# Cardiovascular magnetic resonance training in the UK: an update from the BSCMR trainee observers

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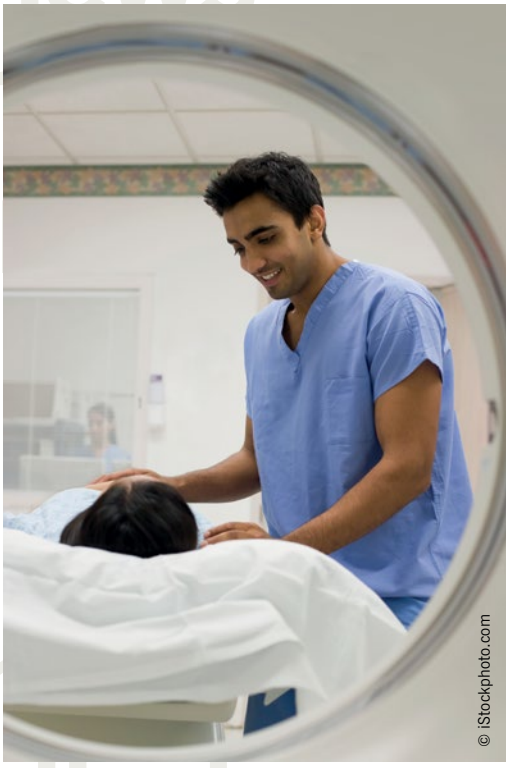
**Cardiovascular magnetic resonance (CMR) imaging is a rapidly developing subspecialty with a clear training structure and good career prospects. Demand for CMR demand is growing rapidly, with an 85% increase in cases scanned nationally in only two years, and this demand is predicted to continue with the British Cardiovascular Society working group predicting a further trebling of demand in the five years from 2010 to 2015. The most recent British Junior Cardiology Association survey identified cardiovascular imaging as an increasing preference for subspecialty training with 22% of trainees choosing imaging in 2012 (up from 10% in 2005) and CMR as the preferred imaging modality (selected by 45%). However, it was highlighted that there were still difficulties in accessing training by around one third of trainees. We describe the common indications for CMR, what CMR training involves (including the accreditation process), as well as how trainees can access current training opportunities.**

## Introduction

Cardiovascular magnetic resonance (CMR) imaging is a rapidly developing subspecialty with a clear training structure and good career prospects. The indications for CMR are evolving and the need for expansion in numbers of trained personnel in CMR is ever increasing. In addition, CMR demand is rapidly expanding with massive growth observed even over the last few years. Nationally, there were 20,597 cases scanned in 2008 and 38,485 in 2010, an impressive increase of over 85% in only two years.[1] The British Cardiovascular Society (BCS) working group predicts that by 2015 there will be a need for 2,275 scans per million of population, which for the current UK population of over 60 million would equate to a further trebling of demand in the five years from 2010 to 2015.[2] With the increase in demand being driven predominantly by myocardial stress perfusion, cardiomyopathies and adult congenital heart disease,[2] as well as increasing regional demand as services are developed. The National Horizon Scanning Centre suggests that CMR may become the gold standard for assessing myocardial viability and the preferred option for perfusion imaging,[3,4] and there is recent evidence from two large randomised-controlled trials showing the benefit of stress perfusion CMR over single photon emission computed tomography in the detection of underlying coronary artery disease.[5,6]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## Why do a CMR study?

The most common indications for CMR are for the assessment of heart failure and cardiomyopathy, ischaemia, viability and congenital heart disease.

CMR is unique in the multi-parametric approach it offers. As well as detailing anatomy and function, it can delineate scar from healthy myocardium, provide accurate tissue characterisation and, with the addition of myocardial stress techniques, can identify inducible hypoperfusion and significant coronary artery disease. CMR is the gold standard for assessment of ventricular volumes and function, which is particularly useful in the congenital population where accurate serial volumetric assessment enables timely intervention.

## What does CMR training involve?

There are currently three levels of accreditation in CMR,[7,8] namely levels 1, 2 and 3, the requirements for which are summarised as follows.

**Level 1:** General training to provide a working knowledge of CMR methods and diagnostic utility.

1. One month of training in CMR with exposure to 50 cases of a varied case mix.

**Level 2:** Specialised training designed to provide the skills necessary to interpret CMR imaging studies independently.

1. At least three months training under a Level 2 or Level 3 (preferred) qualified mentor.
2. At least 50 hours of CMR-related coursework.
3. Supervised interpretation of at least 150 CMR studies representing the range of abnormalities observed in practice.
4. For at least 50 studies, the trainee must be present during the scan, ideally as the primary operator, and should perform the analyses and make the initial interpretation.
5. Maintenance of skills: 20 hours' continued professional development (CPD) every two years and 100 cases every two years.

**Level 3:** Advanced training for those who ultimately wish to be responsible for the operation of a CMR service and participate in CMR teaching and research.

In addition to level 2 training:

1. A total of at least 12 months' training in CMR under a Level 3 qualified mentor to be completed within two years.
2. Supervised interpretation of a total of at least 300 CMR studies representing the range of abnormalities observed in practice.
3. Participation in an ongoing quality assurance or improvement programme for the department in which training is undertaken.
4. Maintenance of skills: 40 hours' CPD every two years and primary interpretation of 200 cases every two years.

