

The new ESC core curriculum for cardiology: implications for revision of the Swiss cardiology training programme

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Introduction

The European Society of Cardiology (ESC) has published several versions of the core curriculum for general cardiology during the last 20 years. The current version was published in 2020 and was considered necessary for several reasons: (a) cardiological knowledge has changed as a result of intense research activities, (b) new skills are required owing to new devices and interventions, and (c) there are increasing demands on assessment of competencies in the clinical context. Therefore, the current version of the ESC core curriculum offers an updated content, and a focus on clinical competencies and their assessment in the clinical context [1].

The 2020 version of the core curriculum was developed within 18 months by a task force specifically composed for this purpose. The nucleus of the task force consisted of 10 members recruited from the ESC education committee, and the extended task force included a total of 90 individuals from ESC education committee, the ESC board, ESC associations, national cardiac societies from countries participating in the European Examination in Core Cardiology (EECC), trainees and patients. The large number of participants with different professional profiles ensured that the content of the core curriculum reflects current clinical cardiology. Consensus was reached by several interactive feedback rounds (Delphi process) performed via online surveys, and communicated via email exchange and teleconferences.

Entrustable professional activities

Whenever we are involved in the training of a young colleague, we observe the progress shown by the trainee and pay particular attention to how the trainee approaches the patient, evaluates the clinical problem, and develops a diagnostic strategy and a therapeutic line of action. The trainer develops an increasing degree of trust in the professional competencies the trainee has acquired and as a result al-

lows the trainee increasing professional independence. Although this process is ubiquitous in training institutions, it often remains subconscious and the involved individuals are not aware of it. Entrustable professional activities (EPAs) represent a formalised approach for considering and including trust in training [2].

An EPA is a unit of professional practice a trainee can perform in an independent manner at some stage of training. In analogy, it describes what a fully trained professional does independently in clinical practice. Hence, it describes a unit of professional practice and defines the knowledge, skills, attitudes and professional roles required for its execution (fig. 1).

It also determines the level of independence the trainee should reach during training (fig. 2). As a result of these properties, EPAs are ideal for assessing the professional skills of a trainee in the clinical context. To complete an EPA successfully means that the trainee has reached an adequate level of clinical competence and the trainer has developed sufficient trust in the trainee to let the latter execute the clinical activity in an independent manner.

Each individual shows a different learning curve, mainly relative to other trainees, but also with regard to diverse competencies. As a result of this inter- and intraindividual variability, each trainee requires a different number of procedures for reaching the expected level of independence [3]. Therefore, it is now generally accepted that training programmes should not rely on numbers of procedures in a rigid manner; modern programmes should instead consider the individuality of learning by focusing on competence levels. As this is exactly what EPAs offer, they represent an excellent method for solving the issue of individual learning in training programmes.

The ESC core curriculum is thus based on EPAs for several reasons: (a) they focus on clinical competencies in a practical setting, (b) they respect the different learning curves of individual trainees, and (c) they provide a framework for holistic assessments of trainees in the clinical context.

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ESC core curriculum

The ESC core curriculum consists of nine chapters. Chapters 2 to 9 each cover a major topic of current cardiology, whereas chapter 1 has a more general content. It is devoted to the cardiologist in the wider context and blends into all the other chapters because it defines the different professional roles a cardiologist should be able to adopt in clinical practice.

Figure 1: All 62 EPAs in the ESC core curriculum share a common structure. The clinical competence is defined in the title and specified in the description. The CanMEDS Roles required for being competent are given as well. This is followed by the knowledge, skills, and attitudes the trainee should possess to perform the professional activity. Tools are suggested for the assessment of each professional activity. Each EPA also indicates the level of independence a trainee is expected to reach when training is completed. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.

