ESC European Society of Cardiology

Europace (2021) **00**, 1–4
doi:10.1093/europace/euab181

EDITORIAL

EHRA certification: a 15-year journey of attesting excellence in arrhythmia healthcare

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Received 12 May 2021; editorial decision 24 June 2021; accepted after revision 29 June 2021

The European Heart Rhythm Association (EHRA) is a leading association of the European Society of Cardiology (ESC) with its core mission to mitigate the impact of cardiac rhythm disorders and to improve the quality of life and outcome of affected individuals. The achievement of this mission requires multifaceted actions, focusing among others on education, research promotion, dissemination of scientific information, quality control, and advocacy. Certification has long been considered a principal activity of EHRA aiming to contribute to the delivery of high-quality arrhythmia healthcare and best clinical practice for the patients. This process aims to provide credentials that physicians and allied professionals (APs) meet specific standards of competence in theoretical knowledge and practical experience in two main fields: cardiac electrophysiology and cardiac rhythm devices.[1] This task is delivered through the collaborative work of the EHRA Certification Committee.

Structure of the EHRA certification process

The EHRA Certification for physicians is a two-level process available for either cardiac rhythm devices (ECDS—EHRA Certified Cardiac Device Specialist) or invasive electrophysiology (ECES—EHRA Certified Electrophysiology Specialist). Level 1 Certification is achieved after success in a multiple-choice question (MCQ) exam and lasts for a 10-year period. Candidates who have successfully passed the Level 1 exam can apply for the Level 2 Certification, documenting practical experience in the respective field. They are required to submit a logbook with a prespecified set of performed cases as first operator and letters of endorsement from a supervisor and their National Cardiac Society.

The core of the EHRA Certification process is the written exam which consists of 130 MCQs covering the whole theoretical spectrum of the examined scientific field (electrophysiology or devices). The exam content stems from a large pool of MCQs that is enriched annually with the contribution of the members of the MCQ writing Subcommittee. Quality control of MCQs is of fundamental importance and is ensured at multiple levels (*Figure 1*). MCQ analysis is a rigorous process that takes place after each annual exam using independent statistical feedback. Specific item analysis metrics provide an objective assessment of each MCQ's difficulty level and its ability to discriminate 'low performer' candidates from 'high performer' ones. Identification of low-quality MCQs enables the Certification Committee members to either perform *post hoc* adjustments (e.g. change in the stem or distractors) or to completely eliminate the MCQ from the database. This standard procedure is repeated annually aiming to improve the validity of the exam.

It should also be noted that each year the Standard Setting Subcommittee, formed by more senior members of the Certification Committee, is responsible for setting the pass mark (also known as standard) for each exam. The process of standard setting is not performed arbitrarily but is based on a validated methodology aiming to maximize credibility and ensure defensibility of the process. The subcommittee uses the modified Angoff standard setting approach and every member estimates the proportion of borderline candidates that will answer correctly each MCQ used in the exam.[2] The average of estimates for all MCQs is used to define the respective pass mark.

The accredited certification is valid for a 10-year period. After its completion, candidates can claim recertification by documenting that they satisfy specific criteria which validate their continuing engagement in EHRA educational activities and attendance of the EHRA annual congresses, without the need for any additional written exam. Details about recertification criteria and necessary evidence of continuing medical education in the respective arrhythmia field are available in the EHRA website.