## How many centres are doing CMR?

The access to CMR varies widely depending on proximity to a centre that provides high-volume CMR and the physicians' previous exposure to CMR, with smaller centres without on-site CMR referring very few patients. In a recent survey undertaken by the British Society of Cardiovascular Magnetic Resonance (BSCMR), there were a total of 60 centres in the UK that offered CMR facilities, with cardiologists and radiologists taking an equal share of the lead with most high-volume centres concentrated around London.[1]

It is widely anticipated that Level 2 competency is aimed at individuals who wish to subspecialise in cardiac imaging and wish to actively perform and report CMR under the supervision of a Level 3 accredited expert.[8] CMR in the UK is likely to develop into a 'hub and spoke' model with current large CMR centres providing expert advice to district general hospitals.

## Where can I get trained?

The most recent British Junior Cardiology Association (BJCA) survey identified cardiovascular imaging as an increasing preference for subspecialty training with 22% of trainees choosing imaging in 2012 (up from 10% in 2005). CMR was the preferred imaging modality (selected by 45%), although it was recognised that there were still difficulties in accessing training by 37%.[9] Most training in CMR is clustered around several high-volume centres. In the recent BSCMR survey there were a total of 28 centres that offered training in CMR, with 15 of these centres offering a formal training programme to full Level 3 standard. Overall, 32% of centres provided Level 3 training and 21% Level 1 or 2 training. In total, 42% of centres had a Level 3 accredited trainer, some of which had no active trainees, proving that there are training opportunities going to waste. A total of 192 trainees were reported at various levels of training in 31 centres, the majority (86%) being cardiology trainees. Nationally, six centres train 61% of all UK trainees with just three centres training 42%.[1]

## Where can I get a taster for CMR?

The BSCMR runs an annual meeting, with the most recent meeting having taken place in Glasgow on 20th March 2013. These events are an excellent opportunity to see expert opinion leaders giving comprehensive talks on CMR and fascinating case studies. It is also a great opportunity to meet other trainees and trainers and to find out about training and research opportunities throughout the UK. This year, the cost for the day was only £80 (including lunch), if you booked in advance to catch the 'early bird' fee.

The Society for Cardiovascular Magnetic Resonance (SCMR) also offer an online introductory training course that is available free of charge at www.training.scmr.org. This course covers CMR basics and gives an overview of more complex areas such as congenital heart disease. The format is of a lecture alongside clinical examples with a multiple-choice question (MCQ) test at the end of each module. If a satisfactory mark (70%) is achieved in each of the 10 modules then all BCS members are able to print off a certificate to use for CPD, and trainees can upload this to their e-portfolio. The 35 cases covered in the lecture series can also be used towards Level 1, 2 or 3 accreditation.

## Advanced training: SCMR certification and European CMR examination

For those currently participating in advanced CMR training, the SCMR provides a letter of certification for completion of training requirements to Level 1, 2 or 3 standard. There is also a European CMR exam which tests knowledge in the theory of CMR including magnetic resonance physics, clinical CMR protocols, indications and clinical application of

CMR. It is held once per year at the EuroCMR conference, the next being May 2014 in Vienna. Neither the SCMR accreditation nor the European certification of CMR competency are compulsory to practice CMR in the UK. Training requirements for cardiology specialist trainees are set by the Joint Royal Colleges of Physicians Training Board (JCPTB) in the form of the cardiology curriculum.

For further advice on training and upcoming courses, there is plenty of information available on the BSCMR website (www.bscmr.org) and on the international Society for Cardiovascular Magnetic Resonance (SCMR) website (www.scmr.org). Links can be found to online talks and training modules. Alternatively, please feel free to contact any of the authors via email, who will be happy to help


## Acknowledgements

Many thanks to all of the authors of the BSCMR survey from which much of the UK data is taken. The full report of this study is available at: http://www.jcmr-online.com/content/13/1/57

## Conflict of interest

None declared.


## Editors' note

See also the editorial by Manisty *et al*. in this issue (pages 88–9).

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# Book review

## The heart of Leonardo

**Author: Francis C Wells**
**Publisher: Springer, London 2013**
**ISBN: 9781447145301**
**Price: £126.00**

Just occasionally you come across a book which captivates your mind, one you know you will still be picking up and learning from in years to come, and a book that will be handed on to future generations, holding great historical interest. This slim yet detailed volume was researched and written by one of my surgical colleagues, Mr Francis Wells, whose interest in the heart has taken him from the cutting edge diagnostic and therapeutic surgical tools of the modern era, back to the 1500s and the heart studies of Leonardo da Vinci – a true 'meeting of the minds'.

The Royal Collection holds the finest of Leonardo's drawings, and this book – with a foreword by HRH Prince Charles, The Prince of Wales – features all those of the heart, describing its anatomy and functioning with extraordinary precision. These are accompanied by translations of the accompanying text, transcribed from the mirror image in which Leonardo wrote! Illustrations are compared with contemporary dissections, images from modern magnetic resonance scanners, and high definition ultrasound. Francis Wells provides a modern interpretation as a clinician, in a way that will be meaningful to cardiologists, medical specialists, anatomists, historians, and the general public.

This is a truly exceptional book. You will be amazed by what you have read, and struggle to put it down. Highly recommended, and excellent value for money!

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