



EACVI
European Association of
Cardiovascular Imaging

Intro to ESC CMR exam

Preparatory course to certification in CMR

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ESC
European Society
of Cardiology

Disclosures of interest

- **Consultancy, Circle Cardiovascular Imaging, Inc.,
Calgary, Alberta, Canada**

Benefits of certification

- Set a European standard for competency and excellence in CMR acquisition and reporting.
- Brings credibility to individual work. **European certification of CMR competency is not a compulsory or regulatory certificate.** any
- Provide the opportunity to test knowledge against an internationally set standard.
- For all details and most updated information:
 - <https://www.esccardio.org/Education/Career-Development/Certification/Cardiovascular-Magnetic-Resonance>

Levels of certification

As a general overview, the three different levels can be described as follows:

- **Level 1 – to request** a technique/test appropriately
- **Level 2 – to provide** a technique/test independently
- **Level 3 – to teach** a technique/test and lead a service
- More details <https://www.escardio.org/Education/Career-Development/Certification/Cardiovascular-Magnetic-Resonance>

Methods of assessment

A. Theoretical part

- CMR exam (summative assessment)

B. Practical part

- On-site training (formative assessments)
- Continuing medical education (CMR courses)
- Logbook of cases

C. Supporting information

- Good professional standing
- Board certifications and licences
- Advanced Cardiac Life Support (ACLS)

Summary of requirements



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<https://www.esccardio.org/Education/Career-Development/Certification/Cardiovascular-Magnetic-Resonance>

Level 1 = standard recommended within the core curriculum. No specific stipulation for duration or CME but any course advertised as providing “Level 1” training should have a minimum duration of at least 2 full days of timetabled learning (or equivalent) together with case review (n = 50).

Level 2 and **Level 3** certification requires the candidate to be a registered physician, a CMR exam pass and training under a Level 3 (EACVI / SCMR) supervisor (requirements for supervisor status should be carefully checked).

Level 2 requirements: 6 months in total (can be split), 150 cases (max 10% normal), 25 hours of CME (specifically in CMR), logbook within 24 month window, submitted no later than 2 years after exam pass.

Level 3 requirements: 12 months in total (can be split), 300 cases in total (max 10% normal), 50 hours of CME (specifically in CMR), logbook within 24 month window, submitted no later than 2 years after exam pass PLUS evidence of peer recognition:

- a) Faculty lecturer for 2 or more CME courses on CMR (local, national, international)
- b) Invited speaker / chair for 2 or more conferences or meetings on CMR (local, national, international)
- c) Oral presentations of original data at 2 or more CMR conferences or meetings (national or international)
- d) Three or more peer-reviewed publications in the area of CMR (any author)





	Level 2	Level 3 via Level 2	Direct Level 3
Registered physician	Required	Required	Required
EACVI CMR exam pass	Required	Required	Required
Level 2 certification	N/A	Required	Not required
Full-time training	6 months	Additional 6 months (12 months in total)	12 months
Logbook cases number	150	Additional 150 (300 in total)	300
Max. normal cases	10%	10%	10%
Max. from courses / teaching files	20%	20%	20%
Max. from elsewhere	75	Additional 75 (150 in total)	150
Advanced life support	Required	Required	Required
CME hours	25	Additional 25 (50 in total)	50
Additional requirements	None	Peer recognition	Peer recognition
Supervisor's declaration	Yes	Yes	Yes

Practical training

Appropriate institution

- Sufficient volume of cases in the centre (>400/year)
- Appropriate case mix
- Structured CMR training programme

Appropriately qualified trainer

- European (EACVI) or SCMR certification - CMR Level 3

Courses and CME

- Must be exclusively in CMR – check ESC / EACVI website for details
- At least one structured CMR course

Log book



- Anonymised, original CMR studies
- The logbook should only include cases where the candidate has been the primary operator or reporting physician (i.e. the candidate must have performed their own analysis and provided a full written report independently).
- The application for CMR certification together with the logbook must be submitted no later than 2 years after passing the EACVI CMR examination with cases taken from a consecutive 24-month window (from a maximum of two years before up to two years after the date of sitting the exam).
- The candidate must perform/be present during at least 50 (Level 2) or 100 (Level 3) of the cases