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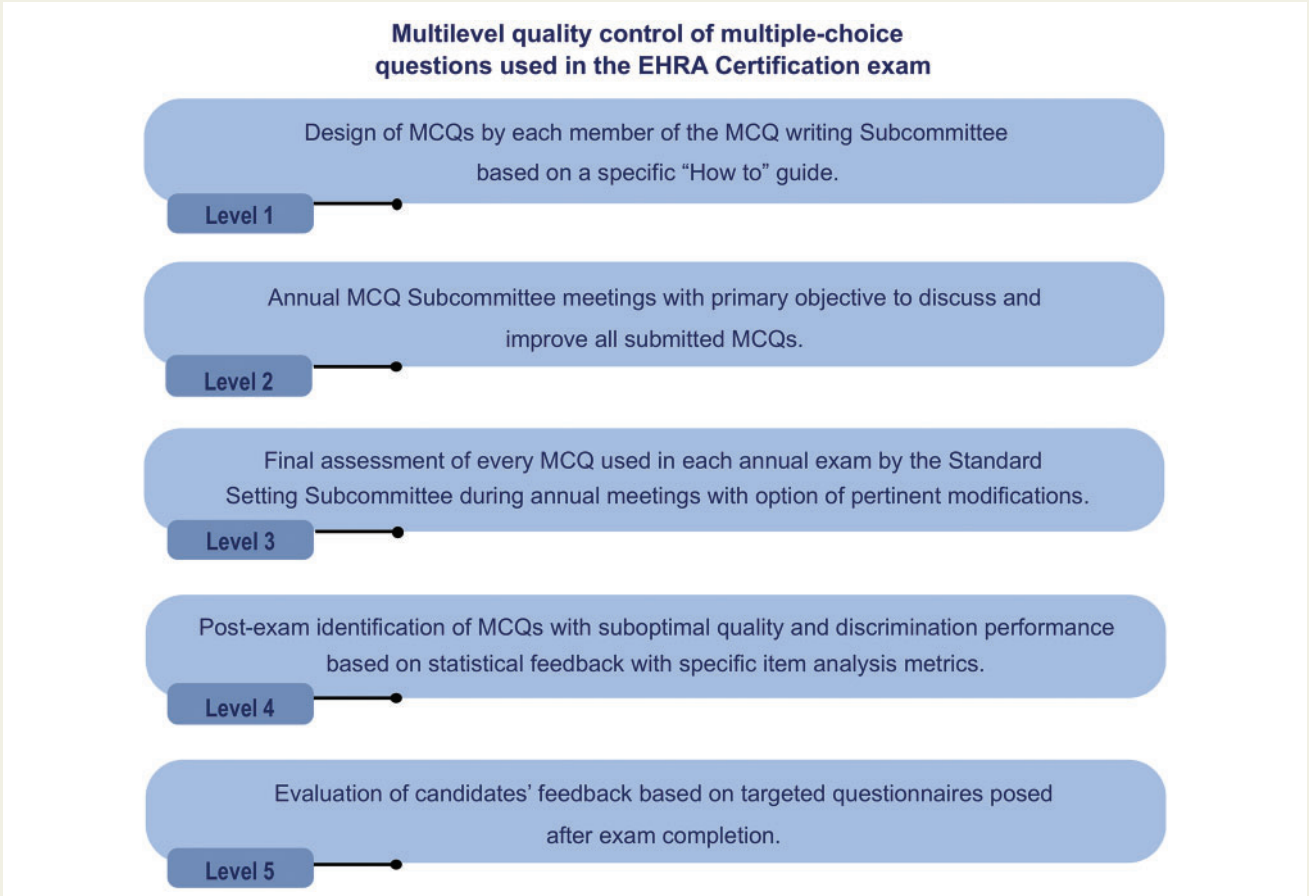

Figure 1 Multilevel quality control of multiple-choice questions (MCQs) used in the EHRA Certification exam.

Current status of EHRA certification

Certification of physicians and APs with a specialized training in arrhythmia healthcare (cardiac devices and/or electrophysiology) differs considerably among ESC member countries. In a few countries, candidates are required to follow a specific national certification process, while in the vast majority of the ESC member countries there is no structured certification program at a national level.[3] The EHRA Certification was developed to bridge these gaps and to provide an homogeneous, high-quality, objective method for competence assessment that harmonizes relevant disparities across ESC member countries. It is noteworthy that countries that have their own national certification for electrophysiology, like Germany, still acknowledge the EHRA Certification as equivalent for achieving national certification.

