Policies & Procedures Manual

Cardiac Interventional Imaging

(Angiography)
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Cardiac Interventional Imaging (Angiography)

Introduction

Diagnostic and Interventional cardiac angiography has undergone significant technique and procedural change in the last 20 years. The advancing role of radiographers in this speciality has led to the implementation of a certification program. This ASMIRT program aims to recognise the additional skills, training and experience radiographers possess to perform high quality angiographic examinations.

The program, consisting of a certification exam, is aimed at a beginner angiography practitioner level and working in a cardiac angiography room. Radiographers at this level should have completed training through an official in-house training program and are regularly rostered through Cardiac catheterisation labs.

Certification of the Cardiac Imaging Practitioner

The certification process consists of 2 components. A multiple choice question exam and practical experience component.

Legislation

There is currently no legislative requirement to be registered as an Angiographic practitioner in Australia, however it is recommended that Angiographic practitioners possess a specific level of training or experience prior to operating Angiographic equipment. MIAP1 recommends that any radiographer undertaking Angiography procedures holds certification.

MIAP1

The Medical Imaging Advisory Panel 1 (MIAP1) is made up of 8 volunteers who donate their time, knowledge and experience to ASMIRT and the progression and development of medical imaging.
Certification Policies

Certification Eligibility

Level 1 Application

Certification comprises a theoretical (part A) and a clinical component (part B). Certification is valid for a 3 year period. Angiographic Certification is awarded to persons who have successfully completed part A and part B. Both part A and part B must be completed by the candidate within a 3-year period.

Part A – Theoretical Component: Is a written examination set by MIAP1, which involves a paper not exceeding 180 multiple-choice questions covering topics such as: Angiographic equipment, Angiographic anatomy, pathophysiology & pharmacology, Angiographic physics, Fundamental cardiac angiographic principles and procedures.

Part B - Practical experience component: Requires the candidate’s supervisor to acknowledge experience with 150 cardiac examinations. These 150 examinations must have taken place within a 12-month period. This period must have occurred within the 3 years prior to application submission.

Experience may include all or part involvement in the following:
- Patient and/or room setup
- Opening of sterile equipment and/or consumables
- Angiographic projection positioning
- Setting/manipulating acquisition and/or injection parameters
- Peri/post procedure image processing

Procedure eligibility

Candidates of the certification process are required to document their practical experience by verifying their assistance in 150 diagnostic or interventional cardiac procedures during a 1 year period.

The following procedures will not be allowed:
- Diagnostic and interventional fluoroscopic procedures
- EP studies
- Ablation
- Cardiac biopsy
Table 1.
Cardiac Imaging (Angiography) Level 1 Certification Requirements.

<table>
<thead>
<tr>
<th>Eligibility Requirements</th>
<th>Time to Acquire</th>
<th>Certification Duration</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1 Application</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part A - Undertake Level 1 Certification Examination.</td>
<td>Part A and Part B must be completed within a 3-year period. Application submission must occur within 3-years of sitting Part A examination.</td>
<td>3-year expiry for Level 1 Certification.</td>
<td>N/A</td>
</tr>
<tr>
<td>Part B - Complete 150 clinical Cardiac angiographic examinations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 1 Application Lapsed</strong></td>
<td>If application submission does not occur within 3 years of undertaking Level 1 Certification Examination, applications must re-sit Level 1 Certification Examination.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Level 1 Renewal**

Renewal of Certification requires completion of the clinical component only. Clinical component requires the candidate’s supervisor to acknowledge completion of 450 cardiac angiographic examinations. These 450 examinations must have taken place within a 3-year period. This 3-year period must have occurred immediately prior to application submission. Renewal submissions must be received by the Secretariat no later than 6 months after expiry of previous angiographic certification. If this timeline is not adhered to, Certification will be deemed as expired and participants will be required to reapply and complete both part A and part B.

Table 2.
Cardiac Angiography Level 1 Certification Renewal Requirements.

<table>
<thead>
<tr>
<th>Eligibility requirements</th>
<th>Time to acquire</th>
<th>Certification duration</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certification application</strong></td>
<td>450 examinations must be completed within a 3-year period. A Minimum of 150 clinical cardiac angiographic examinations must be completed every 12 months within this 3-year period. This 3-year period must have occurred immediately prior to application submission.</td>
<td>3-year expiry for certification</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Certification lapsed</strong></td>
<td>If application submission does not occur within 3 years of undertaking the certification examination, applications must re-sit the examination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1.
Process of Application for Cardiac Angiography Level 1 Certification.

