Inspectie Leefomgeving en Transport
Ministerie van Infrastructuur en Waterstaat

Flow Charts & Guidance Material

Part MED

Uitvoeringsverordening (EU) 2019-27

Versie 1

d.d. 22 juli 2019

Voorwoord

Dit document dient voor nadere uitleg en aanvulling op Uitvoeringsverordening (EU) 2019/27 en bijbehorend AMC en GM

Dit document zal in 2019 verder worden aangepast.

Inhoud

MED.B.010 – Cardiovasculair stelsel

Richtlijnen
Guidance Material

Table - Investigation of ECG abnormalities

Report specifications - Cardiology

Extended cardiovascular assessment
An extended cardiovascular assessment should include a clinical report of an examination by an accredited physician/cardiologist, an exercise ECG and any other test that is clinically indicated.

Cardiovascular risk assessment
A cardiovascular risk assessment tool useful for AMEs.

Reporting of resting and exercise ECGs
All ECGs should be reported by a cardiologist.

Perihpheral Arterial Disease
If exercise electrocardiography cannot be performed (e.g. due to claudication), then a myocardial perfusion scan or stress echocardiogram may be an acceptable alternative investigation.

Carotid Artery Dissection
Cases should be investigated with Angiography (usually MRI). Specialist review by consultant neurologist is required. Any supratentorial stroke is disqualifying due to seizure risk.

Six months following full functional recovery a class 1 OML/unrestricted class 2 assessment may be possible. A further angiogram (usually MRA) is required after 6 months to check whether the dissection has remained stable.

Infrarenal abdominal aortic aneurysm

Class 1:	<5 cm	OML
	5 cm or more	unfit
Class 2:	<5 cm	unrestricted
	5 - 5,5 cm	OSL
	>5,5 cm	unfit

Flowchart – Aortic root dilatation certification

Flowchart – Aortic valve stenosis certification

Flowchart – Mitral valve disease certification

Flowchart – Aortic valve replacement certification

Mitral Valve Repair
After mitral valve repair, recertification to class 1 OML/Unrestricted class 2 level is possible 6 months post operatively, subject to a satisfactory cardiology review, to include an echocardiogram. Follow-up should include annual echocardiograms.

Flowchart – Hypertrophic cardiomyopathy certification

Acute Benign Aseptic Pericarditis
Recertification can be considered 3 months after recovery to class 1 OML/unrestricted class 2 level, subject to a satisfactory cardiology review to include a 24hr ECG, echocardiogram and exercise ECG. Follow-up should initially be 6 monthly cardiology reviews to include a 12 lead resting ECG and echocardiogram. Unrestricted class 1 can be considered after 2 years. Follow-up can usually be discontinued after 2 years.

Richtlijnen
Guidance Material

Constrictive Pericarditis
Recertification can be considered after pericardectomy to class 1 OML/unrestricted class 2 level subject to a satisfactory cardiological review, to include exercise ECG, echocardiogram and 24hr ECG. The applicant should be in sinus rhythm. Annual cardiological follow up is required.

Flowchart – Neuro-cardiogenic syncope certification

Report specifications – Hypertension

Flowchart – Hypertension certification

Flowchart – Investigation of suspected coronary artery disease certification

Flowchart – Coronary artery disease certification

Flowchart – Coronary artery disease certification

Table - Investigation of ECG abnormalities

Short PR interval
Defined as a PR interval of less than 100ms. Class 1 initial applicant, or new finding on ECG, requires cardiological review (to establish no history of tachyarrhythmia) and exercise test.

Long PR Interval
Defined as a PR interval of more than 240ms. Class 1 initial applicant, or new finding on ECG, requires cardiological review, exercise test and 24 hour ECG.

Flowchart – Ventricular ectopy certification

Flowchart – Atrial fibrillation certification

Flowchart – Left bundle branch block (LBBB) certification

Flowchart – Wolff-Parkinson-White (WPW) pre-excitation certification

Flowchart – Brugada certification

Flowchart – Complete Right bundle branch block (RBBB) certification

Left anterior hemi block
Requires investigation by means of at least an exercise ECG. If left anterior hemi block (or left posterior hemi block) is noted in the presence of RBBB, the LBBB flowchart should be followed.

Sinus bradycardia
Requires investigation if the rate is <40bpm (usually by means of a 24 hour ECG).

Richtlijnen **Guidance Material**

Sinus tachycardia
Requires investigation if the rate is consistently >110bpm.

Flowchart – Catheter ablation for tachycardia certification (except WPW and AVNRT)

Flowchart – Catheter ablation for WPW syndrome and AVNRT certification

Flowchart – Implantation of a cardiac pacemaker certification

Table – Investigation of ECG abnormalities

1: Cardiologist review
2: Exercise ECG
3: 24hr Holter
4: Echocardiogram

Diagnosis	Class 1		Flow charts and guidance material available (Class 1/2)	Class 2	
	Fitness assessment	Minimum investigations, others if clinically indicated		Fitness assessment*	Minimum investigations, others if clinically indicated
Rhythm					
Incomplete RBBB	AME	Investigate if other abnormalities are present	No	AME	Investigate if other abnormalities are present
Atrial fibrillation atrial flutter		1, 2, 3, 4	Yes		1, 2, 3, 4
Sinoatrial dysfunction or sinus pauses			No		
Mobitz type 2 AV block			No		
Complete RBBB			Yes		
Complete LBBB (or RBBB+left axis deviation)			Yes		
Broad/narrow complex tachycardia			No		
Pacemakers			Yes		
Mobitz type 1 AV block		1, 3	No		1, 3
SVEs/VEs simple		1, 3 Then possibly 2, 4	Yes		
SVEs/VEs complex		1, 2, 3, 4			1, 2, 3, 4
WPW			Yes		
Other inc AVNRT etc			Yes		
Asymptomatic QT prolongation			No		
Brugada pattern			Yes		
Post ablation			Yes		
Coronary disease					
Pathological Q waves T inversion Q waves Poor R wave progression	MA	1, 2, 3, 4	Yes	AME	1, 2, 3, 4
Cardiomyopathy					
LVH, atrial enlargement, flat or inverted T waves	MA	1, 2, 3, 4	No	AME	1, 2, 3, 4
Miscellaneous – new finding of…					
Non-specific T wave changes	MA	1, 2	No	AME	1, 2
New or progressive left axis deviation					
ST segment sag					
ST segment depression					
First degree AV block (>240 ms)		1, 3			1, 3
Bradycardia (rate <40 bpm)					
Tachycardia (rate >100 bpm)					
Asymptomatic long QT		1, 2, 3	Yes		1, 2

* where there is guidance material and/or certificatory flow charts and assessment is straightforward, AMEs should make the fitness decision. For complex and/or borderline cases the AME should discuss the case with a cardiologist.

MA = Medical Assessor

Report specifications - Cardiology

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Examination and investigation findings**
   - Clinical examination
     - Blood Pressure within acceptable parameters (Flowchart – Hypertension certification)
     - Blood tests (Urea & Electrolytes, Renal and Liver Profile, Lipid Profile, Glucose)
     - Confirmation no end organ damage
   - Cardiovascular risk assessment
     - Family history, smoking, alcohol intake, weight (BMI), and lifestyle interventions
     - Resting ECG
     - Exercise Tolerance Test Report where indicated
       1. Protocol used (e.g. Symptom limited Bruce Protocol off cardioactive medication as directed by the investigating cardiologist)
       2. Walking time
       3. Symptoms experienced
       4. ECG changes
       5. Summary and conclusions
     - Echocardiogram where indicated
       1. Valve structure and function
       2. Standard chamber dimensions
       3. Ejection Fraction (indicate measurement technique)
       4. Summary and conclusions
     - 24-hour ECG where indicated
       1. Beats scanned
       2. Number/frequency of ectopics/aberrants
       3. Runs of abnormal rhythm (extracts)
       4. Summary and conclusion
     - Angiogram where indicated
       1. Full report
       2. Measurement of degree of stenosis in each affected artery (annotated diagram of coronary tree acceptable)
     - Cardiac MRI, Myocardial Perfusion Scan, Stress Echocardiogram (dobutamine or exercise), CT as indicated

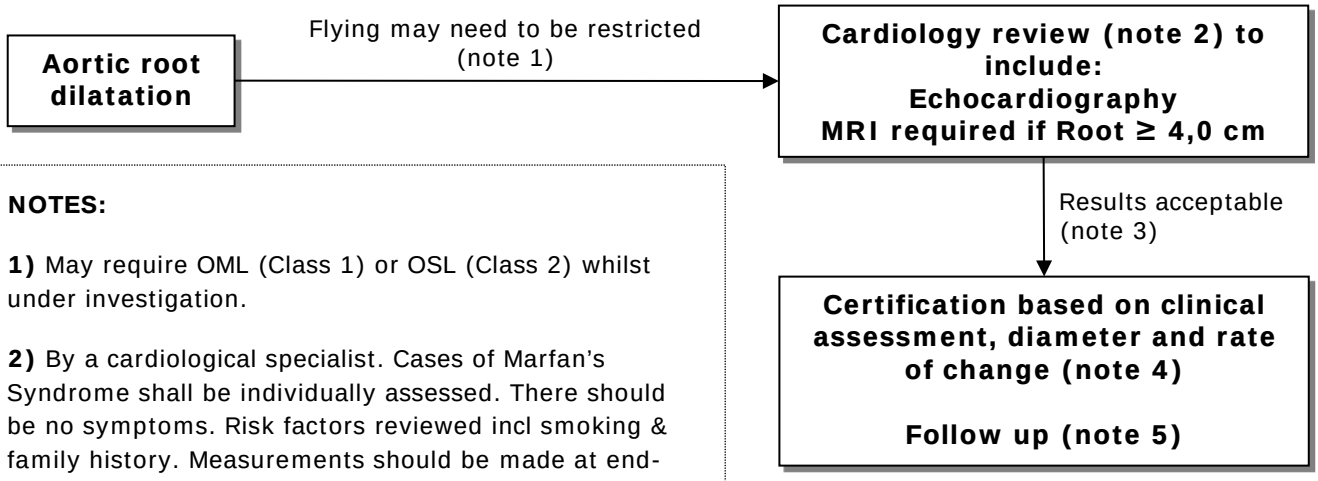
Where investigations are abnormal or borderline the hard copy traces/images are likely to be required for review.

4. **Treatment**
   - Current and recent past medication (dose, frequency, start date and finish date)
   - Confirmation no side effects from medication

5. **Follow up and further investigations/referrals planned or recommended**
   - Plan of management and anticipated follow up

6. **Clinical implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

Flowchart – Aortic root dilatation certification



NOTES:

1) May require OML (Class 1) or OSL (Class 2) whilst under investigation.

2) By a cardiological specialist. Cases of Marfan's Syndrome shall be individually assessed. There should be no symptoms. Risk factors reviewed incl smoking & family history. Measurements should be made at end-diastole of:

1. outflow tract diameter,
2. sinuses of Valsalva,
3. sinotubular junction and
4. tubular ascending aorta.

The largest measurement should be utilised. CT is an acceptable alternative to MRI but repeated studies increases radiation exposure.

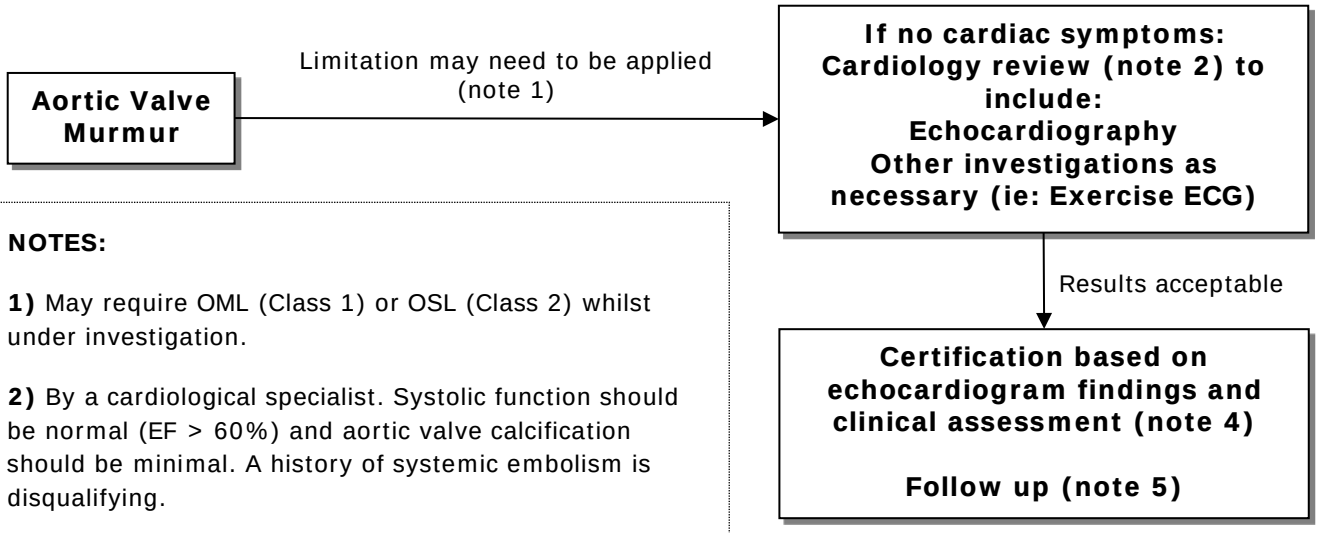
3) The cardiology report will be reviewed by the Medical Assessor for class 1 and AME for class 2. Applicants with Marfans will need special consideration. It may be necessary to see the investigations in which case the actual tracings/films/videos will be requested. In borderline cases a secondary review panel of cardiologists will be convened. An OSL may be applied to a class 2 certificate.

4) The principal measurement to determine medical certification of pilots with aortic root dilatation is MRI. Indexing root area to Body Surface Area (BSA) standardises for large or small BSA. BSA indexed diameter (BSAID) = measured value x 1,73 ÷ BSA (m^2). The following parameters to be used as a guide:

	Bicuspid		**Tricuspid**	
	BSAID	Rate of change	BSAID	Rate of change
Unrestricted class 1 & 2	<4,25 cm	<0,5 cm/yr	<4,5 cm	<0,5 cm/yr
Class 1 OML / class 2 Unrestricted	<4,5 cm	<1 cm/yr	<4,75 cm	<1 cm/yr
Unfit	≥4,5 cm	≥1 cm/yr	≥5,0 cm	≥1 cm/yr

5) Follow up - at least annual echocardiography. MRI (or CT) is required at least 2 yearly where diameter > 4,25 cm or rate of change > 0,5 cm/yr.

Flowchart – Aortic valve stenosis certification



NOTES:

1) May require OML (Class 1) or OSL (Class 2) whilst under investigation.

2) By a cardiological specialist. Systolic function should be normal (EF > 60%) and aortic valve calcification should be minimal. A history of systemic embolism is disqualifying.

3) The cardiology report will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations in which case the actual tracings/films/videos will be requested. In difficult cases a secondary review panel of cardiologists will be convened.

4) Bicuspid valve: may be assessed as fit if no other aortic abnormality is demonstrated. The principal measurement to determine fitness for certification of pilots with aortic stenosis is aortic valve area during echocardiography. Suggested certificatory assessment, based on European Society of Cardiology Guidelines:

VALVE AREA	MEAN AORTIC GRADIENT (Echo-Normal flow conditions)	SEVERITY	CERTIFICATION
>1,5 cm²	0 – 20 mm Hg	Mild	Unrestricted class 1/2
1,0 – 1,5 cm²	20 – 40 mm Hg	Moderate	Class 1 OML / Unrestricted class 2
<1,0 cm²	>40 mm Hg	Severe	Unfit*

Indexing valve area to Body Surface Area (BSA) can be useful in cases of unusually large or small BSA (Moderate: 0,6 – 0,85 cm²/m²; Severe: <0,6 cm²/m²).

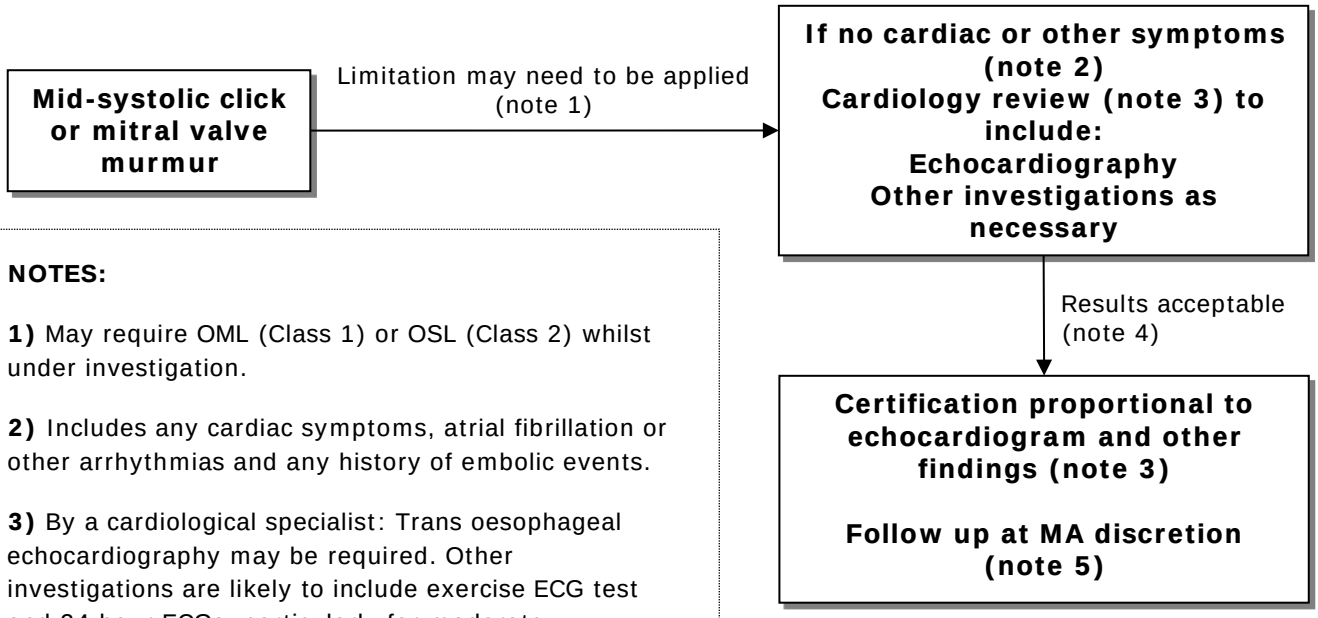
However, other factors need to be considered in each case, including:

- Left ventricular hypertrophy
- Reduced left ventricular diastolic function
- Reduced left ventricular ejection fraction
- Aortic regurgitation
- Pull back pressure gradients measured during catheter studies are 10-15 mm Hg lower than echocardiographically measured peak pressures

* Cases with a mean gradient of 40 – 50 mmHg and favourable other factors may be considered for class 2 OSL.

5) Follow up: at least annual echocardiography if mean pressure gradient 20 mm Hg or more.

Flowchart – Mitral valve disease certification



NOTES:

1) May require OML (Class 1) or OSL (Class 2) whilst under investigation.

2) Includes any cardiac symptoms, atrial fibrillation or other arrhythmias and any history of embolic events.

3) By a cardiological specialist: Trans oesophageal echocardiography may be required. Other investigations are likely to include exercise ECG test and 24 hour ECGs, particularly for moderate regurgitation.

4) The cardiology report will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations in which case the actual tracings/films/videos will be requested. In difficult cases a secondary review panel of cardiologists will be convened. Certification criteria based on echocardiographic and other findings:

Rheumatic mitral stenosis should normally be assessed unfit.

Minor regurgitation or Mitral valve prolapse only: Unrestricted class 1/2

- Requires evidence of no thickened leaflets or flail chordate and left atrial internal diameter less than or equal to 4,0 cm.

Moderate regurgitation: class 1 OML / Unrestricted class 2 (possible OSL)

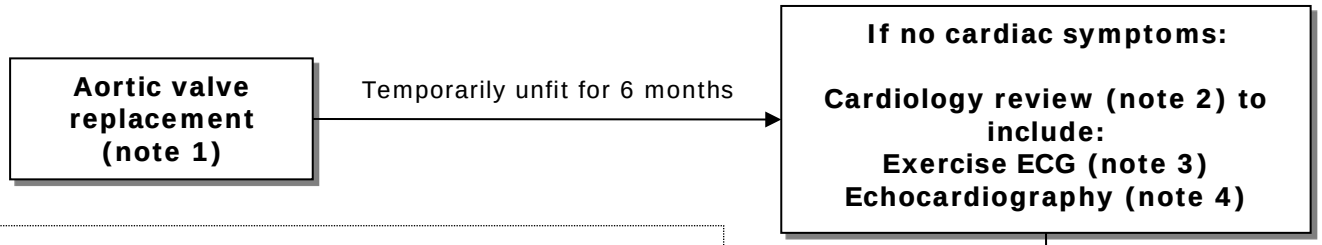
Severe regurgitation: No certification possible.

- The following may indicate severe regurgitation:
  - LV internal diameter (diastole) >6,0 cm
  - LV internal diameter (systole) >4,1 cm
  - Left atrial internal diameter >4,5 cm

Doppler indices such as width of jet, backwards extension and whether there is flow reversal in the pulmonary veins may be helpful in assessing severity of regurgitation.

5) Follow up: periodic echocardiography (annual or bi-annual) will be required.

Flowchart – Aortic valve replacement certification



Results acceptable (note 5)

Class 1 OML

Class 2 Unrestricted or OSL/OPL (note 6)

Follow up (note 7)

NOTES:

1) Tissue or mechanical valves are acceptable. If pilot is anti-coagulated with warfarin (e.g.: Coumadin), 6 months stability of the INR (with at least 4 measurements within the target range) is required. Class 1 certification will require INR testing with a near patient testing device within 12 hours prior to flying (flight only possible if INR within target range).

2) By a cardiologist. If an angiogram was performed pre-operatively, for class 1 applicants, the hard copy will need to be reviewed by the Medical Assessor.

3) Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant ECG or abnormal blood pressure changes. Any abnormality may require further investigation such as myocardial perfusion scanning. If coronary artery surgery was performed at the same time as the valve replacement, the appropriate post-CABG protocol will need to be completed as well.

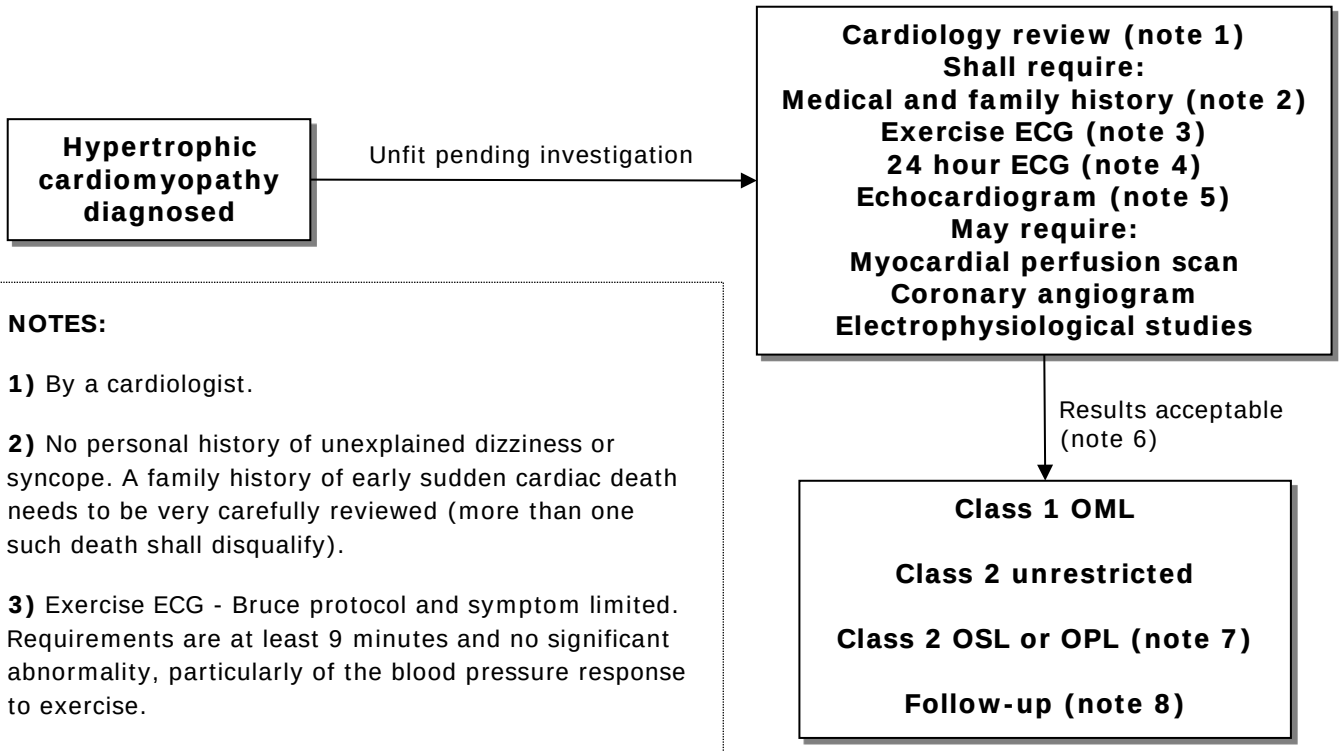
4) Echocardiogram – The valve replacement should be functioning normally. Left ventricular size and function should be normal (≥50%).

5) The cardiology report will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations in which case the actual tracings/films/videos will be requested.

6) If the above requirements cannot be met, class 2 restricted (OSL or OPL) recertification may be appropriate.

7) Annual cardiological review including echocardiography. Reports should include demonstrated stability of anticoagulant therapy where taken.

Flowchart – Hypertrophic cardiomyopathy certification



NOTES:

1) By a cardiologist.

2) No personal history of unexplained dizziness or syncope. A family history of early sudden cardiac death needs to be very carefully reviewed (more than one such death shall disqualify).

3) Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant abnormality, particularly of the blood pressure response to exercise.

4) 24 Hour ECG - No significant rhythm/conduction disturbance. A non-sustained/sustained ventricular rhythm disturbance shall disqualify.

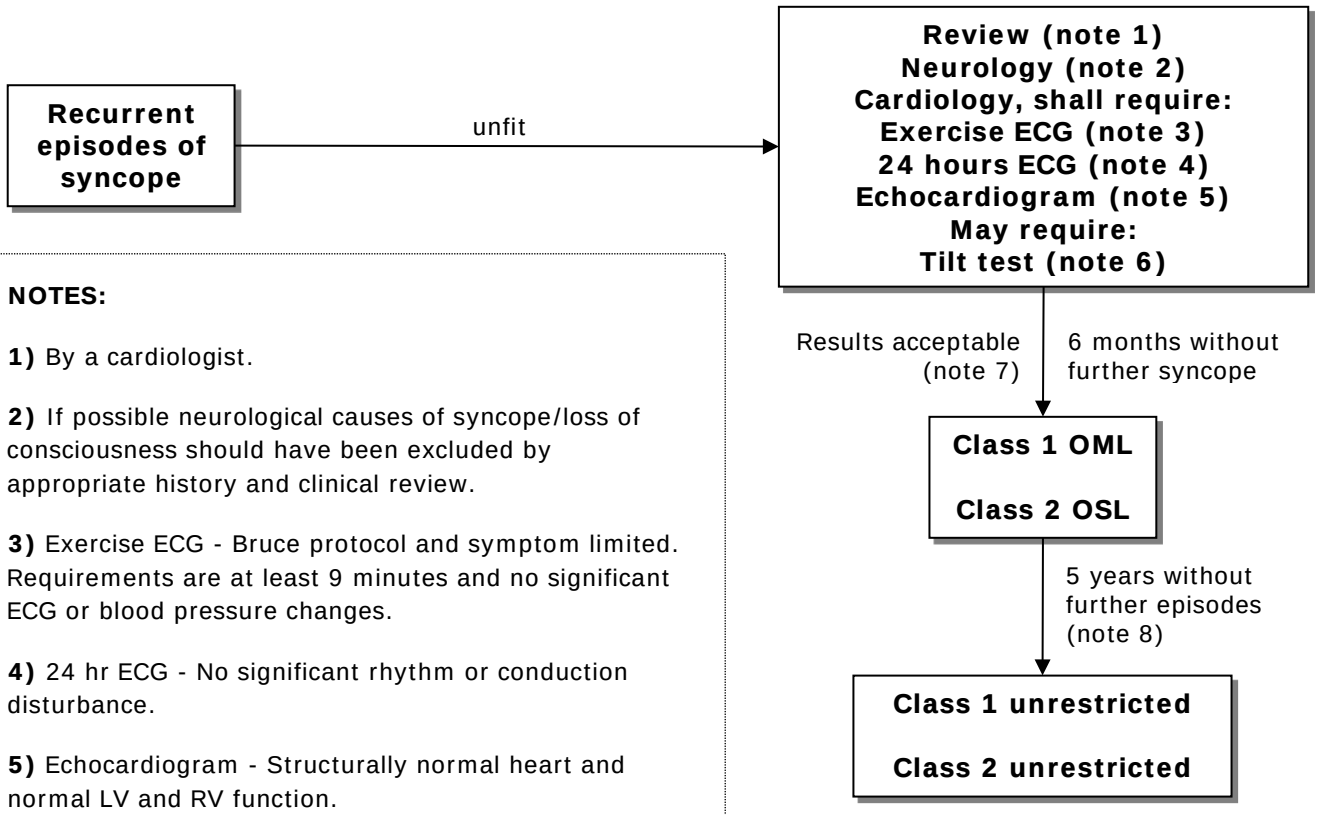
5) Echocardiography - Ejection fraction equal to or more than 50% with no significant abnormality of wall motion. Septal thickness should be less than 2,5 cm.

6) The cardiology report will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations, in which case the actual tracings/films/videos will be requested. Further investigations (e.g. myocardial perfusion scan/angiography/electrophysiological studies) may be required.

7) Certification of class 2 applicants who fail to meet the requirements may be possible with an OSL or OPL.

8) Periodic follow-up, initially annual. Investigation shall include an exercise ECG, 24 hour ECG and an echocardiogram. Further investigations as indicated.

Flowchart – Neuro-cardiogenic syncope certification



NOTES:

1) By a cardiologist.

2) If possible neurological causes of syncope/loss of consciousness should have been excluded by appropriate history and clinical review.

3) Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant ECG or blood pressure changes.

4) 24 hr ECG - No significant rhythm or conduction disturbance.

5) Echocardiogram - Structurally normal heart and normal LV and RV function.

