



CKJ REVIEW

The European Certificate in Nephrology: towards harmonization and excellence in training

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ABSTRACT

Nephrology is a young medical specialty that has evolved and expanded during the last 4 decades of the past century, becoming recognized as one of the most innovative and challenging medical specialties. The training of nephrology takes place mainly in public hospitals, and there are important variations in the duration and assessment of training among the European countries. The Union of European Medical Specialties (UEMS) Renal Section and the European Renal Association-European Dialysis and Transplant Association have been working jointly since 2010 to harmonize European nephrology training and more recently to establish the European Certificate in Nephrology (ECN). The first two editions of the ECN were held in early 2017 and 2018. In total, 122 candidates from 26 countries have sat for the exam, with a success rate of 59% (72/122). To date, Switzerland has adopted the exam as their national training assessment and we expect that other countries will join Switzerland in the near future. Fostering the development and importance of the ECN requires that member states work to increase the academic and professional profile of the ECN within their countries. The ECN should be considered a 'quality mark' and a sign of high achievement in nephrology training in Europe. If holding the ECN becomes advantageous for employment or improving scientific careers, the number of candidates will increase and the sustainability of the ECN will be guaranteed. A recent, positive development is the pre-agreement between the UEMS Renal Section, UK Renal Association and Royal Colleges of the UK to adopt a unique pan-European exam beginning in 2020. However, any decision to commence the pan-European exam will depend, in part, on strong candidate enrolment for the ECN 2019 edition. Thus support of the national societies is crucial for the sustainability and growth of a European exam, because of their capacities to influence strategic policies in hospitals, universities and medical associations, with a longer-term aim to increase the professional recognition of the European exam.

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CURRENT STATUS OF NEPHROLOGY TRAINING IN EUROPE

Nephrology is a relatively young medical specialty, born in the past century, based mainly on advancing the understanding of renal morphology, histology and physiology [1–6]. Between 1960 and 1970, a number of internationally recognized hospitals established training programmes in nephrology with dedicated 2–3 year nephrology-specific tutoring, which followed a period of 1–3 years of training in internal medicine. The European Renal Association–European Dialysis and Transplant Association (ERA–EDTA) was founded in 1964. In 1958 the Union of European Medical Specialties (UEMS) was founded and 4 years later the specialist sections were created with the aim of coordinating and harmonizing training in the different medical specialties. However, it was not until 1993 that the UEMS Renal Section was established.

For >4 decades, interest in nephrology expanded and flourished, becoming one of the most attractive and innovative areas of clinical medicine. However, since the turn of the century there has been a worldwide, progressive decline in interest in nephrology as a career choice. The UEMS Renal Section is working to better understand the causes of these negative sentiments towards the specialty in Europe to identify the

responsible factors that can be modified to enable us to promote and ignite interest in the specialty of nephrology as a career choice. European Union (EU) directives mandate that a specialist in one state be recognized as such in all states. However, there remains substantial variation in the breadth and quality of training of the nephrology workforce, which takes place mainly in public hospitals across the EU. Multiple systems of governance over nephrology specialist training exist. There is no systematic approach on how to evaluate the quality of teaching of nephrology and there are no universal guidelines on the assessment of nephrology training centres and evaluation of trainees' skills.

Not all countries have a mandatory examination, although many have a system of peer review. In both the UK and Ireland, national colleges oversee the implementation of uniform training schemes in hospitals across the country. In France and Belgium, each university directs its own nephrology scheme and is answerable, ultimately, to the relevant government ministry [7]. The UK, Denmark and The Netherlands have adopted competency-based education programmes. Competency-based postgraduate training can bridge the gap between theory and clinical practice [8]. A similar strategy has been adopted recently in Spain [9]. Using this approach, competence is defined by focusing on the observation of critical clinical activities, and multiple competencies are assessed from serial observations of various activities rather than abstract definitions of competences [8, 9].

It is generally agreed that nephrologists should have a sound basic training in general internal medicine and that countries organize their training programme accordingly. However, there is significant dissimilarity in the length of internal medicine training programmes, ranging from 0 to 5 years across the EU (Table 1). The duration of nephrology training is also highly variable, ranging from 2 to 4 years, with an average of 3.1 years [7].