- **Level 1 Certification Part A: Theoretical Component**
  - Theoretical written examination.

- **Level 1 Certification Part B: Clinical Component**
  - Applicants must have achieved a PASS mark for Part A: Theoretical Component
  - Clinical component must be signed off by supervisor within a 3-year period of completing Part A
  - Applicants must perform 150 clinical Cardiac Imaging (Angiography) examinations over a 12-month period
  - Certification valid for a 3-year period.

**Signatory on Part B of Level 1 Certification Applications**

The Supervisor angiographer is defined as a practitioner who holds MRPBA registration, appropriate radiation licenses and has a minimum of 5 years’ experience in medical imaging with at least 2 years of full time equivalent supervisory angiography experience. These practitioners represent the minimum standard of practitioner who is able to be the signatory for Certification applications.

**Certification Length**

Certification certificates have a 3-year expiry from date of issue by MIAP1. Renewed certification certificates will coincide with the original date of issue and will also have a 3-year expiry. Practitioners who pass the theoretical written examination (part A) have a 3-year period to apply for their angiography Certification.

**Certification Renewals**

Notification of a forthcoming certification expiry will be emailed prior to the expiry date. This email will contain a link to the MIAP1 policies and procedures/renewal guidelines and application form. Renewals will only be sent to practitioners who are current financial members of ASMIRT (this includes Voting Members and Non-Member CPD participants) and is dependent on registered email address being maintained by the member.

If the practitioner fails to return the renewal application form for Certification, a final notice will **NOT** be issued. Practitioners must ensure that their details are current and up to date in their member profile. Those who are not members or enrolled in the ASMIRT’s CPD program and are in possession of a current SOC with lapsed Angiography certification will **NOT** be contacted by ASMIRT with a renewal notice.

If practitioners neglect to renew their Certification within 6 months of the expiry date, their certification will be deemed lapsed by MIAP1.
Practitioners with lapsed Certification are expected to follow the procedures outlined under Certification Eligibility. Lapsed certification cannot be re-instatement without the candidate correctly following all of the outlined criteria for Certification application.

**Figure 2.**
*Outline of the Renewal Process for Cardiac Imaging (Angiography) Level 1 Certification.*

<table>
<thead>
<tr>
<th><strong>Eligibility requirements</strong></th>
<th><strong>Time to acquire</strong></th>
<th><strong>Certification duration</strong></th>
<th><strong>Extension</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certification renewal</strong></td>
<td>Complete 450 cardiac angiographic procedures</td>
<td>450 examinations must be completed within a 3-year period. A minimum of 150 clinical cardiac angiographic examinations must be completed every 12-months within this 3-year period.</td>
<td>6-month grace period for lapsed Certification.</td>
</tr>
<tr>
<td><strong>Renewal lapse</strong></td>
<td>Re-sit certification Examination. Complete 150 cardiac angiographic procedures</td>
<td>Must be completed within a 3-year period.</td>
<td>As for certification Application.</td>
</tr>
</tbody>
</table>
Extensions

Practitioners who are unable to fulfil the requirements of renewing their certification before the renewal due date are able to apply for an Angiographic certification extension. Supporting documentation must be attached to the application for review by MIAP1 (Doctor’s certificates, letter from employer, Statutory Declaration etc). Extension applications will be assessed on a case-by-case basis by MIAP1. The extension period granted is at the discretion of MIAP1.
Cardiac Interventional Imaging (Angiography) Level 1 Certification
Part A: Theoretical Component - Written Examination

Cardiac Imaging (Angiography) Level 1 Certification Examination

Candidates will sit a multi-choice question (MCQ) exam containing no less than 160 questions over a maximum duration of 3 hours.