Logbook



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Logbook excel file

	A	B	C	D	E	F	G
1							
2							
3							
4	EACVI <small>EUROPEAN ASSOCIATION OF CARDIOVASCULAR IMAGING</small> <small>A Registered Branch of the ESC</small>						EUROPEAN SOCIETY OF CARDIOLOGY®
5							
6	#	Study category	Date of Study dd/mm/yy	Patient's Initials	Study protocol (e.g. Cine, adenosine stress & LGE)	Main diagnosis	Comments (e.g. artefacts, additional findings)
7	1						
8	2						
9	3						
10	4						
11	5						
12	6						
13	7						
14	8						
15	9						
16	10						
17	11						
18	12						
19	13						
20	14						

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Case mix

- Detection of myocardial infarction and assessment of viability
- Stress testing with either vasodilator or staged inotropic stress (at least 25 for Level 2 and 50 for Level 3)
- Left and right ventricular function assessment
- Aortic, mitral, tricuspid, and pulmonary valve pathology
- Aortic pathology including dilatation and dissection
- Common basic CHD and ACHD (such as coarctation of the aorta, post-operative Tetralogy of Fallot, intracardiac shunts, coronary anomalies) (at least 25 cases for Level 2 and 50 cases for Level 3). Adult congenital cases must include assessment of true congenital pathology such as shunts, anomalous pulmonary venous drainage, Fontan circulation, etc. Cases such as hypertrophic cardiomyopathy, bicuspid aortic valve and normal scans will not be accepted in this category.
- Assessment of causation of heart failure
- Assessment of cardiomyopathy phenotype including hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, dilated cardiomyopathy (at least 25 cases for Level 2 and 50 cases for Level 3)
- Pericardial abnormality
- Cardiac mass/tumour; angiography of major arteries including aorta, pulmonary, carotid, and renal.

Formal assessment by trainer

- At discretion of trainer
 - Directly observed procedural skills (DOPS)
 - Case based discussions
 - Other forms of assessment
 - Confirmation of professional standing

Checklist for certification

1. Certificate of European CMR exam
2. Copies of relevant board certifications and licences
3. Signed declaration / checklist from candidate
4. **Signed Supervisor's Declaration**
5. Advanced Cardiac Life Support documentation (or confirmation that life support is part of candidate's routine practice, for example if they practice as an interventional cardiologist)
6. **CMR Logbook**
7. Proof of CME (Continued Medical Education) **exclusively in CMR**:
Level 2: 25 hours (reduced)
Level 3: 50 hours
8. Contact details (postal address, email, telephone)

Steps to run an exam

- **Exam only part of certification process: Publish certification rationale and framework**
- **General tasks to run exams:**
 - Syllabus – published EHJCI
 - Blueprint – ideally validated through a user survey
 - Exam Board (conflict of interest, confidentiality)
 - Wider contributions through question writers
- **Question writing**
- **Question review**
- **Question selection according to Blueprint**
- **Angoff scoring**
- **Exam delivery**
- **Exam analysis: overall metrics, question metrics**
- **Review of questions with poor metrics as Exam Board**
- **Post-exam Angoff scoring – Standard setting**
- **Exam Report**
- **External Examiner**
- **Approval by EACVI Certification Chair**
- **Communication of results with exam candidates**

Published details of Certification requirements



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- <https://www.escardio.org/Education/Career-Development/Certification/Cardiovascular-Magnetic-Resonance>



Syllabus

- <https://www.escardio.org/Education/CMR-Core-Syllabus-for-Certification>

Blueprint

https://www.escardio.org/static-file/Escardio/Education-Subspecialty/Certification/EACVI/Certification/CMR/EACVI_CM_R_BluePrint.pdf

Blueprint



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Topic 1 | **Physics, Safety, Devices, CMR Methodology & Anatomy** | 15-25%

Topic 2 | **IHD** | 15-25%

Topic 3 | **Myocardial, NIHD** | 15-25%

Topic 4 | **Pericardium** | 5-10%

Topic 5 | **Vascular** | 2-5%

Topic 6 | **Valves** | 5-10%

Topic 7 | **Masses, Tumors** | 5-10%

Topic 8 | **CHD, ACHD** | 10-15%

Topic 9 | **Incidental Findings, Extracardiac** | 2-5%

Please note that percentages are only guides and may be subject to change. Questions may also overlap between categories.