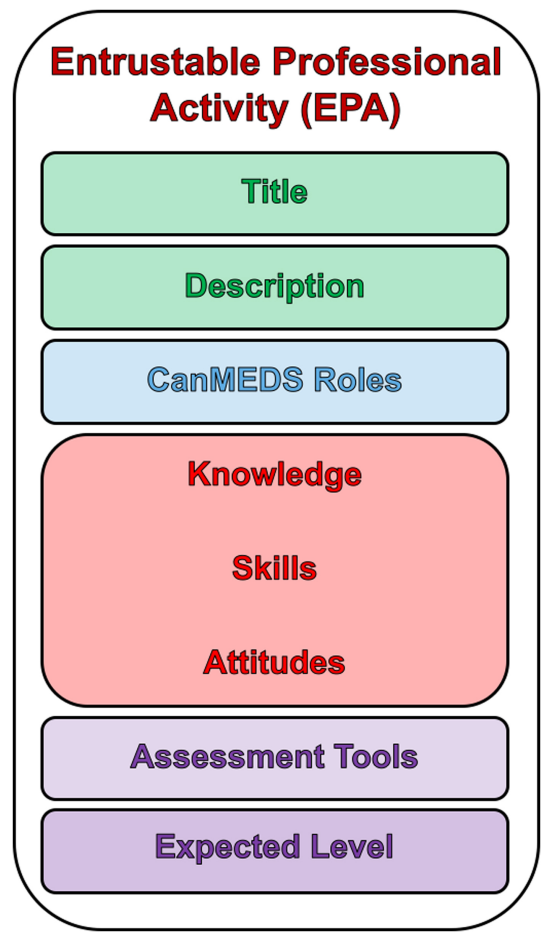
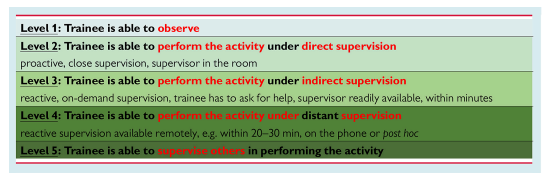


Figure 2: Five different levels of independence defined for a professional activity. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.



These professional roles have been defined by the Canadian Medical Society in the CanMEDS Physician Competency Framework, which has been adopted by the ESC in the new core curriculum [4]. Each EPA refers to this important general chapter by indicating the CanMEDS roles required to execute the clinical competence defined by the EPA (fig. 3).

The core curriculum contains a total of 62 EPAs distributed over chapters 2 to 9. These EPAs define the competencies the general cardiologist without subspecialisation should acquire during training in order to work as an independent professional in clinical practice. It is essential that not all of these professional activities need to be mastered at the same level of independence; the levels rather represent the current activities of the general cardiologist and are an important instrument for defining the profession of the general cardiologist as opposed to that of the subspecialised cardiologist. Therefore, the independence level is indicated for each EPA as it is appropriate for the clinical activities of the general cardiologist (fig. 4).

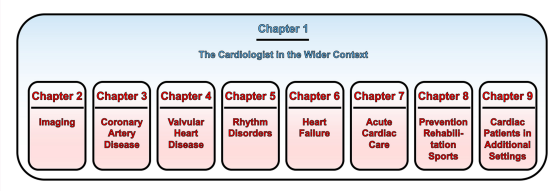
Implications for training and assessment

EPAs focus on professional skills but also integrate knowledge and attitudes. Because of this profile, EPAs are suitable for assessing trainees in a clinical context. EPAs should be performed repetitively in clinical situations of various complexity, as this allows which level of independence the trainee has reached to be documented, providing information on the individual stage of training. Because EPA-based assessments reveal the weak spots in the professional activities of a trainee, they facilitate the shaping of further training by generating the evidence required for fulfilling individual training needs (fig. 5).

Although EPAs include knowledge and attitudes, they focus on skills and thereby the application of knowledge and attitudes. Hence, EPAs cannot replace a knowledge-based written examination, and it is recommended that the European Examination in Core Cardiology is combined with EPAs in a training programme. Similarly, the attitudes a trainee shows in clinical practice should ideally be assessed specifically, with multi-source feedback (fig. 6).