Examination Breakdown

Section A - Angiographic equipment
Section B - Angiographic anatomy, pathophysiology & pharmacology
Section C - Angiographic physics
Section D - Fundamental cardiac angiographic principles
Section E (Part 1) - Fundamental cardiac angiographic procedures – Coronary/Arterial procedures
Section E (Part 2) – Fundamental cardiac angiography procedures – Electrical and structural procedures
Section F - Cardiac angiographic image labelling

The breakdown of marks is approximately:

- Section A – 13%
- Section B – 18%
- Section C – 12%
- Section D – 15%
- Section E (Part 1) – 20%
- Section E (Part 2) – 15%
- Section F – 7%

Candidates will need to achieve an overall pass mark for 75% with no less than 65% in any 1 section. After the conclusion of the examination, the results are tabled and reviewed by the MIAP1. Once this has undergone rigorous scrutiny, the MIAP1 sign off on the results, which are then sent back to ASMIRT. Cardiac Angiography Level 1 Certification Examination results are posted online 6 weeks post examination at [https://www.asmirt.org/training-and-events/education/certification#a3](https://www.asmirt.org/training-and-events/education/certification#a3), listing candidates who have passed. Results are listed using the unique Candidate ID number, which is issued to all registered candidates.

Email correspondence outlining pass or fail result is sent to all candidates who have sat the examination. Candidates who fail receive a breakdown of their results for each section presented in the following form (see Table 1)

Table 1. Example of results breakdown provided to candidates who fail the theoretical written examination.

<table>
<thead>
<tr>
<th>Part A</th>
<th>Part B</th>
<th>Part C</th>
<th>Part D</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pass</td>
<td>Credit</td>
<td>Credit</td>
<td>Fail Score 50 - &lt;60%</td>
</tr>
</tbody>
</table>

Pass score > 85% - High pass
Pass score 76-85% - Credit
Pass score 65-75% - Section Pass
Fail Score 60-64% - Close but needs more study
Fail Score 50 - <60% need a lot more study
Fail Score < 49% need a lot more study

Certification Examination Process

• The certification exams are held several times a year.
• The dates for the examination will be advertised at www.asmirt.org
• After completing the application form you will receive an email outlining your individual process.
• You can select your preferred date and in some cases morning or afternoon and venue.
• If your nearest city/town is not available, then you may be offered an alternative site or alternative process.
• Your venue should be less than 150kms from your workplace address.

Exam Venues

These sites are managed by external providers and as such there are some rules specific to some venues, and some things you need to understand.

1. The room may contain candidates sitting other examinations. They may be coming or leaving at different times.
2. The certification exams are allocated 3 hours in length. The staff at the centre will commence the exam on your computer screen. After this time your screen may be locked out. You may leave early but please be respectful of other candidates.
3. You must arrive at the time designated - you will not be admitted if you are late.
4. Ensure that you read all the documentation provided by Pearson Vue including the location of the venue. We recommend that if you are not familiar with the location of the examination venue, that you plan ahead and drive past the venue as a familiarisation exercise.
5. You must bring 2 forms of photo identification (passport, drivers' licence) as well as your examination registration details. You will not be allowed in to sit without this documentation.
6. You may be asked to place all personal items into a locker or in an area outside the room.
7. You may be requested to remove all jewellery. This is for security reasons.
8. You may not bring into the exam room any other items such as a calculator (there are no questions in the exam that require complicated mathematics).
9. Some sites may restrict the bringing in of water bottles.
10. You will be told how to excuse yourself during the exam.
11. You will be given a note pad to write on. This must be left behind. It may consist of a laminated blank page. Any note pages must be left behind at the end of the examination.
12. The supervisor will explain how to forward and back questions and how to complete checking.
13. The randomisation process of the examination means that no one candidate will receive the same questions and answer selection. Each question is selected from the question bank, but each answer selection is further randomised, so your selection of a or b or c or d may be different to your colleagues, even if the question is the same.
14. You will be able to ask for help during the examination
15. The results will not be available immediately at the end of the examination. They will be released via an examination list on the ASMIRT website and via individual email.
Written exam process
(For candidates who are eligible for a paper version of the exam)

Examination Supervisor

Examination Supervisors must hold employment from an approved occupational group (e.g. the occupational groups approved to endorse Australian passport photographs). Supervisors should not have any direct professional or personal relationship with the candidate. Where possible they should not be their direct supervisor. They must be not be related to the candidate by birth, marriage, de facto or same sex relationship, nor live at the candidates address. The Examination Supervisor must be approved by ASMIRT. Examination supervisors must sign the supervisor’s declaration form acknowledging commitment to upholding the integrity of the examination process.

