams.

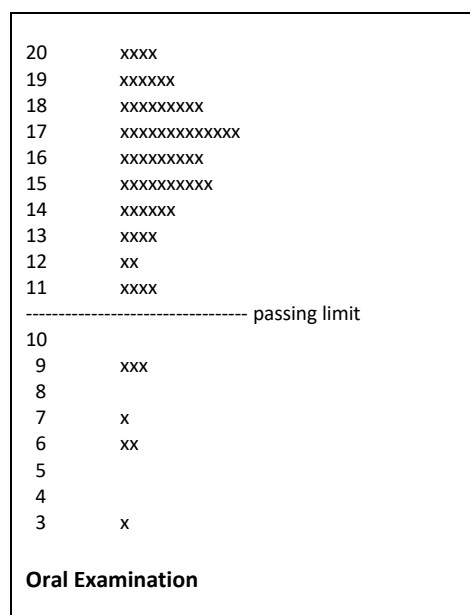
The internal consistency is calculated with Kuder Richardson 20 (KR20, a variant of Crohnbach's Alpha) providing values between 0 and 1 with .65 being acceptable, .80 being fine.

In the 2018 Exam the KR20 was equal to .91, indicating a high internal consistency and thus high reliability of the whole test.

The passing limit with help of Angoff's procedure was around 46%, taking Cohen's procedure calculating the maximum by the mean of the five highest scores the limit was set to 50%.



Considering the results of the written examination in the light of this passing limit, results are the following:



Taking results from written and oral examinations together 10/74 candidates (14%) failed in the whole exam. This seems a rather low percentage but it should be realized that a selection has been performed during the preparation process. 15 out of 89 candidates decided not to take part of the exam for various, partially unknown, reasons. They may have decided to postpone the exam to a next year in order to prepare themselves in a better way. Please see appendix 7 for statistics over the last 5 years.

All candidates got a complete personal feed-back on their achievements (Appendix 4). Failing candidates will get a new invitation for the next EBN-Exam with a reduced admission fee.

Survey

A survey with open and closed question was taken amongst the candidates. See appendix 5.

Results can be summarized as follows:

- Satisfaction with the information support before the examination **86%** (2017 96%, 2016 90%)
- Questions have been formulated clearly **88%** (2017 85%, 2016 70%)
- Questions could be answered within the timeframe given **88%** (2017 88%, 2016 75%)
- The open book exam is an essential part **86%** (2017 79%, 2016 65%)
- The oral part is essential in the board exam **91%** (2017 85%, 2016 80%)
- The examination fee is affordable **55%** (2017 48%, 2016 60%)
- Would you like to have a possibility to take your exam in your own country?
No **48%** (2017 60%), yes **40%** (2017 30%)

Conclusion

The 10th Exam of the European Board of Neurology may be considered as a multi-competency examination with reliable results and a favorable outcome in 2018 for 86% of the candidates. The overall satisfaction amongst the candidates was good, but we could do better following some remarks of the candidates that definitely should be taken into account.

In the next future we will further professionalize questions and examiner training. Furthermore the exam will be extended with more oral stations and computer-based questions.

In spite of more than half of the candidates not being interested to take exams in local centers, we will further explore the possibility of multi-center exams to allow candidates, not being able to show up at the EAN congress (and thus not completing our evaluation forms), to take part in our exam as well.

For 2019 a more intense cooperation with the EAN is foreseen, now there is a 'joint examination board' with 3 members from the EBN and 3 from the EAN.

In the beginning of 2019 we will start with a written exam ("step 1") in a European capital.

Please, visit our Website www.uems-neuroboard.org for further information.

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Appendix 1 Distribution of questions according to topics