6) Tilt test to a standard protocol. Drug provocation is not necessary.

7) The reports will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations , in which case the actual tracings/films/videos will be requested. Cases with loss of consciousness without significant warning shall be assessed as unfit.

8) Shorter (or longer) periods may be accepted by the Medical Assessor according to the individual circumstances.

Report specifications – Hypertension

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Examination and Investigation Findings**
   - Blood pressure stabilised within acceptable parameters
     - Three blood pressure readings each taken more than 18 hours aparts or a 24 hour blood pressure recording. Readings should be taken no sooner than two weeks after commencing anti-hypertensive medication.
   - Blood tests
     - Urea and Electrolytes
     - Liver and Renal Function (Estimated Glomerular Filtration Rate)
     - Lipid Profile - serum total cholesterol and HDL cholesterol
     - Plasma glucose
   - Confirmation of no end organ damage
     - Renal disease
       1. Liver and Renal Function (Estimated Glomerular Filtration Rate)
     - Hypertensive retinopathy
   - Cardiovascular risk assessment
     - Family history, smoking, alcohol intake, weight (BMI)
     - Resting ECG
     - Exercise Tolerance Test Report where indicated (e.g. Class 1 multiple risk factors)
       1. Protocol used (e.g. Symptom limited Bruce Protocol off cardioactive medication as directed by the investigating cardiologist)
       2. Walking time
       3. Symptoms experienced
       4. ECG changes
       5. Summary and conclusions
     - Echocardiogram where indicated
       1. Valve structure and function
       2. Standard chamber dimensions
       3. Ejection Fraction (indicate measurement technique)
       4. Summary and conclusions

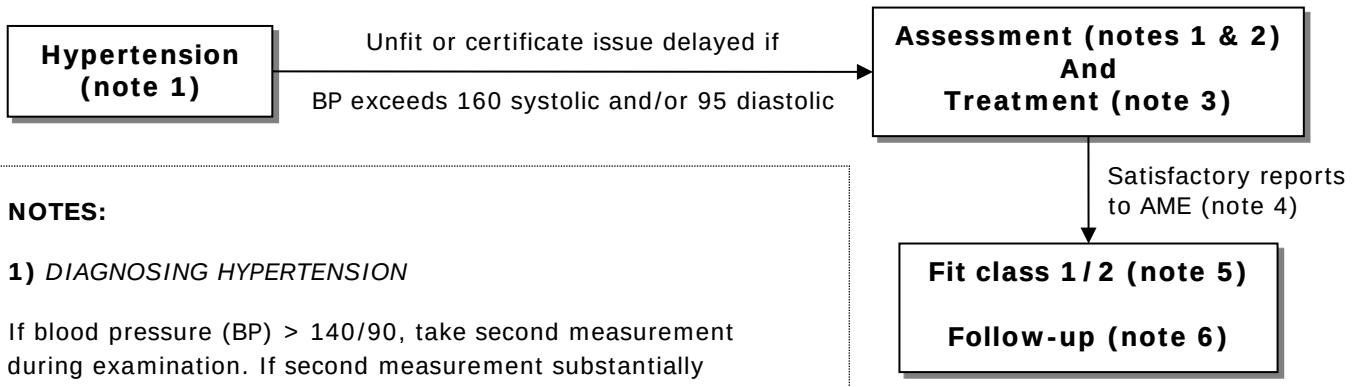
Where investigations are abnormal or borderline the hard copy traces/images are likely to be required for review.

4. **Treatment**
   - Current and recent past medication (dose, frequency, start date and finish date)
   - Confirmation no side effects from medication
   - Lifestyle interventions

5. **Follow up and further investigations/referrals planned or recommended**
   - Plan of management and anticipated follow up

6. **Clinical Implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

Flowchart – Hypertension certification



NOTES:

1) *DIAGNOSING HYPERTENSION*

If blood pressure (BP) > 140/90, take second measurement during examination. If second measurement substantially different, take a third measurement. Record the lower of the last 2 measurements on Med 161. If BP > 140/90, perform 24hr ambulatory BP. Use mean value of at least 14 measurements during waking hours. If 24 hr ambulatory BP cannot be tolerated or for class 2 certificate holders, home blood pressure monitoring is acceptable (for each blood pressure recording, take 2 measurements 1 minute apart, take 2 recordings a day for at least 4 days, discard 1st day measurements and use average value of remaining measurements).

2) *ASSESSMENT*

- Check for end organ damage: echocardiography should be performed if ECG shows LVH, repolarisation changes or LA overload; hypertensive retinopathy or chronic renal disease.
- Check urinalysis and urea, creatinine and electrolytes.
- Assess cardiovascular risk (using the NHG cardiovascular risk assessment tool).
- Certificate holders with hypertension should be referred to their GP or cardiologist for investigation and treatment

3) *BLOOD PRESSURE MEDICATION*

For pilots already established on a thiazide-like diuretic whose blood pressure is stable and well controlled, treatment can be continued, but if treatment plan is reviewed then alternative acceptable medications should be considered.

Acceptable medication:

- Non-Loop diuretics
- ACE inhibitors (e.g. Ramipril)
- Angiotensin II/AT1 blocking agents (sartans)
- Slow-release calcium channel blocking agents
- Beta-blocking agents (e.g. Atenolol)

Unacceptable medication:

- Centrally acting agents (e.g. methyldopa)
- Adrenergic blocking drugs (e.g. guanethidiine)
- Alpha-blocking drugs (Doxazosin may be acceptable in exceptional cases, providing not used as first line treatment- consult Medical Assessor)
- Loop diuretics (e.g. furosemide)

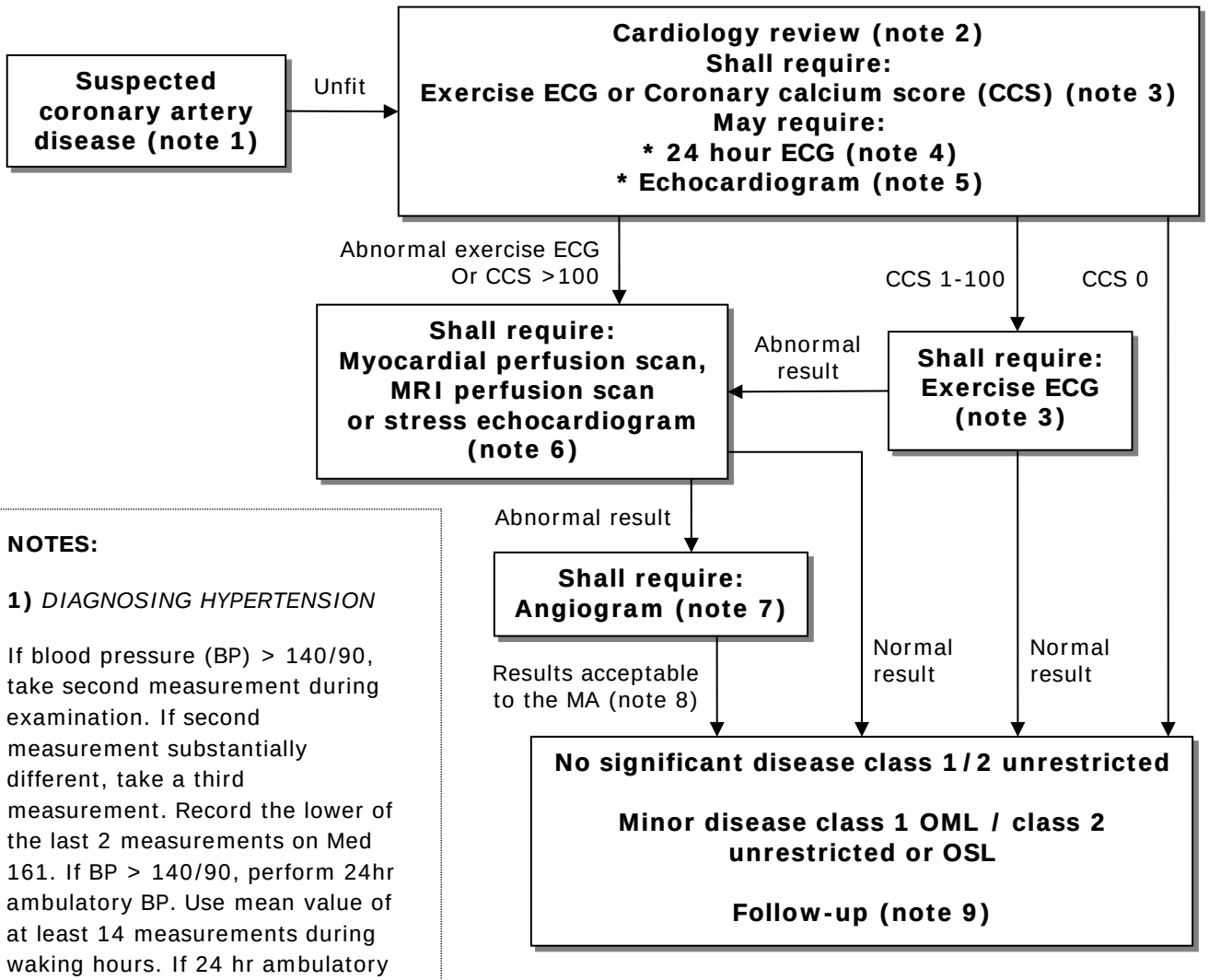
4) A full report from cardiologist or GP to the AME should confirm that the BP has stabilised on acceptable treatment (for a minimum of 2 weeks) and that the pilot has no treatment-related side-effects. If satisfactory a fit assessment can be made and/or a medical certificate issued. Reports should be sent to the Medical Assessor.

5) Pilots with complications of hypertension or multiple risk factors may need to be referred to (Class 1) or discussed with (Class 2) the Medical Assessor. Class 1 pilots with multiple risk factors (10 year cardiovascular risk ≥ 10%) should undergo periodic exercise testing. An OML may be required.

6) Pilots should provide evidence of BP stability to their AME at their periodic medical examinations.

7) Any changes in medication or dosage should be notified to an AME and will require a two week period of grounding. After two weeks the pilot should provide their AME with a report from their GP or treating specialist to confirm the changes, stability of BP and no treatment related side-effects.

Flowchart – Investigation of suspected coronary artery disease certification



NOTES:

1) *DIAGNOSING HYPERTENSION*

If blood pressure (BP) > 140/90, take second measurement during examination. If second measurement substantially different, take a third measurement. Record the lower of the last 2 measurements on Med 161. If BP > 140/90, perform 24hr ambulatory BP. Use mean value of at least 14 measurements during waking hours. If 24 hr ambulatory BP cannot be tolerated or for class 2 certificate holders, home blood pressure monitoring is acceptable (for each blood pressure recording, take 2 measurements 1 minute apart, take 2 recordings a day for at least 4 days, discard 1st day measurements and use average value of remaining measurements).

2) *ASSESSMENT*

- Check for end organ damage: echocardiography should be performed if ECG shows LVH, repolarisation changes or LA overload; hypertensive retinopathy or chronic renal disease.
- Check urinalysis and urea, creatinine and electrolytes.
- Assess cardiovascular risk (using the NHG cardiovascular risk assessment tool).
- Certificate holders with hypertension should be referred to their GP or cardiologist for investigation and treatment

3) *BLOOD PRESSURE MEDICATION*

For pilots already established on a thiazide-like diuretic whose blood pressure is stable and well controlled, treatment can be continued, but if treatment plan is reviewed then alternative acceptable medications should be considered.

Acceptable medication:

- Non-Loop diuretics
- ACE inhibitors (e.g. Ramipril)
- Angiotensin II/AT1 blocking agents (sartans)
- Slow-release calcium channel blocking agents
- Beta-blocking agents (e.g. Atenolol)

Unacceptable medication:

- Centrally acting agents (e.g. methyldopa)
- Adrenergic blocking drugs (e.g. guanethidiine)
- Alpha-blocking drugs (Doxazosin may be acceptable in exceptional cases, providing not used as first line treatment- consult Medical Assessor)
- Loop diuretics (e.g. furosemide)

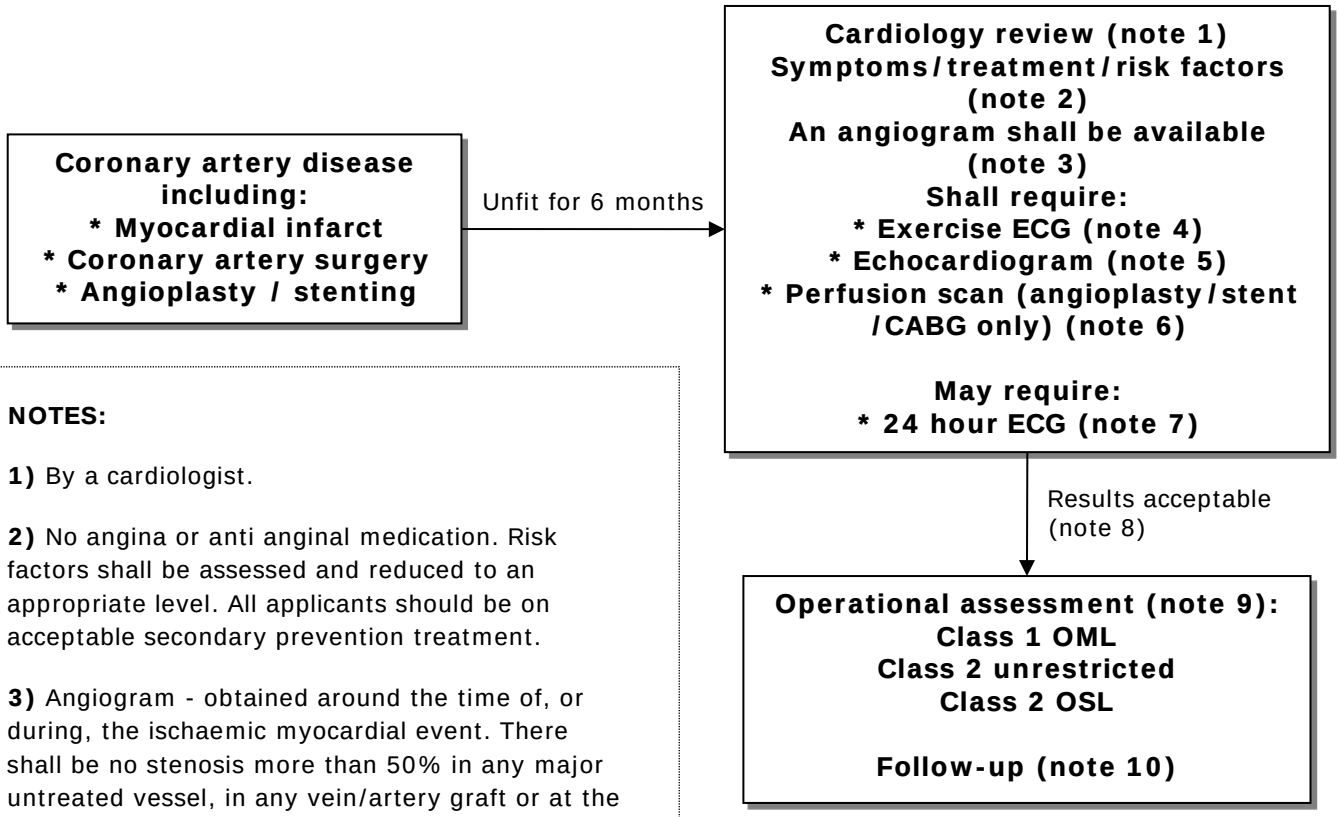
4) A full report from cardiologist or GP to the AME should confirm that the BP has stabilised on acceptable treatment (for a minimum of 2 weeks) and that the pilot has no treatment-related side-effects. If satisfactory a fit assessment can be made and/or a medical certificate issued. Reports should be sent to the Medical Assessor.

5) Pilots with complications of hypertension or multiple risk factors may need to be referred to (Class 1) or discussed with (Class 2) the Medical Assessor. Class 1 pilots with multiple risk factors (10 year cardiovascular risk ≥ 10%) should undergo periodic exercise testing. An OML may be required.

6) Pilots should provide evidence of BP stability to their AME at their periodic medical examinations.

7) Any changes in medication or dosage should be notified to an AME and will require a two week period of grounding. After two weeks the pilot should provide their AME with a report from their GP or treating specialist to confirm the changes, stability of BP and no treatment related side-effects.

Flowchart – Coronary artery disease certification



NOTES:

1) By a cardiologist.

2) No angina or anti anginal medication. Risk factors shall be assessed and reduced to an appropriate level. All applicants should be on acceptable secondary prevention treatment.

3) Angiogram - obtained around the time of, or during, the ischaemic myocardial event. There shall be no stenosis more than 50% in any major untreated vessel, in any vein/artery graft or at the site of an angioplasty/stent, except in a vessel supplying an infarct. More than two stenoses between 30% and 50% within the vascular tree should not be acceptable. The whole coronary vascular tree shall be assessed (particular attention should be paid to multiple stenoses and/or multiple revascularisations). An untreated stenosis greater than 30% in the left main or the proximal left anterior descending coronary artery should not be acceptable.

4) Exercise ECG - should be symptom limited to a minimum of Bruce stage 4 or equivalent, with no evidence of myocardial ischaemia or significant rhythm disturbance.

5) Echocardiogram - myocardial function shall be assessed and show no important abnormality of wall motion and a LV ejection fraction of 50% or more (Echo not required if ejection fraction measured by stress echocardiography or myocardial perfusion scan).

6) Myocardial perfusion scan - showing no evidence of reversible ischaemia shall be required at least 6 months after angioplasty/stenting/CABG, but not after myocardial infarction unless there is doubt about myocardial perfusion. Stress echocardiogram or MRI perfusion may be accepted in lieu of myocardial perfusion scan.

7) 24 hour ECG - may be necessary to assess the risk of any significant rhythm disturbance.

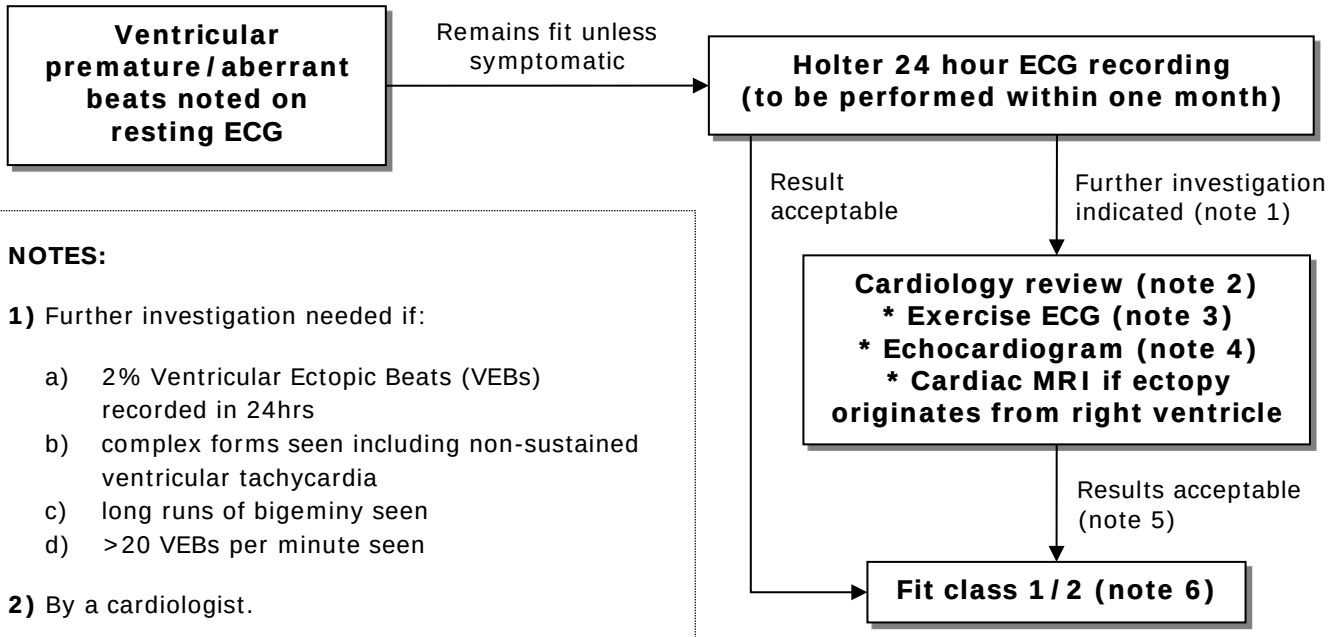
8) The cardiology report will be reviewed by the Medical Assessor (Class 1) or AME for class 2. It may be necessary to see the investigations, in which case the actual tracings/films/videos will be requested. Further investigations may be required.

9) class 1 recertification will require a multi-pilot limitation (OML). Unrestricted class 2 certification is possible having completed all the above investigations. Class 2 applicants not fully meeting the requirements may be recertificated with a safety pilot limitation (OSL) having completed a satisfactory exercise ECG test (as in note 4).

10) Periodic follow-up (at least annually for the first 5 years) shall include a specialist cardiology review, cardiovascular risk assessment and an acceptable exercise ECG (as in note 4 above). In all cases coronary angiography and/or myocardial perfusion scanning (or equivalent) shall be considered at any time if

symptoms, signs or non-invasive tests indicate cardiac ischaemia. In all cases of coronary artery bypass grafting (except class 2 OSL) a myocardial perfusion (or equivalent) scan shall be performed 5 years after the procedure (if not done before).

Flowchart – Ventricular ectopy certification



NOTES:

1) Further investigation needed if:

a) 2% Ventricular Ectopic Beats (VEBs) recorded in 24hrs
b) complex forms seen including non-sustained ventricular tachycardia
c) long runs of bigeminy seen
d) >20 VEBs per minute seen

2) By a cardiologist.

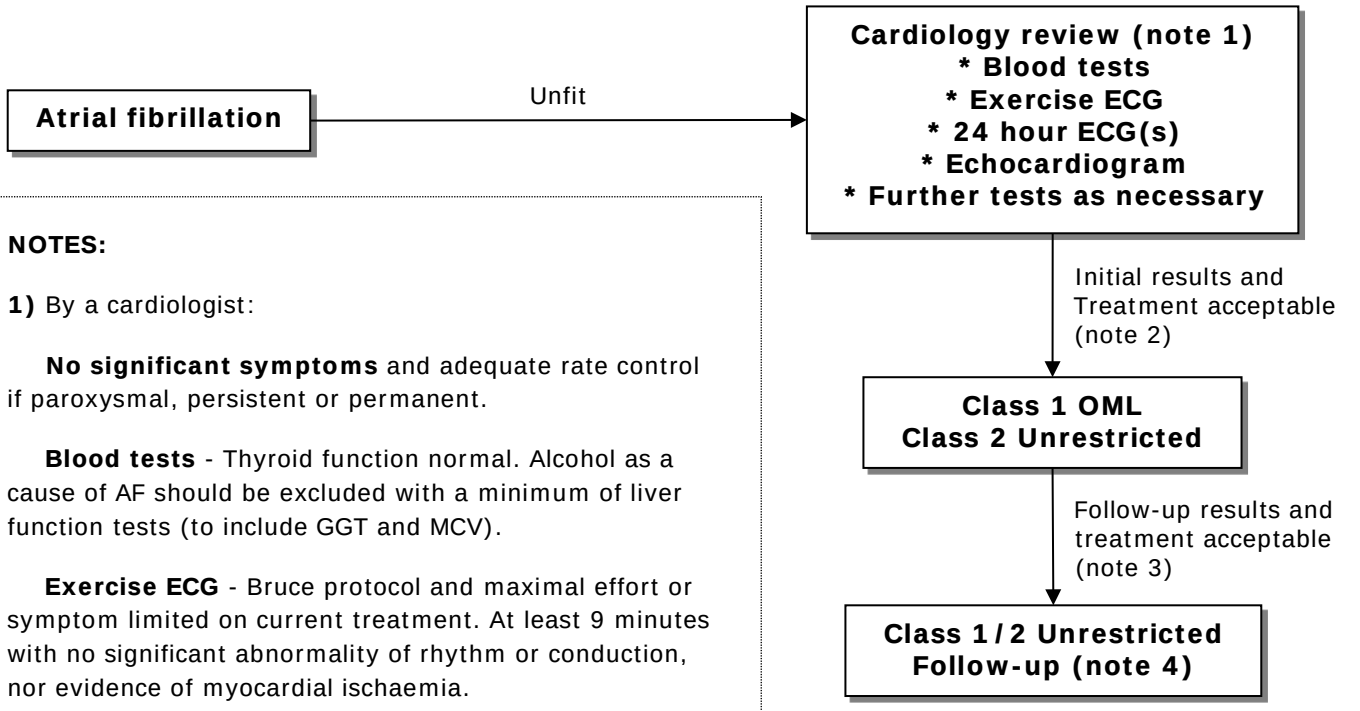
3) Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant ECG or blood pressure changes. Any abnormality may require further investigation.

4) Echocardiogram - Should reveal a structurally normal heart with normal LV/RV function.

5) The cardiology report will be reviewed by the AME. It may be necessary to refer cases to the Medical Assessor with the investigation results (the actual tracings/videos may be requested).

6) If the above investigations show a significant abnormality, an OML/OSL limitation may need to be applied by the Medical Assessor. An ectopic beat count of >7,5% of the total beat count on Holter recording will normally require an OML limitation. Periodic cardiological review may be required.

Flowchart – Atrial fibrillation certification



NOTES:

1) By a cardiologist:

No significant symptoms and adequate rate control if paroxysmal, persistent or permanent.

Blood tests - Thyroid function normal. Alcohol as a cause of AF should be excluded with a minimum of liver function tests (to include GGT and MCV).

Exercise ECG - Bruce protocol and maximal effort or symptom limited on current treatment. At least 9 minutes with no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia.

24 hr ECG - More than one may be required. The following criteria should be met:

If in sinus rhythm - No episodes of AF and no pauses >2,5s whilst awake. Ventricular arrhythmia should not exceed an aberrant beat count >2% of total, with no complex forms.
Established AF - RR interval >300ms and <3,5s (i.e. no very rapid rates or long pauses).
Paroxysmal, persistent & permanent AF - As above plus the longest pause on recapture of sinus rhythm should not exceed 2,5s whilst awake.

Echocardiogram - Should show no significant selective chamber enlargement, or significant structural or functional abnormality, and an LVEF of 50% or more.

Further tests - May include repeat 24 hour ECG recordings, electrophysiological studies, cardiac MRI, myocardial perfusion scanning and/or coronary angiography.

2) For class 1 certificate holders the cardiology report(s) will be reviewed by the Medical Assessor. Class 2 applicants will be re-certificated by the AME in consultation with the Medical Assessor. It may be necessary to see the investigations, in which case the actual tracings/films/videos/ CDs will be requested.

CHA_2DS_2-VASc score		**Assessment of CHA_2DS_2-VASc score for certifications**
C Congestive heart failure (or Left ventricular systolic dysfunction) = 1	**V** Vascular disease (e.g. peripheral artery disease, myocardial infarction, aortic plaque) = 1	0 Class 1 OML / class 2 Unrestricted
H Hypertension = 1	**A** Age 65-74 years = 1	1 Individual assessment
A_2 Age ≥ 75 years = 2	**Sc** Sex category (i.e. female gender) = 1	2 Class 2 OSL
D Diabetes Mellitus = 1	**S_2** Prior Stroke or TIA or thromembolism = 2	>2 Unfit all classes

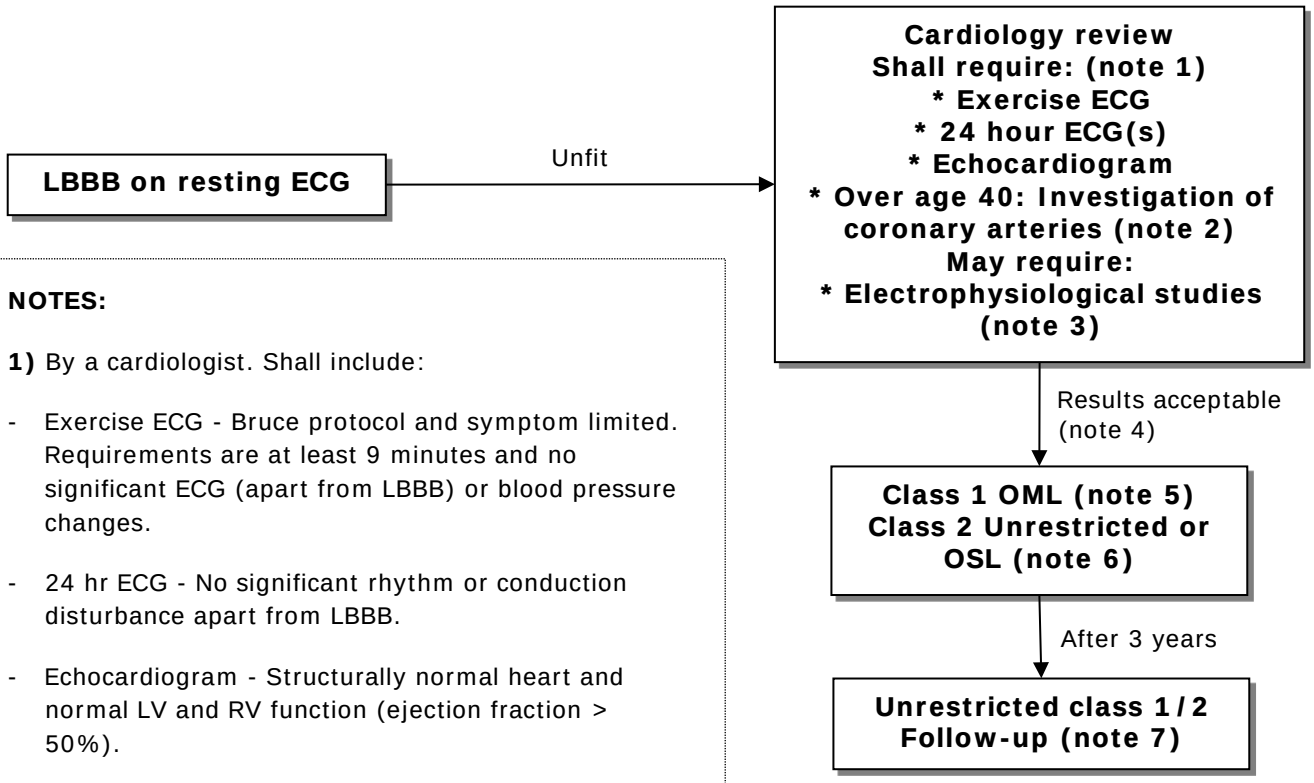
Acceptable treatment includes sotalol, bisoprolol or other beta-blocking drugs, digitalis, dronedarone (periodic blood testing required to check for hepatotoxicity), diltiazem and verapamil. Exceptionally flecainide or propafenone may be used in consultation with the Medical Assessor (with 6 months

demonstrated stability). Amiodarone is normally unacceptable for class 1, but may be acceptable for class 2 (maximum dose 200mg daily, night flying will require a Medical Assessor ophthalmological review).