Candidates may request to sit the examination at their own location if a Pearson Vue location is unavailable. Candidates will be required to submit an application form to the ASMIRT Secretariat and a supervisor will be nominated for them. If an ASMIRT nominated supervisor is not available, the candidate will be contacted for suggested names of supervisors. ASMIRT will review the suggested names and select an appropriate independent person acceptable to ASMIRT for supervision purposes.

By signing the supervisor’s declaration, examiners are agreeing to ensure that the examinations are conducted fairly, ethically and professionally. It is an expectation that as a supervisor, these principles are upheld, and the integrity of the certification examinations are maintained.

Examination Venues

Examination venues must be an officially sanctioned venue e.g. a workplace under the direct supervision of an examination supervisor. Supervisors are required to closely supervise candidates and be present in the examination room whilst the examination is in progress.

Examination Procedures

1. Examinations are scheduled for a 3-hour period from 9.00am – 12.00pm. Candidates are asked to arrive at their examination venue at least 15 minutes prior to the examination start time to ensure that they are present prior to the commencement of the examination. Candidates are reminded to be cognisant of their fellow candidates sitting this examination.
2. Late arrivals – if candidates arrive within the first 30 minutes of the examination commencement, they will be permitted to continue the examination in the remaining time.
3. Arrivals post - 30 minutes of the advertised examination start time will result in an ineligibility to sit the examination.
4. Candidates are required to bring a form of photo ID and their allocated unique candidate ID number to the examination.
5. No reading material is permitted in the examination room.
6. All notes, booklets and answer sheets are not to be brought into the examination room.
7. Candidates are to exit the examination room as quietly as possible so as not to disturb fellow candidates.
8. Bring a soft lead pencil with spares, eraser and pencil sharpener to the examination.
9. Multiple-choice questions – responses are to be marked on the Response Bubble Sheet provided by the exam supervisor. Responses to be recorded as per the following examples:
1. \[ \text{A B C D E F} \]
2. \[ \text{A B C D E F} \]

It is of vital importance that the boxes are clearly marked across the entire box.

Examples from exams:

10. The above effect can be achieved by using a dark, soft pencil (2B or HB). If candidates are using an eraser to correct an answer, they must ensure that the correct answer is clear and defined.
11. Pens or other permanent markers are not to be used on the Response Bubble Sheet – candidates must be able to modify their responses, if they need to, prior to the end of the examination.
12. Candidates may be escorted out of the examination if the behaviour displayed is not conducive to the professional conduct of the examination.
13. At the conclusion of the examination, candidates must ensure that their name and unique candidate ID numbers are clearly written on the Response Bubble Sheet and examination paper. Candidates are to remain quietly seated until their examination paper has been collected and the supervisor concludes the examination. Candidates are not to remove the examination material from the examination room.

**Special Consideration**

**On the day of the examination**

If a candidate experiences extenuating circumstances preventing their attendance at the examination venue, including illness, they should contact ASMIRT immediately.

If you commence the examination, you are ruled to be fit. Special consideration will not apply, and your result will be upheld. If you are unwell or unlikely to perform at your best, you should contact ASMIRT prior to the exam date. If you are unwell on the day of the examination, DO NOT SIT THE EXAM.

**Supporting documentation**

Candidates will need to provide one or more of the following documents to support their application for refund consideration:
• Medical certificate or letter from a medical professional
• Death notice or certificate and evidence of relationship
• Police report
• Statutory declarations from employer or relevant people
• Notification from:
  o Defence services
  o Juries Commissioner’s Office
  o Emergency service organisations such as the Country Fire Authority
• Medical/professional certificates must state that candidates were unfit to sit the examination or complete work for assessment **on or before** the relevant date, and cannot be signed by a member of the candidate’s family.
**Certification Procedures**

**Assessments**

Level 1 Certification applications and renewal applications are received by the Secretariat and forwarded to the MIAP1 Chair for assessment. This process can take up to 8 weeks from the date that the Secretariat receives a practitioner’s application. A Level 1 application will be dated from the date that the application was approved by the MIAP1 Chair.

Applications will be dated from the original date that the application was approved by the MIAP1 Chair.

**Incorrect Applications**

Practitioners who provide incorrect information on any application form will be emailed and / or have their application returned to them with notification querying the information provided and a list of information that needs to be reviewed by the practitioner and the Supervisor.

**Extension Applications**

Applications for extensions are received by the Secretariat and forwarded to the MIAP1 Chair for review and assessment. This process can take up to 6 weeks and practitioners will be notified by email of the outcome, and extension time granted if applicable.