	1. Anatomy	2. Biology	3. Therapy	4. Physiology	5. Genetics	6. Chemistry	7. Pathology	8. Clinics	9. Imaging	10. Toxicology
1. Oncology	58				55	54		11, 40	41	
2. Trauma		none		33	none	36	none	12	11	
3. CSF				32	none	31	53	39	none	none
4. Infections	none	16	20		none	15		15, 45	18	
5. Immunology	none	23			none			26		32
6. Vascular	1, 22				4		17	2, 35	10, 16	
7. Epilepsy	39	14		40		37		12, 13		
8. Sleep			14				none	46, 8		
9. Headache							none	38		
10. Cognition	30		17	8		6	21	1, 28		
11. Degeneration Extrap	7	21	9, 31	30	9	29	27, 3, 20	25	10	24
11. Degeneration Cerebr	29		none	33	4	none		5		
12. Spinal cord & Brain	57		3		5	2				
13. Polyneuropathy	none			25	19			24	none	22
14. Mononeuropathy	52				44	none			none	none
15. Cranial nerves	34		7	28	42	none		6, 34, 37		
16. Myopathy	none				43	56	18	19, 23	none	
17. Myasthenia	none			51	none			13	none	47
18. Complications Int Me	none			none	none	26	38	36		none
19. Consciousness	35					60	59	27		
20. Autonomous NS			48		49		50		none	

Classification of subjects according to the EBN-training-requirements (core curriculum neurology).
Green numbers: closed book, red numbers: open book

Appendix 2 Topics chosen by the candidates for oral examination.

A Topics on public health or global health and ethics.

Trials

- Willing to participate in a clinical trial but refusing to be randomized

Role of industry

- Industry sponsorship and research outcome

Telling a diagnosis and informed consent

- Withholding diagnosis at families request in case of language barrier
- Can the chronic illness be kept secret from the partner ?
- Informed consent in Alzheimer patients in Italy
- Is transparency always obligatory?

Autonomy

- Autonomy in dementia treatment
- Should vaccinations programs be compulsory?

Genetic testing

- Presymptomatic genetic testing in ALS
- Presymptomatic genetic testing in Creutzfeldt Jacob Disease
- Genetic counseling for autosomal recessive neuromuscular disorders in the context of consanguinity in Morocco

National health care

- Public Health care in Egypt
- Managing polyautoimmunity in Denmark
- Public Health Organization in India
- Public Awareness of Multiple Sclerosis in Egypt
- Private and public health care in Paraguay
- Multiple Sclerosis in Syria
- Neurological practice in India
- Public Health services in Azerbeidjan
- Measles Vaccination Program and Subacute Sclerosing Panencephalitis in Turkey
- Refugees in Turkey
- Dementia management in Morocco
- Traditional Cauterization for Neurol Diseases in Saudi Arabia
- The Danish Cancer Patient Pathway for Brain Cancer
- Private and public health care in Portugal
- Euthanasia and organ donation in Belgium
- The role of malnutrition in neurological disease in Egypt

Dealing with advanced neurological deterioration

- Treating patients with severe disorders of consciousness
- Revascularisation therapies in patients with dementia
- Irreversible coma and brain death: today and tomorrow
- Physician assisted suicide and dementia
- Artificial intelligence in Alzheimer's disease
- The advance healthcare directives in MND
- Coma after cardiac arrest. Differing points of view

Epilepsy and daily life

- A car driver with epilepsy, forbidding you to make know his diagnosis
- Driving after first seizure in India
- How to deal with a car driver with epilepsy, forbidding you to make known his diagnosis?
- Epilepsy in teenagers
- Valproid acid in pregnant women
- Epileptic seizures and driving license
- Driving license for epileptic patients

- Epilepsy monitoring unit to improve the diagnosis and management of epilepsy in Bahrain
- Driving and epilepsy in Saudi Arabia
- Driving Restrictions and People with Epilepsy
- Epilepsy and public health

Costs of therapy

- Orphan medicine pricing and the case of nusinersen
- Cost Effectiveness of Multiple Sclerosis drugs
- Cost Effectiveness of DBS for Parkinson's Dis. in Italy
- Thrombolysis in patients with dementia

Neurological diseases and daily life

- Dementia and driving
- Young onset Parkinson's disease and its impact on working capacity.
- A car driver with a severe Obstructive Sleep Apnea Syndrome (OSAS), forbidding you to make known his non-adherence to the treatment
- Knowledge gap towards epilepsy among non-medical health providers in Low and Middle-Income Countries

Patients and doctors

- Demanding patients asking for unnecessary investigations
- ?Debet curare infirmos? ? ought to or not ought to?
- The fit of a solo neurologist in modern medicine
- Pseudoscience, social media and the role of the medical doctor.
- How to deal with a deceased patient's wishes when opposite to medical needs
- Dealing with Misbehaving Colleague in his Field of Expertise
- Violence of patients in public institutions
- Patients demanding non-medically indicated investigations
- Dealing with patients requesting unnecessary investigations
- Patients gifts to a physician
- Future perspectives in the neurologic outpatient clinics

Various

- Assessment of patients' mental competence
- Migrant Flux in Europe
- Neurological impact of drinking TCE
- Is lumbar puncture necessary in Alzheimer?
- Insurance system influencing individual health care
- Edaravone for ALS in Italy
- When child neglect sneaks into the adult neurological practice
- Anticoagulants without antidote
- Do not harm
- How to Deal with a Non-Compliant Patient
- Patient and Internet

B Critical appraisals of topics.