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Question Writing

Single Best Answer (SBA) example



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Stem

A 60-year-old man presents with acute onset of confusion and restlessness: he walks with a broad-based gait. On examination there is nystagmus and lateral rectus palsies bilaterally. There is alcoholic fetor.

Lead in Question

The most likely diagnosis would be:

Options

Options:

- A. Alcohol withdrawal
- B. Folic acid deficiency
- C. Subarachnoid haemorrhage
- D. Subdural haematoma
- E. Wernicke-Korsakoff syndrome

Correct answer

Answer: E (Wernicke-Korsakoff syndrome)

Random order of questions, shuffle answer options

Question selection

- **Match to blueprint**
- **By discrimination index/total-item-correlation**
- **By facility index**
- **By previously used (maybe use 20% old questions)**
- **By media content etc.**

New: Exam delivery online!

- Offered anywhere in the world
- Identical in content, format, on-screen experience to previous on-site exams delivered on tablets
- Taken on own device (computer) and monitored by a hum proctor online through ProctorU®



<https://www.proctoru.com/live-plus-resource-center#what>

Tips and tricks, question psychology



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- **The distractor is “almost always” incorrect distractor if you see: ALWAYS, NEVER, ...**
- **If one of the distractors is much longer than the others, this often (but not always) suggests this may be the correct distractor. Examiners are trying to qualify this answer to ensure it is watertight and unambiguous!**
- **If you see typos, grammatical errors in distractors they are less likely to be the correct distractor! Examiners pay less attention to incorrect distractors!**
- **There should be no trick questions!**
- **Your first instinct is often good! If in doubt follow your first instinct.**

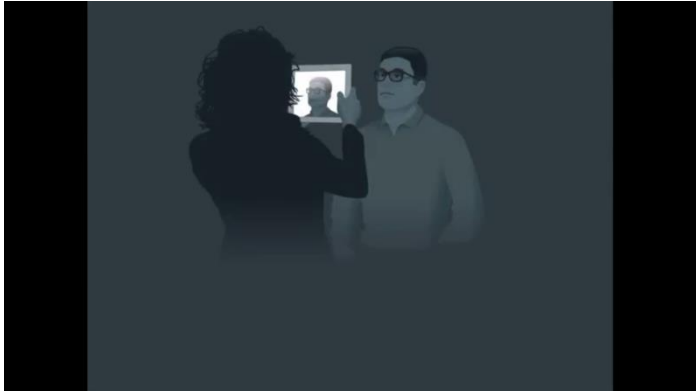
Common errors and pitfalls



- Don't panic – if you think the exam is **VERY** difficult, this is the case for everybody. The passmark is independent of how well other candidates perform. The passmark is determined by the difficulty of the exam!
- If movies do not work, the system crashes etc, don't panic! The exam board have robust ways of accounting for these issues. Just flag them during the exam to the invigilators.
- **If your tablet freezes or crashes, just request help from the invigilators and a new tablet will be provided. All questions you have already answered will be stored on the server so no need to worry!**
- Do not spend too much time on certain questions – pace yourself through the exam, you can easily go back to questions you did not answer.
- Do not try and cheat!

European CMR exam “simulation”