3) Initial cardiological follow-up should be 6 monthly to include a minimum of 24 hour ECG monitoring. Subsequent follow-up at the discretion of the Medical Assessor, normally annual cardiological review with 24hr ECG and echocardiogram. Other tests if clinically indicated.

4) After 2 years follow up for class 1, only applicants with a single original episode of AF with no recurrence may be able to achieve unrestricted class 1 certification. Subsequent follow up normally annual with 24hr ECG.

Flowchart – Left bundle branch block (LBBB) certification



NOTES:

1) By a cardiologist. Shall include:

- Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant ECG (apart from LBBB) or blood pressure changes.
- 24 hr ECG - No significant rhythm or conduction disturbance apart from LBBB.
- Echocardiogram - Structurally normal heart and normal LV and RV function (ejection fraction > 50%).

2) Coronary artery investigation - shall be required in all applicants over the age of 40. A myocardial perfusion scan, stress echo, CT angiogram or cardiac MRI will normally be sufficient. Pharmacological stress should be used to avoid difficulties in the interpretation of septal perfusion.

3) Electrophysiological studies - should be performed if the PR interval is >200 msec, and possibly if the ECG shows an abnormal axis. The HV interval should be less than 100 msec.

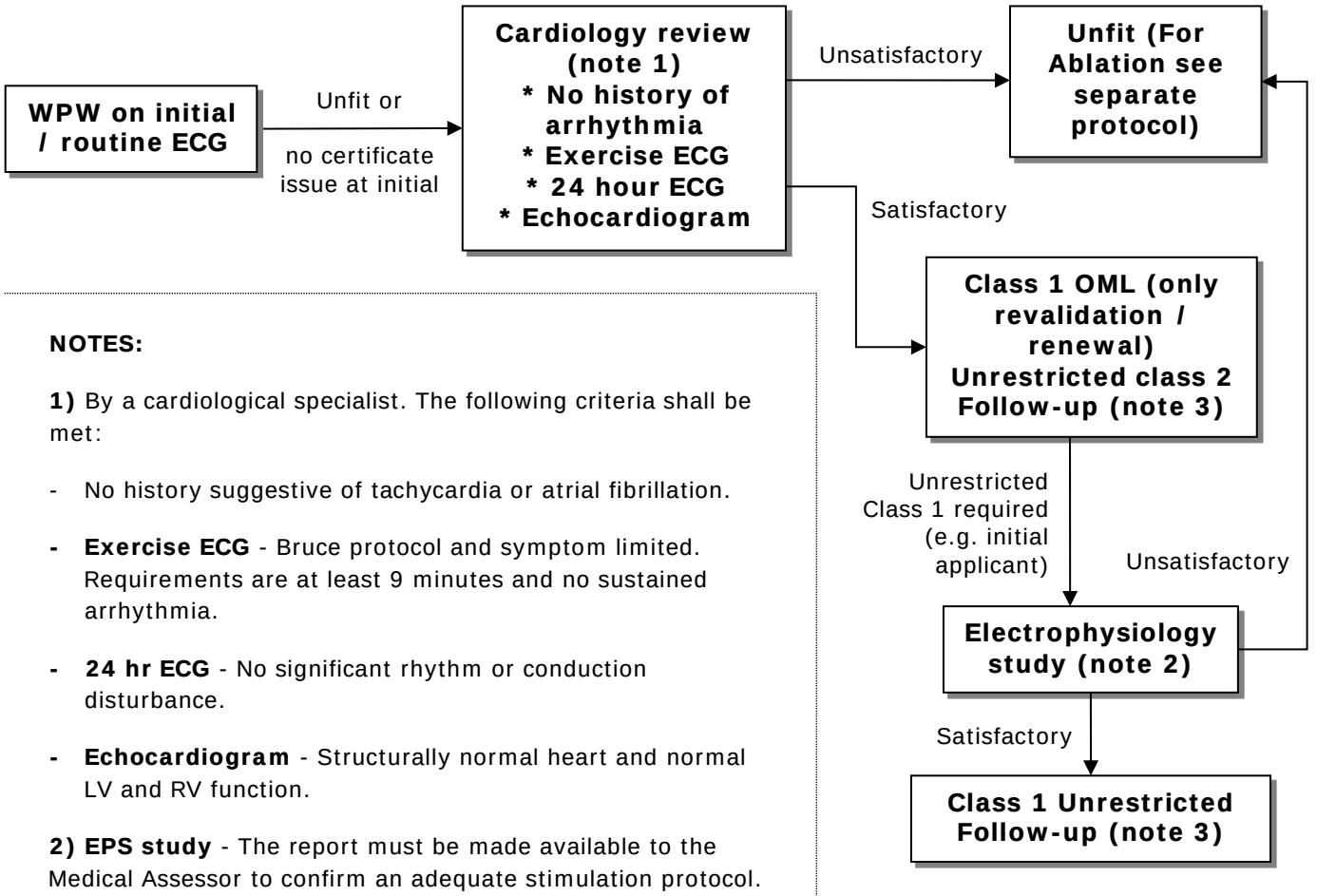
4) For class 1 applicants the cardiology report will be reviewed by the Medical Assessor. It may be necessary to see the investigations in which case the actual tracings/films/videos will be requested.

5) class 1 certification - Satisfactory investigations will allow class 1 OML. Annual cardiology review with a minimum of an exercise ECG. Review at 3 years should also include a 24 hour ECG and echocardiogram. If satisfactory - unrestricted class 1 can be issued. Initial class 1 applicants will need to show a 3 year period of stability, as above, before a class 1 certificate can be issued.

6) class 2 certification - Satisfactory investigations will allow unrestricted class 2. If coronary artery investigation was not done at initial assessment, class 2 applicants over the age of 40 may need to be restricted to OSL (safety pilot). For these pilots unrestricted class 2 certification can be considered after 3 years satisfactory follow up as in note 4 above.

7) Follow up after the 3 year period: pilots with long standing LBBB should expect to be asked to have occasional cardiology reviews to check that all remains well, particularly if any changes are noted on the resting ECG.

Flowchart – Wolff-Parkinson-White (WPW) pre-excitation certification



NOTES:

1) By a cardiological specialist. The following criteria shall be met:

- No history suggestive of tachycardia or atrial fibrillation.
- **Exercise ECG** - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no sustained arrhythmia.
- **24 hr ECG** - No significant rhythm or conduction disturbance.
- **Echocardiogram** - Structurally normal heart and normal LV and RV function.

2) EPS study - The report must be made available to the Medical Assessor to confirm an adequate stimulation protocol. It must include an isoprenaline / adrenaline infusion sufficient to increase the sinus rate by 25%.

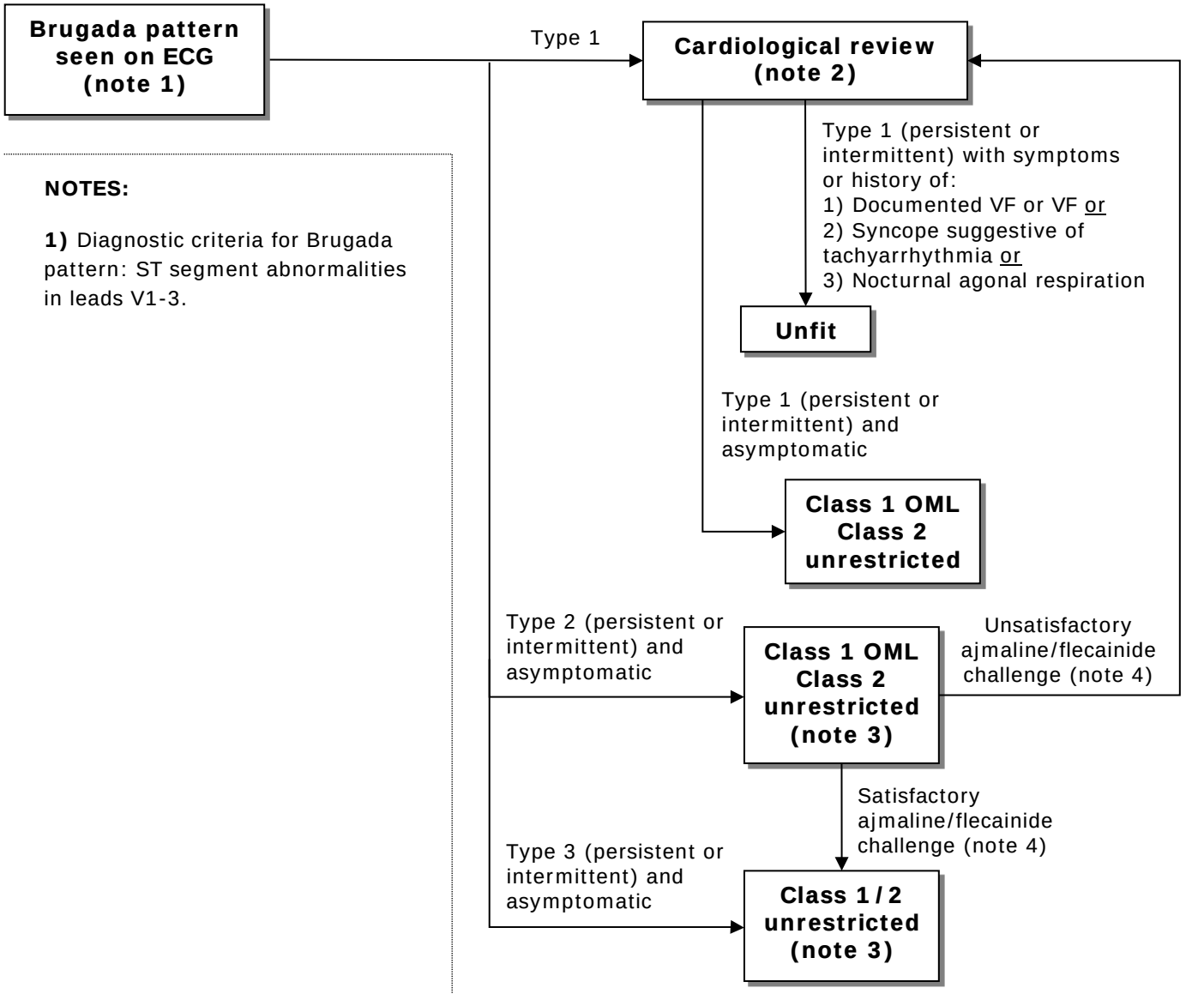
The following criteria shall be met:

- No inducible atrioventricular re-entry tachycardia
- Delta-delta interval during atrial fibrillation >300 ms (>250 ms with isoprenaline)
- Antegrade refractory period of accessory pathway >300 ms (>250 ms with isoprenaline)
- Cycle length with 1:1 accessory pathway conduction >300 ms (>250 ms with isoprenaline)
- No evidence of multiple pathways

The report will be reviewed by the Medical Assessor.

3) class 1 follow up shall be at the discretion of the Medical Assessor.

Flowchart – Brugada certification



NOTES:

1) Diagnostic criteria for Brugada pattern: ST segment abnormalities in leads V1-3.

	Type 1
J point	≥2 mm
T wave	Negative
ST-T configuration	Coved type
ST segment (terminal portion)	Gradually descending

	Type 2
J point	≥2 mm
T wave	Positive or biphasic
ST-T configuration	Saddleback
ST segment (terminal portion)	Elevated ≥1 mm

	Type 3
J point	≥2 mm

T wave	Positive
ST-T configuration	Saddleback
ST segment (terminal portion)	Elevated <1 mm

Asymptomatic type 1 and type 2 cases may continue to fly class 1 OML / class 2 unrestricted.

2) Type 1 cases need review by a cardiologist. Investigations should include:

Exercise ECG: to the Bruce protocol or equivalent. The test should be to maximum effort or symptom limited. Bruce stage 4 should be achieved and no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia shall be demonstrated. Withdrawal of cardioactive medication prior to the test should be considered (not beta-blockade for atrial fibrillation).

24-hour ambulatory ECG: shall demonstrate no significant rhythm or conduction disturbance.

Echocardiogram: shall show no significant selective chamber enlargement, or significant structural or functional abnormality, and a left ventricular ejection fraction of at least 50%.

Cardiac MRI: should exclude ARVD. The cardiology report(s) will be reviewed by the Medical Assessor. It may be necessary to see the investigations, in which case the actual results will be requested. Type 1 cases who are symptomatic or have evidence of tachyarrhythmia shall be assessed as unfit.

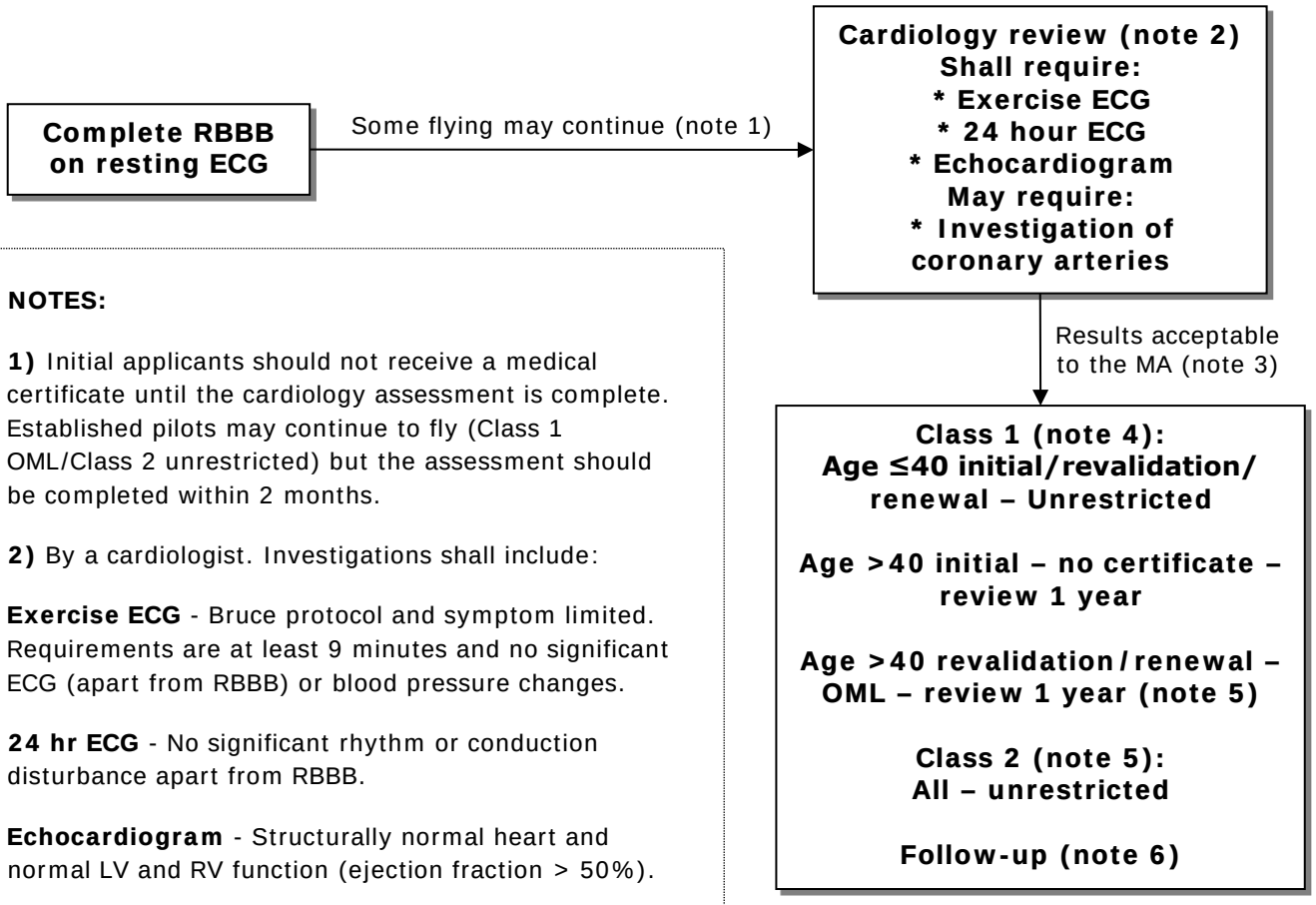
3) At least annual ECG.

4) Applicants wanting to be considered for unrestricted class 1 will need to undergo a challenge test consisting of Ajmaline 1mg/kg over 5 minutes intravenously or Flecainide 2mg/kg over 15 minutes (maximum dose 150mg). Indications for termination are to be determined by the prescriber; they may include:

a) Development of Type 1 Brugada ECG
b) Greater than or equal to 2mm increase in ST elevation in patients with Type 2 Brugada ECG
c) The development of VPBs or other arrhythmias
d) Widening of QRS greater than or equal to 30% above baseline

If acceptable, applicants will be considered for unrestricted class 1. If Type 1 changes seen during Ajmaline or Flecainide challenge, the applicant will need to comply with note 2.

Flowchart – Complete Right bundle branch block (RBBB) certification



NOTES:

1) Initial applicants should not receive a medical certificate until the cardiology assessment is complete. Established pilots may continue to fly (Class 1 OML/Class 2 unrestricted) but the assessment should be completed within 2 months.

2) By a cardiologist. Investigations shall include:

Exercise ECG - Bruce protocol and symptom limited. Requirements are at least 9 minutes and no significant ECG (apart from RBBB) or blood pressure changes.

24 hr ECG - No significant rhythm or conduction disturbance apart from RBBB.

Echocardiogram - Structurally normal heart and normal LV and RV function (ejection fraction > 50%).

Further evaluation may be required (for example investigation of the coronary arteries) if any of the above investigations are abnormal.

3) For class 1 applicants the cardiology report will be reviewed by the Medical Assessor. It may be necessary to see the investigations in which case the actual tracings/films/videos/CDs will be requested.

4) class 1 applicants age 40 or under (initial and revalidation/renewal) may have unrestricted certification.

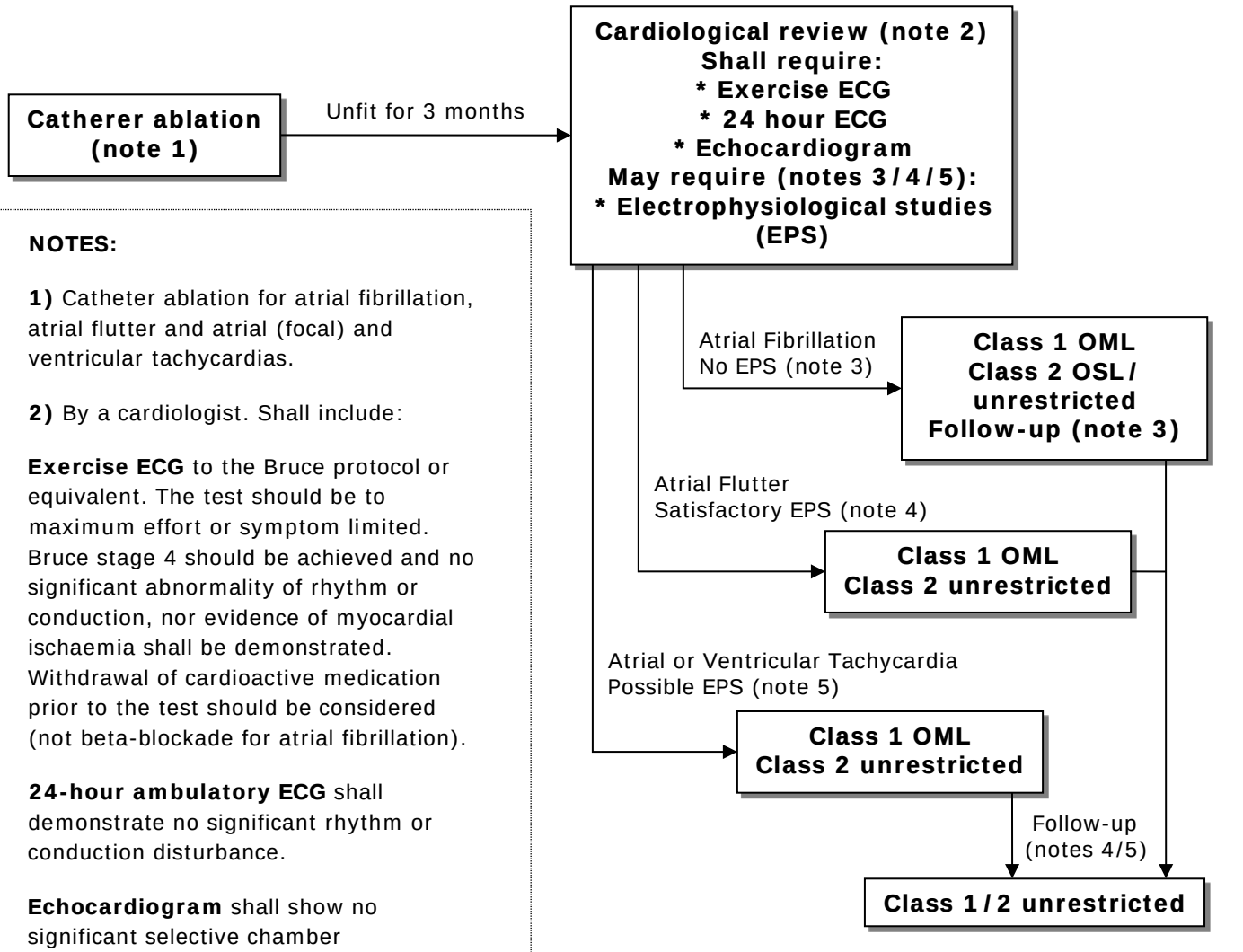
Initial class 1 applicants over age 40 cannot be certificated until completing a satisfactory follow up review at one year to include an exercise ECG.

Class 1 applicants over age of 40 for revalidation/renewal will need an OML and a review again in a year to include an exercise ECG. At that time an unrestricted certificate can be issued if there is no change. If there has been a documented gradual progression from incomplete RBBB to complete RBBB over several years, there will be no requirement for an OML.

5) class 2 applicants can have unrestricted certification if all the requirements are met. Certification with OSL may be possible if only some requirements are achieved.

6) Pilots with long standing RBBB should expect to be asked to have occasional cardiology reviews to check that all remains well, particularly if there is a change to the resting ECG.

Flowchart – Catheter ablation for tachycardia certification (except WPW and AVNRT)



NOTES:

1) Catheter ablation for atrial fibrillation, atrial flutter and atrial (focal) and ventricular tachycardias.

2) By a cardiologist. Shall include:

Exercise ECG to the Bruce protocol or equivalent. The test should be to maximum effort or symptom limited. Bruce stage 4 should be achieved and no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia shall be demonstrated. Withdrawal of cardioactive medication prior to the test should be considered (not beta-blockade for atrial fibrillation).

24-hour ambulatory ECG shall demonstrate no significant rhythm or conduction disturbance.

Echocardiogram shall show no significant selective chamber enlargement, or significant structural or functional abnormality, and a left ventricular ejection fraction of at least 50%. The cardiology report(s) will be reviewed by the Medical Assessor for class 1 and the AME for class 2. It may be necessary to see the investigations, in which case the actual results will be requested.

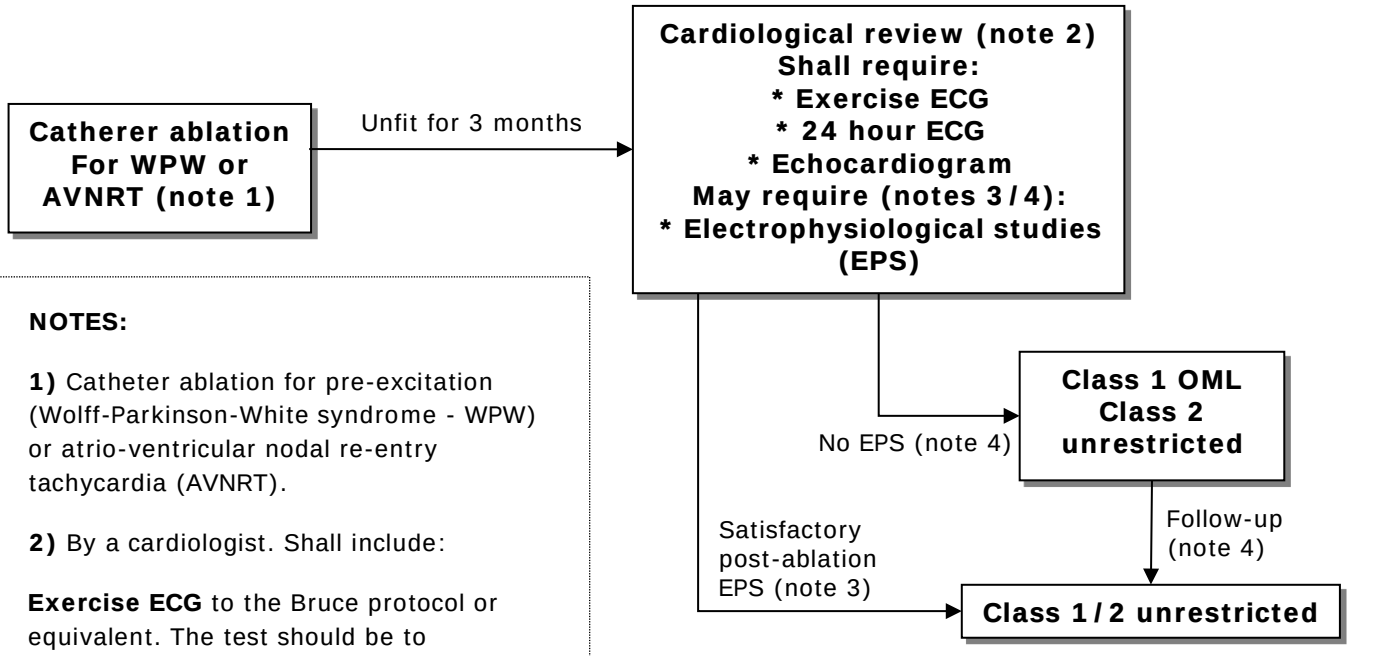
3) Atrial Fibrillation: Post ablation EPS may not predict recurrence and is not a requirement. However, because of the relatively high risk of recurrence, class 1 applicants require an OML. Unrestricted class 1 may be considered after 2 years of satisfactory follow up. Class 2 applicants who were symptomatic pre-ablation may need an OSL. Follow-up: usually annual with 24hr ECG.

4) Atrial Flutter: Post ablation EPS (bi-directional isthmus block) will be required in most cases 2 months after the ablation procedure to demonstrate abolition of flutter circuit. Because of the subsequent unpredictable risk of atrial fibrillation, class 1 applicants shall have an OML for 1 year, which may be removed with a satisfactory review. Unrestricted class 2 certification may be appropriate, also with annual review.

5) Atrial and Ventricular Tachycardia: class 1/2 applicants with a pre-ablation history of significant tachycardia (syncope or haemodynamic compromise) will require post ablation EPS to check that tachycardia is no longer inducible. For all applicants (with or without EPS) class 1 OML and unrestricted class 2 certification is likely to be appropriate with review at 1 year. If satisfactory the OML can be removed.

In all cases, failure to meet the standards may require OML/OSL and/or extended follow-up.

Flowchart – Catheter ablation for WPW syndrome and AVNRT certification



NOTES:

1) Catheter ablation for pre-excitation (Wolff-Parkinson-White syndrome - WPW) or atrio-ventricular nodal re-entry tachycardia (AVNRT).

2) By a cardiologist. Shall include:

Exercise ECG to the Bruce protocol or equivalent. The test should be to maximum effort or symptom limited. Bruce stage 4 should be achieved and no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia shall be demonstrated. Withdrawal of beta blockade or other anti-arrhythmic treatment should be considered prior to the test.

24-hour ambulatory ECG shall demonstrate no significant rhythm or conduction disturbance.

Echocardiogram shall show no significant selective chamber enlargement, or significant structural or functional abnormality, and a left ventricular ejection fraction of at least 50%.The cardiology report(s) will be reviewed by the Medical Assessor for class 1 and by the AME for class 2. It may be necessary to see the investigations, in which case the actual results will be requested.

3) Applicants seeking unrestricted class 1 certification and any applicant (Class 1/2) with a history of significant tachycardia (syncope or haemodynamic compromise) shall have a satisfactory post ablation EPS:

Pre-excitation - No evidence of accessory pathway conduction pre or post isoprenaline/adrenaline. For WPW where antegrade conduction was present pre-ablation, a satisfactory adenosine test may be sufficient.

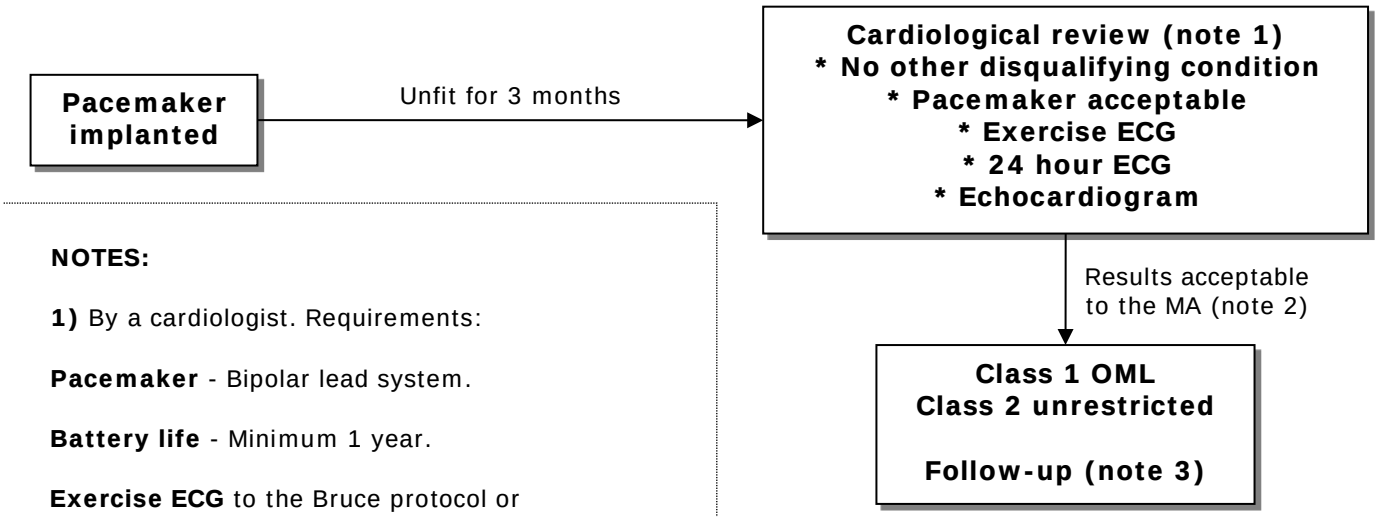
AVNRT - No inducible tachycardia pre or post isoprenaline/adrenaline. Dual pathways and single echoes are acceptable.