Movement disorders and degenerative diseases

- Amantadine for L-DOPA-induced dyskinesia in Parkinson patients
- Treatment of episodic ataxia unresponsive to acetazolamide
- Acetylcholinesterase inhibitors in dementia associated with progressive supranuclear palsy
- Zonisamide in essential tremors
- Deep brain stimulation for orthostatic tremor
- Deep brain stimulation effect on impulse control disorders in Parkinson's disease
- Deep brain stimulation in Tourette syndrome
- Safinamide as Add-on Therapy in Parkinson's disease
- Rivastigmine for gait problems in Parkinson's disease
- Exenatide in Parkinson's disease

Headache

- Levetiracetam in adult migraine
- Venous Stenting for IHH

- Acetazolamide in Normal Pressure Hydrocephalus
- Onabotulinumtoxin A in migraine
- Coenzyme Q10 in Migraine prophylaxis
- Acupuncture in Migraine Prophylaxis
- Riboflavin in pediatric migraine
- Treatment of acute migraine with intravenous fluids

Neuropharmacology

- Cannabis for neurological diseases
- Risk for hyperammonemia with Valproic Acid
- Safety of dimethyl fumarate in pregnancy
- Methylphenidate for apathy
- The impact of lacosamide on mood disorders

Vascular neurology

- Thrombectomy in stroke after 6 hours
- CT and MRI in the Detection of cervical artery dissection
- Treatment after stroke due to patent foramen ovale (PFO)
- Low- versus Standard-Dose TPA for Acute Ischemic Stroke
- Ticagrelor Use in Secondary Stroke Prevention
- Role of aspirin and other antiplatelet agents in primary prevention of ischemic stroke in patients with metabolic and vascular risk factors
- Patent foramen ovale closure in cryptogenic stroke
- Acute ischemic stroke treatment in brain neoplasm
- Pattern recognition in microbleeds
- Artery recanalization to treat ischemic stroke
- Persistent foramen ovale and cryptogenic stroke
- Antiplatelet therapy after intracerebral hemorrhage
- New Oral Anticoagulant Treatment In Ischemic Stroke
- Thrombolysis in patients with a recent ischemic cerebrovascular accident
- Oral coagulation in the secondary prevention of ESUS
- Prognostication models in spontaneous intraparenchymal hemorrhage

Neuromuscular disorders

- IVIG and paraneoplastic neuropathy
- Rituximab in myasthenia gravis
- Rituximab and Chronic Inflammatory Demyelinating Polyradiculoneuropathy
- Edaravone in NMD
- Edaravone to slow progression of Amyotrophic Lateral Sclerosis
- IVIG to treat chronic myasthenia
- Rituximab in anti-MuSK positive Myasthenia Gravis
- Peripheral nerve ultrasound in CIDP follow-up
- Plasmapheresis or IVIG for Guillain Barré

Pain

- Does the surgical timing of cranioplasty affect neurological outcomes?
- Lacosamide in neuropathic pain

Epilepsy

- Brivaracetam in the treatment of partial-onset seizures
- Lamotrigine in pregnancy in women with epilepsy
- Ketogenic diet to treat refractory status epilepticus.
- Ketogenic diet to treat refractory epilepsy of adults
- Intravenous ketamine in the treatment of status epilepticus in adult patients
- Intravenous lacosamide efficacy to treat refractory status epilepticus
- Vagus nerve stimulation against SUDEP
- Perampanel in Progressive Myoclonus Epilepsies

Multiple sclerosis a.o. white matter diseases

- Amantadine in patients with multiple sclerosis and fatigue
- Hematopoietic stem cell transplantation in Neuromyelitis Optica