Application of EPAs in a training programme is expected to increase the awareness of both trainee and trainer of the current status and specific needs of the trainee [5]. The trainee is exposed to the greater aim of becoming an independent professional from the very beginning of the train-

Figure 3: The ESC core curriculum consists of nine chapters. The professional roles of the cardiologist – based on the CanMEDS framework – are described in chapter 1 and are all represented, to a variable extent, within each EPA of chapters 2–9. The EPAs are arranged in eight chapters (chapters 2–9), which reflect the major clinical topics in current cardiological practice. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.



ing programme, which will increase the trainee’s motivation to strive for independence by acquiring knowledge and skills and by initiating assessments in the clinical context. The trainer is expected to take responsibility for the competence level of the trainee rather than the number of procedures performed during training, which will enhance the trainer’s interest in an effective progress and true competence of the trainee (fig. 7).

Figure 4: Each Entrustable Professional Activity (EPA) is assigned an expected level of independence from level 1 to level 5: 1. Observe - 2. Direct supervision - 3. Indirect supervision - 4. Distant supervision - 5. Able to teach (no supervision). From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.

EPA	Level of Independence				
	1	2	3	4	5
2. Imaging					
2.1. Assess a patient using one or multiple imaging modalities					
2.2. Assess a patient using echocardiography					
2.3. Assess a patient using cardiac magnetic resonance					
2.4. Assess a patient using cardiac computed tomography					
2.5. Assess a patient using nuclear techniques					
3. Coronary artery disease					
3.1. Manage a patient with symptoms suggestive of coronary artery disease					
3.2. Manage a patient with acute coronary syndrome					
3.3. Manage a patient with chronic coronary syndrome					
3.4. Assess a patient using coronary angiography					
4. Valvular heart disease					
4.1. Manage a patient with AR					
4.2. Manage a patient with AS					
4.3. Manage a patient with mitral regurgitation					
4.4. Manage a patient with mitral stenosis					
4.5. Manage a patient with tricuspid regurgitation					
4.6. Manage a patient with tricuspid stenosis					
4.7. Manage a patient with pulmonary regurgitation					
4.8. Manage a patient with pulmonary stenosis					
4.9. Manage a patient with multivalvular disease					
4.10. Manage a patient with a prosthetic valve					
4.11. Manage a patient with endocarditis					
5. Rhythm disorders					
5.1. Manage a patient with palpitations					
5.2. Manage a patient with transient loss of consciousness					
5.3. Manage a patient with atrial fibrillation					
5.4. Manage a patient with atrial flutter					
5.5. Manage a patient with supraventricular tachycardia					
5.6. Manage a patient with ventricular arrhythmias					
5.7. Manage a patient with bradycardia					
5.8. Manage a patient with a cardiac ion channel dysfunction					
5.9. Manage a patient with a pacemaker					
5.10. Manage a patient with an ICD					
5.11. Manage a patient with a CRT device					
6. Heart failure					
6.1. Manage a patient with symptoms and signs of heart failure					
6.2. Manage a patient with heart failure with reduced ejection fraction					
6.3. Manage a patient with heart failure with preserved ejection fraction					
6.4. Manage a patient with acute heart failure					
6.5. Manage a patient with cardiomyopathy					
6.6. Manage a patient with pericardial disease					
6.7. Manage a patient with right heart dysfunction					
6.8. Manage a patient with a cardiac tumour					
6.9. Manage cardiac dysfunction in oncology patients					
7. Acute cardiovascular care					
7.1. Manage a patient with haemodynamic instability					
7.2. Manage a patient with survived cardiac arrest					
7.3. Manage a critically ill cardiac patient					
7.4. Manage a patient after a percutaneous cardiovascular procedure					
7.5. Manage a patient after cardiac surgery					
7.6. Manage end-of-life care in a cardiac patient					
B. Prevention, rehabilitation, sports					
8.1. Manage cardiovascular aspects in an athlete (Sport Cardiology)					
8.2. Manage a patient with arterial hypertension					
8.3. Manage a patient with dyslipidaemia					
8.4. Manage cardiovascular aspects in a diabetic patient					
8.5. Manage a cardiac patient in primary prevention					
8.6. Manage a cardiac patient in secondary prevention					
8.7. Prescribe a prevention and rehabilitation programme for a cardiovascular patient					
9. Cardiac patients in other settings					
9.1. Manage a patient with aortic disease					
9.2. Manage a patient with trauma to the aorta or the heart					
9.3. Manage a patient with peripheral artery disease					
9.4. Manage a patient with thromboembolic venous disease					
9.5. Manage a patient with pulmonary thromboembolism					
9.6. Manage a patient with pulmonary hypertension					
9.7. Manage a patient with adult congenital heart disease					
9.8. Manage a pregnant patient with cardiac symptoms or disease					
9.9. Perform a cardiological consultation					