Failure to reach these requirements will require a period with an OML/OSL and follow up as in note 4 below.

4) Other class 1 applicants with satisfactory tests as in note 2 above, who elect not to have a post ablation EPS will require an OML and follow up. Satisfactory review in 1 year should allow unrestricted class 1 certification.

Other class 2 applicants who elect not to have a post ablation EPS may gain an unrestricted certificate with satisfactory tests as in note 2 above. Further review may not be necessary. Failure to achieve the requirements may require an OSL.

Flowchart – Implantation of a cardiac pacemaker certification



NOTES:

1) By a cardiologist. Requirements:

Pacemaker - Bipolar lead system.

Battery life - Minimum 1 year.

Exercise ECG to the Bruce protocol or equivalent. The test should be to maximum effort or symptom limited. Bruce stage 4 should be achieved and no significant abnormality of rhythm or conduction, nor evidence of myocardial ischaemia shall be demonstrated. Withdrawal of cardioactive medication prior to the test should be considered.

24-hour ambulatory ECG shall demonstrate no significant rhythm or conduction disturbance.

Echocardiogram shall show no significant selective chamber enlargement, or significant structural or functional abnormality, and a left ventricular ejection fraction of at least 50%.

2) For class 1 applicants, the cardiology report will be reviewed by the Medical Assessor. It may be necessary to see the investigations, in which case the actual tracings/videos will be requested.

3) Follow-up will normally be a minimum of a six monthly pacemaker check and an annual cardiology review.

MED.B.015 – Luchtwegenstelsel

Richtlijnen
Guidance Material

Report specifications – Respiratory

Exercise spirometry testing
Exercise spirometry testing is required if there is any of the following:

1. Abnormal lung function:

Class 1: FEV_1/FVC <70%
Class 2: Peak flow <80% predicted

2. History of asthma:

Class 1 current of within last 5 yrs
Class 2 current of within last 2 yrs
Asthma needing regular (>once per 3 months) use of any inhaler

3. Any other indication

Asthma
Initial class 1 applicants or class 1 holders with a new diagnosis of asthma require review by a pulmonologist.
Class 1 holders with an established diagnosis of asthma who are stable, or initial class 2 applicants, require a review by a pulmonologist, to include exercise spirometry and details of medication required.
A history of asthma attacks requiring acute medical intervention/admission within past 5 years for class 1 and 2 years for class 2 and/or repeated courses of oral steroids/frequent exacerbations is normally disqualifying.

Asthma Medication
Oral steroids are disqualifying for certification. Inhaled beta 2 agonists, anticholinergic medication, corticosteroids, cromoglycate and the leukotriene receptor antagonists, such as montelukast, are acceptable for certification.

Flowchart – Sarcoidosis certification

Pneumothorax
Acceptable surgical treatment
includes thoracotomy, oversewing of apical blebs, parietal pleurectomy and Video Assisted Thoracic Surgery (VATS) pleurectomy.
Recertification can be undertaken six weeks after a VATS pleurectomy. For other procedures, recertification may require a longer grounding period.
If 6 weeks following successful surgical treatment with a normal post-operative chest radiograph, unrestricted initial class 1 and 2 medical certification can be considered.
If surgical treatment is not undertaken, an OML for class 1 is required for one year following the pneumothorax due to the possible risk of recurrence.

Flowchart – Obstructive sleep apnoea certification

Report specifications – Respiratory

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Current/presenting symptoms
     - Shortness of breath, wheeze or bronchospasm, nocturnal symptoms
     - Circumstances surrounding onset, precipitating factors
     - Residual impairment or loss of function
   - Confirmation of any systemic involvement
   - Details of respiratory events within past 5 years (including treatment and admissions)
   - Childhood and other relevant medical history
   - Family history

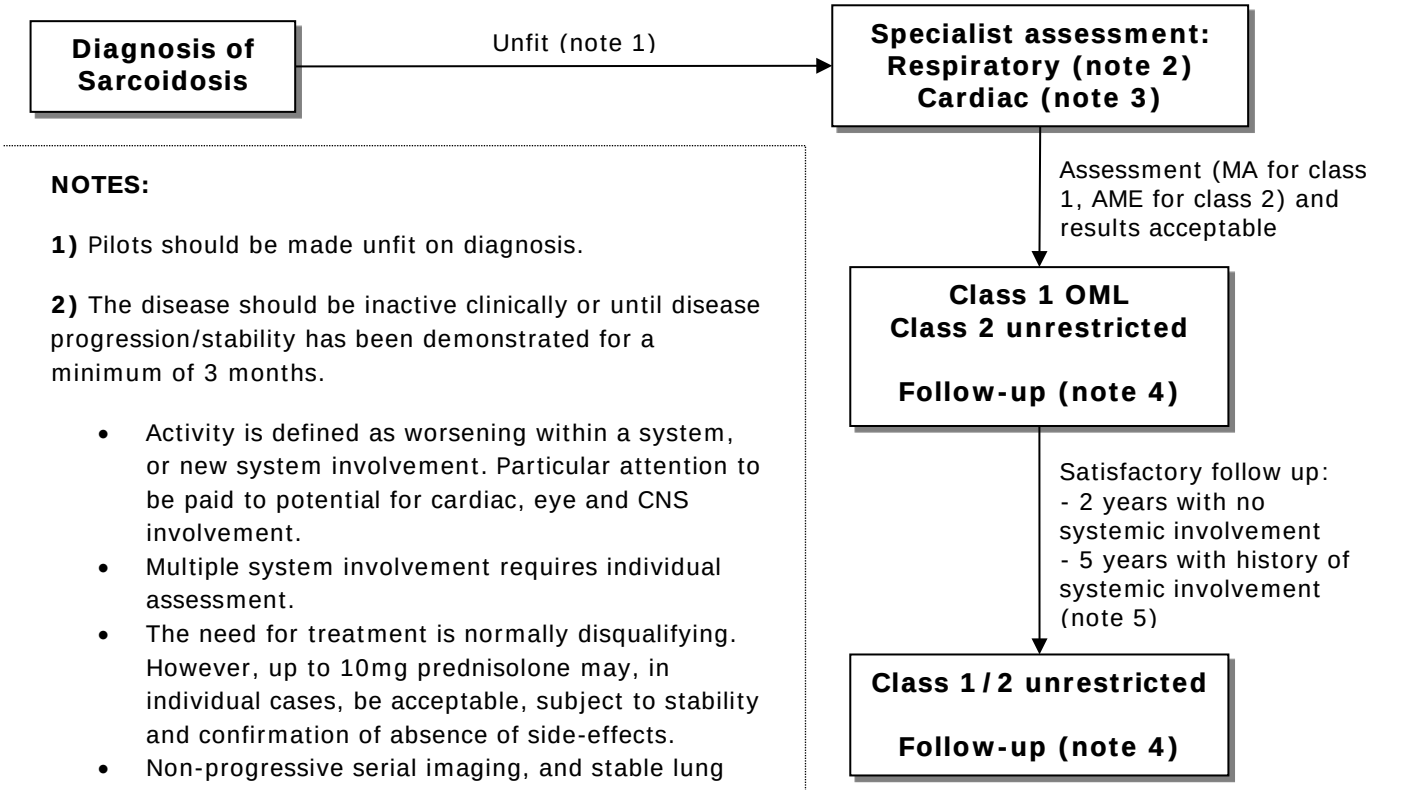
3. **Examination and Investigation Findings**
   - Clinical findings
   - Standard spirometry and/or exercise spirometry
   - Bronchial reactivity/reversibility test (if indicated)
   - Radiology imaging reports (e.g. x-ray, serial imaging if indicated)
   - Other investigations (e.g. bronchoscopy/thoracoscopy if performed)

4. **Treatment**
   - Current and recent past medication (dose, frequency, start date and finish date)
     - Include frequency of bronchodilator use (as applicable)
   - Confirmation no side effects from medication
   - Current and past history of systemic steroids
   - Other treatments must be detailed (BTS guidelines)
     - For OSAS CPAP report included with medical report
   - Surgical reports (where performed)

5. **Follow up and further investigations/referrals planned or recommended**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Prognosis and risk of recurrence
   - Confirmation of full recovery or remission on maintenance dose of acceptable medication and well controlled at date of report

6. **Clinical Implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

Flowchart – Sarcoidosis certification



NOTES:

1) Pilots should be made unfit on diagnosis.

2) The disease should be inactive clinically or until disease progression/stability has been demonstrated for a minimum of 3 months.

- Activity is defined as worsening within a system, or new system involvement. Particular attention to be paid to potential for cardiac, eye and CNS involvement.
- Multiple system involvement requires individual assessment.
- The need for treatment is normally disqualifying. However, up to 10mg prednisolone may, in individual cases, be acceptable, subject to stability and confirmation of absence of side-effects.
- Non-progressive serial imaging, and stable lung function (<10%/yr fall in FVC or <15%/yr fall in gas transfer factor (no lower than 70% of predicted)).

3) Cardiology review to include:

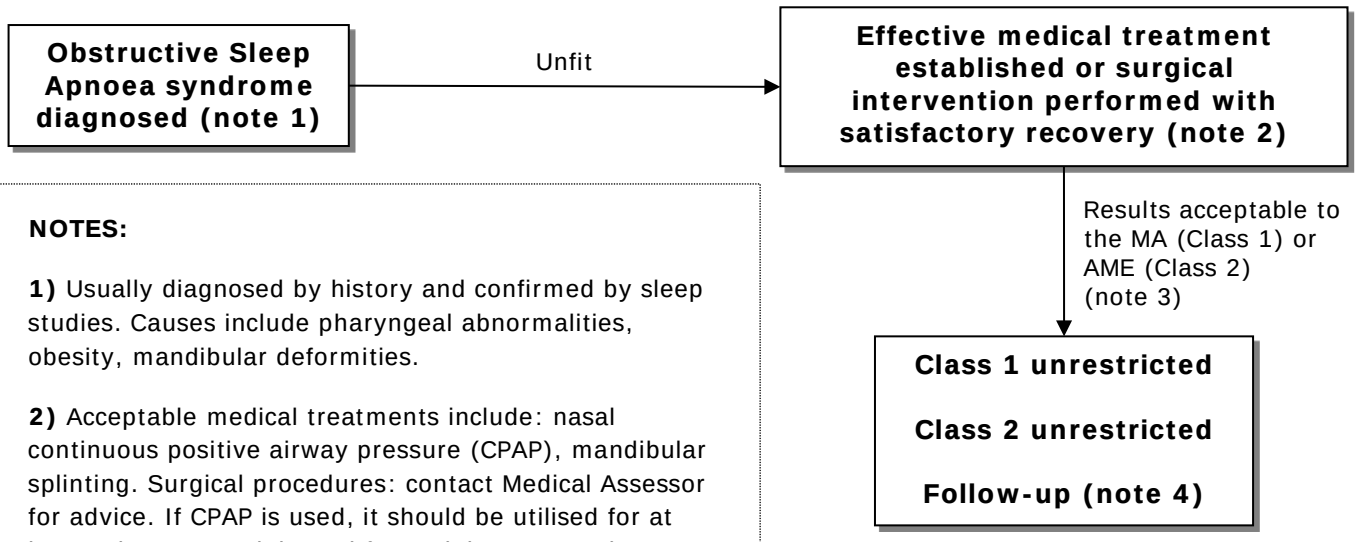
- 12 lead resting ECG;
- 24 hour ECG
- Echocardiogram

Any cardiac symptoms or investigation abnormality will require further evaluation to include cardiac MRI. Evidence of cardiac sarcoidosis likely to cause incapacitation will disqualify.

4) class 1 follow-up should be 6 monthly for 2 years then annually. Class 2 follow up should be annual. Review to include Chest Xray if clinically indicated, pulmonary function tests, resting ECG and 24hr ECG. Remains fit if <10%/yr fall in FVC or <15%/yr fall in gas transfer factor (no lower than 70% of predicted). Other tests may be indicated. Follow up may cease with resolution of disease and at the discretion of the Medical Assessor.

5) A previous history of systemic involvement includes: skin (except erythema nodosum), bone, eye, heart, central nervous system and lung parenchyma.

Flowchart – Obstructive sleep apnoea syndrome certification



NOTES:

1) Usually diagnosed by history and confirmed by sleep studies. Causes include pharyngeal abnormalities, obesity, mandibular deformities.

2) Acceptable medical treatments include: nasal continuous positive airway pressure (CPAP), mandibular splinting. Surgical procedures: contact Medical Assessor for advice. If CPAP is used, it should be utilised for at least 5 hours per night and for 6 nights per week. It must be used during the sleep period just prior to flight. Full benefit from CPAP usually takes 6 weeks of use. The machine usage report should be assessed by the Medical Assessor (Class 1) or AME (Class 2) with any clinical reports. Applicants with excess cardiovascular risk shall undergo cardiological evaluation.

3) Epworth Sleepiness Scale score should be less than 10. In cases of doubt, a Multiple Sleep Latency Test should be performed.

4) Pilots are not to fly if they experience any problems with their treatment or experience a recurrence of their symptoms and/or an Epworth Sleepiness Scale score is greater than or equal to 10. If CPAP is used, the machine usage report should be submitted to the AME (initially every 3 months for the first year) together with copies of your flying logbook for the same period to demonstrate compliance with (2) above.

EPWORTH SLEEPINESS SCALE

Use the following scale to choose the most appropriate number for each situation: 0 = would *never* dose or sleep, 1 = *slight* chance of dozing or sleeping, 2 = *moderate* chance of dozing or sleeping, 3 = *high* chance of dozing or sleeping.

Situation	**Chance of dozing or sleeping**
Sitting and reading	
Watching TV	
Sitting inactive in a public place	
Being a passenger in a motor vehicle for an hour or more	
Lying down in the afternoon	
Sitting and talking to someone	
Sitting quietly after lunch (no alcohol)	
Stopped for a few minutes in traffic while driving	
Total score (add the scores up)	

MED.B.020 – Spijsverteringsstelsel

Richtlijnen
Guidance Material

Report specifications - General

Irritable bowel syndrome
Assessment by a consultant gastroenterologist is required to exclude other medical conditions such as inflammatory bowel disease. Underlying stress should be addressed. If symptoms persist, increased physical activity and dietary modification may be helpful. Symptom targeted medication may include antispasmodics, laxatives, antimotility medication and analgesics.
Certification for class 1 or 2 is possible if symptoms are well controlled with acceptable medication. In intermittently symptomatic cases, an OML may be appropriate for class 1 certificate holders.

Diverticular disease
Peppermint oil is acceptable for aeromedical certification when symptoms are controlled. If broad spectrum antibiotics are prescribed the licence holder should be considered unfit until the course is completed and symptoms have settled. If there is evidence of bleeding or during episodes of diverticulitis the licence holder is unfit. If colectomy is required for severe complications or failure to respond to medical treatment, the licence holder will be unfit pending recovery.
In intermittently symptomatic cases, an Operational Multipilot Limitation (OML) may be appropriate for class 1 certificate holders.

Peptic ulceration
Aeromedical certificate holders will be assessed unfit while undergoing H. pylori eradication therapy. Following successful eradication of H. pylori proton pump inhibitors and H2 receptor antagonists are acceptable for maintenance therapy.

Inflammatory Bowel Disease
An aeromedical certificate holder with inflammatory bowel disease is assessed unfit unless the condition is in remission. For class 1 the pilot must have been in remission on minimal medication for six months for aeromedical certification. Initially this will be with an Operational Multipilot Limitation (OML). This limitation can be reviewed after a further 6 months of remission. The applicant should be warned of the risk of significant interruptions in their ability to exercise licence privileges if their condition relapses.

Report specifications - General

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Examination and Investigation Findings**
   - Clinical findings
   - Impairment or loss of function

4. **Investigation findings**
   - Blood test results (Urea & Electrolytes, liver function tests including GGT, Thyroid function tests, full blood count)
   - Radiology imaging reports (e.g. x-ray, ultrasound, CT, MRI)
   - Histology reports
   - Other procedures and investigation reports

5. **Treatment**
   - Recent, past and ongoing treatment must be detailed
   - Current and recent past medication (dose, frequency, start date and finish date)
   - Confirmation no side effects from medication
   - Surgical reports

6. **Follow up and further investigations/referrals planned or recommended**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Prognosis and risk of recurrence
   - Confirmation of full recovery or remission on maintenance dose of acceptable medication and well controlled at date of report

7. **Clinical Implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

MED.B.025 – Metabolische en endocriene stelsels

Richtlijnen
Guidance Material

Benign Pituitary Tumours class 1 and 2
Applicants with symptoms and/or on first diagnosis should be assessed as unfit.

A fit assessment can be considered subject to a satisfactory endocrinologist's report and visual fields assessment after 3 months of being stable on treatment.

Annual follow-up with endocrinology report and visual fields is required.

Cabergoline is used for the treatment of microprolactinomas. It is acceptable for any class of certification, providing the pilot has been stabilised on this medication for a period of not less than three months on the ground and has no adverse side-effects from the therapy.

Obesity class 1 and 2
Information - Obesity and medical certification

Flowchart – Obesity certification

The Medical Flight Test Form is included as an attachment to this document.

Information – Thyroid dysfunction certification

Abnormal Glucose Metabolism class 1 and 2
Glycosuria should always be investigated with a minimum of random blood sugar. Symptomatic individuals should have an oral glucose tolerance test.
Class 1 applicants with impaired glucose tolerance should be reviewed annually.

Information – Diabetes certification

Report specifications – Diabetes

Information - Obesity and medical certification

Obesity is defined as a body mass index (BMI) in excess of 30 by the 'Nederlands Huisartsen Genootschap' (NHG). The NHG guidelines regarding BMI can be found in the NHG-Standaard Obesitas. The BMI is calculated by dividing the person's mass in kilograms by the square of his height in metres. A BMI calculator can be found here. Obesity substantially increases the risk of acute and chronic medical conditions summarised below:

Risks of health problems associated with obesity

Greatly increased risk	Moderately increased risk	Slightly increased risk
Type 2 diabetes	Coronary heart disease	Some cancers
Insulin resistance	Hypertension	Reproductive hormone abnormality
Gallbladder disease	Stroke	Impaired fertility
Dyslipidaemia	Osteoarthritis	Polycystic ovary disease
Breathlessness	Hyperuricaemia (gout)	Low back pain
Sleep apnoea	Psychological factors	Anaesthetic risk

Treatment that affects medical certification

Medication which reduces the absorption of dietary fat, when combined with a change in lifestyle, can be used to treat obesity in individuals with a BMI in excess of 30 or 28 if other risk factors such as hypertension, diabetes or high cholesterol are present. Although sometimes available over-the-counter all treatments should be discussed with your GP or AME. If you do commence treatment you must notify your AME and ground yourself for two weeks to ensure you have no adverse effects from the medication. Side-effects might include flatulence, oily or leaky stools, abdominal pain and bloating, headaches and anxiety.

Appetite suppressants are disqualifying for medical certification and are not recommended for the treatment of obesity.

Surgery

Bariatric surgery promotes weight loss by altering the anatomy of the digestive system and limiting the amount of food that can be eaten and digested, for example by a gastric bypass or gastric banding. It is a major procedure that is usually considered as an option if individual's BMI is 40 or more, or between 35 and 40 if other risk factors that could be improved by a reduction in weight are present. Other criteria also need to be fulfilled and this option should be discussed with your AME. If it is deemed acceptable for treatment for you and you decide to proceed, you must notify your AME as you will be assessed as unfit for a period of up to 3 months post surgery which will be dependent upon the type of procedure performed and your recovery. Endoscopic procedures will significantly reduce this period. Detailed reports will be required to confirm that you have made a full recovery from the procedure, are not experiencing any incapacitating side-effects, and a final assessment with your AME will be required before you can be assessed as 'fit' again. Any other treatment or procedure that you might be considering must be discussed with your AME.

Aeromedical considerations

Beside the potential impact to your health, the nature of your operating environment in relation to your BMI should also be considered.

A Medical Flight Test may be required to ensure that you can safely complete your checks, and have full and free movement to reach all switches and controls without any impedance. You will also need to demonstrate that you can sagely and quickly prepare and evacuate the aircraft in case of an emergency. Separate tests may be required if you fly substantially different types of aircraft e.g. a commercial pilot who also undertakes private flying.

Pilots or light aircraft are reminded that crew (and passenger) weights are important factors for aircraft performance and centre of gravity, and that accurate weights should be measured before flight.

Regulatory requirements

Initial applicants for a medical certificate issue will be referred for further assessment if their BMI is 35 or above. Existing pilots whose BMI exceeds 35 require investigation within 2 months.

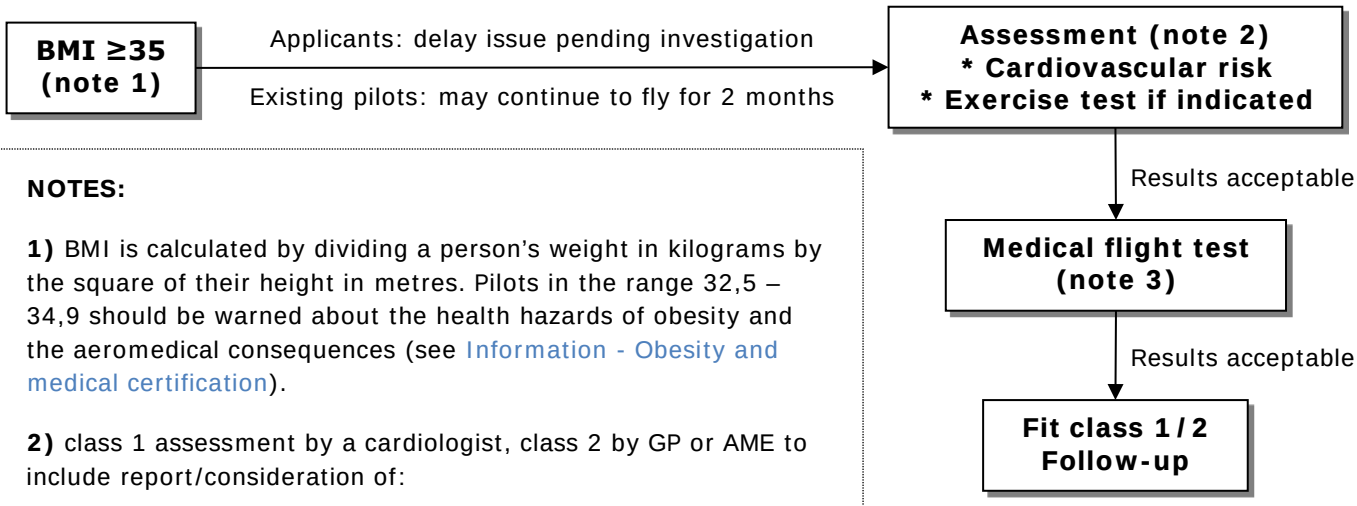
- Assessment
    - Medical history & risk factors to include, BMI, waist & neck circumference, lipid profile, blood glucose, urinalysis, blood pressure, Epworth score
    - Class 1: Review by cardiologist to include annual exercise test
    - Class 2/LAPL: AME or GP to investigate include cardiovascular risk score. If risk above 20% in 10 years an exercise ECG is likely to be indicated.

- Medical Flight Test (form is included as an attachment to this document.)

    - For class 1 by TRE, Training Captain, or FI(E)
    - For class 2 or LAPL by CFI or FI(E)

If acceptable, further reviews with either your AME or GP will be required 6 monthly until the BMI falls below 35. Class 1 pilots will require an annual cardiological review to include exercise test. If the BMI increased by 2,5 points since the last medical flight test, the test shall be repeated.

Flowchart – Obesity certification



NOTES:

1) BMI is calculated by dividing a person's weight in kilograms by the square of their height in metres. Pilots in the range 32,5 – 34,9 should be warned about the health hazards of obesity and the aeromedical consequences (see Information - Obesity and medical certification).

2) class 1 assessment by a cardiologist, class 2 by GP or AME to include report/consideration of:

- Medical history including lifestyle factors
- BMI
- Waist and neck circumference
- Lipid profile
- Blood sugar
- Urinalysis
- Blood pressure
- Epworth score

Cardiovascular risk score should be calculated using appropriate tools, and an annual exercise test performed if risk exceeds 20% in next 10 years.

Pilot must notify AME or referral for investigation and/or treatment.

3) Medical Flight Test Form is available as attachment in this document.
Class 1 with a training Captain or FI(E)
Class 2 with a CFI or FI(E)

4) Follow-up review as above: 6 monthly class 1, annual class 2. If BMI increases by ≥2,5 then the Medical Flight test must be repeated.

Information – Thyroid dysfunction certification

1. Initial applicants with an established diagnosis of thyroid dysfunction will have the issue of their medical certificate referred until acceptable reports have been received. On diagnosis of thyroid dysfunction a certificate holder shall be assessed as unfit.

2. A report from an endocrinologist or GP will be required to confirm details of history, investigations, diagnosis and treatment, optimised thyroid function, no side-effects from either the disorder or the treatment and plans for follow-up care.

- **Hypothyroidism**

Any changes in management, including medication changes, must be notified to the AME. If the certificate holder is asymptomatic then no grounding period will be required for minor (up to 25mcg) changes in dose of thyroxine. If any symptoms are present then the certificate holder will be assessed as unfit until symptom free.

- **Hyperthyroidism**
    - Anti-thyroid drugs in the absence if side-effects are not disqualifying
    - Class 1 certificate holders will undergo review with an ophthalmic to ensure satisfactory eye movements and no diplopia. If normal, a fit assessment can be made by the AME, otherwise review by the Medical Assessor will be required. An OML may be required.
    - Class 2 holders will undergo review with an AME to ensure satisfactory eye movements and no diplopia.

3. Reports as detailed above will be submitted to the AME for review only in the initial phases of the disease.

4. All changes in management will be notified to an AME and the certificate holder will be assessed as unfit until clinically euthyroid and a satisfactory report has been received.

Thyroidectomy

Following thyroid surgery (complete or partial) the certificate holder will be assessed as unfit. A fit assessment can be made following full surgical recovery, and demonstrated stability of thyroid function.

A report from the specialist will be required confirming details of the surgery, recovery and ongoing treatment and confirmation of euthyroid state. Minimum follow up is annual blood test confirming euthyroid status.

Radioactive iodine treatment

The certificate holder will be assessed as unfit until all treatment is complete and a euthyroid state has been achieved. A report from the specialist will be required and should confirm details of treatment and follow-up care including confirmation of euthyroid state. Minimum follow up is for an annual blood test confirming euthyroid status.

Information – Diabetes certification

All potentially hypoglycaemic treatment is disqualifying. This includes all insulins, sulphonylureas and glinides.

Applicants with non-hypoglycaemic treatment (includes glitazones, gliptins, incretin mimetics, biguanides, alphaglucosidase inhibitors) can be certified with an OML limitation for class 1 and unrestricted for class 2. Diet only treatment can be certified with unrestricted class 1 and 2.

Surveillance requirements

	Class 1	**Class 2**
Review of clinical reports, data logging of operational blood sugars and review of flying log	Annual AME	Annual AME
Reporting / review of symptoms	Mandatory	Mandatory
$HbA1_C$ frequency	Six-monthly	Annual
Renal & liver profiles lipids	Annual	Annual
Diabetology review including: • Symptom review • Cardiovascular status / risk • Nephropathy status • Neuropathy status • Opthalmic screening	Local specialist annual	Local GP or specialist annual
Cardiology review including exercise test	On diagnosis, then: <40 yrs two-yearly >40 yrs annual	If 10 yr cardiovascular risk >20% then annual if 10 yr risk remains >20%

Target ranges for clinical variables

Variable	**Target**	**Review treatment (may need period of unfitness)**	**Unfit**
$HbA1_C$	<8,5 % (<69 mmol/l)	8,5% – 10% (69 – 86 mmol/l)	>10% (>86 mmol/l)
Systolic BP	<140 mmHg	140 – 160 mmHg	>160 mmHg
Diastolic BP	<80 mmHg	80 – 95 mmHg	>95 mmHg
Cholesterol	4,0 – 4,5 mmol/l	>4,5 mmol/l	n/a
Triglycerides	<2,5 mmol/l	>2,5 mmol/l	n/a

Fitness / unfitness status

- Change of non-hypoglycaemic medication type or dose: 2 weeks unfit. Stability should be reviewed/confirmed by GP or AME.
- Episodes of severe hypoglycaemia must be reported and shall entail unfitness. Specialist review will be required before consideration of any resumption of flying.
- Development of any retinopathy requires ophthalmological assessment and is likely to result in further restriction or unfitness if there is any field loss or reduction in visual acuity.
- Presence of significant nephropathy significantly increases cardiovascular risk and is likely to entail unfitness.
- Non-declaration of symptoms, medical history or provision of incomplete testing records/flying logbook is likely to entail unfitness.

Report specifications – Diabetes

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**
   - Type
   - Comorbidities

2. **History**
   - Presenting complaint and symptoms (including date of diagnosis)
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Number of severe hypoglycaemic episodes in past year
   - Loss of hypoglycaemic awareness
   - Other relevant medical history

3. **Examination and Investigation Findings**
   - Blood tests (as per Diabetes Certification guidance)
     - $HbA1_c$ and glucose
     - Liver and renal function (eGFR)
     - Lipids
   - Confirmation of stable blood sugars, correlated with symptom review
   - Screening for complications
     - Retinopathy (for class 1 by an ophthalmologist/specialist clinic)
     - Neuropathy
     - Nephropathy
   - Cardiovascular risk assessment confirming no evidence of cardiovascular disease
     - With consultant cardiologist to include an exercise tolerance test to the Bruce Protocol
     - Risk factors including family history, smoking, alcohol and weight
   - Blood pressure within acceptable parameters

4. **Treatment**
   - Recent, past and ongoing treatment must be detailed
   - Current and recent past medication (dose, frequency and start date)
   - Confirmation no side effects from medication

5. **Follow up and further investigations/referrals planned or recommended**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Confirmation of full recovery or remission on maintenance dose of acceptable medication and well controlled at date of report

6. **Clinical Implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

MED.B.030 – Hematologie

Richtlijnen
Guidance Material

Class 1 Haemoglobin should be measured at every medical with appropriately maintained and calibrated testing equipment. Abnormalities on near patient testing should be confirmed with a full blood count assessed in a haematology laboratory.