- Ocrelizumab for Treatment of Primary Progressive Multiple Sclerosis
- MMP-9 and MMP-2 in multiple sclerosis pathogenesis
- Azathioprine vs Rituximab in NMO
- Cognitive impairment in radiologically isolated syndrome
- Oral corticosteroids for relapses in Multiple Sclerosis
- Inositol in Multiple Sclerosis
- Rituximab in Multiple Sclerosis
- Oral or intravenous methylprednisolone in MS
- Fampridine to improve walking in MS
- Dalfampridine for walking in transverse myelitis
- Cladribine as emerging therapy in multiple sclerosis
- Alemtuzumab and multiple sclerosis
- Medicinal cannabis in MS
- When to discontinue MS treatment in secondary progressive patients

Infections

- Antiviral treatment in Bell's Palsy
- Central vein sign in CNS inflammatory disorders
- Steroids in the treatment of hsv 1 encephalitis

Various

- Rituximab to treat stiff person syndrome.
- Deferiprone for superficial sclerosis
- Robotics for upper extremity rehabilitation

Appendix 3 Scoring forms for oral examination.

Scoring form for the Critical Appraisal of a Topic (CAT)

	Item Score	Maximal Score	Actual score*
1	There is a clear, concise and focused question	1	
2	The question is original and relevant for clinical practice	2	
3	The search strategy is adequate	1	
4	The research outcome is adequate	1	
5	The table with results is correct	2	
6	The comments described are adequate	3	
7	The final conclusion is sound	1	
8	The references are really the current key-references for this problem	1	
9	The answers to the questions on the exam are adequate	2	
10	Handling ignorance during the exam is adequate	1	
	Total (please add up number 1-10)	15	
	Additional Global Score		
	Global impression on a 10 points scale 1=extreme poor - 10 = excellent	10	

Scoring form for the Essay on Public Health / Ethics Presentation

	Item Score	Maximal Score	Actual score*
1	The topic is relevant for clinical practice	1	
2	There is a sound introduction	2	
3	The elaboration of the problem is adequate	2	
4	The own vision of the candidate is clear	1	
5	The presentation is clear and to the point	2	
6	The answers to the questions are adequate	2	
7	Handling ignorance is adequate	1	
8	Time management is adequate	1	
	Total (please add up number 1-8)	12	
	Additional Global Score		
	Global impression on a 10 points scale 1=extreme poor - 10 = excellent	10	

Appendix 4 Feed-back to candidates

Report feedback EBN-Exam Amsterdam 2018, **your number = 006**
For any questions: j.b.m.kuks@umcg.nl

31-07-2018

1. Your achievements related to other candidates

Legenda to the overall table

****ROWS****

Numbers of columns are given in the first row.
Maximum scores to be obtained are given in the second row.
The following rows contain individual scores.

****COLUMNS****

Column 1. Number of candidate

The original written test consisted of a closed book test (guidelines, general) and an open book test (general) with 100 questions, for the final calculation (columns 12 and 14) 4 questions have been skipped because of bad statistics.

Column 2. Score on the closed book test (guidelines), number of questions: 19
Column 3. Idem Z-score
Column 4. Score on the closed book test (general), number of questions: 21
Column 5. Idem Z-score
Column 6. Summation of 2 and 4 (total closed book test), number of questions: 40
Column 7. Idem Z-score
Column 8. Score on the open book test, number of questions 60
Column 9. Idem Z-score
Column 10. Total score, summation of 2, 4, 6, 8
Column 11. Z-score on the total written test

A passing-limit score has been calculated with an Angoff-procedure and a Cohen-procedure, it was set to 45 (of 95 questions).

For reasons of harmonization scores from column 10 have been transformed to marks ranging from 0-100 with a score of 45 (passing limit) giving a mark of 55 etc.

Column 12. Marks for the total written test.

The oral test consisted of an essay and a CAT presentation, each was scored with a standard list and finally the examiners provided a global impression on a 10-point scale. All candidates got two examiners.

Scores from the essay-examination (0-12 standard points weight 2/3, 0-10 global impression points weight 1/3) and the CAT-examination (0-15 standard points weight 2/3, 0-10 global impression points weight 1/3) were added up and transformed to a mark ranging from 0-20.