- Check-in



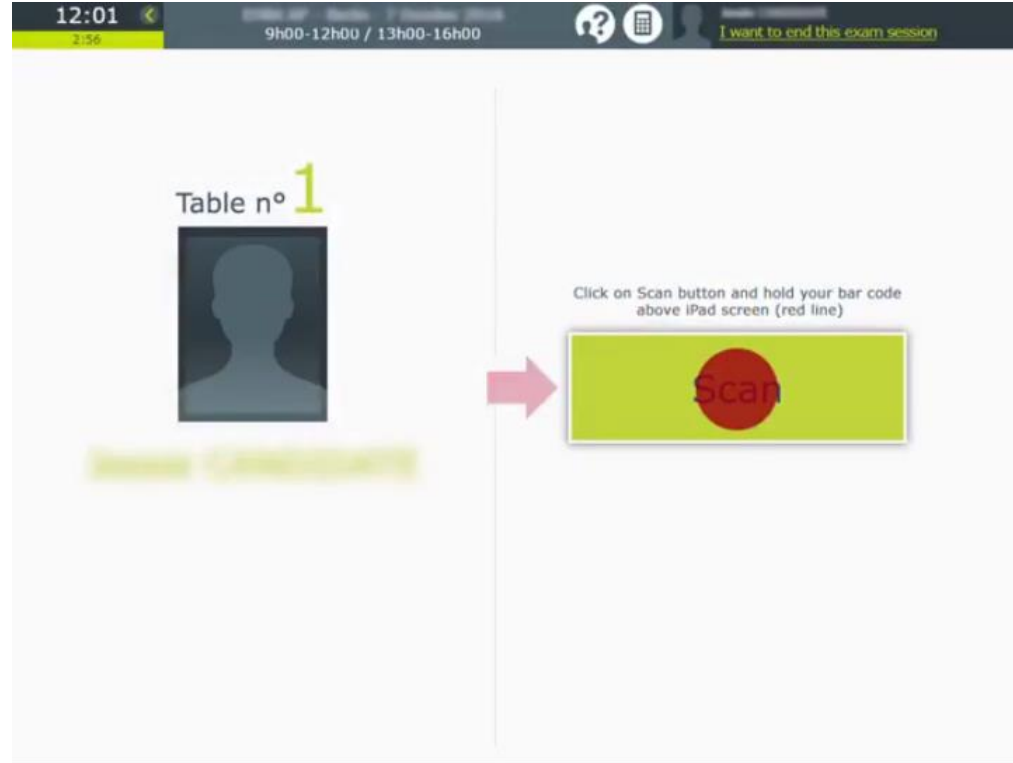
European CMR exam “simulation”

- Candidate’s table



European CMR exam "simulation"

- **Tablet display before starting the exam**



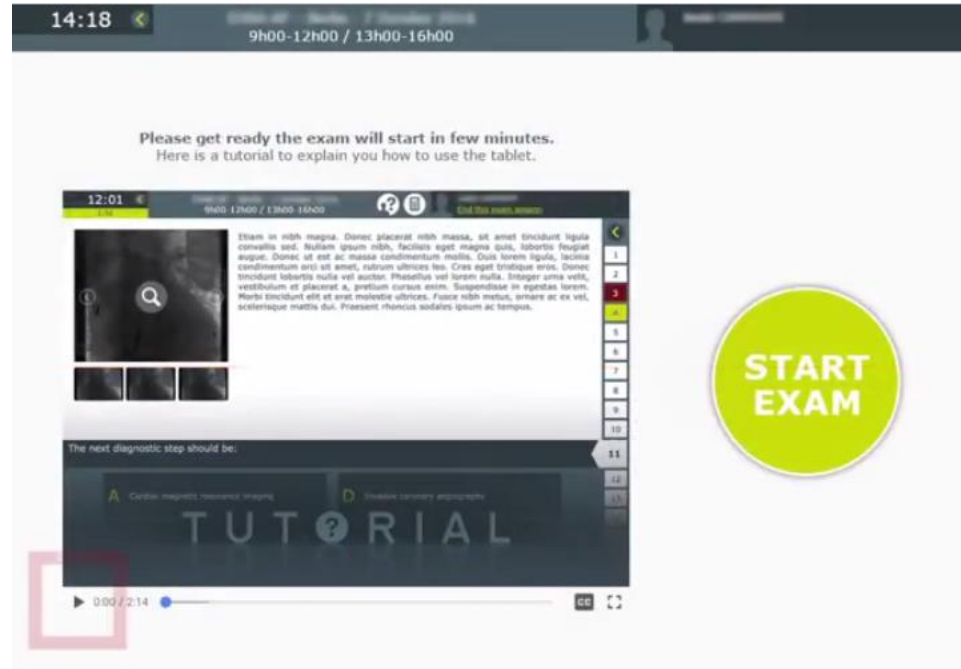
European CMR exam “simulation”

- Scan the bar code



European CMR exam “simulation”

- Visualisation of tutorial starting the exam



14:18

9h00-12h00 / 13h00-16h00

Please get ready the exam will start in few minutes.
Here is a tutorial to explain you how to use the tablet.