Figure 5: What should be aimed at and avoided by trainers and trainees in the assessment situation. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.

For trainers	
Do's	Don'ts
Define the EPAs that are feasible and relevant for your setting; any clinical situation is an opportunity for an assessment	Don't think you are on your own; share challenges, tips, and tricks with peers
Use the Knowledge/Skills/Attitudes section of the EPAs as a resource for specific feedback	Don't use the Knowledge/Skills/Attitudes section as a checklist
Integrate the assessment real time in your daily work	Don't postpone the assessment
When observing a trainee always look for knowledge and attitudes, not only skills	Don't assess manual/technical skills only
Use your expert judgement to rate the level of the trainee's independence	Don't worry about subjectivity
For trainees	
Do's	Don'ts
Integrate the assessment in the workflow	Don't postpone assessments
Ask your trainer to rate the level of independence for every EPA you perform - and the reason for the level	Don't only ask for ratings in EPAs you are already competent in
Ask all your trainers to rate you at several occasions	Don't only ask for ratings from your favourite trainer
Identify the relevant EPAs for each setting	
Use your EPA profile for driving your learning and completing your competence	
Use Knowledge/Skills/Attitudes section of the EPAs to guide you in your training	

It is to be expected that the number of assessments performed at training institutions will increase when the programmes are based on EPAs. As a consequence, it is important to reduce as much as possible the time required for documentation of assessments. This aim can be achieved by the application of smartphone apps for documentation of assessments and by the transfer of documented assessments in the electronic logbook. It is important to appreciate that an EPA-based assessment has similarities to the well-established “mini clinical evaluation exercise” or the “direct observation of procedural skills”. Furthermore, an EPA-based assessment can be planned if the trainee is particularly interested in a specific assessment or needs to complete the training curriculum, but it can also be performed ad hoc whenever trainee and/or trainer feel that a clinical situation that has just been passing provides a good opportunity for an assessment (fig. 8).

Figure 6: Entrustable professional activities define the knowledge, skills, and attitudes required for the respective clinical competencies. Because of their focus on skills, they are particularly useful for assessments in a clinical context. The latter should be complemented with a knowledge-based examination such as the European Examination in General Cardiology as well as with multi-source feedback. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.

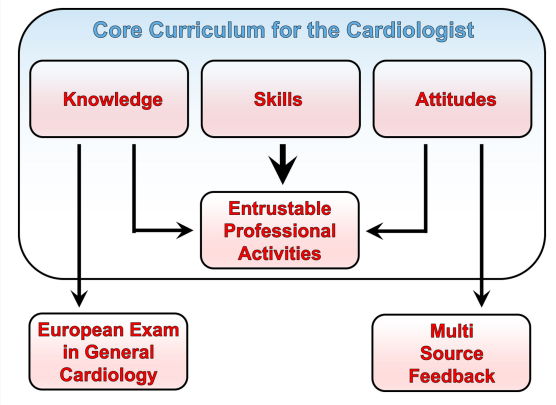
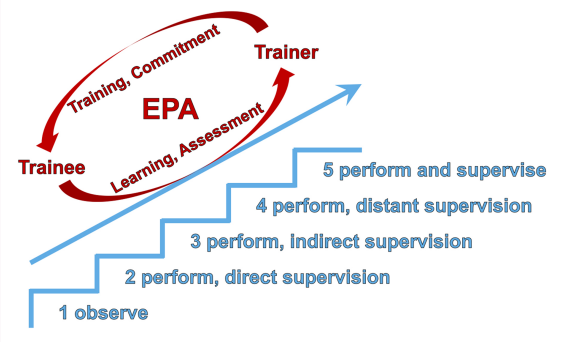