Column 13. Marks for the oral test

Marks from the written test (weight 4/5, so magnified with 0.8) were added up with the marks from the oral test, resulting in a final combined mark. 55 being the passing limit.

Column 14. Combined final mark.
80-100 = Excellent, 70-79 = Good, 60-69 = Fair, 55-59 = Marginal, <55 = No pass

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	19		21		40		60		100		100	20	100	(maximal scores)
		z		z		z		z		z				(z-scores)
018	17	1.46	17	1.47	34	1.66	52	1.72	86	1.84	88	19	89	
026	17	1.46	16	1.11	33	1.45	51	1.59	84	1.66	88	18	88	
054	17	1.46	16	1.11	33	1.45	50	1.45	83	1.57	86	19	87	
075	16	1.07	16	1.11	32	1.24	48	1.19	80	1.31	83	19	85	
005	17	1.46	16	1.11	33	1.45	49	1.32	82	1.49	86	16	85	
073	17	1.46	18	1.83	35	1.87	49	1.32	84	1.66	86	17	85	
036	14	0.30	12	-0.32	26	-0.02	48	1.19	74	0.78	78	20	82	
050	14	0.30	18	-1.83	32	1.24	45	0.78	77	1.04	80	18	82	
022	15	0.68	16	1.11	31	1.03	44	0.65	75	0.86	79	18	80	
028	12	-0.47	16	1.11	28	0.40	46	0.92	74	0.78	77	19	80	
030	14	0.30	16	1.11	30	0.82	46	0.92	76	0.95	78	19	80	
051	14	0.30	16	1.11	30	0.82	48	1.19	78	1.13	82	14	80	
029	16	1.07	15	0.76	31	1.03	41	0.25	72	0.60	76	19	79	
027	13	-0.09	12	-0.32	25	-0.23	50	1.45	75	0.86	79	17	79	
004	16	1.07	11	-0.68	27	0.19	45	0.78	72	0.60	76	18	78	
053	13	-0.09	11	-0.68	24	-0.44	50	1.45	74	0.78	76	18	78	
055	16	1.07	15	0.76	31	1.03	44	0.65	75	0.86	78	16	78	
062	13	-0.09	17	1.47	30	0.82	46	0.92	76	0.95	79	15	78	
010	14	0.30	15	0.76	29	0.61	43	0.51	72	0.60	76	17	77	
012	16	1.07	17	1.47	33	1.45	46	0.92	79	1.22	82	12	77	
016	16	1.07	15	0.76	31	1.03	42	0.38	73	0.69	73	19	77	
032	17	1.46	13	0.04	30	0.82	39	-0.02	69	0.33	72	20	77	
047	12	-0.47	16	1.11	28	0.40	43	0.51	71	0.51	75	18	77	
006	16	1.07	13	0.04	29	0.61	41	0.25	70	0.42	74	18	76	<<<
033	11	-0.86	13	0.04	24	-0.44	45	0.78	69	0.33	73	18	76	
048	11	-0.86	14	0.40	25	-0.23	45	0.78	70	0.42	74	17	76	
044	15	0.68	12	-0.32	27	0.19	44	0.65	71	0.51	74	17	75	
049	16	1.07	14	0.40	30	0.82	43	0.51	73	0.69	77	14	75	
067	13	-0.09	13	0.04	26	-0.02	45	0.78	71	0.51	75	13	73	
064	12	-0.47	15	0.76	27	0.19	39	-0.02	66	0.06	69	17	72	
003	14	0.30	12	-0.32	26	-0.02	35	-0.56	61	-0.38	64	20	71	
021	13	-0.09	11	-0.68	24	-0.44	40	0.11	64	-0.11	66	18	71	
068	13	-0.09	14	0.40	27	0.19	37	-0.29	64	-0.11	67	17	70	
065	11	-0.86	14	0.40	25	-0.23	37	-0.29	62	-0.29	66	18	70	
025	15	0.68	9	-1.39	24	-0.44	36	-0.42	60	-0.47	64	19	69	
040	16	1.07	14	0.40	30	0.82	39	-0.02	69	0.33	73	11	69	
020	14	0.30	12	-0.32	26	-0.02	32	-0.96	58	-0.65	62	19	68	
031	11	-0.86	13	0.04	24	-0.44	40	0.11	64	-0.11	68	15	68	
045	11	-0.86	11	-0.68	22	-0.87	38	-0.16	60	-0.47	64	17	68	
015	9	-1.63	12	-0.32	21	-1.08	39	-0.02	60	-0.47	64	16	67	
039	12	-0.47	9	-1.39	21	-1.08	38	-0.16	59	-0.56	62	16	65	
074	13	-0.09	11	-0.68	24	-0.44	28	-1.50	52	-1.18	56	20	64	
057	16	1.07	16	1.11	32	1.24	30	-1.23	62	-0.29	64	13	64	
001	15	0.68	10	-1.03	25	-0.23	35	-0.56	60	-0.47	64	13	63	
007	11	-0.86	12	-0.32	23	-0.66	35	-0.56	58	-0.65	62	14	63	
042	12	-0.47	13	0.04	25	-0.23	34	-0.69	59	-0.56	63	12	62	
035	9	-1.63	11	-0.68	20	-1.29	37	-0.29	57	-0.74	61	12	61	
069	12	-0.47	14	0.40	26	-0.02	36	-0.42	62	-0.29	66	7	59	
009	12	-0.47	12	-0.32	24	-0.44	28	-1.50	52	-1.18	55	15	59	
008	10	-1.24	7	-2.11	17	-1.92	29	-1.36	46	-1.71	50	19	58	
014	13	-0.09	12	-0.32	25	-0.23	33	-0.83	58	-0.65	62	9	58	
017	12	-0.47	8	-1.75	20	-1.29	38	-0.16	58	-0.65	61	10	58	
034	9	-1.63	11	-0.68	20	-1.29	36	-0.42	56	-0.82	60	11	58	
043	13	-0.09	9	-1.39	22	-0.87	31	-1.09	53	-1.09	57	12	57	
070	15	0.68	12	-0.32	27	0.19	28	-1.50	55	-0.91	58	10	56	
002	9	-1.63	11	-0.68	20	-1.29	26	-1.76	46	-1.71	49	18	56	
059	11	-0.86	11	-0.68	22	-0.87	30	-1.23	52	-1.18	56	11	56	
077	11	-0.86	12	-0.32	23	-0.66	31	-1.09	54	-1.00	56	10	55	
019	15	0.68	9	-1.39	24	-0.44	26	-1.76	50	-1.36	53	10	51	
024	9	-1.63	8	-1.75	17	-1.92	31	-1.09	48	-1.53	51	8	48	
023	6	-2.79	9	-1.39	15	-2.34	26	-1.76	41	-2.16	45	10	46	
071	8	-2.02	6	-2.46	14	-2.55	22	-2.30	36	-2.60	40	7	39	