The UEMS Renal Section has recently published guidelines outlining the recommended minimum common framework for harmonization of training in nephrology in the EU [10]. It is challenging to produce universal recommendations, yet this programme was developed following widespread consultations among the nephrology community across member states. They include a minimum of 2 years in general medicine training, with 6 months nephrology experience desirable, prior to entering a training programme. Nephrology training should be of 3–4 years duration in a recognized teaching hospital, of which at least 3 years should be in clinical nephrology. It is also desirable that trainees undertake a period of structured research, although it is recognized that a more substantial period of research may be undertaken later.

It is recognized that excellent teaching and mentoring are among the most important factors for the satisfaction of nephrology fellows in training [11]. Thus each programme should have a named trainer who is responsible for the programme and a written record should be maintained and regular appraisals of the progress should be made by the trainee. The curriculum is suggested to include the following: (i) manifestations and pathophysiology of renal disease, acute kidney injury and chronic kidney disease; (ii) renal replacement therapies and end-of-life care; (iii) knowledge of the major randomized controlled trials and guidelines in the fields of nephrology, dialysis and transplantation and (iv) procedural skills including renal

Table 1. Training years after registration to attain higher specialty certification in nephrology based on a survey of countries represented at the UEMS Renal Section 2015

Country	Total years after registration	General years	Nephrology
Austria	6	3	3
Belgium	6	4	2
Bosnia and Herzegovina	5	3	2
Bulgaria	4	1	3
Croatia	5	3	2
Czech Republic	4	0	4
Denmark	7	3	4
Estonia	4	0	4
Finland	6	3	3
France	4	2	2
Germany	6	3	3
Greece	6	2	4
Hungary	6	2	4
Ireland	6	2	4
Israel	6	4	2
Italy	4	1	3
Kosova	5	2	3
Montenegro	7	5	2
Netherlands	6	4	2
Norway	6.5	3.5	3
Portugal	5	1	4
Romania	4	2	2
Slovakia	6	2	4
Slovenia	6	2	4
Spain	4	1	3
Sweden	5	2	3
Switzerland	6	3	3
Turkey	7	4	3
UK	7	4	3

ultrasound, renal biopsy and insertion of central venous catheters. The necessity to acquire competence in procedural skills is a matter of ongoing debate within the nephrology community [12]. Which procedures nephrology fellows learn and how they should be attained remains an open question that needs further discussion. However, we must ensure that those who complete training are highly skilled, with expertise that distinguishes nephrologists from other specialties, capable of providing optimal outcomes for patients with kidney disease.

TOWARDS HARMONIZATION AND FEWER BARRIERS: THE ECN

As mentioned previously, the UEMS Renal Section and the ERA-EDTA have been working jointly since 2010 to harmonize European nephrology training [10, 13]. The most recent enterprise, with the collaboration of the Federation of the Royal Colleges of the UK and the UK Renal Association, has been the establishment of the ECN. The ECN should ensure that free movement of labour across Europe does not compromise the highest standards of medical care. The first edition of the ECN was in 2017, sharing the same format, and most of the content, of the Specialty Certificate in Nephrology (SCE), developed in the UK in 2009 as a requirement to achieve certification as a renal specialist.

Comprehensively covering the field of nephrology, the examination is designed to test the expected knowledge of a newly qualified specialist and should be taken towards the end of specialty training. However, it is acknowledged that many trainees will consider sitting for the exam at earlier stages of training. The exam does not aim to test detailed subspecialist knowledge, but requires practical knowledge, problem-solving ability and clinical judgement related to what a general nephrologist should be familiar with. The original curriculum was written by the Joint Royal Colleges Training Board, oriented towards practicing clinicians, and is available at <https://www.jrcptb.org.uk/documents/2010-renal-medicine-amendment-2012>.

A recent *NDT Digest* report provides complete information about the exam with some good advice regarding how to be successful [12]. In brief, the exam consists of two papers of 3-h duration, each comprising 100 extended matching multiple choice questions (the best of five possible choices); there is no negative marking, questions are in English and many of them are based on opinion and best judgement.