12:01

9h00-12h00 / 13h00-16h00

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The next diagnostic step should be:

A Cardiac magnetic resonance imaging

D Prostate coronary angiogram

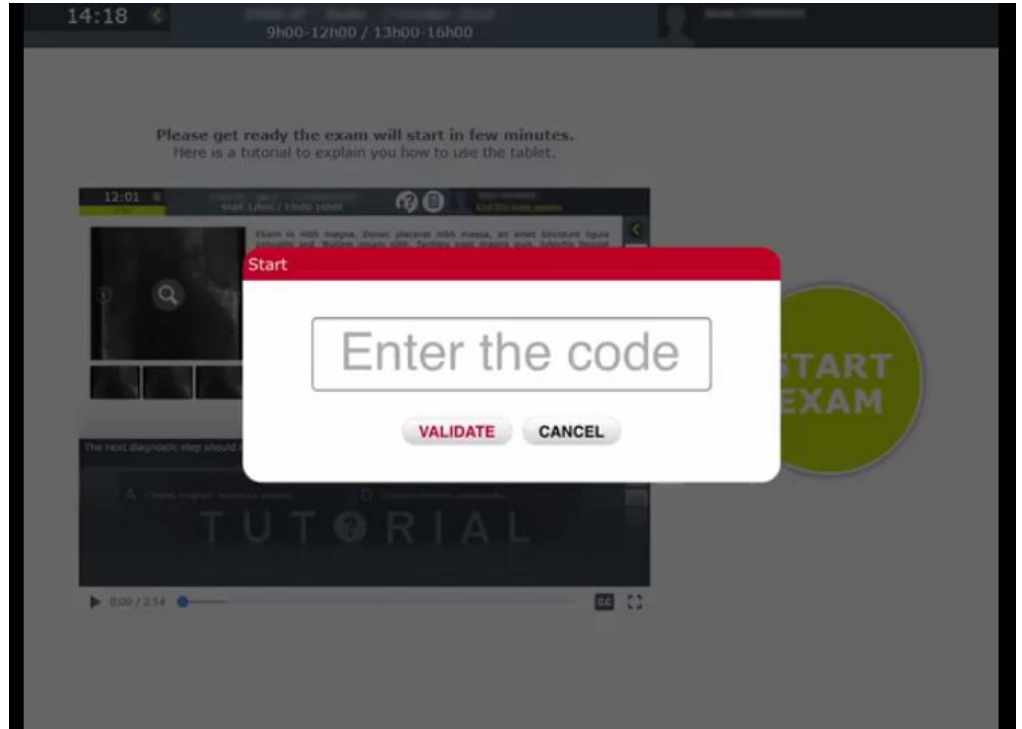
TUTORIAL

0:00 / 2:14

START EXAM

European CMR exam “simulation”

- Click on start exam and enter the exam code provided by the invigilator



European CMR exam "simulation"



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- **Question display**

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The next diagnostic step should be:

- A Cardiac magnetic resonance imaging
- B Dobutamine stress echocardiography
- C Hemodynamic heart catheterisation
- D Invasive coronary angiography
- E Transesophageal echocardiography



Mark question to return later

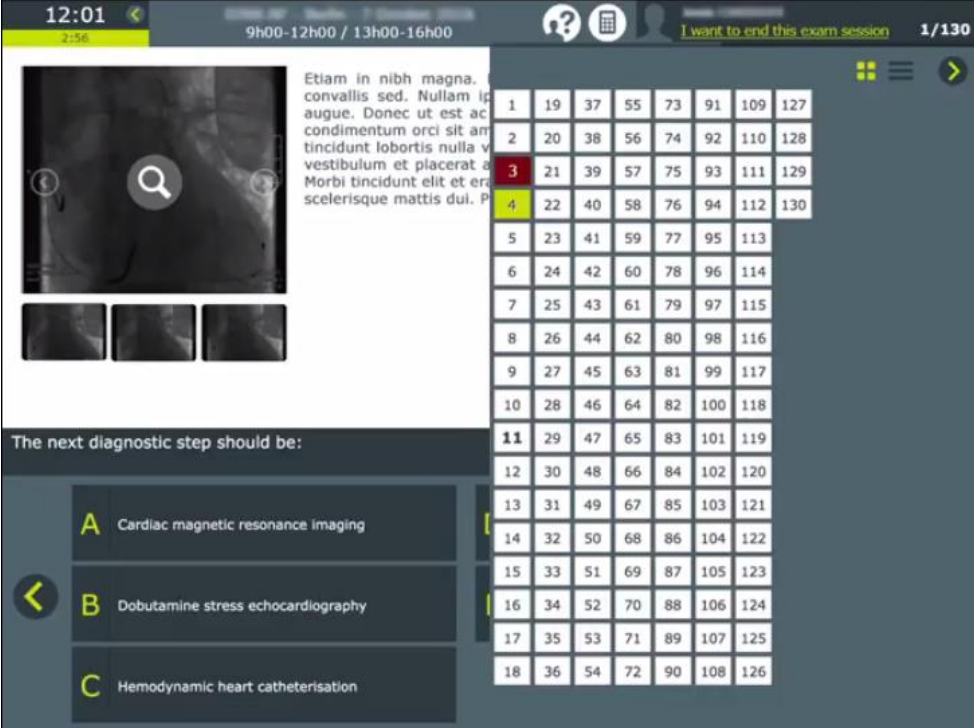
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