Figure 7: Trainees develop an increasing degree of independence during their training. In parallel, trainers develop increasing trust in the competence of their trainees. This process requires the commitment of both sides involved. Commitment of the trainers to teaching and assessing the trainees is essential since the trainers need to be able to confirm that the trainees can be trusted to perform the professional activities at the expected level of independence. From: Tanner FC, Brooks N, Fox KF, Gonçalves L, Kearney P, Michalis L, et al.; ESC Scientific Document Group. ESC Core Curriculum for the Cardiologist. Eur Heart J. 2020;41(38):3605–92 [1], by permission of Oxford University Press.



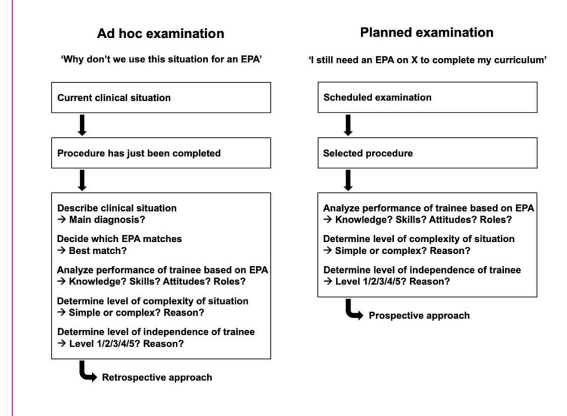
Implications for the current revision of the Swiss cardiology training programme

The Swiss cardiology training programme is currently being revised. This revision aims at updating the content and modernising the concept of the programme. The education committee of the Swiss Society of Cardiology (SSC) is adopting the ESC core curriculum for the revised Swiss cardiology training programme. This has two major reasons. The first is that the SSC adopts all the ESC guidelines; the content of the ESC core curriculum is based on these guidelines and beyond that represents a European consensus based on the input from more than 60 highly qualified contributors. The other reason is that the European Examination in Core Cardiology is mandatory for Swiss cardiology trainees; this examination is now being reorganised according to the new ESC core curriculum. The education committee of the SSC has discussed the intention to adopt the ESC core curriculum for the revised Swiss cardiology training programme with the directors of the Swiss cardiology training centres, as well as the Swiss

Council for Cardiology Practice (SCCP), and this proposal was unanimously accepted recently.

The revised Swiss cardiology training programme will be implemented in two steps. In a first step, the SSC will introduce the content of the revised Swiss cardiology training programme. Trainees will be assessed on the revised content, but this will still be done by “mini clinical evaluation exercise” and “direct observation of procedural skills”. In parallel, however, several pilot training centres will obtain experience in assessing trainees using the EPA system and documenting assessments by a smartphone app developed for the SSC and already available for download. In a second step, the EPA system will be introduced for all the training centres once (a) sufficient experience with regard to both EPA-based assessments and documentation in the smartphone app have been gained and (b) sufficient trainers have been instructed in performing EPA-based assessments. Thus the implementation process will be led by the education committee of the SSC and performed in close collaboration with the training centres.

Figure 8: Assessments are based on the content of the respective EPAs. The latter serve as a framework for the assessments. Any clinical scenario should be used for assessments. This can be achieved spontaneously (ad hoc approach; left panel) or it can be planned (prospective approach; right panel).



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