The exam is produced following a well-structured and detailed process that involves three groups: the question-writing group, the exam board and the standard-setting group. The question-writing group consists of peer-trained nephrologists (UK and European) who write and review the questions. Five European representatives selected by the UEMS Renal Section and the ERA-EDTA attended the question-writing group in 2017 and 2018. Questions are entered into a question bank from which the exam questions are drawn. In a second step, the exam is reviewed by the exam board, which has two representatives from the UEMS Renal Section. The exam is edited and then reviewed again by the standard-setting group. The blueprint, which determines the distribution of questions, is available at <https://www.mrcpuk.org/sites/default/files/documents/SCE%20Nephrology%20Blueprint%202014%20Final%20.pdf>.

The standard-setting group, which includes two European representatives, reviews the papers, determines that all questions are suitable and sets the pass mark. The pass mark is derived by the modified Angoff method [14, 15], which estimates

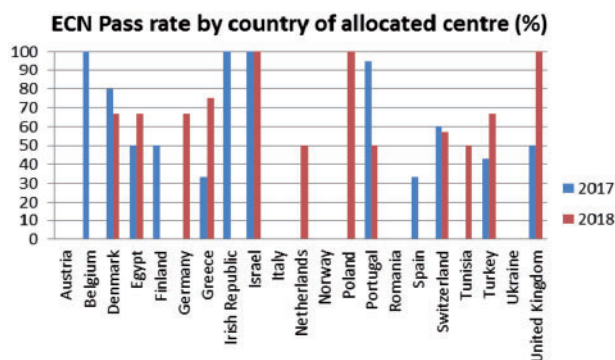


FIGURE 1: Percentage of ECN pass rate by country.

what proportion of just passing candidates will answer the question correctly. A *post hoc* correction of the pass mark is applied using the Hofstee compromise [16] and then the final pass mark is calculated. For more details visit <https://www.mrcpuk.org/mrcpukexaminations/results/exam-pass-marks>.

The UEMS Renal Section published the 'Updated program for harmonization of training in nephrology in the EU' [8], which gives information on the range of knowledge needed for the exam. Although there are no specific courses to prepare for the ECN, more information about useful resources to prepare for the exam, such as the 'Advanced Nephrology Course', can be found in a recent publication [12]. Registration for the exam is currently 6–7 weeks, typically between the end of October/early November and the beginning of December. For the 2019 ECN, registration will be from 7 November to 5 December 2018 and the exam will take place on 27 February 2019.

FIRST TWO EDITIONS OF THE ECN: RESULTS AND REFLECTIONS

The first two editions of the ECN were held in early 2017 and 2018. In 2017, the exam was taken by 77 candidates from 19 countries, of whom 44 were successful and in 2018 by 45 candidates from 17 countries, 28 of whom were successful. The pass rate and passing numbers by country are detailed in [Figure 1](#) and [Tables 2 and 3](#).

Several logistical difficulties were encountered in the first 2 years of the exam, mainly related to the availability of examination centres. For example, due to the large number of applicants, several candidates from Lisbon were allocated examination centres in Porto in the first year.

Exam candidates were surveyed after each exam. For the 2017 exam, the majority of candidates (68.4%) heard about the exam from their national society ([Figure 2](#)), with colleagues, conferences and training bodies being the other sources of information. About 38% of respondents stated that they sat for the exam, as it would reflect a good benchmark of their knowledge, while 35% felt that success in the exam would help to advance their career.

About 35% of survey respondents felt that the exam was too difficult, with the remainder stating that the exam was difficult but fair, or exactly of a standard that they had expected. The results were similar for those who responded to the survey in 2018. When asked whether the exam was relevant to their clinical practice, 74% of respondents agreed or strongly agreed, with only a small percentage strongly disagreeing with this statement. The online application system was deemed satisfactory