For Example no. 036 did rather well on the guideline questions (14 out of 19 correct, z-score 0.30 i.e. above the mean) but below the mean on the other closed book questions (12 out of 21 correct, z-score -0.32). The total achievement in the closed book section was slightly below the mean with 26 out of 40 correct and a z-score of -0.02. He (or she) was good in the open book test with 48 out of 60 correct (z-score 1.19, i.e. far above the mean) with a total score of 74 out of 100 (z-score 0.78 being nicely above the mean). As 4 questions have been skipped, his mark on the written test was not 74 but 78 (100 being maximal for 96 correct answers). His (or her) achievement on the oral test was maximal with 20 point. Weight factors written: oral is 4:1 -> $4/5 \cdot 78 + 20 = 82$

2. Your personal detailed results on the orals and the written tests.

O R A L E X A M

These are your scores given for the several items from the scoring list as provided by your examiners 1 and 2, the maximum score obtainable is given in the utmost right column.

Oral Examination CAT	Ex 1	Ex 2	Maximum
C01. There is a clear concise and focused question -----	1.00	1.00	1.00
C02. The question is original and relevant for clinical practice -	1.00	2.00	2.00
C03. The search strategy is adequate -----	1.00	1.00	1.00
C04. The table with results is correct -----	1.00	1.00	1.00
C05. The comments described are adequate -----	1.00	1.00	2.00
C06. The comments described are adequate -----	3.00	2.00	3.00
C07. The final conclusion is sound -----	1.00	1.00	1.00
C08. The references are really the current key-references ----	1.00	1.00	1.00
C09. The answers to the questions on the exam are adequate	2.00	2.00	2.00
C10. Handling ignorance during the exam is adequate -----	1.00	1.00	1.00
C99. Global impression CAT on a 10 points scale -----	8	8	10