**Current Application Forms**

Practitioners must ensure that current application forms are submitted to the ASMIRT, or applications will not be accepted.
Suggested Reading

**Basics of Angiography**


**Anatomy**


**Cardiac angiography**

Grossman’s Cardiac catheterization, angiography and intervention, Donald S. Baim, 7th Edition, 2006 through the following link:

**Cardiac angiography projections**

Coronary angiography in the angioplasty era: projections with a meaning. Carlo Di Mario, Nilesh Sutaria

**Other Materials**

Any other source material can suffice however the information must be general in its applications to angiography. Doctor, practice and site specific methods may be too narrow in their applications and should be avoided. Site specific practices are not being examined, only the fundamental angiography methodologies (which apply across all sites).
Sample Questions

1. **Using radial arterial access for a coronary angiogram leads to higher patient radiation doses. Why:**

   a.) More acquisitions of the contrary arteries are required
   b.) Radial artery catheters are smaller, therefore acquisitions are longer
   c.) The anatomy from the radial artery to the aorta is often more tortuous requiring more fluoroscopy to visualise
   d.) Initial cannulation of the radial artery can take considerably longer time than femoral access

   **The correct answer is c.**

2. **The pressure limit on a power injector exists:**

   a.) To increase the duration of a procedure
   b.) To protect the patient, catheter and injector from extreme pressure increases
   c.) To prevent the use of extremely low pressures
   d.) To stabilize the injection pressure

   **The correct answer is b.**

3. **A positive D-Dimer test indicates:**

   a.) Probable myocardial infarction
   b.) No myocardial infarction
   c.) No PE or DVT
   d.) Probable PE or DVT

   **The correct answer is d.**

4. **List the ideal projection for demonstrating the left common femoral bifurcation.**

   a.) LAO 10
   b.) LAO 30
   c.) RAO 30
   d.) RAO 10

   **The correct answer is b.**

5. **The severity of an atrial septal defect can be determined by:**

   a.) Taking a series of oxygen saturations from different areas of the right heart
   b.) Taking a series of oxygen saturation from different areas of the left heart
   c.) Performing a right ventriculogram
   d.) Performing a left ventriculogram

   **The correct answer is a.**
6 Which projection is normally used to traverse a catheter through the chambers of the right heart to the pulmonary arteries:

a.) Left anterior Oblique  
b.) Right anterior oblique  
c.) Posterior anterior projection  
d.) Lateral projection  

The correct answer is c.

7 How would a catheter be able to travel directly from the right atrium to the left atrium:

a.) Through a patent Foramen ovale  
b.) Through a trans septal puncture  
c.) Through an Atrial Septal Defect  
d.) All of the above  

The correct answer is d.
**FAQ’s**

*Do I have to sit the Angiography Certification Examination to work as an angiography radiographer in Australia?*

No, however passing the examination and being part of the ASMIRT Level 1 Angiography Certification Program is an indication of your knowledge and commitment to your speciality within the Medical Imaging profession. There are some departments and practices which require Level 1 Certification prior to employment. This Certification is not a qualification like a Master’s degree which has no clinical requirement, but rather a program that ensures a level of knowledge that is measurable and common across Australia.

*How much study do I have to do to pass the examination?*

The examination is designed to test your clinical and academic ability. It is an indication of a knowledge base when measured against your colleagues. A study approach similar to any advanced program is suggested.

*Do I have to join the 3-year Certification Program?*

No, this is not a requirement as you may decide that passing the examination is adequate to demonstrate your abilities. There is however a limited time after passing the examination to join the program. If you choose not to join the Certification Program within the 3-year time period and change your mind down the track, you may be required to re-sit the Level 1 examination again.

*What are examples of cardiac procedures that would count towards the 150 clinical examinations required for Part B practical experience component?*

- Pacemaker insertion involving the injection of contrast and the acquisition of a run (whether that be DSA or unsubtracted angiography)
- Diagnostic coronary angiography
- Interventional coronary angiography (angioplasty, stenting, rotorblator, chronic total occlusion, thrombectomy)
- Tavi workup
- Tavi insertion
- Balloon Valvuloplasty
- Atrial appendage occlusion
- Ductus arteriosus closure
- Patent foramen ovale closure
- Closure of a coronary artery fistula