Thrombocytopaenia
Applicants with a diagnosis of thrombocytopenia should be assessed as unfit. Medical certification is considered subject to a haematologist report acceptable to the Medical Assessor (for class 1 applicants) or AME who performed the periodic medical examination (Class 2). Platelet counts below 75 x 10^9/l should be assessed as unfit.

Haemophilias
Applicants with a diagnosis of Haemophilia A (factor VIII deficient) or Haemophilia B (Factor IX deficient, Christmas disease) should be assessed as unfit. Medical certification is considered for applicants with a diagnosis of very mild forms with >30% coagulation factor subject to a haematologist report acceptable to the Medical Assessor (Class 1) or an AME (Class 2). History of spontaneous bleeding is not acceptable for medical certification.

Von Willibrand disease
Applicants with a diagnosis of Von Willibrand disease should be assessed as unfit. Medical certification is considered subject to a haematologist report acceptable to the Medical Assessor (Class 1) or an AME (Class 2) confirming that the phenotype is mild, that there is no history of significant bleeding and that therapy is not required.

Aspirin and **Clopidogrel** are acceptable anti-platelet medications.

Anagrelide inhibits platelet formation. Applicants requiring this medication should be assessed as unfit. Medical certification for class 1/OML can be considered by the Medical Assessor no sooner than 2 weeks after commencing this treatment, subject to a satisfactory haematologist's report to include comment on any side-effects.

Thrombocytosis requires referral to the Medical Assessor.

Deep Venous Thrombosis (DVT), Pulmonary Embolism (PE) and use of Coumadin
Class 1 OML and class 2 unrestricted certification are possible provided that:

1. The pilot has recovered from the underlying condition or the condition has been stabilised and does not in itself preclude flying.

2. The total incapacitation risk of the medication, the condition for which anticoagulation is indicated and any other conditions is acceptable.

Likely indications include:
DVT/PE: Screening should have been undertaken for underlying causes, including coagulation abnormalities. DVT is likely to be the least problematic for certification; target INR is likely to be 1,8 - 2,5 (with an ideal 2,0 – 2,3). In all cases of pulmonary embolism follow-up reviews should be with a pulmonologist and reports should include relevant investigations.

Atrial fibrillation may be associated with other risk factors, which usually means that the highest level of certification achievable will be class 2 OSL.

Flowchart – Atrial fibrillation certification

Cardiac valve replacement
The target INR following valve replacement and other co-morbidities should be taken into account.

Flowchart – Aortic valve replacement certification

Prior to certification the INR should be demonstrated to be within the target range for 6 months (4 results at 2 monthly intervals) and 2 monthly laboratory testing should be continued on an ongoing basis. If the INR varies considerably within the target range on the initial readings, a longer period of surveillance may be required.

Class 1 applicants will be required to measure their INR on a 'near patient' testing system 12 hours prior to flight and only fly if the INR is within the target range. The INR should be recorded in the Log Book. The Log Book should be reviewed at each medical certificate revalidation examination.

Richtlijnen
Guidance Material

Disorders of the lymphatic system

Information – Malignancies of the immune system certification

Abnormal Haemoglobin

Male

Hb result (in mmol/l)	Outcome
<7,45	Investigation required
<7,14	Unfit
>11,2	Ht to exclude polycythaemia

Female

Hb result (in mmol/l)	Outcome
<6,8	Investigation required
<6,5	Unfit
>11,2	Ht to exclude polycythaemia

Haemachromatosis

An applicant with a diagnosis of Haemachromatosis should be assessed as unfit. Unrestricted medical certification can be considered by the Medical Assessor (Class 1) or AME who performed the periodic medical examination (Class 2), once treatment is stabilised, on receipt of acceptable medical reports to include a haematology report. Applicant should have normal serum Ferritin following treatment, normal echocardiogram, Holter and Exercise ECG. Follow up reports generated by the applicant's treating haematologist should be copied to the AME who performed the periodic medical examination. Applicants should not fly within 48 hr of having venesection as treatment.

Haemoglobinopathy

Applicants with thalassaemia trait may be assessed as acceptable for unrestricted certification subject to the receipt of a haematology report.

Applicants with sickle cell trait may be assessed as acceptable for unrestricted certification.

Information – Malignancies of the immune system certification

- All class 1 assessments shall be referred to the Medical Assessor.
- Class 2 assessments may be referred to the Medical Assessor by the AME. For class two certification:
    - Fitness for class 1 OML is considered equivalent to unrestricted class 2 certification.
    - Class 2 certification with an Operational Safety pilot Limitation (OSL) is possible for all tumour types of the immune system provided the overriding prerequisites for certification have been satisfied.

Introduction

The assessment of an individual's fitness to fly after treatment for a malignancy of the immune system is complex as such tumours are a heterogeneous group and vary markedly in terms of clinical patterns of spread, response to treatment, sites of relapse and prognosis. There are more than 25 diseases classified as lymphoid malignancies in the current World Health Organization classification.

Modern classification of malignancies involving the immune system (according to the World Health Organisation)

Precursor cell Lymphoma

- Lymphoblastic lymphoma
    - T-cell
    - B-cell

Peripheral B-cell Neoplasms

- B-chronic lymphocytic leukaemia/small lymphocytic lymphoma
- B prolymphocytic lymphoma
- Lymphoplasmacytic lymphoma
- Mantle cell lymphoma
- Follicular lymphoma
- Marginal zone B-cell lymphoma
    - Extranodal (MALT)
    - Nodal
- Hairy cell leukaemia
- Diffuse large B-cell lymphoma
- Burkitt lymphoma and Burkitt-like lymphoma
- Plasmacytoma and myeloma

Peripheral T and NK Cell Neoplasms

- T prolymphocytic leukaemia
- T cell granular lymphocytic leukaemia
- Aggressive NK cell leukaemia
- Mycosis fungoides and Sezary syndrome
- Peripheral T-cell lymphoma not otherwise characterised
- Angioimmunoblastic T-cell lymphoma
- Extranodal NK/T cell lymphoma of nasal and nasal type
- Enteropathy-type T-cell lymphoma
- Hepatosplenic gamma delta T-cell lymphoma
- Subcutaneous panniculitis-like T-cell lymphoma
- Anaplastic large cell lymphoma (T/null cell)
    - Primary systemic type
    - Primary cutaneous type
- Adult T-cell lymphoma/leukaemia (HTLV1 positive)

Hodgkin's Lymphoma

Legend:
HTLV = Human T-cell Lymphoma/Leukaemia Virus 1
MALT = Mucosa-Associated Lymphoid Tissue
NK = Natural Killer

Prerequisites for certification

A detailed oncology report will be required and the following criteria should be satisfied before certification can be considered:

- Normally a minimum of 6 weeks since completion of radiotherapy. If radiotherapy has been given to the chest and cardiac tissue was included within the radiation field, cardiac evaluation should be satisfactory;
- Minimum of 2 months since completion of chemotherapy (excluding anthracyclines);
- Minimum of 6 months since completion of anthracycline chemotherapy, and cardiac evaluation should be satisfactory;
- Satisfactory haematological parameters Haemoglobin >7,45 mmol/l (male) or >7,14 mmol/l (female), Platelets >100.000/mm³, (or > 50.000 mm³ provided the trend is upwards and thrombocytopaenia is secondary to therapy and not disease), White Cell Count (WCC) > 3.000/mm³ and Neutrophils >1.000/mm³;
- In continuing clinical remission without symptoms of potential flight safety importance;
- No history of central nervous system involvement;
- No continuing side-effects from treatment;
- 6 monthly Full Blood Count (to include WCC and differential) and Biochemical Profile (to include Liver function tests) for 5 years then annually (exception - see group G below);
- Regular clinical follow up is being undertaken and satisfactory reports submitted to the Medical Assessor.

Certificatory assessment

Malignancies of the immune system, including lymphoid leukaemias, may be grouped according to potential for long-term complete remission ('cure') and prolonged relapse-free survival. All assessments are after treatment for primary disease except where specifically stated. A longer time period should normally elapse before returning to flying after treatment for relapse than is required after primary treatment.

The prognosis for some patients within a particular diagnostic category may be very different from the median and an assessment of prognostic factors can allow a more accurate prediction of the probability of relapse-free-survival, event-free-survival and overall survival. These probabilities will change with time as the clinical condition progresses. In addition transformation to a higher grade of lymphoma may occur. Relevant clinical information should be taken into account on a continuous basis when considering fitness for pilot certification.

The 'potential cure' for each group is an 'average' for the diagnoses listed. Within each group an individual may be assessed as having a better prognosis (good prognostic factors) or worse prognosis (adverse prognostic factors) than the 'average'. This may allow an earlier return to certification or delay the return to flying, according to individual circumstances. Relapses may present with an acute incapacitating event such as a retinal bleed, neuropathy, seizure or abdominal pain. However, it is more likely to be associated with symptoms such as fatigue, fever, sweats, headache, nausea, vomiting or diarrhoea. Any of these could adversely affect flight safety.

Certification following treatment for Lymphoid Malignancy

Group	Potential Cure Rates	Diagnosis	Minimum time to certification after completion of treatment	
			Class 1 OML Class 2 unrestricted	Class 1 unrestricted
A	>80%	MZ MALT (stage I/II) DLBC (stage I/II) ALCL (stage I/II) Solitary Plasmacytoma	Once pre-requisites satisfied	2 – 6 months (dependent on type of chemotherapy)
B	50%	Primary Mediastinal Lymphoma	6 months	2 years
C	30%	DLBC (stage III/IV)	1 year	2 years

Group	Potential Cure Rates	Diagnosis	Minimum time to certification after completion of treatment	
			Class 1 OML Class 2 unrestricted	Class 1 unrestricted
		ALCL (stage III/IV) including ALK negative MZ MALT (stage III/IV)		
D	30%	Burkitt's/Burkitt-like Lymphoma Pre-B Lymphoblastic Lymphoma/Leukaemia B-cell Lymphoblastic Lymphoma/Leukaemia Multiple myeloma (post BMT-csd)	2 years	3 years
E	10 – 20%	Pre-T ALL Pre-T LBL Mantle cell lymphoma (2 years symptom free)	2 years	3 years
F	<10% and moderately aggressive	Other Peripheral T-cell and NK Lymphoma/Leukaemia Adult T-cell Lymphoma (HTLV+) Mantle Cell Lymphoma Multiple Myeloma (Other) Subcutaneous panniculitis T-cell lymphoma	5 years (see text)	Not applicable
G	Considered incurable using current therapy but indolent	Follicular Lymphoma SLL B-cell CLL Lymphoplasmacytic Lymphoma T-cell Prolymphocytic Leukaemia T-cell Granular Lymphocytic Leukaemia Hairy Cell Leukaemia MZ B-cell Lymphoma (nodal/splenic)	See text	See text
H	A miscellaneous group with a generally good prognosis	Primary Cutaneous Lymphoma	Once wound healed	Once wound healed
I	Poor prognosis	Mycosis fungoides/Sezary syndrome	See text	See text
J	>60%	Hodgkin's lymphoma	6 months	2 years

Legend:
ALCL = Anaplastic Large Cell Lymphoma
ALK = Anaplastic Lymphoma Kinase
BMT-csd = Bone Marrow Transplantation – compatible sibling donor
CLL = Chronic Lymphocytic Leukaemia
DLBC = Diffuse Large B-cell Lymphoma
HTLV = Human T-cell Lymphoma/Leukaemia Virus 1
MZ = Marginal Zone Lymphoma
MALT = Mucosa-Associated Lymphoid Tissue
NK = Natural Killer
Pre-T ALL = Precursor T-cell Lymphoblastic Leukaemia
Pre-T LBL = Precursor T-cell Lymphoblastic Lymphoma
SLL = Small Lymphocytic (B-cell) Lymphoma

Group F

Most of these conditions have a very poor prognosis and relapse is common. However, in some, a durable remission may be achieved and individual consideration can be given to cases that have been in continuous remission for 3 years.

Group G

A remission of an indolent lymphoma may be complete or associated with the presence of small amounts of residual disease after treatment. Licence holders with a good partial remission (minor residual bone marrow involvement or a small amount of residual lymphadenopathy present on Computerised Tomography (CT) scan), which is not progressive, may be certificated. Persistent evidence of liver involvement or palpable enlargement of the spleen will disqualify.

Follicular Lymphoma

A monthly full blood count to include a differential white cell count and biochemical profile to include liver function tests is required. Six-monthly follow up is acceptable after 5 years complete remission.

a) Certification after primary treatment

This may be possible if the International Prognostic Index (IPI) is low and there is no evidence of progressive disease.

Class 1 OML at 3 months
Unrestricted at 1 year

Class 2 Unrestricted at 3 months

b) Certification after treatment for relapse

This may be possible if the relapse was only nodal, performance status was good and serum lactate dehydrogenase was normal at the time of relapse. Additionally for class 1, if the relapse occurred within 3 years of previous treatment, an OML will be applied to the licence. Thereafter unrestricted certification is only possible if sustained remission is achieved (more than 3 years).

Class 1 OML at 3 months
Unrestricted at 2 years (unless initial remission period <3 years)

Class 2 Unrestricted at 3 months

Chronic Lymphocytic Leukaemia/Small Lymphocytic (B-cell) Lymphoma

a) Stable stage A disease – not requiring treatment

Certification is possible as soon as the disease can be shown to be stable and non-progressive.

Class 1 Unrestricted at 3 months

Class 2 Unrestricted at 3 months

b) Certification after treatment

Treatment may be indicated for progressive Stage A (lymphocytosis alone or with a small amount of lymphadenopathy) or Stage B + (with substantial lymphadenopathy, splenomegaly, hepatomegaly or cytopaenias). If a good partial remission is achieved with treatment and there is no evidence of progressive disease, certification may be possible.

Class 1 OML at 3 months
Unrestricted at 1 year

Class 2 Unrestricted at 3 months

Marginal Zone B-cell Lymphoma (nodal/splenic)

Class 1 OML at 2 years
Unrestricted at 3 years

Class 2 OSL once pre-requisites for certification satisfied
Unrestricted at 2 years

Lymphoplasmacytic Lymphoma

Certification is not possible if the performance status is poor at presentation, if two or more cytopaenias are present or there is hepato/splenomegaly.

a) Stable early disease not requiring treatment
Certification is possible if there is low IPI at presentation and the disease can be shown to be stable and non-progressive.

Class 1 OML at 3 months
Unrestricted at 1 year

Class 2 Unrestricted at 3 months

b) Certification after primary treatment
Certification is possible for those who achieve a complete or good partial remission.

Class 1 OML at 6 months
Unrestricted at 2 years

Class 2 OSL once pre-requisites for certification satisfied
Unrestricted at 6 months

Hairy Cell Leukaemia

a) Stable early disease not requiring treatment

Class 1 OML at 3 months
Unrestricted at 1 year

Class 2 Unrestricted at 3 months

b) Certification after primary treatment
Certification is possible for those who achieve a complete or good partial remission following interferon therapy. A relapse less than 3 years after treatment and requirement for chemotherapy will disqualify.

Class 1 OML at 2 months
Unrestricted at 2 years

Class 2 OSL once pre-requisites for certification satisfied
Unrestricted at 2 years

Group H

Primary Cutaneous Lymphoma

When primary therapy or treatment for relapsing lymphoma only involving the skin has been completed, and at least a partial remission has been achieved with recovery from any complications of therapy, unrestricted class 1 certification is possible.

Group I

Sezary Syndrome and Mycosis Fungoides

This is characterised by involvement of the blood and bone marrow and in view of the poor prognosis requires more careful consideration. In those who achieve a stable, good partial remission following primary treatment certification may be considered.

Group J

Hodgkin's Lymphoma

The overall survival of patients with Hodgkin's Lymphoma depends on stage (10 year survival rate of 95% for stage IA, 60% for stage IV) and prognostic factors at presentation. Adverse prognostic factors include serum albumin <40 g/l, haemoglobin <6,5 mmol/l, <45 years, male, WCC >15,000/mm^3, lymphocytes <600/mm^3.

80% of relapses occur within the first 2-3 years after treatment. Relapses are extremely unlikely to present with symptoms that cause sudden incapacitation.

Substantial improvements in radiotherapy and combination chemotherapy during the late 20th century dramatically increased survival. The use of autologous stem cell transplantation has recently provided a further treatment option for relapse and approximately 50% will achieve prolonged survival using this method.

Long term follow up is important as radiotherapy and chemotherapy both result in an increased risk of second malignancy, either a solid tumour or a further lymphoid malignancy, beyond ten years after treatment. The relative risk is higher for younger patients as malignancy is uncommon in this age group.

Prolonged Long-Term Complete Remission

Unrestricted class 1 is possible for all tumour types of the immune system if a period of 5 years or more has elapsed since completion of treatment with no evidence of relapse of disease during this period.

Bone Marrow Transplantation

Fitness for recertification after bone marrow transplantation will be dependent on the individual circumstances. Lack of adverse prognostic features and the underlying diagnosis will be important and, in the case of allogenetic transplantation, the lack of continuing graft-versus-host disease or immunosuppression.

Autologous Stem Cell Transplantation:

Class 1 OML at 1 year after transplantation
Unrestricted at 2 years after transplantation

Class 2 Unrestricted at 1 year after transplantation

Allogeneic Transplantation:

Class 1 OML at 2 years after transplantation
Unrestricted at 3 years after transplantation

Class 2 OSL at 1 year afters transplantation
Unrestricted at 2 years after transplantation

Definitions

International Prognostic Index (IPI)

The IPI is the scoring system frequently used as a prognostic indicator for lymphoid malignancies. It takes the clinical features at presentation into account. The overall prognosis is related to the histological diagnosis (World Health Organization classification) and the IPI. A low score is 0-2, a high score is 3-5.

Prognostic factor	Score	Prognostic factor	Score
Age <60 years	0	Number of extranodal sites >2	1
Age >60 years	1	Performance status 0-1	0
Stage I-II	0	Performance status 2+	1

Stage III-IV	1		
Serum Lactate Dehydrogenase Low	0		
Serum Lactate Dehydrogenase High	1		
Number of extranodal sites <2	0		

Staging System

The accepted staging system is a modification of the Ann Arbor staging system.

Stage I 1 lymph node site involved;
Stage II 2 or more lymph node sites involved either above or below the diaphragm;
Stage III Nodel sites involved both above and below the diaphragm;
Stage IV Extranodal sites such as bone marrow, lung and liver involved in addition to the above.

When there is only a single localised extranodal site of involvement such as salivary gland, thyroid, orbit, testis, tonsil, stomach or cervix, the appropriate stage would be annotated with E 'Patients who present with weight loss or fever/sweats are classified as having B symptoms' (designated B).

Performance Status

0 Fully active
1 Ambulatory
2 Confined to bed/chair <50% of the daytime
3 Confined to bed/chair >50% of the daytime
4 Completely confined to bed/chair

MED.B.035 – Genito-urinaire stelsel

Richtlijnen
Guidance Material

Haematuria
Please note revised terminology for haematuria: now called 'visible' and 'non-visible' (otherwise referred to as 'microscopic' or 'dipstick positive' haematuria).
Urine dipstick of a freshly voided urine sample containing no preservative is considered a sensitive means of detecting the presence of haematuria.
Routine microscopy for the confirmation of dipstick positive haematuria is not necessary.

Significant haematuria is defined as:
1. Any single episode of visible haematuria
2. Any single episode of symptomatic non visible haematuria (in the absence of a urinary tract infection (UTI) or other transient cause)
3. Persistent asymptomatic non visible haematuria (in the absence of UTI or other transient cause). 'Persistent' is defined as: 2 out of 3 dipsticks positive for non visible haematuria.

NB: Trace haematuria can be considered as negative although not in the presence of significant proteinuria (see below).

Proteinuria
Trace proteinuria is acceptable except in the presence of trace haematuria. When trace proteinuria and trace haematuria are both present, a repeat test is indicated.
(Note: 24 hour protein collection for the assessment of proteinuria is no longer recommended).
Urine protein: creatinine ratio (PCR) or albumin: creatinine ratio (ACR) is preferred. ACR has the greater sensitivity.

Significant proteinuria is defined as: ACR >30 or PCR >50

Flowchart – Abnormal urinalysis certification

IgA Nephropathy/Thin Basement Membrane Disease
Applicants are requested to submit an annual renal review to confirm blood pressure level and no evidence of proteinuria or impaired renal function. A creatinine clearance below 20ml/min is unacceptable for medical certification. If the review is acceptable, the applicant can be assessed as fit for unrestricted certification.

Chronic Renal Disease
Applicants require regular renal review. In the absence of nephrotic syndrome and its associated thrombotic potential, and in the absence of uncontrolled hypertension, unrestricted certification may be permitted. A creatinine clearance below 20 ml/min is unacceptable for medical certification. An albumin level below 0,52mmol/l is also disqualifying.

Polycystic renal disease
The diagnosis of autosomal dominant polycystic kidney disease requires an OML for class 1 certificate holders. Berry aneurysms need to be excluded by means of Magnetic Resonance Angiography and cardiac valve disease (including aortic root dilatation) by means of an echocardiogram. Abdominal aortic aneurysm also needs to be excluded.

Acceptable treatment and medication erectile dysfunction
Phosphodiesterase Type 5 (PDE5) inhibitors

The main aeromedical concerns are the side effect profile of these drugs which includes colour vision changes in the blue/green and purple spectrum and sudden hearing loss.

Generic name	NL trade name*	Minimum time between dose and flying
Sidenafil	Viagra	12 hrs
Vardenafil	Levitra	12 hrs
Tadalafil	Cialis	36 hrs

* Other trade names are used outside the Netherlands

Richtlijnen
Guidance Material

Notes for pilots:

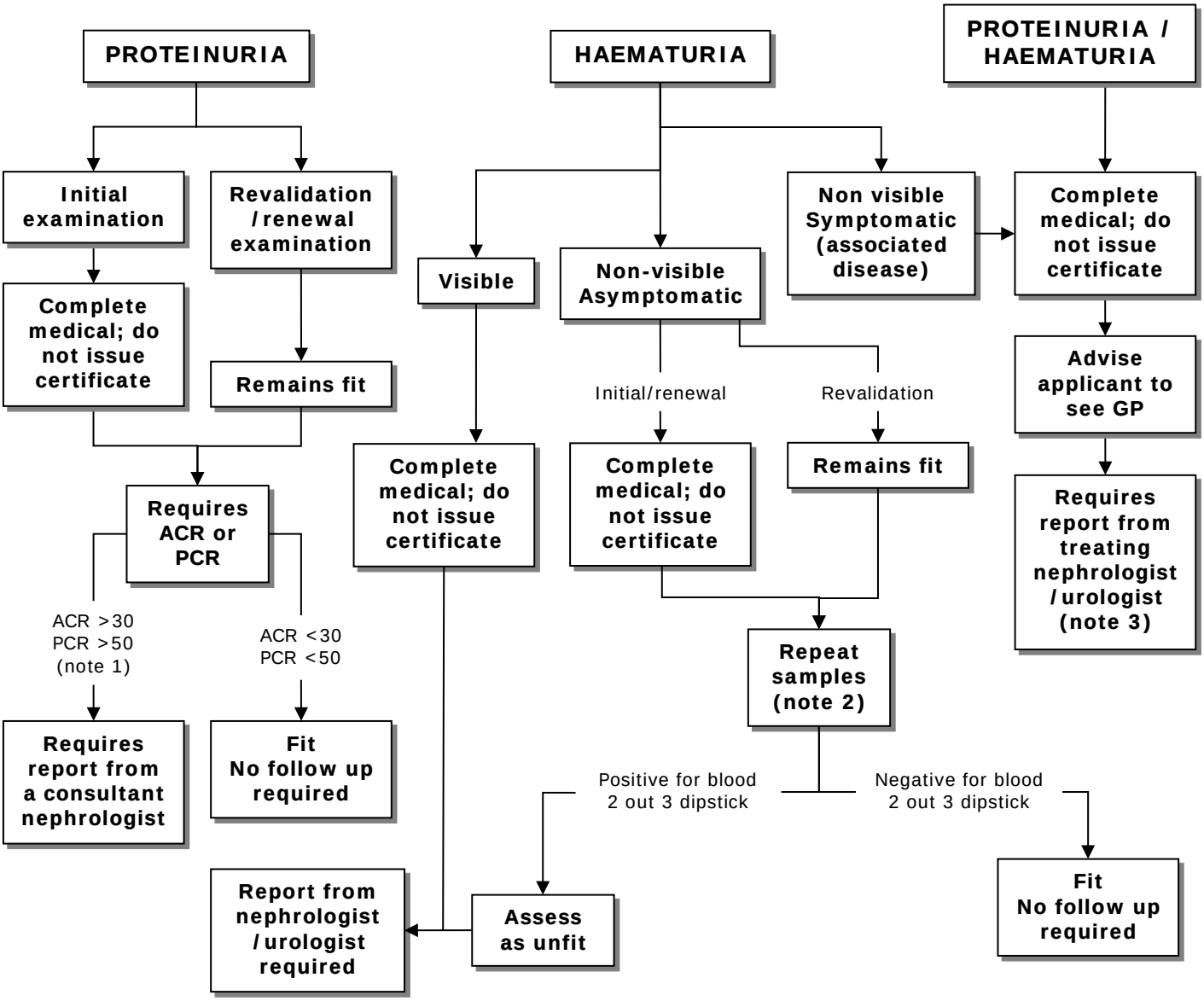
1. You should discuss the appropriate dose with your GP/AME.
2. PDE5 inhibitors should never be taken in conjunction with any other medication without first discussing potential interactions with your GP/AME.
3. Choose an extended off duty period to try the medication for the first time in case of side effects.
4. Side effects that are important for flying include changes in blood pressure, visual disturbance including a change in colour vision, headaches, musculoskeletal pain and a sustained erectile effect with the potential for distraction from the flying task.
5. You should not obtain this medication other than by prescription to ensure product quality. The contents of medication obtained in other ways, in particular over the internet, cannot be assured.

Flowchart – Renal stones certification

Renal Transplant

Applicants who have undergone a renal transplant are assessed as unfit. Medical certification can be considered 12 months post transplant. Renal function must be stable with no underlying systemic disorder that is likely to cause sudden change and blood pressure must be within normal limits. The use of approved anti-hypertensive drugs is permitted. Any steroid dosage must be below 10mg/day. Levels of anti-rejection drugs must be within therapeutic range to minimize side effects. Cardiovascular risk must be assessed by a cardiologist to include an exercise (stress) ECG. To maintain certification, applicants are required to provide a regular annual renal report. Class 1 holders also require an annual cardiology assessment, including an exercise ECG. Class 1 certificates will be restricted with OML.

Flowchart – Abnormal urinalysis certification



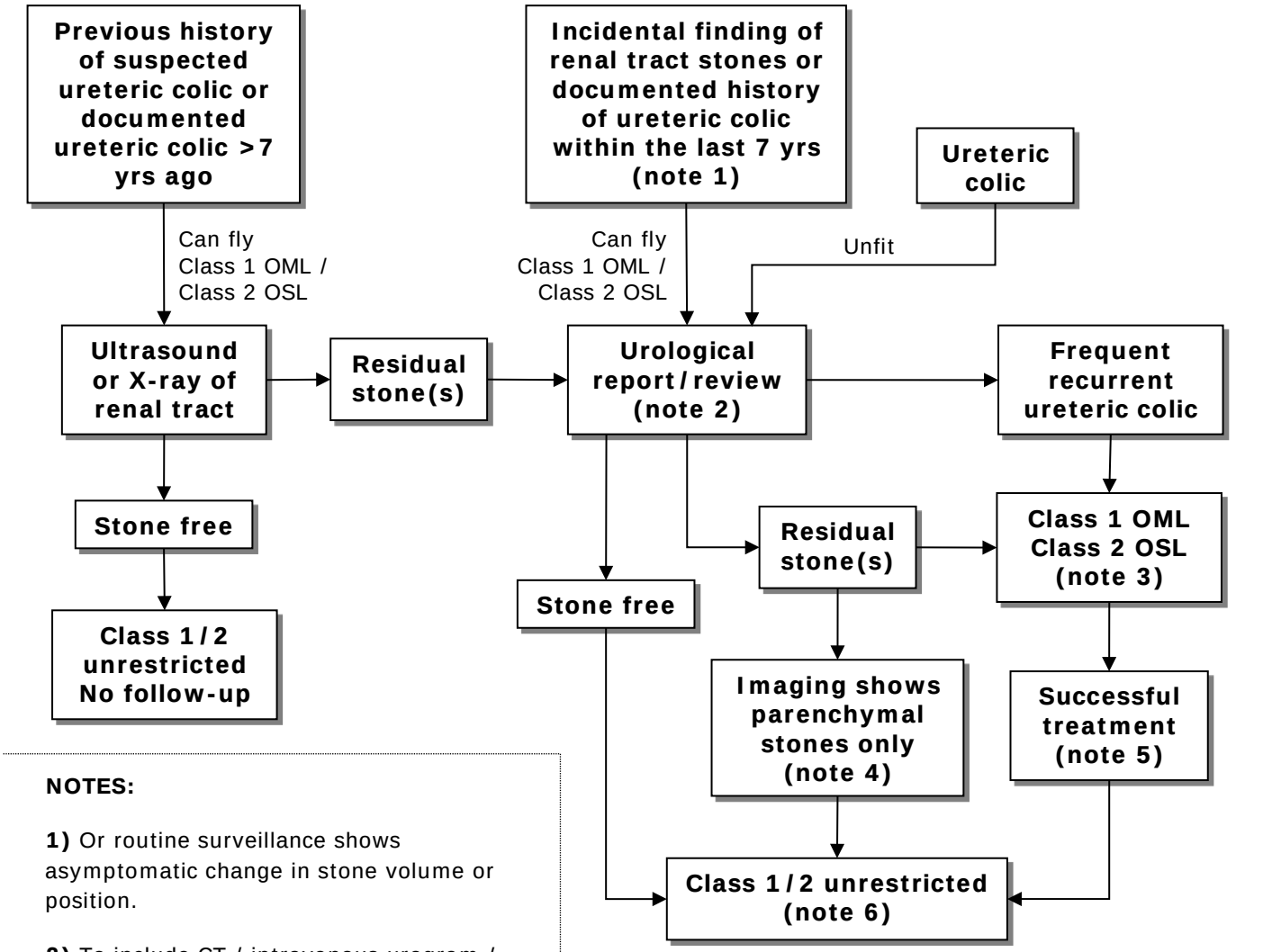
NOTES:

1) PCR >100 mg/mmol or ACR >70 mg/mmol precludes applicants from medical certification.