Oral Examination Essay	Ex 1	Ex 2	Maximum
E01. The topic is relevant for clinical practice -----	1.00	1.00	1.00
E02. There is a sound introduction -----	2.00	2.00	2.00
E03. The elaboration of the problem is adequate -----	2.00	1.00	2.00
E04. The own vision of the candidate is clear -----	1.00	1.00	1.00
E05. The presentations is clear and to the point -----	2.00	2.00	2.00
E06. The answers tot the questions are adequate -----	2.00	2.00	2.00
E07. Handling ignorance is adequate -----	1.00	1.00	1.00
E08. Time management is adequate -----	1.00	1.00	1.00
E99. Global impression Essay on a 10 points scale -----	9	8	10

Examiner 1 (and comments): Prof x

Examiner 2 (and comments): Prof y

WRITTEN EXAM

Your numbers of right (+) and wrong (-) answers per discipline

Cognition	6+ 3-	66% correct answers
Spinal cord	4+ 0-	100% correct answers
Cerebellar	2+ 2-	50% correct answers
Extrapyramidal	11+ 2-	84% correct answers
Traumatology	3+ 1-	75% correct answers
Myasthenia	2+ 2-	50% correct answers
Sleep	2+ 1-	66% correct answers
Infections	7+ 0-	100% correct answers
Vascular	4+ 4-	50% correct answers
Myopathy	3+ 1-	75% correct answers
Polyneuropathy	3+ 0-	100% correct answers
Immunology	2+ 1-	66% correct answers
Internal Medicine	2+ 1-	66% correct answers
Cranial Nerves	5+ 2-	71% correct answers
CSF	2+ 1-	66% correct answers
Consciousness	2+ 2-	50% correct answers
Epilepsy	2+ 3-	40% correct answers
Oncology	3+ 3-	50% correct answers
Headache	1+ 0-	100% correct answers
Mononeuropathy	2+ 0-	100% correct answers
Autonomous	2+ 1-	66% correct answers

Your numbers of right (+) and wrong (-) answers per category

Clinics	20+ 8-	71% correct answers
Chemistry	8+ 2-	80% correct answers
Therapy	9+ 0-	100% correct answers
Genetics	9+ 1-	90% correct answers
Anatomy	5+ 7-	41% correct answers
Physiology	4+ 5-	44% correct answers
Imaging	5+ 1-	83% correct answers
Biology	2+ 1-	66% correct answers
Pathology	5+ 4-	55% correct answers
Toxicology	3+ 1-	75% correct answers

Appendix 5 Evaluation for Candidates of the 2018 EBN Exam

1 = Do not agree – 5 = Fully agree.

1. How did you learn first about the examination or who recommended the examination to you?

<input type="radio"/>	The EBN Flyer	n = 0
<input type="radio"/>	Previous candidates	n = 10
<input type="radio"/>	The head of your Department	n = 4
<input type="radio"/>	Other colleagues	n = 7
<input type="radio"/>	The EBN-Website	n = 8
<input type="radio"/>	EAN-Pages	n = 7
<input type="radio"/>	National Society	n = 6
<input type="radio"/>	Otherwise.....	None

2. What was your motivation for taking the exam? (You may take several answers)

<input type="radio"/>	To test your skills and knowledge	n = 30
<input type="radio"/>	To get a certificate	n = 11
<input type="radio"/>	To be a fellow of the European Board of Neurology	n = 14
<input type="radio"/>	To increase possibilities for migrating to another country	n = 7

3. Are you satisfied with the information given before the exam and with the help by e-mail?

0	0	5	8	22	<i>(Numbers of candidates answering 1, 2, 3, 4, 5)</i>
1	2	3	4	5	

4. Did you find the written questions clearly formulated?

0	0	4	20	10
1	2	3	4	5

5. Have you been able to answer the MC-questions properly within the timeframe given?

1	1	3	15	15
1	2	3	4	5

6. Are you satisfied with the instructions and help during the exam?

0	1	3	9	22
1	2	3	4	5

7. What is your opinion on having an open book exam?

Do you appreciate this as a realistic part of a board exam?