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European CMR exam "simulation"

- You can navigate through the questions by clicking on the arrows. Or select one specific question is the list available on the right.
 - Question in green: you have answered
 - Question in red: you have flagged the question
 - Question in blank: not answered and not flagged
- Time remaining is available on the top left of the screen.
- Exam information is available on the top of the screen
- Click on the icon  to request help from the invigilator
- Click on the icon  to access the calculator



12:01
2:56

9h00-12h00 / 13h00-16h00

I want to end this exam session 1/130

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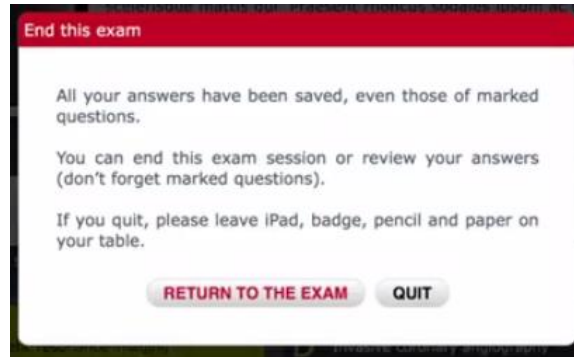
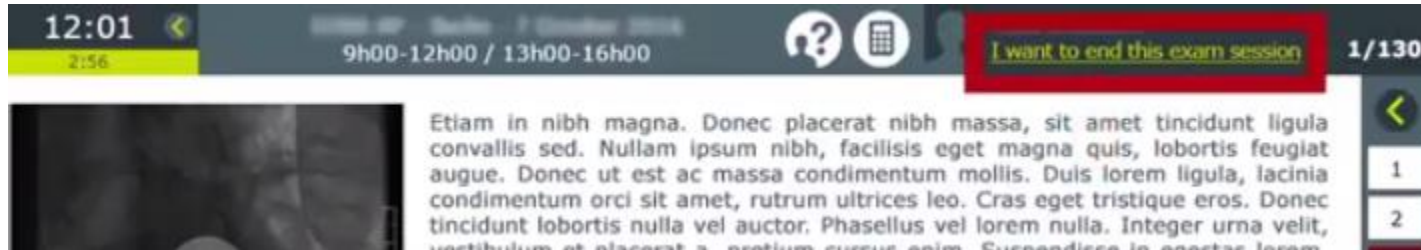
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7	25	43	61	79	97	115	
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9	27	45	63	81	99	117	
10	28	46	64	82	100	118	
11	29	47	65	83	101	119	
12	30	48	66	84	102	120	
13	31	49	67	85	103	121	
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16	34	52	70	88	106	124	
17	35	53	71	89	107	125	
18	36	54	72	90	108	126	

The next diagnostic step should be:

- A Cardiac magnetic resonance imaging
- B Dobutamine stress echocardiography
- C Hemodynamic heart catheterisation

European CMR exam "simulation"