EHRA Certification was launched in 2005, and until 2020, a total of 1958 physicians have participated in the cardiac device exam and 1235 in the electrophysiology exam. The average success rate is 65% for the cardiac device exam and 62% for the electrophysiology exam. The uptake of EHRA Certification varies considerably among different countries and is related not only to the availability of a national certification process but also on the popularity and the level of promotion of the certification process.[3] The ESC member countries with the highest number of EHRA Certified Level 1 specialists per million of population are presented in *Figure* 2. It is worth noting that the EHRA Certification is particularly popular in countries such as the Netherlands and Switzerland that have adopted it as their national standard.

Recent developments in EHRA certification

Online EHRA certification exam

EHRA Certification was initially introduced as a paper-based exam, while in 2014 its format changed to computer-based, using tablets. All exams were held on-site during the annual EHRA congress. In 2020, EHRA made the transition to an online exam delivery allowing candidates to use their own computer or tablet from their preferred location. This choice was also accelerated by the COVID-19 pandemic. Live online exam proctoring based on artificial intelligence-based technology and behaviour analysis maximizes security and ensures the exam credibility. In this new format, the Certification exam has been made more accessible, especially for candidates from

Figure 2 Countries with the highest number of Level 1 EHRA Certified Cardiac Device Specialists (ECDS) and EHRA Certified Electrophysiology Specialists (ECES) based on the number of successful candidates per million of country population. The absolute number of certified specialists is also reported.

non-European countries, due to its flexibility and convenience, with very good feedback from the participants and the members of the EHRA Certification Committee.

Electrophysiology exam for allied professionals

The EHRA Certification for APs was launched in 2011 and until now 666 candidates have participated with a success rate of 62%. The EHRA Certification for APs has only focused on cardiac rhythm devices, leading to the award of EHRA Certificated Cardiac Device Specialist Allied Professional (ECDSAP) after a written exam, without the need for any logbook assessment. The exam is conducted in different languages (e.g. Dutch, Italian) depending on demand. However, the AP community is diverse, with significant variation in the professional background of participants. In an attempt to render the certification exam more relevant and attractive to APs engaged professionally only in electrophysiology, the EHRA Board decided to launch a new certification exam for APs focused on cardiac electrophysiology, starting from 2021. The newly introduced type of exam is expected to further enhance the popularity of the EHRA Certification in the AP community and to facilitate the adoption of the certification exam by healthcare industries who can use it as a marker of the highest standard of competence for their technical engineers.

EHRA-LAHRS collaboration in certification

EHRA activities have always been characterized by extroversion, with an open mind for collaboration with other societies. In this context, EHRA and Latin American Heart Rhythm Society (LAHRS) recently agreed upon a collaboration for the development of the '*EHRA Certification exam in invasive cardiac electrophysiology provided by LAHRS*'. LAHRS representatives have been included in the EHRA Certification Committee with supplementary role to translate the exam content for the LAHRS exam in Portuguese and Spanish. This collaboration is expected to further increase the popularity of the EHRA Certification process in Latin American countries and to strengthen the bonds between the two associations.

Conclusion and future perspective

The EHRA Certification has completed a 15-year journey pursuing the task of validating proficiency of physicians and APs in specific fields of arrhythmia healthcare. The certification process has reached its current

high standards owing to the long-term contribution and teamwork of well-respected members of the EHRA community that served voluntarily the Certification Committee's tasks across these years. Recent developments constitute a leap forward further improving the process of the EHRA Certification, cementing its role as principal method of certifying competence, and setting the stage for its adoption as the national standard in most member countries of the ESC and beyond.

Acknowledgements

We would like to acknowledge the invaluable contribution of the EHRA and ESC staff in this long EHRA Certification journey, with particular reference to Stephanie Thibault, Vanessa Meyen, and Svya Palayan.

Conflict of interest: none declared.

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