Table 2. Passing and sitting numbers by country

Country	2017			2018		
	Fail	Pass	Total	Fail	Pass	Total
Austria	1	0	1			
Belgium	0	1	1			
Denmark	1	4	5	1	2	3
Egypt	1	1	2	1	2	3
Finland	1	1	2			
Germany	1	0	1	1	2	3
Greece	8	4	12	1	3	4
Irish Republic	0	1	1			
Israel	0	1	1	0	1	1
Italy	2	0	2			
Netherlands				1	1	2
Norway	1	0	1			
Poland				0	1	1
Portugal	1	19	20	4	4	8
Romania	1	0	1			
Spain	4	2	6	2	0	2
Switzerland	4	6	10	3	4	7
Tunisia	1	0	1	1	1	2
Turkey	4	3	7	2	4	6
Ukraine	1	0	1			
United Kingdom	1	1	2	0	3	3
Total	33	44	77	17	28	45

Table 3. Pass rates of the ECN

Year	Pass mark (%)	Pass rate all candidates (%)
2018	62.1 (123/198 questions)	62.2 (28/45 candidates)
2017	60.1 (119/198 questions)	57.1 (44/77 candidates)

by 96% of applicants, and respondents were, on the whole, positive about the exam venue (apart from the exceptions mentioned earlier). Conversion charts (for SI to traditional units) were introduced for the 2018 exam. About 57% of candidates used the charts, of whom, 50% found them to be useful.

ROLE OF THE UEMS, ERA-EDTA AND NATIONAL SOCIETIES IN THE SUSTAINABILITY OF THE ECN

So far, after two editions of the ECN, 122 candidates from 26 countries have sat for the exam, with 72 (59%) having passed. While the numbers taking the exam in 2018 were more modest, the numbers taking the exam in 2017 exceeded initial expectations. On reflection, the exam was promoted more widely in the first year. In order to attract sufficient candidates to the exam, a robust promotional strategy has been designed by the UEMS Renal Section and this article is part of it. Of greater importance, however, is to make the exam more relevant to European nephrology trainees. To date, Switzerland has adopted the exam as their national training assessment; we expect in the near future that other countries will join Switzerland, as it is felt that

Where did you hear about the ECN Examination?

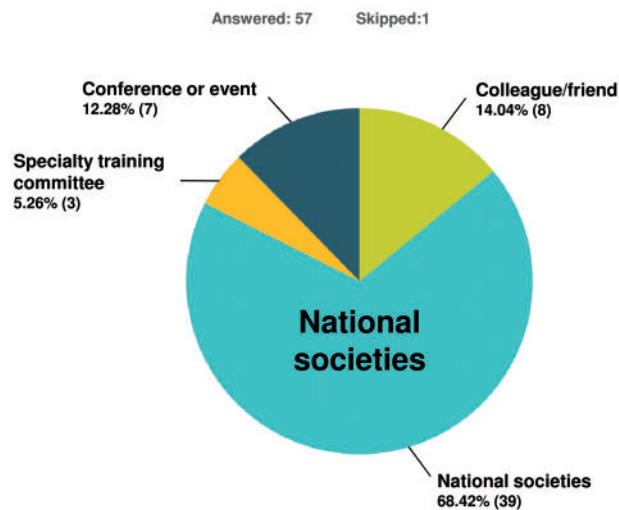


FIGURE 2: Sources of information about the ECN according to the answers of the nephrologists who sat for the ECN exam in 2017.

promoting the exam to national training bodies is the best way to ensure the exam flourishes.

Another important aspect is to increase the academic and professional recognition of the ECN at the national level to have it recognized as a 'relevant merit' and a sign of high-quality training in nephrology to be used for obtaining professional career advantages in the hospital or university environment. It is crucial that the national societies work in this direction, with the idea of promoting the ECN as a mark of excellence that will be useful to obtain better professional positions.

The ERA-EDTA and the national societies play a key role in obtaining these achievements. As stated previously, according to the responses from the 2017 survey, more than two-thirds of the nephrologists who sat for the ECN received information about it through their national societies (Figure 2). Furthermore, the involvement of national societies is crucial in another aspect, as in the first two editions of the exam, several societies subsidized young nephrologists, paying or waiving the ECN registration fee and also offered various advantages to successful young candidates.

If the ECN proves advantageous to candidates securing employment or advancing scientific careers, then the number of candidates will increase and the sustainability of the ECN will be guaranteed. Furthermore, if a national training body adopts the ECN as the mandatory exam at the end of training and can guarantee a regular stream of candidates on an annual basis, it may be possible to work towards the possibility of translating the exam into that country's language. Another important aspect of the ECN through European and national recognition is the possibility that it may become a kind of 'passport' to facilitate the mobility of nephrologists among the European countries. This objective was a priority on the list of the main objectives to achieve when the UEMS Renal Section decided to establish the ECN.