2) Transient causes of non visible haematuria should be excluded, i.e. urinary tract infection, exercise induced, menstruation. Repeat samples to be tested within 1 months if pilot to remain fit.

3) For medical certification to be considered a report is required detailing the diagnosis, outcome of any investigations and treatment.

Flowchart – Renal stones certification



NOTES:

1) Or routine surveillance shows asymptomatic change in stone volume or position.

2) To include CT / intravenous urogram / ultrasound / Biochemistry results as appropriate.

3) Applicants with frequent / recurrent stone formation require individual assessment and follow up. In some cases a permanent limitation or unfit assessment may be necessary.

4) If imaging shows stones not in calyces or collecting system, unrestricted certification may be considered by the Medical Assessor.

5) Results acceptable and no stones in calyces or collecting system.

6) Surveillance imaging shows no recurrence and/or change in volume or position of stone(s): AXR or Ultrasound of renal tract at years 2 and 7.

MED.B.040 – Infectieziekte

Richtlijnen
Guidance Material

Infectious hepatitis

Hepatitis A

Hepatitis A infection is disqualifying. Certification will be considered upon full recovery.

Hepatitis B

Acute hepatitis B is disqualifying. Certification may be considered upon full recovery (viral clearance).
Certification may be considered in pilots in the 'immune tolerant' or 'inactive HBV carrier state' of chronic hepatitis B.

Pilots are required to submit a report from a liver specialist, to include:

- History of infection
- Current symptoms
- Stability of condition
- Liver function tests
- HBV serology
- HBV DNA levels
- Alphafoetoprotein (AFP)
- Report of ultrasound of the liver

Requirement for treatment is disqualifying.

Hepatitis C

Acute hepatitis C is disqualifying. Certification may be considered upon full recovery (viral clearance).
Certification may be considered following successful treatment which has rendered the pilot disease free from chronic hepatitis C.

Pilots are required to submit a report from a liver specialist, to include:

- History of infection
- Current symptoms including an CNS effects
- Stability of condition
- Liver function tests
- HCV serology
- HCV RNA and genotype
- Report of ultrasound of the liver including biopsy results if available

Pilots may be required to undergo neuropsychological assessment.

Requirement for treatment is disqualifying, certification may be considered following successful treatment (sustained viral response).

HIV infection

Information – Certification for HIV positive applicants

Information – Certification for HIV positive applicants

Following diagnosis or on declaration of HIV infection, the pilot should be declared unfit until reports have been obtained from the reviews described in **(a)** to **(e)** below. These can be used to assess functional fitness and the prospective incapacitation risk.

(a) HIV Specialist Review

An accredited specialist in genitourinary/HIV medicine should undertake this review. The report submitted should include:

- A history of infection
- Current symptoms
- Stability of the condition
- History of AIDS defining opportunistic infections or associated illnesses
- CD4+ T cell counts and viral load measurements
- Medication and start dates (describing side-effects if any)
- Results of co-infection testing (including Hep B/C, Cytomegalovirus, Toxoplasmosis and, in at risk cases, tuberculosis)
- HT, Urea and electrolytes, Liver function tests, fasting glucose and lipids

(b) Neurology Review

Assessment should be undertaken to look for neurological sequelae either of HIV positivity or therapy by an HIV specialist or consultant neurologist.

(c) Neuropsychological Review

The pilot should undertake a baseline neuropsychological assessment. The tests should assess timed psychomotor tasks and memory tasks which require attention, learning and active monitoring or retrieval of information. These baseline tests may be used as a future comparator.

(d) Psychiatry Review (if clinically indicated)

Assessment should be undertaken by a consultant psychiatrist with particular attention paid to the psychiatric symptoms and signs related to HIV seropositivity and or Anti Retroviral Therapy (ART). There is evidence in the immediate post diagnosis phase of a higher risk of developing a depressive illness. Some medication may also have side-effects such as mood changes and/or depressive illness. An initial assessment of these conditions can be made by the treating HIV specialist with a further assessment by a psychiatrist if indicated.

(e) Cardiology Review (if clinically indicated)

Lipodystrophy and metabolic syndrome may arise as an interaction between HIV disease and or immune recovery and ART. This may manifest as a dyslipidaemia with raised total cholesterol, low HDL cholesterol and raised Triglycerides or insulin resistance and hyperglycaemia. Cardiology review is required in the presence of significant cardiac risk factors e.g.:

- Hypertension
- Family history
- Smoking
- Raised Lipids
- Diabetes
- Age
- Evidence of Left Ventricular Hypertrophy

Aeromedical Certification Assessment

Pilots whose condition is stable, asymptomatic, with an acceptable CD4+ count and viral load, with acceptable co-infection serology and therefore an acceptable risk of disease progression may be considered for a class 1 with an Operational Multi-pilot Limitation. These applicants should be referred to

the Medical Assessor. Class 2 applicants who are similarly well and have an acceptable risk of disease progression can be considered in consultation with the Medical Assessor.

Medication

All medications should be discussed with the AME or Medical Assessor.

Certificate holders should be declared unfit whilst initiating, modifying or discontinuing antiretroviral treatment (ART) and may be reassessed after a period of 2 months, although in some cases it may be at least 6 months before recertification, by means of a report from their treating HIV specialist, to include recent CD4+ counts and viral loads and confirmation of an absence of ongoing side-effects from medication or symptoms related to HIV seropositivity.

Follow Up

3 monthly	Viral loads and CD4+ count (can be submitted as part of a 6 monthly report from HIV specialist to include neurology review, if applicant remains stable with no symptoms related to infection or treatment).
6 monthly	Report with neurology review - see **(b)** above. If on ART, blood results should include Liver function tests and HT.
12 monthly	If on ART, blood results should include lipids and fasting glucose. Cognitive Function Assessments (can be Licence Proficiency Check or Medical Flight Test with a Flight Examiner where risk of disease progression is low). Impaired performance will require further neuropsychological assessment to be compared with baseline testing and any deficits will require that the pilot is declared unfit. Further co-infection testing will be required as clinically indicated, and those with positive tests need to be referred to the Medical Assessor in the case of class 1 certificate holders or assessed in consultation with the Medical Assessor in the case of class 2 certificate holders. New symptoms or results outside acceptable limits are likely to lead to an unfit assessment and should be referred to/assessed in consultation with the Medical Assessor in accordance with the class of certificate held.

MED.B.045 – Obstetrie en gynaecologie

Richtlijnen
Guidance Material

Polycystic Ovary Syndrome (PCOS)
Ongoing medical certification is subject to a specialist gynaecologist report. This should include a cardiovascular and metabolic risk assessment and review of any symptoms of obstructive sleep apnoea syndrome(OSAS). A diagnosis of cardiovascular, metabolic disease or OSAS entails unfitness and risk factors should be addressed.

Hormone manipulation therapy is acceptable subject to confirmation of no side effects and adequate symptom control.

Note: Metformin & thiazolidinediones are unlicensed for use in PCOS and may only be used in consultation with the Medical Assessor on a case-by-case basis.

Endometriosis
Applicants with a first diagnosis of endometriosis should be assessed as unfit. Recertification is considered subject to a specialist gynaecologist report. Recertification is considered if the applicant is symptom free, on minimal analgesics and/or has minimal side effects from hormone manipulation therapy. Surgery entails unfitness. (See below)

Hormone Replacement Therapy
Applicants undergoing, or changing, hormone replacement therapy (HRT) should refrain from flying/controlling for at least 2 weeks to ensure they have no side effects from the medication. Failure to control symptoms of concern should entail unfitness until stability on appropriate medication is achieved. A report from a gynaecologist or General Practitioner (GP) which should include a cardiovascular risk assessment, confirmation of no side effects of therapy and adequate symptom control, should be reviewed by the AME.

Gynaecological Surgery
The period of unfitness will vary according to the type of surgery and any post-operative complications. A minimum period of 1 week should elapse after a Dilatation and Curettage (D&C), 6 weeks after laparoscopic hysterectomy, 8 weeks after vaginal hysterectomy and 12 weeks after an abdominal hysterectomy. Laparoscopy involving insertion of gas in to the abdominal cavity may require 2 weeks prior to returning to flying. A gynaecological report should be obtained.

Menorrhagia
Applicants requiring specialist investigation for menorrhagia should be assessed as unfit. Recertification is considered subject to a satisfactory specialist gynaecologist report. The applicant should be symptom free and/or have minimal side effects from hormone manipulation therapy. Haemoglobin should be within normal limits. Surgery entails unfitness until symptom-free following recovery.

In Vitro Fertilisation
Applicants undergoing a first cycle of IVF should be declared unfit. Recertification may be considered subject to an acceptable specialist gynaecologist report. The report should confirm no evidence of continuing ovarian hyperstimulation or other associated side effects and intended future management including medication. The applicant should remain assessed as unfit if pregnancy is confirmed.

Pregnancy Information Sheet
Pilots should be advised to give a copy of this information sheet to their midwife or doctor for inclusion in their medical notes. This information sheet is included as an attachment to this document.

Periods of unfitness for subsequent cycles should be determined according to the issues experienced during previous cycles.

Miscarriage or termination of Pregnancy
Applicants who suffer a miscarriage or have a termination of pregnancy should be assessed as unfit.

Recertification is considered subject to a GP or gynaecologist report. The report should confirm they have fully recovered, with no residual symptoms, a normal haemoglobin and comment on psychological status. Before returning to flying class 1 applicants should undergo an assessment by their AME of their psychological state.

MED.B.050 – Spier- en skeletstelsel

Richtlijnen
Guidance Material

Examination of the musculoskeletal system
At routine medical examination much information on musculoskeletal function is obtained informally by observation of the applicant as they walk, sit, climb onto the examining couch etc. At the initial examination, following musculoskeletal injury or if there is any other reason to suspect impaired function, formal examination is required. This will include, as a minimum, demonstration of a satisfactory range and strength of neck and limb movement, of stability of joints likely to be subjected to prolonged or sudden stress and the absence of pain or medication side-effects likely to affect concentration or judgement. More detailed examination will be required for applicants with musculoskeletal disease/injury and supplementary notes can be found in: Information – Examination of the musculoskeletal system.

The Medical Flight Test Form is included as an attachment to this document.

Report specifications – Musculoskeletal

Physical Disability and Aviation Medical Certification
In the aviation environment impairment of the musculoskeletal system may cause difficulty in entry to and exit from an aircraft and safe operation of controls. Restricted mobility may adversely affect the ability to read instruments or keep a satisfactory lookout. Applicants for medical certification with musculoskeletal disabilities require assessment to ensure they have the strength and range of movement necessary to operate an aircraft safely, with aids or modifications to controls as appropriate, and that they are not experiencing symptoms or medication side effects likely to impair judgement and concentration.

Information - Obesity and medical certification

Information – Examination of the musculoskeletal system

To perform the tasks involved in inspecting, flying and evacuating an aircraft safely and effectively a pilot must be free of pain and have sufficient strength and range of movement in the spine and limbs.

At routine medical examination information on musculoskeletal function is obtained informally by observation of the applicant as they walk, sit, climb onto the examining couch etc. At the initial examination, following musculoskeletal injury or if there is any other reason to suspect impaired function, formal examination is required. This will include, as a minimum, demonstration of a satisfactory range and strength of neck and limb movements, of stability of joints likely to be subjected to prolonged or sudden stress and the absence of pain or side effects of medication likely to affect concentration or judgement.

Neck movement is essential to keep a satisfactory lookout and the initial applicant must show a good range of flexion, extension, lateral flexion and rotation of the cervical spine.

Examination of lumbar spine movements will help to identify painful conditions which might cause distraction in flight. The initial applicant should demonstrate a good range of flexion, extension, lateral flexion and rotation of the lumbar spine.

Putting the hands behind the head and then behind the back tests elbow and shoulder movements and is usually sufficient to demonstrate satisfactory reach. Observing the applicant writing, tying shoe-laces etc may alert the examiner to the need for further examination of manual dexterity.

If the applicant can squat and stand up comfortably without support he or she has demonstrated sufficient range of movement and strength to operate the brake and rudder pedals.

Physical Disability and Aviation Medical Certification

In the aviation environment impairment of the musculoskeletal system may cause difficulty in entry to and exit from an aircraft and safe operation of controls. Restricted mobility may adversely affect ability to read instruments or keep a satisfactory lookout. Applicants for pilot licensing with musculoskeletal disabilities require assessment to ensure they have adequate strength and range of movement, with aids or modifications to controls as appropriate, and that they are not experiencing symptoms or side effects of medication likely to impair judgement and concentration. A medical flight test will be required to assure satisfactory function in the cockpit environment if there is any major physical disability or any minor disability that has the potential to cause difficulty with any control movement or other required in-flight function, access or egress.

Medical Certification following Musculoskeletal Injury

Significant injury warrants an unfit assessment. The doctor responsible for treating the injury should provide full details of damage sustained and treatment provided. The AME must confirm satisfactory functional recovery. The pilot must show a full pain-free range of movement with sufficient strength to carry out the relevant flying tasks.

For example, a pilot returning to flying after a lower limb injury would have to demonstrate hip, knee and ankle mobility and strength sufficient to assist passengers in aircraft evacuation and to operate rudder and brakes in difficult circumstances such as cross-wind landings.

Report specifications – Musculoskeletal

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms, injury, impairment
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Examination findings at time of clinical report**
   - Stability of joints (stable/unstable)
   - Muscular strength and control (normal/diminished)
     - Relevant forces required (e.g. in the cockpit, arms for stick controls and legs for pedal control)
   - Range of movement and control (restricted/unrestricted)
     - Relevant to limb movements for operation of controls and neck movements for look out

4. **Results of any investigation performed**
   - Blood test results (e.g. HT, urea and electrolytes, liver function tests, erythrocyte sedimentation rate, C-reactive protein)
   - Radiology imaging reports (e.g. x-ray, bone scan, CT, MRI)
   - Other procedures and investigation reports

5. **Treatment**
   - Recent, past and ongoing treatment must be detailed
   - Current and recent past medication (dose, frequency, start date and finish date)
   - Confirmation no side effects from medication
   - Surgical reports

6. **Follow up and further investigations/referrals planned or recommended**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Prognosis and risk of recurrence
   - Confirmation of full recovery or remission on maintenance dose of acceptable medication and well controlled at date of report

7. **Clinical Implications**
   - Any concerns regarding stability deficits, disease progression, treatment compliance or risk of sudden incapacity

MED.B.055 – Mental Health

Richtlijnen
Guidance Material

Fear of flying
Although fear of flying affects about 15% of the general population, it is unlikely those affected will opt for a career as a pilot and, if they do, habituation with consequent resolution of anxiety will have taken place during training. The development of fear of flying in experienced fliers is normally due to the development of an underlying psychiatric disorder such as adjustment disorder, acute stress disorder, PTSD, agoraphobia, with or without panic disorder, or depression. Management should be appropriate to the diagnosis.

Report specifications - Psychological and psychiatric

Disorders due to alcohol or other substance use
Flowchart – Alcohol/substance misuse certification

Psychotropic substances
Report specifications - Psychological and psychiatric

Mood disorder
Flowchart – Depression certification

Report specifications - Psychological and psychiatric

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms, including reason for referral
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Nature severity and course of illness**
   - Current symptoms
     - Specifically include details of any sleep deprivation, suicidal ideation, deliberate self-harm or delusions
   - Results of clinical questionnaires

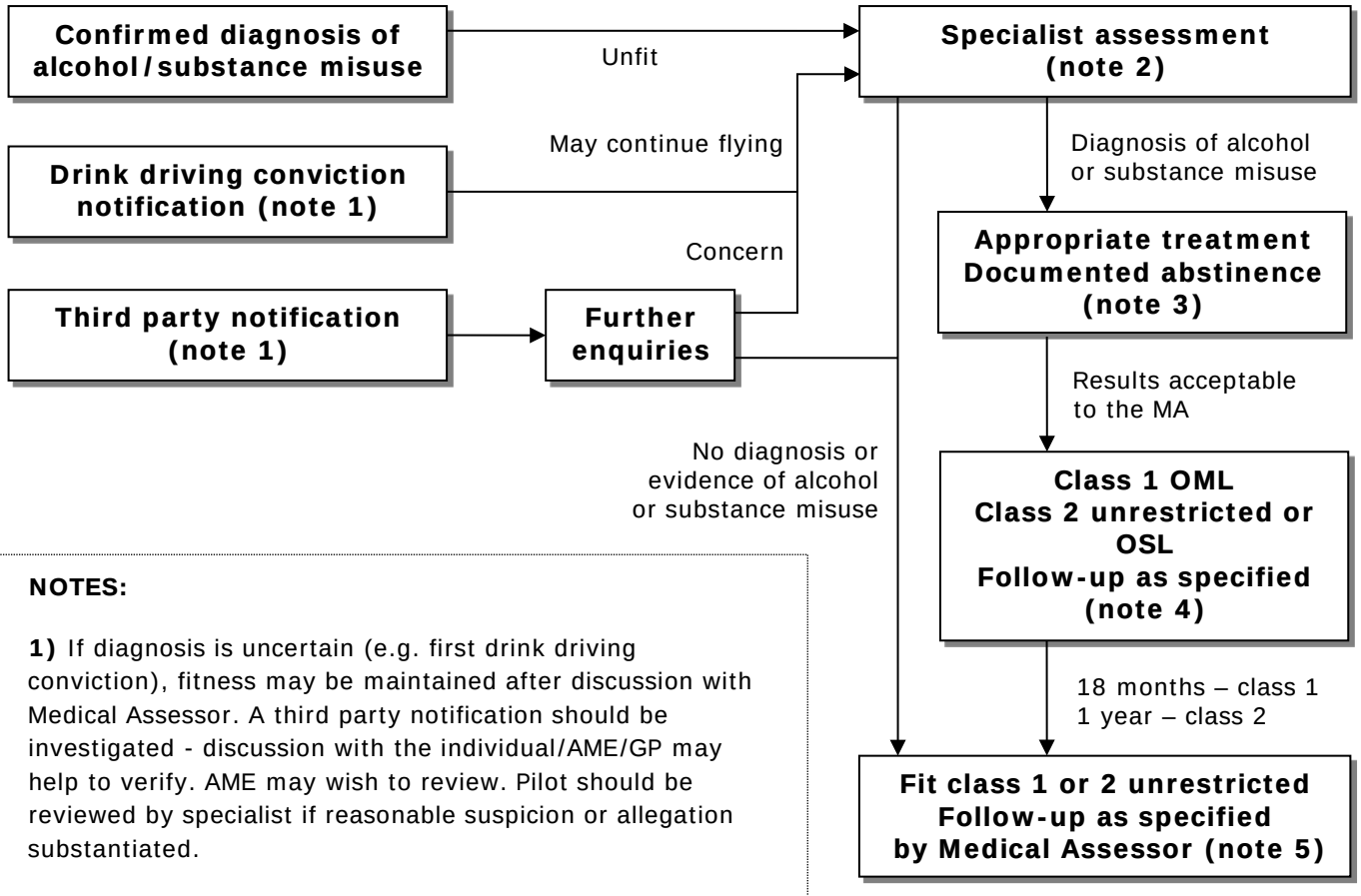
4. **Treatment**
   - Received to date (past and ongoing treatment should be detailed)
   - Current and recent past medication (dose, frequency, start date and finish date)
   - Details of any side effects from medication
   - Details of referral for further treatment to other healthcare professionals

5. **Follow up anticipated**
   - Anticipated follow up/frequency of clinical reviews and investigations

6. **Likelihood of recurrence**
   - Prognosis and risk of recurrence

7. **Clinical implications**
   - Any concerns regarding symptom and diagnosis progression, treatment compliance or risk of incapacity

Flowchart – Alcohol/substance misuse certification



NOTES:

1) If diagnosis is uncertain (e.g. first drink driving conviction), fitness may be maintained after discussion with Medical Assessor. A third party notification should be investigated - discussion with the individual/AME/GP may help to verify. AME may wish to review. Pilot should be reviewed by specialist if reasonable suspicion or allegation substantiated.

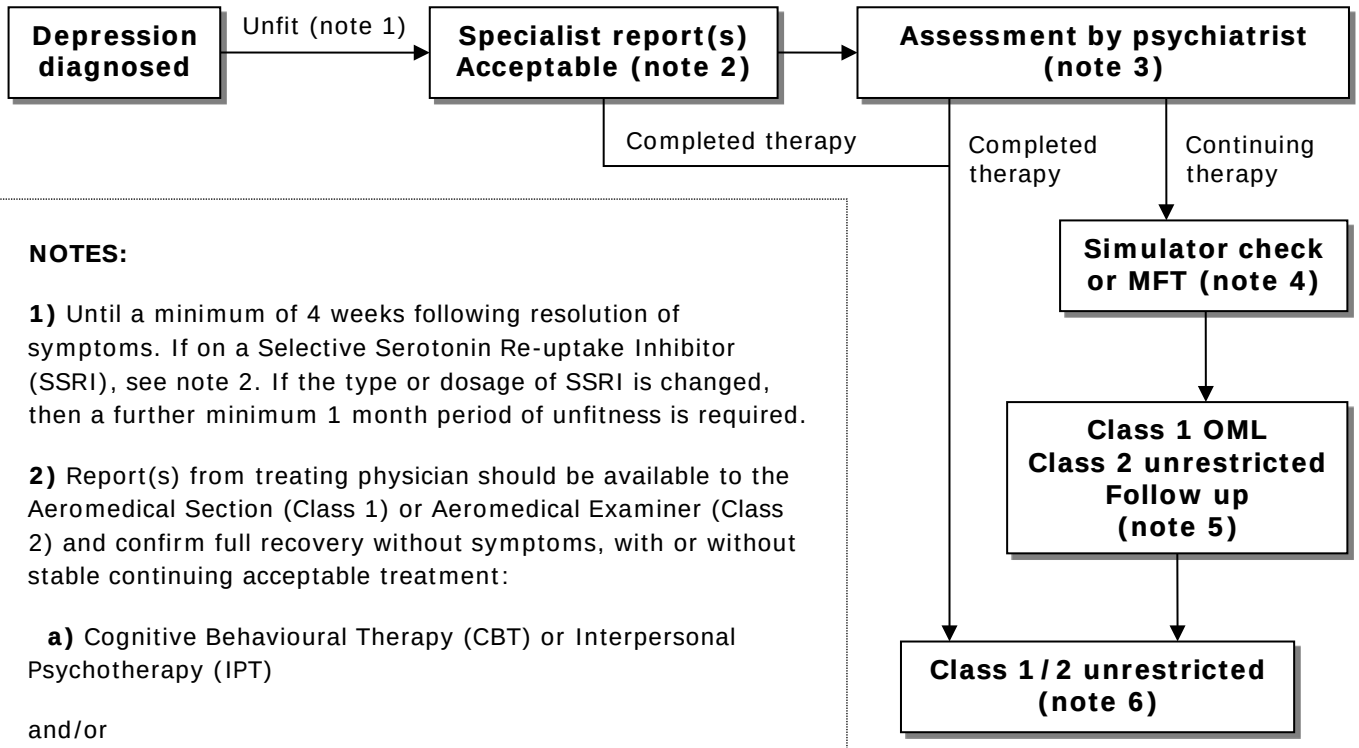
2) By CAA specialist advisor in alcohol and addiction disorders. To include bloods: MCV, GGT and % CDT (for alcohol misuse) and hair analysis for cannabis, amphetamines, methamphetamines, cocaine, opiates and BDZs (for substance misuse).

3) Depending on the individual case and at the discretion of the Medical Assessor, treatment and review may include in-patient treatment of some weeks followed by periodic specialist review, and blood/hair testing and buddy reports at each review.

4) A fit assessment may be considered by the Medical Assessor after a period of two years documented sobriety or freedom from substance use. At revalidation or renewal a fit assessment may be considered earlier and a multi-pilot (Class 1 'OML') or safety pilot limitation (Class 2 'OSL') may be appropriate.

5) Follow up may be required indefinitely in severe cases. If relapse occurs, a further period of grounding is required, pending further assessment/treatment. More than one episode of relapse is disqualifying.

Flowchart – Depression certification



NOTES:

1) Until a minimum of 4 weeks following resolution of symptoms. If on a Selective Serotonin Re-uptake Inhibitor (SSRI), see note 2. If the type or dosage of SSRI is changed, then a further minimum 1 month period of unfitness is required.

2) Report(s) from treating physician should be available to the Aeromedical Section (Class 1) or Aeromedical Examiner (Class 2) and confirm full recovery without symptoms, with or without stable continuing acceptable treatment:

a) Cognitive Behavioural Therapy (CBT) or Interpersonal Psychotherapy (IPT)

and/or

b) SSRIs: only Citalopram, Sertraline or Escitalopram are acceptable as maintenance therapy. No other psychotropic medication is permitted.

The pilot should only be returned to flying duties if psychiatric assessment is satisfactory and either treatment is complete without recurrence or they remain on maintenance SSRI therapy.

A psychiatrist assessment may be indicated in some class 1 cases and for all cases (Class 1 and 2) where the pilot is still undergoing therapy and/or taking an acceptable SSRI.

3) If the type or dosage of the SSRI has been changed, or the condition is not stable, then a further period(s) of unfitness shall be required until both dose and condition are stable. Further report(s) from treating physician may be required. If the SSRI is being discontinued the earliest return to fitness is 4 weeks after ceasing medication.

4) Simulator check (Class 1) or Medical Flight Test (MFT) (Class 2 – with a Chief Flying Instructor or Flight Instructor Examiner) is required.

5) Follow up to be determined by a psychiatrist, initially every 3 months whilst being treated. 'Buddy reports' may be requested.

6) Follow up: class 2 AME (with clinical reports if available). Class 1 to be determined by a psychiatrist. Unrestricted class 1 is only possible 6 months after cessation of all treatment.

MED.B.065 – Neurologie

Richtlijnen
Guidance Material

Cerebral aneurysm, Sub-Arachnoid haemorrhage including coiling
Three factors influence aeromedical safety:

1. Any neurological damage from the bleed or subsequent surgery
2. The risk of epilepsy (which may be modified by surgery) and;
3. The risk of future bleeding.

A full neurological report must be obtained which gives information about these factors, the presentation, exact diagnosis, surgical treatment and post-operative course. Information on post-operative medication, if any, must be obtained.

The site of the aneurysm and nature of the surgical treatment will determine the overall risk of epilepsy in the future and this will determine the certification decision that can be taken.

Once neurology reports and investigation results are available class 1 cases should be referred to the Medical Assessor and class 2 cases managed by AMEs in consultation with the Medical Assessor.

Epilepsy
Epileptiform seizures immediately occurring within 24 hours of a head injury may be acceptable, as may drug related or alcohol withdrawal seizures provided that the causation is certain and the predisposing causes have been acceptably managed. Refer to:
Flowchart – Alcohol/substance misuse certification or Table – Head injury certification as appropriate.

Neonatal and febrile convulsions occurring under five years of age are not disqualifying.

A single unprovoked seizure does not constitute epilepsy. About a third of single seizures in adult life recur. Recurrence is more common in the first three months after the first seizure than subsequently – so a significant seizure-free interval reduces the risk.

Two or more unprovoked seizures more than 24 hours apart fulfill the criteria for epilepsy.

Clinical EEG abnormalities
If an EEG has been undertaken for clinical reasons e.g. a single afebrile seizure, a 'provoked' seizure, head injury, post neurosurgery or infection the report should be available for the AME to review.

Rarely, a first degree family history of epilepsy, especially if the mother is affected and if her epilepsy presented in childhood, and the applicant is young, an EEG may be warranted. Medical Assessor advice should be sought.

Multiple Sclerosis
Flowchart – Multiple sclerosis certification

Migraine
Flowchart – Migraine certification

5HT1 agonists, ergot alkaloids and antidepressants are in general not permitted because of their side effect profiles.

In exceptional circumstances low dose propranolol (10mg 3 times daily or slow release equivalent) may be considered for class 1, on referral to the Medical Assessor, or for class 2 in consultation with the Medical Assessor. Simple analgesics or non-steroidal anti-inflammatory agents are permitted provided that they adequately control symptoms. As with all medications, an adequate period of grounding must take place so that the effectiveness can be assessed and any side effects will become apparent.

Parkinson's disease
A definitive diagnosis of Parkinson's disease will not permit initial class 1 or 2 certification. Once the disease becomes clinically evident there is a high incidence of cognitive dysfunction which may progress to dementia. There is also a high incidence of depression. Bradykinesia and tremor may present a flight safety hazard. Additionally the disease process is generally progressive which makes it difficult to predict the cognitive and physical function a few months ahead.

Pilots with a diagnosis of Parkinson's disease will be made unfit pending neurology review. For commercial pilots this must be with a neurologist with a specialist interest in aviation. Most medications used to treat Parkinson's disease are unacceptable for

certification due to their side-effects but amantadine and selegiline are acceptable. Return to flying will be with an OML limitation and subject to a satisfactory simulator check. Due to the progressive nature of the disease there must be an adequate process in place for regular clinical and functional review.

Class 2 applicants may regain certification, which may be subject to an OSL, once a satisfactory report is obtained from a consultant neurologist, in consultation with the Medical Assessor.

Episode of disturbance of consciousness

Information – Certification after cerebrovascular events, stroke and transient ischaemic attack

Information – Carotid or vertebral artery dissection certification

Transient Global Amnesia (TGA)
A diagnosis of TGA should be confirmed by a neurologist.
Initial certification (Class 1 or 2) is not possible.
If investigations (EEG and appropriate scanning) are normal and if there has been no recurrence for 12 months then, for class 1, a review should be undertaken by a neurologist. If satisfactory a class 1/OML may be issued.
For a class 2 revalidation or renewal, recertification with an OSL may be considered.

Flowchart – Neuro-cardiogenic syncope certification

Head Injury
History should include the date of the event, post-traumatic amnesia, duration of unconsciousness, any seizure, the presence or absence of skull fracture, and whether any scan or surgical procedure was performed, for example elevating a depressed fracture or removing a blood clot.

There may be associated facial or orbital trauma which may need additional assessment, for example formal visual field testing following orbital injury.

AMEs should consider Eustachian or sinus dysfunction following trauma.

Table – Head injury certification

Report specifications – Head injury

Spinal or peripheral nerve injury
A pilot who suffers a peripheral nerve injury should be made unfit. Once sufficient time for recovery has passed an assessment of function can be made. Reports on the injury, its treatment and the recovery should be available. For class 1 applicants a Medical Flight Test should be performed in a relevant simulator or aircraft type with a Type Rated Examiner, to assess the ability of the applicant to perform all the checks, fly the aircraft and perform the emergency drills and evacuation procedures should be obtained. This practical assessment will need to be repeated if there is a change in aircraft type. For class 2 applicants the AME should assess if recovery is complete. If not, a Medical Flight Test report from a flying instructor should be obtained.