0	1	5	10	21
1	2	3	4	5

8. What is your opinion on the CAT and essay assignments?

Do you appreciate these as a realistic part of a board exam?

0	0	10	16	22
1	2	3	4	5

9. Have you been satisfied with the oral examination?
Do you appreciate this as a realistic part of a board exam?

0	1	1	9	21
1	2	3	4	5

10. Did you find the examination fee affordable?

2	3	9	10	7
1	2	3	4	5

11. Have you taken another national or international postgraduate neurology exam?

- | | | |
|-----------------------|-------------------------------------|-------------------|
| <input type="radio"/> | The Royal College Exam (London) | N = 3 |
| <input type="radio"/> | A national Exam in your own country | N = 12 |
| <input type="radio"/> | Another international exam, namely | <i>Sonography</i> |

12. Do you feel a European board exam useful while having other postgraduate exams available as well?

1	0	1	11	27
1	2	3	4	5

Please indicate why!

- The EBN exam is a good option if there is no national exam
- It is a stimulus to train neurology in another way
- It is a good assessment to check where I am in comparison to international colleagues (2*).
- It would be great if the EBN-Exam were valid in own country as a national exam.
- The EBN-exam is a tool to introduce common European standards.
- This exam shows a wider knowledge than the local guidelines in our own hospital.

13. How did you appreciate the ICT (information and communications technology) system for the written exam?

0	0	1	6	25
1	2	3	4	5

14. Would you prefer a two step exam with a written exam in a center within your region and subsequently a practical oral exam at the site of the EAN-congress above the current system with all exams on one day at the EAN-congress?

9	3	3	4	6
1	2	3	4	5

15. Do you have any further comments or recommendations for improvement of the examination process?

- Less waiting on the day of the exam would be welcomed.
- Thank you for the experience and for your attention.
- The written exam: too many questions within the neuromuscular area. Insufficient between all topics in neurology.
- Provide sample questions to get familiarized with the question type before starting the exam
- Thank you for a very good examination. The questions were well-balanced and relevant.
- There were too many questions on genetics and neuromuscular disease, very few on cerebrovascular disease. A better distribution of questions within the various fields of neurology seems reasonable.

Appendix 6 Evaluation for Candidates of the 2018 ORAL EBN Exam

1 = Do not agree – 5 = Fully agree.

Please indicate your group number at the oral exam:

1. Did you feel, the examiners have read your CAT carefully?

		1	7	23
1	2	3	4	5

2. Did you feel, the examiners have read your Essay carefully?

		1	8	22
1	2	3	4	5

3. Did you find their questions formulated clearly?

	1	1	9	20
1	2	3	4	5

4. Did you get the opportunity to present your work adequately?

		1	1	29
1	2	3	4	5

5. Did the discussion of your CAT make sense?

		1	5	25
1	2	3	4	5

6. Did the discussion of your Essay make sense?

		2	5	24
1	2	3	4	5

7. Do you feel the timeframe of the session is adequate?

			7	24
1	2	3	4	5

8. Could you give a note to the first examiner? (0 = bad, 5 = excellent)

		1	8	20
1	2	3	4	5

9. Could you give a note to the second examiner? (0 = bad, 5 = excellent)

		2	5	22
1	2	3	4	5

Appendix 7 Statistics over 5 years

	Lisbon 2018	Amsterdam 2017	Copenhagen 2016	Berlin 2015	Istanbul 2014
#Applicants	89	77	100	80	No data
# Candidates Participating	74	62	69	63	61
Written examination	(psychometric data)				
Mean P-value	.65	.66	.67	.67	.64
KR20 value	.91	.86	.91	.88	.89
Passing limit	50%	51%	45%	67%	54%
Oral examination	(scores 1-20 transformed to a 0-100 scale)				
90-100	14%	22%	15%	21%	NA because of a different type exam
80-90	30%	31%	20%	30%	
70-80	25%	11%	18%	16%	
55-70	22%	21%	34%	22%	
<55	9%	15%	13%	11%	
Final results	(combined written/oral transformed to a 0-100 scale)				
90 – 100	1%				
80 – 90	19%	18%	14%	5%	10%
70 – 80	32%	37%	42%	33%	21%
60 – 70	22%	21%	20%	17%	39%
55 – 60	12%	18%	13%	32%	23%

40 – 55	14%	6%	7%	13%	7%