- End and quit the exam



How to prepare for the exam



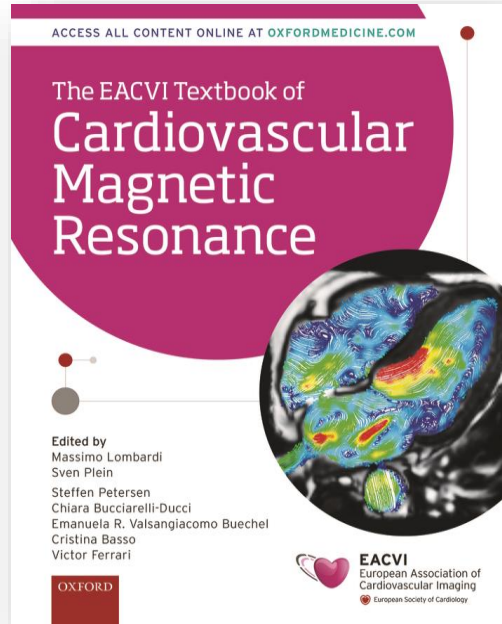
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- **European CMR Exam Prep Course!**
- **Check the syllabus and blueprint**
- **Internet resources:**
 - <http://www.escardio.org/communities/Working-Groups/eurocmr/education/Pages/cmr-recordings.aspx>
 - www.scmr.org
 - Case of the week
 - Hundreds of webcasts
 - Links to guidelines
 - SCMR forum
 - SCMR online training course
- **CMR review articles (e.g. JCMR, EHJ-CI)**
- **Guidelines and consensus papers (ESC, SCMR, EACVI)**
- **Duke case collection**
- **Scan, report, conferences, etc etc**





NEW: The EACVI Textbook of CMR!



Specifically based on the
exam curriculum

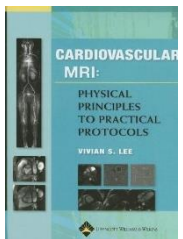
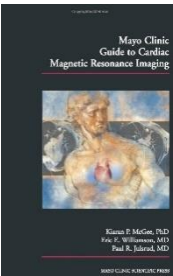
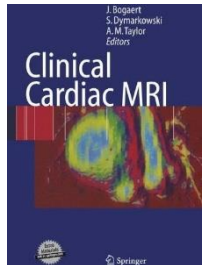
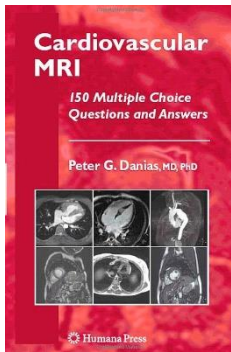
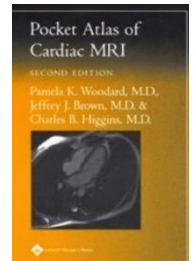
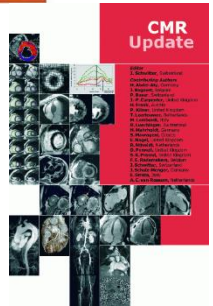
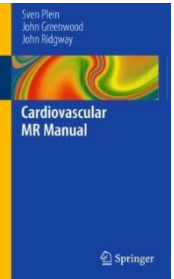
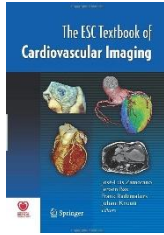
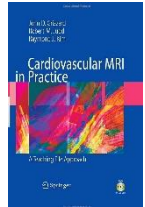
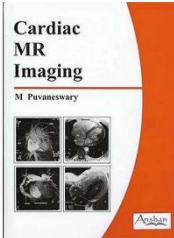
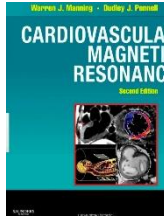
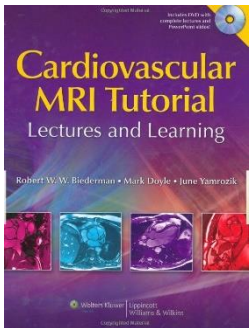
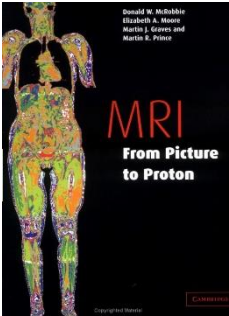
Also available:

EACVI CMR Pocket Guides





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And many more books available



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Tips and tricks, question psychology



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