The Medical Flight Test is included as an attachment in this document.

Additional guidance is available in:

MED.B.050 – Spier- en skeletstelsel

Dementia/Cognitive Impairment
Dementia (cognitive and behavioural problems severe enough to impair normal function) is incompatible with any form of certification. Mild cognitive impairment does not interfere with normal daily activities but may represent a significant flight safety risk. It is increasingly common with advancing age and may not be recognised by the pilot. Although there are a number of simple tests of cognition that can be used by the AME these are unlikely to pick up mild cognitive impairment. It is important to have an index of suspicion in elderly pilots and ask about their flying and how well they manage different situations, in particular read-back of information and the acquisition of new skills, for example a different communication layout on a different aircraft. Presentation of a 4-digit number at the start of the medical for recall some time later may be useful.
A Medical Flight Test (for class 2) or referral to the Medical Assessor for a simulator assessment with a Type Rated Examiner (for class 1) may be required, specifically to test decision-making skills and conditional tasks.

Richtlijnen
Guidance Material

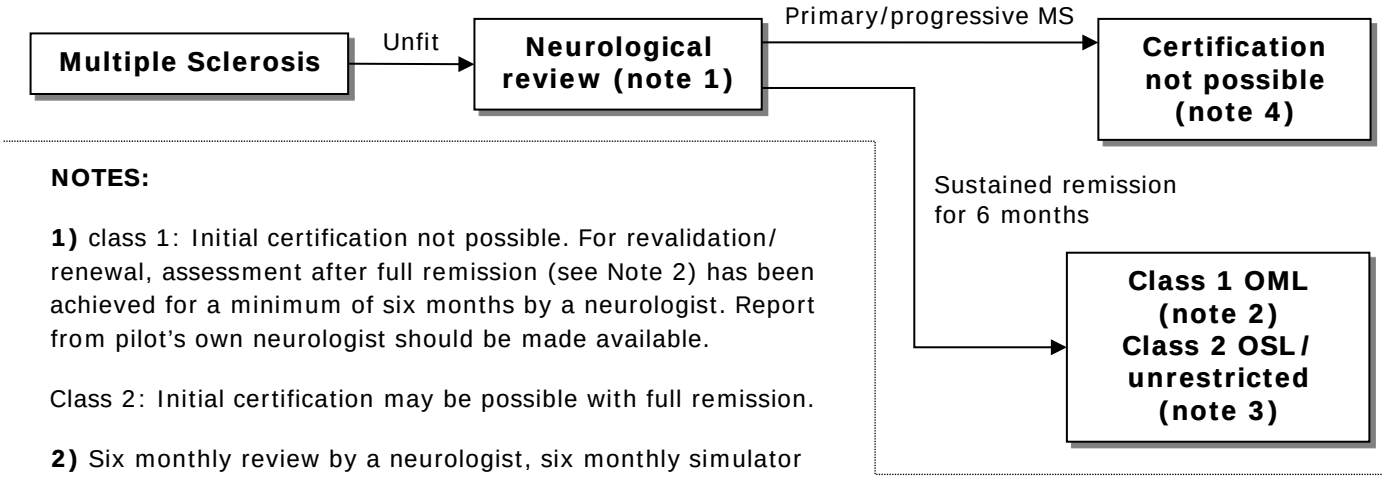
The Medical Flight Test Form is included as an attachment in this document.

Table – Head injury certification

Classification	Criteria	Aircrew Medical Category	Assessment*
Minimal	• Any concussive or mild head injury symptoms which have recovered within 48 hours • No loss of consciousness (LOC) • No post traumatic amnesia (PTA) • No neurological deficit • No seizure	Class 1 & 2 Unfit 7 days	Medical report from attending doctor **OR** AME clinical assessment
Mild	• Any concussive or mild head injury symptoms for greater than 48 hours • **Initial Glasgow Coma Score (GCS) 12-15** • LOC less than 30 minutes • PTA less than 30 minutes • No neurological deficit • No skull fracture (if scan performed) • No brain contusion (if scan performed) • No seizure	Class 1 & 2 Unfit for 6 weeks after resolution of any symptoms Class 1 Then OML fur further year	Medical report from attending doctor including investigations **AND** AME clinical assessment after resolution of symptoms
Moderate	• **Initial GCS 9-12** • LOC 30 mins to 24 hours • PTA 30 mins to 24 hours • No neurological deficit • Skull fracture • No brain contusion on CT/MRI • No seizure	Class 1 Unfit for 6 months after resolution of any symptoms Then OML for 2 years Class 2 Unfit for 3 months after resolution of any symptoms Then OSL for 3 months	Medical report from attending specialist including investigations. CT/MRI mandatory before recertification **AND** AME clinical assessment after resolution of symptoms
Severe	• **Initial GCS less than 9** • LOC more than 24 hours • PTA more than 24 hours • Focal neurological deficit • Brain contusion on MRI • Intracranial haemorrhage on CT/MRI • Depressed skull fracture	Class 1 Unfit for 3 years after resolution or stable, non-disabling symptoms Then OML long-term Class 2 Unfit for 1 year after resolution of symptoms or demonstration of stable, non-disabling symptoms Then OSL for 2 years	Medical report from attending specialist including investigations. CT/MRI mandatory before recertification Class 1: satisfactory simulator check Class 2: satisfactory medical flight test **AND** AME clinical assessment
Very severe	• Penetrating brain injury • Significant parenchymal damage • Disabling neurological deficit	Class 1 & 2 Unfit long-term	Medical report from attending specialist including investigations. CT/MRI mandatory before recertification **AND** satisfactory medical flight test **AND** AME clinical assessment

* class 1 cases to be assessed by Medical Assessor apart from minimal (AME), class 2 cases to be assessed by AME

Flowchart – Multiple sclerosis certification



NOTES:

1) class 1: Initial certification not possible. For revalidation/ renewal, assessment after full remission (see Note 2) has been achieved for a minimum of six months by a neurologist. Report from pilot's own neurologist should be made available.

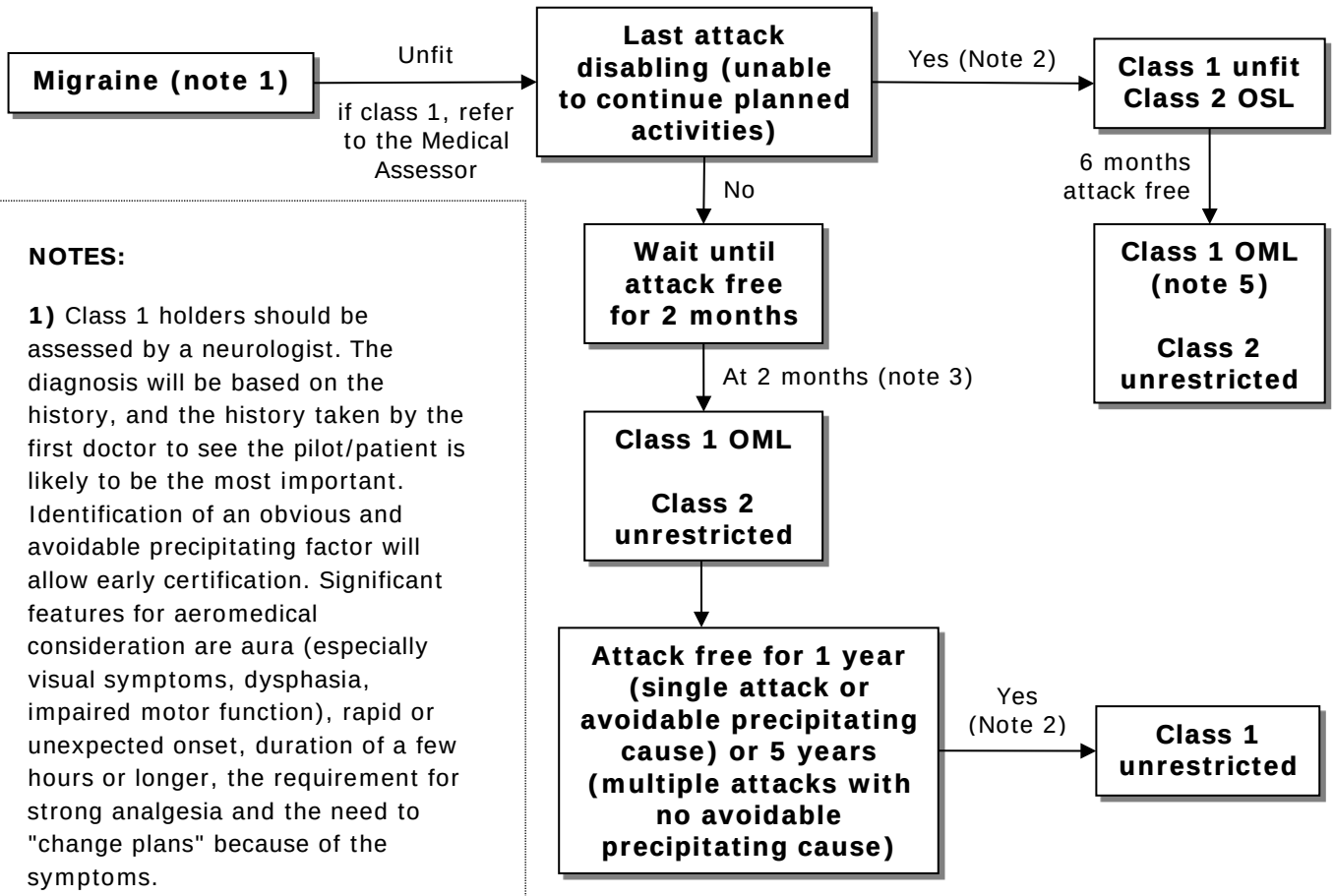
Class 2: Initial certification may be possible with full remission.

2) Six monthly review by a neurologist, six monthly simulator check and +/- ophthalmology review as required.

3) Annual local neurological review. Unrestricted certification may be possible with full remission (no symptoms).

4) Subsequent full recovery may permit certification for (Class1/OML, class 2/OSL) subject to neurological review (Class 1 – Medical Assessor, class 2 – locally).

Flowchart – Migraine certification



NOTES:

1) Class 1 holders should be assessed by a neurologist. The diagnosis will be based on the history, and the history taken by the first doctor to see the pilot/patient is likely to be the most important. Identification of an obvious and avoidable precipitating factor will allow early certification. Significant features for aeromedical consideration are aura (especially visual symptoms, dysphasia, impaired motor function), rapid or unexpected onset, duration of a few hours or longer, the requirement for strong analgesia and the need to "change plans" because of the symptoms.

2) For professional and private pilots already possessing a licence.

3) For professional pilots with a licence and initial applicants for a class 2 medical certificate.

4) Initial applicants for a class 1 certificate or professional pilots with a past history of migraine and a class 1 OML certificate.

Information – Certification after cerebrovascular events, stroke and transient ischaemic attack

Class 1 & 2

Applicants for class 1 and class 2 certification with a diagnosis of Stroke, Transient Ischaemic Attack (TIA) or Reversible Ischaemic Neurological Deficit (RIND) should be assessed as unfit.

The basis for this is an up to date review of the epidemiological studies that has shown that the risk of a future event (including further vascular event, stroke or seizure) will always exceed 1% per annum, usually by a considerable margin, even in individuals under 45 years of age and those with paradoxical embolism. Therefore this also precludes all class 1 and unrestricted class 2 certification.

Class 2 (OSL)

Existing class 2 certificate holders may be considered for recertification by the AME if there is no residual impairment likely to affect flight safety and there are no other significant risk factors including:

- Age >70
- Diabetes
- Uncontrolled hypertension
- Coronary artery disease
- Atrial fibrillation
- Heart failure
- Anticoagulation or underlying coagulation defects if associated with an increased risk of spontaneous bleeding or thrombosis

Assessment

- Review of neurological reports including risk factor control must be satisfactory
- Cardiological review to include exercise ECG testing before certification and on an annual basis
- Echocardiogram
- 24hr ECG recording
- Carotid artery imaging – should show now stenotic lesions ≥50%
- Thrombophilia screening if indicated
- Visual field mapping should be normal
- A medical flight test is required to assess functional capacity with particular reference to cognitive functions and any physical disability

Recertification

Unfit for 12 months then permanent OSL.

Follow-up

Annual cardiological review is required to include exercise testing, and review and investigation of risk factors.

Information – Carotid or vertebral artery dissection certification

The following co-existing conditions are unacceptable for recertification:

- Smoking
- Uncontrolled hypertension
- Coronary artery disease
- Previous stroke or TIA
- Anticoagulation or underlying coagulation defects
- Autosomal dominant polycystic kidney disease
- Osteogenesis imperfect type I

Assessment

- Review of satisfactory neurological and cardiological reports including risk factor control
- Selective arterial angiogram to exclude arterial disease in the carotid or posterior cerebral circulations
- Exercise stress test
- Coronary angiography, if the cause was likely to have been atheromatous or there are any symptoms suggestive of peripheral vascular, carotid or vertebral artery disease
- Formal visual field mapping, if vertebral artery dissection
- A medical flight test is required to assess function capacity with particular reference to cognitive function and any physical disability.

Recertification

- Unfit class 1 for 12 months after recovery then long-term OML
- Unfit class 2 for 6 months after recovery, then OSL for minimum of 6 months, and then consider unrestricted class 2

Follow-up

Annual cardiological review is required to include exercise testing, and review and investigation of risk factors.

Report specifications – Head injury

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Nature and circumstances surrounding injury
     - Attach personal and witness accounts and paramedic records
   - Duration of loss of consciousness
   - Pre and post traumatic amnesia
   - Other injuries and relevant medical history

3. **Symptoms (post injury period and current)**
   - Any seizures
   - Focal neurological deficits
   - Disorientation or deficits in memory
   - Confusion behaviour alteration disturbance of mood hallucination delusions
   - Generalized intellectual impairment change of personality
   - Coarsening of behaviour e.g. irritability, lack of drive, loss of control aggression

4. **Examination findings**
   - Neurological deficit intellectual impairment or loss of function
   - Compounding factors (e.g. skull fracture, vertigo, headache)
   - Residual impairment

5. **All investigation findings performed (as applicable)**
   - Imaging (CT, MRI)
     - Intracranial haemorrhage
     - Skull fracture
     - Meningeal rupture/penetration of dura
   - Neuropsychological evaluation
   - EEG
   - Other procedures and investigations

6. **Treatment**
   - Past and ongoing treatment must be detailed
   - Current and recent past medications (dose, frequency, start and finish dates)
   - Confirmation of no side effects from medication
   - Surgical reports

7. **Follow up and further investigations/referrals planned or recommended (as applicable)**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Prognosis and risk of recurrence
   - Confirmation of full recovery at date of report

8. **Clinical implications**
   - Any concerns regarding residual impairment, treatment compliance, or risk of sudden incapacity including post-traumatic epilepsy

MED.B.070 – Visuele systeem

Richtlijnen
Guidance Material

Visual system
Report specifications – Ophthalmic

Eye conditions
Information – Eye conditions certification

Information – Retinal arterial disorders certification

Information – Retinal vein occlusion (RVO) certification

Eye examination
Ophthalmology examination reports and information are included as an attachment to this document.

A routine eye examination that forms part of all revalidation and renewal examinations shall include: history; visual acuity, near and distant vision (uncorrected and with best optical correction if needed), examination of the external eye, anatomy, media, fundoscopy and further examination on clinical indication.

For conditions where deterioration in visual function may pose a significant risk to flight safety, the Medical Assessor will impose a RXO limitation

Comprehensive eye examination
Eye specialist is defined in MED.A.010.

Initial applicants who do not meet the requirements in (ii), (iii) and (iv)
Assessment should be conducted by, or under the supervision of, an ophthalmologist and ensure that there is no underlying pathology or other ocular abnormalities. Monocular visual acuities shall be 6/6 or better. Assessment shall include:
1) Dilated, binocular, indirect ophthalmoscopy in cases of myopia exceeding –6,0 dioptres.
2) Corneal topography at initial assessment (and at renewal where there is significant change in refraction) in cases of astigmatism exceeding 2,0 dioptres.

Applicants with excess hypermetropia may be assessed by the Medical Assessor on an individual basis and should be assessed by a consultant aviation ophthalmology advisor. Monocular visual acuities shall be 6/6 or better.
Assessment shall include:
1) Anterior angle assessment, with gonioscopy where clinically indicated, to assess the risk of closed angle glaucoma attack.
2) Fusional reserve testing to ensure there are no adverse prism effects from spectacles.
3) Exclusion of underlying pathology or other ocular abnormalities.

Anisometropia in excess of 3,00 D
Where anisometropia in excess of 3,00 D is found at revalidation, a pilot who does not wear contact lenses should be referred to a local contact lens practitioner for suitability assessment. A report should be provided after contact lens trial to either confirm successful wearing times and visual acuities or to specify why contact lens wear was not successful.

Class 1 Eye Examination Periodicity
In cases of known pathology /
abnormality, if there is no change to the condition and the visual standards are met, the indication for and periodicity of further assessment by an ophthalmologist can be determined by the Medical Assessor.

Eye examination
Ophthalmology examination reports and information are included as an attachment to this document.

At the initial assessment
All initial applicants who use optical correction should submit the result of a recent spectacle prescription.

Substandard vision
Local ophthalmologist reports and an assessment with a consultant aviation ophthalmology advisor will be required before a fit assessment can be made.
Class 1 applicants with substandard vision should be referred to the Medical Assessor for further advice about the type of Medical Flight Test to be undertaken.

Flowchart – Substandard vision in one eye certification (class 2 only)

Richtlijnen
Guidance Material

EASA MED.B.070 (e) states that “Applicants for a Class 1 medical certificate shall be required to have normal fields of vision and normal binocular function”. For the purpose of clarity the CAA defines "normal fields of vision" as follows:

1. Monocularly, on Esterman field testing, there should be no more than a single missed spot within 20 degrees vertically from the primary position and 30 degrees horizontally from the primary position. There should be no confluent area of missed spots outside this area.
2. Additionally, binocularly, on Esterman field testing there should be no more than 4 missed spots, of which not more than 2 shall be contiguous in the visual field defined horizontally by 60 degrees either side of the primary position and vertically by 20 degrees above the primary position and 30 degrees below the primary position.

Normal binocular function is defined as any individual with a degree of binocular lock. This would include individuals with normal binocular single vision and those individuals with well-adapted heterotropias, who are not at risk of diplopia and have adopted a suppression scotoma when both eyes are open.

Report specifications – Ophthalmic

Keratoconus

A CCL limitation (‘Correction by means of Contact Lenses only’) should be applied in cases of keratoconus where the visual requirements are met only with contact lenses, rather than spectacles.

Eye surgery

Report specifications – Ophthalmic

Class 1 & 2 - Correcting lenses

Information – Presbyopia correction guidance

Information – Guidance on spectacle frames and lens choise

Information – Guidance on contact lenses

Report specifications – Ophthalmic

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms
   - Nature of condition, circumstances surrounding onset, precipitating factors
   - Other relevant medical history

3. **Examination and investigation findings**
   - Clinical findings
     - Uncorrected visual acuities (R,L, both) – distant (6 m), intermediate (1 m) and near (30-50 cm)
     - Corrected visual acuities (R,L, both) – distant (6 m), intermediate (1 m) and near (30-50 cm)
     - Current refractive error
     - Impairment or loss of function
     - Clinical findings (as applicable)
       1. Retinal examination
       2. Slit lamp examination
       3. Fusion ability (state method used in examination)
     - Visual fields
       1. Standard Automated Perimetry
   - Surgical reports (see below)
   - Other relevant procedures and investigation reports

4. **Treatment**
   - Past, recent and ongoing treatment must be detailed
   - Ocular and other current and recent past medications (name, dose, start and finish dates, frequency)

5. **Follow up and further investigations/referrals planned or recommended (as applicable)**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Degree of recovery from the condition

6. **Clinical implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity

Please refer to the next page for details of further information required in certain specified conditions.

Ocular Hypertension, Glaucoma and Pigment Dispersion Syndrome

- Visual fields
- Optic disc assessment
- Intra ocular pressures
- Anterior angle assessment

Keratoconus

- Specify treatment (spectacles, contact lens supervision, cross linking, corneal transplant)
- Corneal topographies (colour copy)

Vascular Conditions (Artery or vein occlusions, Amaurosis Fugax)

- Visual fields
- Intra ocular pressures
- Cardiovascular review include
    - HT, erythrocyte sedimentation rate, Trombophilia screen
    - Temporal artery biopsy, carotid Doppler, echocardiogram

Phorias and Tropias

- Orthoptic report required

Eye Surgery Reports (from ophthalmic surgeon who carried out surgery)

- Date of surgery
- Intra or post operative complications
- Comment on relevant clinical findings
    - Ocular discomfort or diplopia
    - Corneal haze or other median opacities
    - Symptoms of glare, photophobia or other dysphotopic symptoms
    - Night vision issues

Cataract Surgery

- Type of surgery (phacoemulsification or extracapsular)
- Type of intraocular lens implant used
- Post capsular thickening

Refractive Surgery and Collagen Cross Linking

- Type of surgery (LASIK, LASEK, PRK, Collagen Cross Linking, other)
- Pre-operative refractions
- Post-operative refractions
    - Months 2 and 3 following LASIK
    - Months 3 and 6 following LASEK
- Glare sensitivity
- Corneal topographies (Collagen Cross Linking)
- Mesopic Contrast Sensitivity

Retinal Detachment / Par Planus Vitrectomy – Laser Retinopexy

- Type of surgery (gas or silicone oil)
- Residual field defect
- Risk of recurrence

Follow-up reports, to include visual field test results are required for many eye conditions in order to maintain medical certification.

Information – Eye conditions certification

Conjunctivitis

May require topical medication (e.g. fusidine), but it should not have an impact certification unless it causes a reduction of vision or discomfort. Note that some topical eye ointments may cause reduced vision immediately after insertion and so they should not be used just before or during flight.

Minor eyelid infections

Minor eyelid infections such as chalazion (stye) do not normally impact on certification unless causing discomfort or a reduction in vision due to ptosis or induced astigmatism. Topical medications should not have an impact on certification unless it results in a reduction of vision or discomfort. Note that some topical eye ointments may cause reduced vision immediately after insertion and so they should not be used just before or during flight.

Blepharitis

Blepharitis is usually a chronic condition and should be managed to ensure no symptoms (eye rubbing, dry eye) occur during flight.

Keratitis / Anterior Uveitis

Should be declared unfit on diagnosis. Recertification is considered once the condition resolved and the applicant is off medication (or low dose topical therapy). A consultant report is required regarding diagnosis and follow-up. Class 1 holders may be required to undertake an assessment with a consultant aviation ophthalmology adviser, particularly if residual scarring is present. Recurrent anterior uveitis should be investigated for systemic inflammatory conditions (such as ankylosing spondylitis).

Trauma

Eye injuries requiring ophthalmological assessment should be reported to the AME (Class 2) or Medical Assessor (Class 1). The pilot may be made unfit whilst recovering, depending on the individual case. Class 1 holders may be required to undertake assessment with a consultant aviation ophthalmology adviser. Pilots with minor corneal abrasions should not fly with any discomfort or disturbance to vision, with or without treatment.

Pupil Abnormalities

The pilot should be made unfit if there is recent onset and should be referred for further assessment by an ophthalmologist. Recertification is dependent on need for other investigations related to any underlying cause identified, and no symptoms (photophobia/difficulties with night vision).

Cataract

Pilots can be certificated provided the vision standards are met and is asymptomatic (no glare, haloes etc). The pilot will be certificated as unfit if symptomatic or below vision standards with best correction. Certification can be reconsidered following successful cataract surgery with an intraocular lens implant (see eye surgery guidance).

Posterior Uveitis

If posterior uveitis is active, the applicant should be declared as unfit. Certification can be reconsidered once treated provided vision and visual field standards are met. Consideration should be given to any underlying cause (bowel or renal disease, sarcoidosis, parasitic infection). Ophthalmological reports are required, and class 1 holders may be required to undertake assessment by a consultant aviation ophthalmology adviser.

Retinal Detachment

Pilot will be unfit on diagnosis of retinal detachment. Consultant reports will be required. Recertification can be considered following successful treatment. Recertification following surgery can be assessed individually. Note retinal tears treated successfully with laser can be reconsidered for certification once confirmation that no further treatment is required. Visual fields are required and should be normal. In complex cases including visual field loss, certification can be considered, following assessment by a consultant aviation ophthalmology adviser, for class 1 with OML provided binocular visual field normal. Class 2 cases with significant field loss should follow the substandard vision in one eye guidance.

Central Serous Retinopathy
Pilot is made unfit on diagnosis. Recertification can be considered when the condition is resolved or when no further improvement to vision is expected. Pilot must be asymptomatic and adapted to any vision loss. In cases of significant visual acuity loss, certification can be considered using the substandard vision in one eye guidance.

Acquired Disorders of the Macula
Retinal drusen should be monitored. In case of any distortion of central vision or reduction of visual acuity below standards, the pilot should be made unfit. Ophthalmological reports are required. Recertification on individual basis but the pilot must be asymptomatic and adapted to any vision loss. In cases of significant visual acuity loss, certification can be considered using the substandard vision in one eye guidance.

Optic Disc Drusen
Certificated as fit provided visual fields are acceptable. Requires submission of periodic (normally annual) field tests for ongoing certification.

Glaucoma
Initial diagnosis should be reported by the pilot to their AME who should then manage/advise the pilot appropriately. Class 1 cases should be referred onward to the Medical Assessor and class 2 cases managed by the AME in consultation with the Medical Assessor. Routine follow up reports including visual field results will be required. If there is significant loss of field in one eye, certification can be considered using the substandard vision in one eye guidance provided the binocular visual field is normal. In cases of glaucoma in both eyes, binocular visual fields shall be normal. Pilots undergoing glaucoma surgery will be made unfit. Recertification is on an individual assessment basis. Selective laser trabeculoplasty can, if successful, be recertificated subject to a satisfactory specialist report. Assessment by a consultant aviation ophthalmology adviser may be required for class 1 pilots following surgery for glaucoma, where pilots have significant visual field loss or aggressive glaucoma.

Information – Retinal arterial disorders certification

(includes: retinal artery occlusion, ischaemic optic neuropathy and amaurosis fugax)

Pilots with arterial vascular disease affecting the eye should be made unfit. The subsequent aeromedical fitness assessment needs to take into account the both the effect on visual functions and the cardiovascular incapacitation risk.

Arterial vascular disease affecting the eye reduces visual acuity and field of vision in the affected eye, sometimes permanently.

It is important to identify disease due to emboli from the left side heart and carotids, as this carries a higher cardiovascular risk. Infective endocarditis and the systemic vasculitides, including giant cell (temporal) arteritis and thrombophilia must all be excluded, as these conditions have their own treatment protocols and aeromedical implications.

Arterial vascular disease affecting the eye is usually associated with an increased cardiovascular mortality. Cardiovascular risk factors must be identified and managed before recertification.

Class 1 & 2 certification

Assessment of visual function

A report must be obtained from the treating consultant ophthalmologist, to include:

- Visual acuity in each eye separately
- Visual field results in each eye separately and together

If the pilot develops substandard vision in one eye following a vascular event then they should be assessed in accordance with the substandard vision in one eye guidance.

Assessment of cardiovascular risk

All pilots must undergo a cardiovascular review with a consultant cardiologist and submit a report to their AME (or if class 1 to the Medical Assessor if referred by their AME) to include:

- HT and erytrocyte sedimentation rate
- Results of temporal artery biopsy if performed
- Carotid Doppler scan and echocardiogram
- Confirmation that blood pressure is stable (ideally with a 24-hour blood pressure recording)
- Assessment and appropriate management of other cardiovascular risk factors
- Exercise ECG, symptom limited and performed in accordance with the Bruce protocol
- Thrombophilia screen

Aeromedical disposal

Class 1

If both ophthalmic and cardiological assessments are satisfactory, the pilot can be assessed by the Medical Assessor as fit with an OML applied to the certificate. Abnormal findings may require further investigation/assessment.

Class 2

If ophthalmic and cardiological assessments are satisfactory, an unrestricted fit assessment can be made. When there are field defects and/or cardiovascular risks, an OSL may need to be applied to the certificate. This can be done by an AeMC or AME in consultation with the Medical Assessor.

Information – Retinal vein occlusion (RVO) certification

Pilots with RVO should be declared as unfit. The subsequent aeromedical fitness assessment needs to take into account both the effect on visual function and the cardiovascular incapacitation risk.

RVO reduces visual acuity and field of vision in the affected eye, sometimes permanently. It is usually associated with an increased cardiovascular mortality. High blood pressure is a cardinal risk factor for RVO and satisfactory blood pressure control is therefore essential before recertification.

Class 1 & 2 certification

Assessment of visual function

A report must be obtained from the treating ophthalmologist, to include:

- Visual acuity in each eye separately
- Visual field results in each eye separately and together
- Evidence that intraocular pressure is stable

If the pilot develops substandard vision in one eye following a vascular event then they should be assessed:

a) For class 1, in conjunction with the Medical Assessor. Review with a specialist advisor in aviation ophthalmology is likely to be required.
b) For class 2, in accordance with the substandard vision in one eye guidance.