FINAL REMARKS AND THE FUTURE OF THE ECN

A recent positive development is the pre-agreement between the UEMS Renal Section and Boards, the British Renal

Association and the Royal Colleges of the UK to adopt a common pan-European exam in 2020, following the third-pathfinder exam in 2019. The ECN 2019 will be of great importance in deciding the future of the ECN, as the number of registrations in 2019 will provide information about the trend of registrations to ascertain if a pan-European exam would be financially viable. The pan-European exam will unify the current ECN described in this article and the Royal College of Physicians of the UK (RCPUK) specialty certificate exam that has existed since 2009. While the governance of the exam will remain under the RCPUK, the UEMS Renal Section and Boards will have integral roles in the development and delivery of each edition of the exam. If, after the analysis of the results of the ECN 2019, all parties consider that the new initiative will be viable, a new memorandum of understanding will be signed in December 2019, covering a period of 3 years. Therefore success in increasing the number of candidates for the ECN 2019 will play a key role in deciding the future. Two other medical specialties, gastroenterology and endocrinology, signed an agreement in 2018 for a pan-European examination. The support of the national societies in this enterprise is crucial, as they can reach and influence local bodies (hospitals, universities and medical associations) to increase the national professional recognition of the ECN at different practical levels of medical careers.

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CONFLICT OF INTEREST STATEMENT

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REFERENCES

1. Pitts RF (ed). *Physiology of the Kidney and Body Fluids*. London: Year Book Medical Publisher, 1963, 1–234
2. Gottschalk CW. Alexander Schumlansky's *De Structura Renum*. *Am J Nephrol* 1994; 14: 320–324
3. Kinne-Saffran E, Kinne RK. Jacob Henle: the kidney and beyond. *Am J Nephrol* 1994; 14: 355–360
4. Ritz E, Küster S, Zeier M. Clinical nephrology in 19th century Germany. *Am J Nephrol* 1994; 14: 443–447
5. Fogazzi GB, Cameron JS, Ritz E et al. The history of urinary microscopy to the end of the 19th century. *Am J Nephrol* 1994; 14: 452–457
6. Hernando L (ed). *Historia de la Nefrología en España. Antecedentes históricos*. Barcelona, Spain: Pulso Ediciones, 2012
7. Gleeson PJ, Slotki I, Cannata-Andia JB et al. What should the characteristics and attributes of an accredited nephrology training program be? Looking for high standards. *Clin Kidney J* 2016; 9: 23–28
8. Ten Cate O. Competency-based postgraduate medical education: past, present and future. *GMS J Med Educ* 2017; 34: 1–13
9. Arroyo D, Dominguez P, Panizo N et al. A Spanish multicentric study to evaluate the clinical activity of nephrology fellows during in-hospital on-call shifts. *Clin Kidney J* 2013; 6: 556–560
10. Lappin DWP, Cannata-Andia JB. Updated programme for harmonization of training in nephrology in the European Union. *Clin Kidney J* 2013; 6: 116–121
11. Adams ND. Attracting more residents into nephrology. *Clin J Am Soc Nephrol* 2012; 7: 1382–1384
12. Padmanabhan N, Waller D. The European Certificate in Nephrology: What is involved and how to prepare it. *Nephrol Dial Transplant* 2018 (in press)
13. Lane C, Brown M. Alignment of nephrology training with workforce, patient, and educational needs: an evidence based proposal. *Clin J Am Soc Nephrol* 2011; 6: 2681–2687
14. Norby SM. Requirements for procedural skills in nephrology training programs. *Clin J Am Soc Nephrol* 2018; 13: 1096–1098
15. Nedelsky L. Absolute grading standards for objective tests. *Educ Psychol Meas* 1954; 14: 3–19
16. Wyse AE, Babcock B. An investigation of undefined cut scores with the Hofstee standard-setting method. *Educ Meas* 2017; 36: 28–34