Assessment of cardiovascular risk

All pilots must undergo a cardiovascular review with a consultant cardiologist to include:

- Confirmation that blood pressure is stable (ideally with a 24-hour blood pressure recording)
- Assessment and appropriate management of other cardiovascular risk factors
- Exercise ECG, symptom limited and performed in accordance with the Bruce protocol
- Thrombophilia screen

Aeromedical disposal

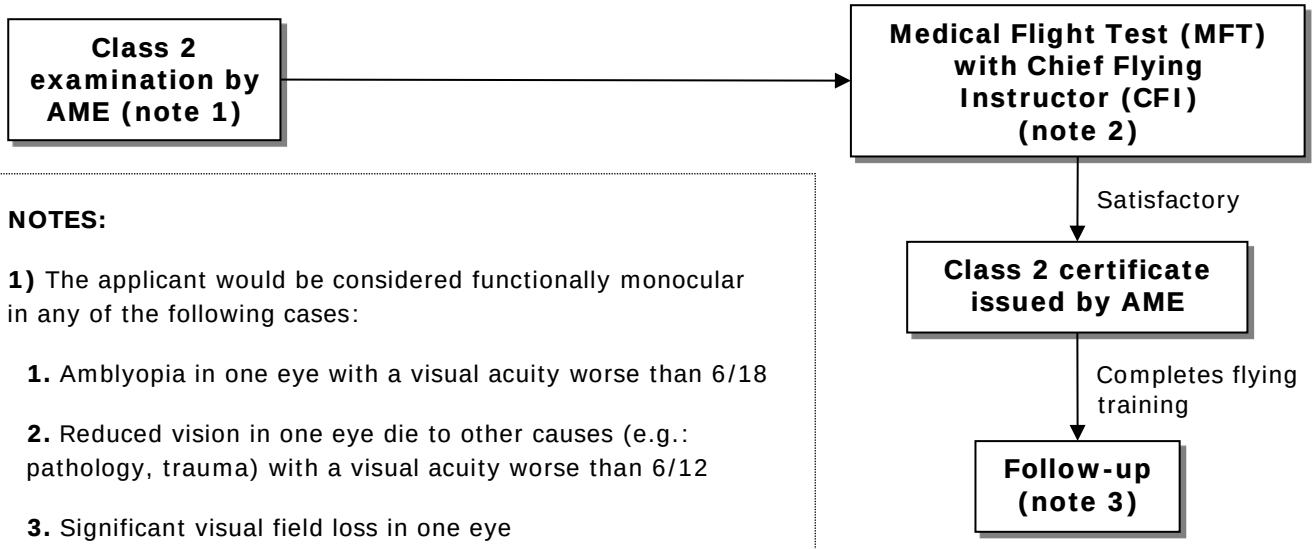
Class 1

If both ophthalmic and cardiological assessments are satisfactory, the pilot can be assessed by the Medical Assessor as fit with an OML applied to the certificate. Abnormal findings may require further investigation/assessment.

Class 2

If ophthalmic and cardiological assessments are satisfactory, an unrestricted fit assessment can be made. When there are field defects and/or cardiovascular risks, an OSL may need to be applied to the certificate. This can be done by an AeMC or AME in consultation with the Medical Assessor.

Flowchart – Substandard vision in one eye certification (class 2 only)



NOTES:

1) The applicant would be considered functionally monocular in any of the following cases:

1. Amblyopia in one eye with a visual acuity worse than 6/18

2. Reduced vision in one eye die to other causes (e.g.: pathology, trauma) with a visual acuity worse than 6/12

3. Significant visual field loss in one eye

Where functionally monocular, the AME can consider certification if, at the time of the initial examination, the better eye achieves the following:

1. Distant VA (uncorrected or corrected) of 6/6 or better.

2. No significant ocular pathology and risk of visual incapacitation (<1% per annum).

AND the applicant undertakes a satisfactory Medical Flight Test (form can be found at note 2).

In cases of acute onset, unilateral visual loss, a period of adaption time (usually 6-12 months) must have passed from the known point of visual loss.

2) Form for Medical Flight Tests available as attachment to this document.

3) Any further deterioration in visual acuities requires ophthalmological assessment and repeat MFT.

Information – Presbyopia correction guidance

Pilots have to change their gaze frequently between objects at near, intermediate and far distances. With age, the ability of the eye to focus on near tasks decreases. This is known as presbyopia and the individual requires a prescription for near tasks. If a distance prescription is also required, some form of optical correction is needed which incorporates focus for both distance and near (and also intermediate) vision.

Spectacles

All types of correction (bifocal, progressive or trifocal) are acceptable provided they are well tolerated. Bifocals will offer distance and near correction with the near portion being a distinct segment within the lower part of the lens. There are different bifocal types: D-segment are the most prevalent and these are acceptable. Executive bifocals (where the reading portion covers the whole width of the lens) are less ideal, and are not recommended for helicopter pilots.

Progressive lenses (or varifocals) change in prescription gradually from the distance part of the lens at the top, to the near portion of the lens towards the bottom. These lenses will also have an area of intermediate focus in-between the distance and near portions. The other type of lens available with an intermediate prescription is a trifocal lens. These are usually similar in appearance to bifocals but with an extra segment on top of the near portion. Occasionally the intermediate portion is incorporated into the top of the lens, with the reading portion at the bottom of the lens and the distance area in the centre. This may be useful for viewing overhead panels.

Contact Lenses

See Information – Guidance on contact lenses.

Intra-Ocular Lens Implants (IOLs)

All IOLs must be monofocal.

Multifocal IOLs are not acceptable. These lenses are available however they function very differently to multifocal spectacle lenses which have distinct separate areas for different focal lengths. With multifocal spectacle lenses, the user can use eye movements to view through a different portion of the lens and consequently a different focal length. A multifocal IOL employs a type of simultaneous viewing where distance and near focus are presented and the subject uses the part of the lens which is least out of focus for the task. A poorer quality of image is received at the retina and although high contrast visual acuities may be unaffected, contrast sensitivity, particularly in mesopic conditions, is often affected.

There have been recent developments with ‘accommodating’ IOLs which, although they still sit in the capsular bag, are able to move slightly with ciliary muscle action. This enables some accommodation, but not enough to negate the need for reading glasses. The optics of these lenses should not affect visual acuity or contrast sensitivity and may be acceptable for certificatory use following aeromedical assessment.

Information – Guidance on spectacle frames and lens choise

The following is intended to offer guidance on the type of spectacle frame and lenses recommended for use in the aviation environment.

Frame choice

All frames should be well fitting and comfortable. The choice of frame should minimise any effects on peripheral vision. The eye size should not be too small and a frame with a reasonably thin front (e.g. metal) and sides should be used. However, for those pilots that may have to use emergency oxygen, such as commercial jet airline pilots, the sides of the spectacles need to be strong enough to be placed under the oxygen mask straps.

For presbyopic pilots with good uncorrected distance vision, reading glasses should be in a ½ eye (look-over) style of frame. A full frame reading correction is unacceptable.

Lens Choice

The vast majority of spectacle lenses prescribed are made from a plastic material. These have a weight and a safety advantage over glass lenses. A hard coating is always recommended. Anti-reflection coatings reduce the intensity of reflections from the lens surfaces and allow a higher percentage of light to pass through the lens. These are compatible with aviation use.

High index lenses are recommended for stronger spectacle prescriptions.

For further information on bifocal and varifocal lenses, please see Information – Presbyopia correction guidance.

Note that all pilots requiring corrective lenses must have at least one pair of untinted spectacles available whilst exercising the privileges of their licence.

Information – Guidance on contact lenses

Contact lenses have an optical advantage over glasses. The change of image size is minimised compared to glasses. Ring scotomas (area of visual field missed) caused by spectacle frame and lenses are eliminated as are peripheral aberrations induced by a spectacle lens.

However a pilot wishing to use contact lenses for flying will need to ensure that the lenses can be comfortably worn on the ground before using them in the cockpit. As a guide, a minimum wearing time of 8 hours a day for 5 days a week consistently for least one month is acceptable. It is important that the wearing times do not impact on the pilot's visual acuity, comfort or eye health. All contact lens wearing pilots are expected to attend for regular check-ups as advised by their contact lens practitioners.

It should be noted that some successful contact lens wearers are not able to use their lenses in flight. This may be due to dehydration of the lens, altering lens parameters or other factors.

All contact lens materials (gas permeable, soft, soft disposable, hard) are acceptable for aviation use provided they are well tolerated. Optimum correction must be achieved. The correction of astigmatism should always be considered for soft contact lens wearers (toric lenses). Silicon hydrogels (a type of soft disposable contact lens material) should be considered for aviation use due to their low water content and high oxygen transmission.

All contact lenses must be for distance only correction.

The following types of contact lens correction are not acceptable:

Monovision
This is where the dominant eye is fully corrected for distance and the non-dominant eye is corrected for near. The distance visual acuity in the 'reading eye' will often fall below the appropriate acuity standard. It can interfere with depth perception and does not give optimum distance vision.

Multifocal (bifocal / varifocal)
Unlike spectacle lenses where the user can use eye movements to view through a different portion of the lens and consequently a different focal length, a contact lens will move with eye movement. This means that a different optical system must be applied to enable the viewing of more than one focal length. There are several designs of multifocal contact lenses, however they will tend to have a poorer optical quality and cause potential loss of visual acuity and contrast sensitivity. Some designs are also problematic in bright light conditions. Multifocal contact lenses are not acceptable for aviation use.

Cosmetic coloured lenses
These have either a tint or an iris pattern to change the apparent colour of the user's eyes. More recent designs include themed images such as slit pupil 'cat's eyes'. Coloured lenses are not compatible with aviation use due to potential visual disturbances in lower light levels where the pupil widens beyond the central clear zone of the lens. Some lenses also have a high risk of inducing corneal hypoxia in flight due to poor oxygen transmissibility.

Orthokeratology (or Ortho K) lenses
These are 'reverse geometry' lenses designed to remould the front corneal surface. They are often worn at night and removed during the day. Any change to the corneal shape (and hence improvement to unaided vision) tends to be lost during the day and wearers of these lenses are unable to have optimum vision throughout the day. For this reason, this type of lens is not acceptable.

X-chrom or Chromagen lenses
These are coloured lenses which are occasionally worn by people with colour vision deficiencies to aid them in a particular area where they may confuse certain colours. The lenses do not correct a colour vision deficiency but merely move the colour confusion to a different area of the colour spectrum. Due to the significant interference and loss of colour discrimination induced, these are not acceptable for aviation use.

MED.B.075 – Kleurwaarneming

Richtlijnen
Guidance Material

Ishihara test to be conducted as per manufacturer's instructions: test distance 75cm with plane of plates at right angles to line of vision under daylight or daylight simulated light (usually colour temperature around 6500K) allowing 3 seconds per plate for response. The plates should be presented to the applicant in a random order. Ishihara plates should be updated periodically or if showing any signs of fading.

Colour Assessment and Diagnosis (CAD) test is also accepted if there are any errors on the first 15 plates.
Part MED.A.010 defines colour safe as 'the ability of an applicant to readily distinguish the colours used in air navigation and correctly identify aviation coloured lights.
The CAD test will only pass as colour safe, those individuals who perform as well as individuals with colour vision in the normal range on the most difficult aviation colour vision tasks.

If the Medical Assessor is to consider the result of a lantern test, the report should include clear detail of the protocol used, responses made and documentation of the calibration/maintenance of the equipment.

MED.B.080 – Keel-, neus- en ooraandoeningen

Richtlijnen
Guidance Material

Report specifications – Otorhinolaryngology

Initial class 1 with Hearing Loss
Initial applicants shall not have a hearing loss of more than 35 dB at any of the frequencies 500, 1.000 or 2.000 Hz, or more than 50 dB at 3.000 Hz, in either ear separately.

Revalidation / renewal class 1 with Hearing Loss
For only revalidation or renewal, greater hearing loss can be recertificated following demonstrated satisfactory functional hearing ability.

Speech discrimination test or functional hearing test
This test should be based on the following ICAO guidance:
Hearing loss greater than the requirements may be acceptable provided that there is normal hearing performance against a background noise that reproduces or simulates the masking properties of the flight deck noise in the cockpit upon speech and beacon signals.

It is important that the background noise be representative of the noise in the cockpit of the type of aircraft for which the applicant's licence and ratings are valid. The frequency composition of the background noise is defined only to the extent that the frequency range 600 to 4800 Hz (speech frequency range) is adequately represented. In the speech material for discrimination testing, both aviation-relevant phrases and phonetically balanced words are normally used. Alternatively, a practical hearing test conducted in communication environment representative of the one for which the certificate holder's licence and ratings are valid may be used.

Otorhinolarygology examination reports and information are included as an attachment to this document.

Hearing Aids
For initial class 1 applicants, hearing aids are not usually acceptable.

In an applicant who already holds a medical certificate, any type of hearing aid is acceptable for recertification, e.g. bone-anchored or intra-aural. Following insertion of the hearing aid, a functional hearing assessment must be performed and if satisfactory a return to certification is possible. A multi-crew restriction may be required for class 1 applicants.

Note: For many pilots increasing the volume of the head set may be preferable and enhance hearing more than wearing hearing aids.

For removable hearing aids, audiometry, if required, should be undertaken both with and without hearing aids.

Class 2 with Hearing Loss
Class 2 applicants who fail the conversational test at 2m are required to provide specialist medical reports detailing the cause of hearing loss and the results of pure tone audiometry. Functional testing in flight may be necessary.

Otorhinolarygology examination reports and information are included as an attachment to this document.

Ear Conditions
A fit assessment can be considered after full recovery from a condition affecting the ear following provision of a satisfactory GP or specialist report. Complex conditions and class 1 certificate holders will require an ENT specialist assessment.

If there is incomplete recovery from the condition, evidence that the condition has stabilised for an appropriate period of time is required. The audiogram standards must be met or a satisfactory functional hearing assessment is required.

Perforation
Recertification is possible after a minimum period of six weeks following a single dry perforation of non-infectious origin. A specialist report is required confirming complete healing and the pilot must be pain free. A satisfactory audiogram is required for class 1 or class 2 Instrument Rating (IR) recertification.

Stapedectomy
To ensure full healing, recertification is only allowed a minimum of three months after surgery, subject to a satisfactory specialist report confirming no complications, the absence of dizziness, spontaneous or positional nystagmus and a satisfactory hearing result.

Richtlijnen
Guidance Material

Grommet insertion
This is acceptable for certification at both initial and revalidation/renewal.

Acoustic Neuroma
On diagnosis, the applicant should be made unfit. If clinical management is a 'watch and wait' policy, the applicant can be recertificated to class 1 OML/unrestricted class 2. Follow-up MRI reports should be forwarded to the Medical Assessor.

An applicant with symptoms, or if a decision is made to treat, should be made unfit pending full recovery from symptoms or treatment.

Following surgery, recertification depends on surgical approach, extent of removal and post op symptoms. If brain has been retracted during operation the risk of seizure should be considered. Normally, following full recovery, a fit class 1 OML or unrestricted class 2 assessment is appropriate. Can consider unrestricted class 1 at 12 months post-operatively if the imaging shows complete resection of the tumour and there are no seizures or balance disturbance.

Following radiotherapy, certification is possible as class 1 OML/unrestricted class 2 on recovery (minimum 4 weeks following completion of treatment). Unrestricted certification can be considered 1 year after the completion date of radiotherapy, subject to imaging showing complete resection of the tumour and there being no seizures or balance disturbance.

Benign Positional Vertigo/Labyrinthitis
In view of the recurrence risk of this condition and the sudden incapacitating nature of the symptoms, the earliest a pilot can be considered for recertification is after they have been symptom-free and off any treatment for at least 4 weeks. Class 1 holders require an OML for a minimum period of 3 months from recertification.

The use of any medication to treat vestibular symptoms, e.g. Betahistine is not acceptable for medical certification.

Meniere's Disease
A diagnosis of Meniere's Disease, untreated or treated is not acceptable for class 1 or 2 medical initial or recertification.

Report specifications – Otorhinolaryngology

The following subheadings are for guidance purposes only and should not be taken as an exhaustive list.

1. **Diagnoses**

2. **History**
   - Presenting symptoms and date of onset
     - Otologic (e.g. deafness, tinnitus, vertigo, otalgia, discharge, fever, barotraumas)
     - Nasal (e.g. obstruction, discharge)
     - Throat/larynx
   - Duration of loss of consciousness
   - Circumstances surrounding onset, precipitating factors
   - Past history and family history of ENT disorders
   - Effect on daily activities/duties of working role, including altitude pressure changes and balance/orientation

3. **Examination findings relevant to condition**
   - Eustachian tubes (Valsalva manoeuvre)
   - Tympanic membrane integrity (perforations)
   - Hearing function Weber and Rinne tests
   - Vestibular function
   - Oropharynx

4. **Findings of investigations performed (as applicable)**
   - Pure tone audiometry – required for all cases of hypoacusis
     - Up to date audiogram required post treatment when symptoms are fully resolved
     - Tympanometry
   - Imaging reports (CT, MRI)
   - Histology reports
   - Other procedures and investigations

5. **Treatment**
   - Past, recent and ongoing treatment must be detailed
   - Current and recent past medications (dose, frequency, start and finish dates)
   - Confirmation of no side effects from medication
   - Surgical reports

6. **Follow up and further investigations/referrals planned or recommended (as applicable)**
   - Anticipated follow up/frequency of clinical reviews and investigations
   - Prognosis and risk of recurrence
   - Confirmation of full recovery at date of report

7. **Clinical implications**
   - Any concerns regarding disease progression, treatment compliance or risk of sudden incapacity, difficulties with environmental pressure change or balance/orientation

MED.B.085 – Dermatologie

Richtlijnen **Guidance Material**

Dermatology
Information – Dermatological conditions certification

Other relevant documents
Information – Malignant melanoma certification

Information – Dermatological conditions certification

Acne, Eczema, Psoriasis, Photosensitivity, Bullous eruptions

As long as these conditions are under sufficiently good control so that there is:

- no significant irritation or distraction;
- no possibility of a sudden flare-up with significant symptoms;
- acceptable treatment (see below),

then certification can be maintained.

Otherwise the pilot will need to be declared 'unfit' and a report sought from a consultant dermatologist. Class 2 OSL may be considered in some cases. In all cases where doubt exists or control is sub-optimal an opinion should be sought from a consultant dermatologist.

Many topical treatments are acceptable after refraining from flying whilst symptoms are brought under control and ensuring that there are no side effects from the treatment. A few topical treatments can themselves cause irritation/pruritis or even drowsiness. Long-term low dose erythromycin or tetracycline treatment for acne is acceptable following 2 days of refraining from flying after initially starting treatment whilst ensuring that no side-effects occur.

Care must be taken to ensure that associated conditions e.g., arthropathy with psoriasis, are considered.

Skin infections

Provided that the infection is not of risk to others, that there is no significant irritation or distraction, and that the infection is limited to the skin and not systemic, there is no restriction to certification. Acute infections, where the immediate course is uncertain, require a period off flying until resolved. Topical antibiotics, antifungals or antiviral treatments are acceptable after refraining from flying whilst symptoms are brought under control and ensuring that there are no side effects from the treatment.

The only systemic antifungal that is permitted is Terbinafine for fungal infection of the nails. Flying is not permitted within two weeks of the start of treatment and liver function tests need to be monitored throughout treatment.

Skin malignancy

Squamous cell carcinoma, Bowen's disease and Paget's disease of the nipple are disqualifying before treatment. Unrestricted certification for class 1 and class 2 is possible for localised disease after complete excision, provided confirmation of this is obtained from the relevant specialist and adequate follow-up is in place.

Basal cell carcinoma, keratoacanthoma, actinic keratosis must be treated as soon as possible after diagnosis. Immediate grounding is not necessary, however specialist reports should be obtained following treatment. Unrestricted certification for class 1 and class 2 is acceptable following full excision or satisfactory alternative treatment.

MED.B.090 – Oncologie

Richtlijnen
Guidance Material

On reporting a diagnosis of malignancy, applicants should be assessed as unfit.
Recertification can be considered following receipt of a satisfactory specialist report.

Report specifications – Oncology

Note 1: All class 1 applicants shall be referred to the Medical Assessor.
Note 2: class 2 applicants shall be discussed with the Medical Assessor.

For recertification:

- Treatment completed
- Full recovery
- No symptoms that could affect flight safety
- No complications, or if any, appropriate investigation and specialist referral may be required

Chemotherapy

1. Recertification a minimum of 6 weeks after the last dose of chemotherapy, subject to satisfactory blood tests results (HT, urea and electrolytes, liver function tests, relevant tumour markers as a minimum).

2. If any complications from treatment, need full recovery. If unresolved, may require appropriate specialist assessment, e.g. neuropathy may require a specialist neurology assessment.

3. Class 1 pilots who have had anthracycline (e.g. doxorubicin, adriamycin, daunorubicin) require cardiological assessment in accordance with:

Flowchart – Anthracycline treatment certification

Radiotherapy

1. Recertification a minimum of 4 weeks after the last dose of radiotherapy.

2. If any complications from treatment, need full recovery. If unresolved, appropriate specialist assessment required e.g. radiation pneumonitis/pulmonary fibrosis requires a specialist respiratory assessment.

Surgery

As a guide, minimum post-operative grounding periods:
Minor – 1 week
(e.g. skin lesion)

Intermediate – 6 weeks
(e.g. prostatectomy (TURP))

Major – 3 months
(e.g. hemicolectomy)

Metastatic disease

Metastatic disease is disqualifying for class 1 and class 2 certification.
In exceptional cases, class 2 OSL may be considered by the Medical Assessor only.

Incapacitation risks are based on:

1. Risk of a recurrence
2. Site of the recurrence
3. Risk of a recurrence at that site leading to an incapacitation.

Information – Oncology charts for certification assessments

Oncology certification charts exist for these tumour types:

- Colorectal
- Breast cancer
- Malignant melanoma
- Testicular germ cell tumour
- Renal cell carcinoma
- Non-small cell lung cancer

Richtlijnen
Guidance Material

Information – Malignancies of the immune system certification
(All class 1 cases should be referred to the Medical Assessor.)

The above guidance is also available in Ernsting's Textbook of Aviation Medicine 4th Edition, Chapter 44, Malignant Disease.

Information – Prostate cancer guidance

Report specifications – Oncology

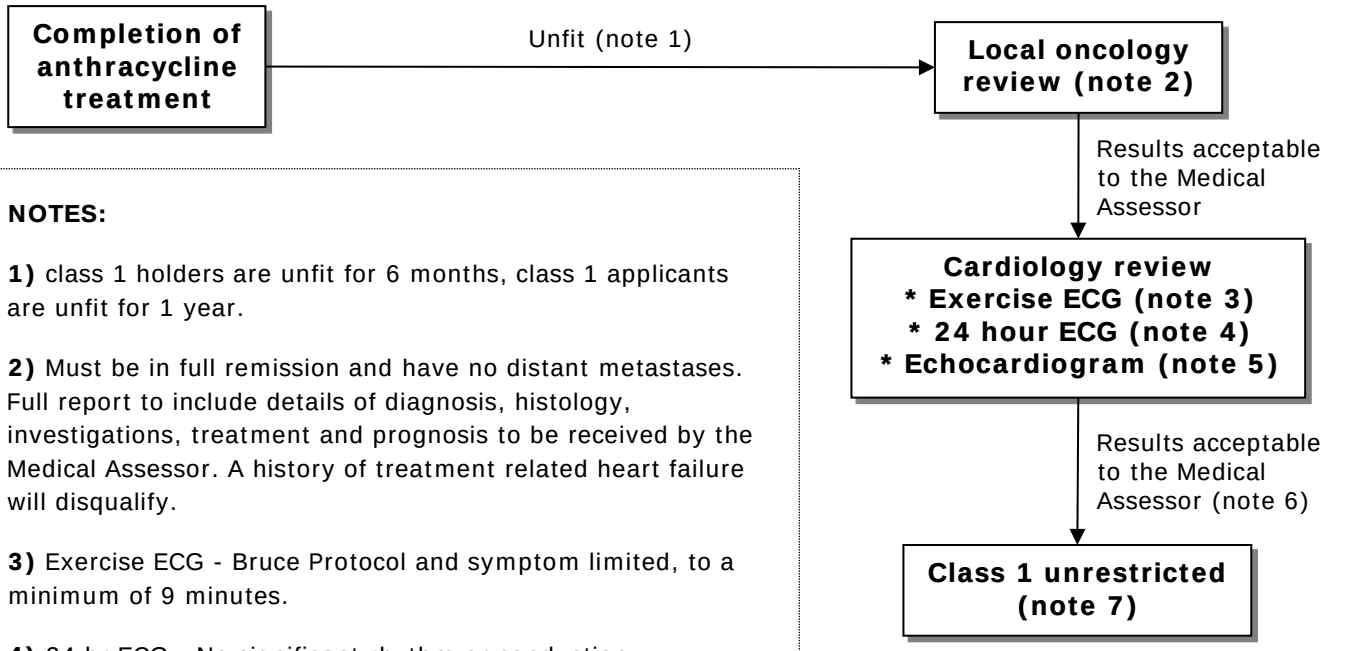
To return to flying:

1. There must be no evidence of residual malignant disease after treatment.
2. Adequate time must have elapsed appropriate for a full recovery, at least 6 weeks following chemotherapy and 4 weeks following radiotherapy.
3. There must be no evidence of complications from treatment likely to interfere with flight safety.
4. The risk of in-flight incapacitation must be no greater than:
    - 1% per annum (Class 1 OML, class 2 unrestricted)
    - 5% per annum (Class 2 OSL)

A medical report may be provided to the Medical Assessor (Class 1) or AME (Class 2) with the following information:

1	History	Presentation and course of illness including dates	
2	Diagnosis		
3	Results of radiological investigations	CT/MRI scan, ultrasound, bone scan, chest x-ray, other	
4	Blood test results	Haematology (HT, liver function tests, etc), tumour markers	
5	Grade of tumour	Including copies of histology reports	
6	Stage of tumour	TNM or other staging	
7	Site of any distant disease		
8	Types and dates of treatment	i. Surgery ii. Chemotherapy (curative / adjuvant / palliative) (specify if anthracylines) iii. Radiotherapy (curative / adjuvant / palliative) iv. Hormone therapy	
9	Complications from treatment	Investigations or referral to other specialists	
10	Follow-up plan	Frequency of clinical radiological imaging and tumour markers	
11	Ongoing treatment	All ongoing treatment should be specified	
12	Prognostic factors	Adverse or good	
13	Prognosis	Event free survival Disease free survival Overall survival	1 year, 5 years and 10 years
14	Risk of possible future recurrence / metastasis	i. What are the most likely sites of recurrence / metastases? ii. What is the risk of cerebral metastasis? iii. What are the likely clinical presentations of recurrences / metastases? iv. Could these symptoms be incapacitating? v. Could a recurrence / metastasis be detected before symptoms develop by increasing the frequency or types of surveillance (radiological imaging / blood tests)?	
15	References to medical literature	Provide and relevant references in medical literature, especially for are malignancies.	

Flowchart – Anthracycline treatment certification



NOTES:

1) class 1 holders are unfit for 6 months, class 1 applicants are unfit for 1 year.

2) Must be in full remission and have no distant metastases. Full report to include details of diagnosis, histology, investigations, treatment and prognosis to be received by the Medical Assessor. A history of treatment related heart failure will disqualify.

3) Exercise ECG - Bruce Protocol and symptom limited, to a minimum of 9 minutes.

4) 24 hr ECG - No significant rhythm or conduction disturbance. Short burst of SVT may be acceptable. VT will require further investigation.

5) Echocardiogram - Structurally normal heart and normal LV and RV function.

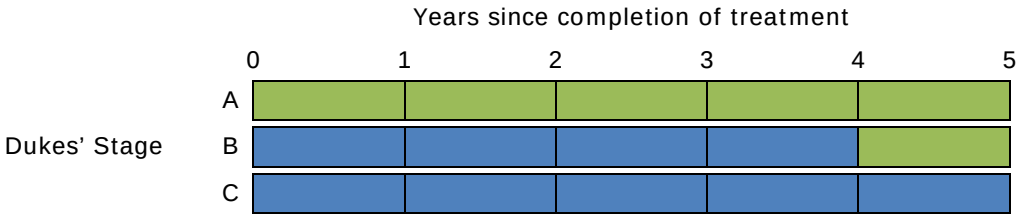
6) The cardiology report will be reviewed by the Medical Assessor. It may be necessary to see the investigations, in which case the actual tracings/films/videos will be requested.

7) Initially, annual cardiology review with echocardiogram, 24-hour and exercise ECG. Subsequently, reduced follow-up requirements may be acceptable at the Medical Assessor's discretion.

Information – Oncology charts for certification assessments

Note: All class 1 holders should be referred to the Medical Assessor.

Colorectal cancer

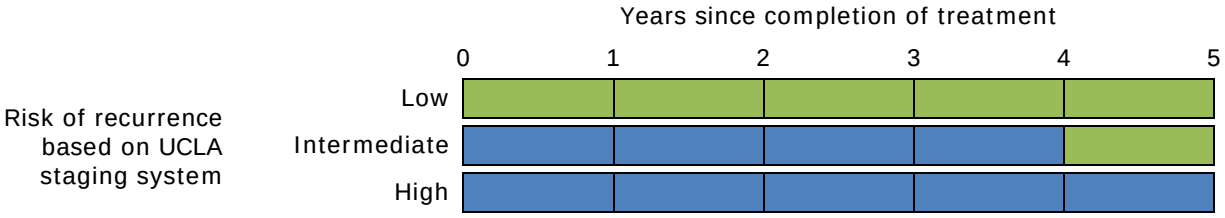


- Dukes' Stage A = T_{1-2}
- Dukes' Stage B = T_{3-4}

= class 1 & 2 unrestricted

= class 1 OML, class 2 unrestricted

Renal cell carcinoma



= class 1 & 2 unrestricted

= class 1 OML, class 2 unrestricted

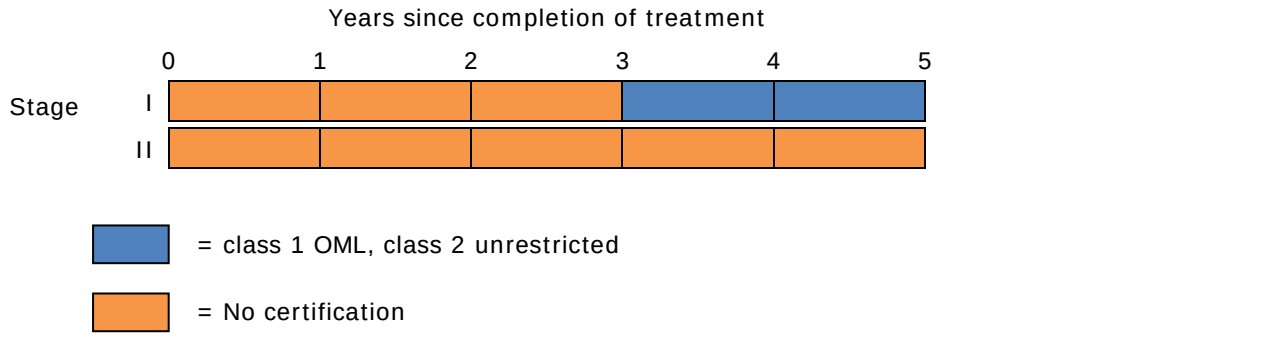
UCLA integrated staging system N_0M_0 renal cell carcinoma

Risk Factor	T Stage	Grade	Performance Status	5 year survival
Low	1	1 – 2	0	91%
Intermediate	1, 2 or 3	Any	Any	71% – 80%
High	4 or 3	Any	0 / 1+	40% - 55%

Performance Status is determined according to the Eastern Co-operative Oncology Group criteria.

(UCLA = University of California Los Angeles)

Non-small cell lung cancer



Breast cancer

15 year survival for breast cancer using the NPI prognostic groups

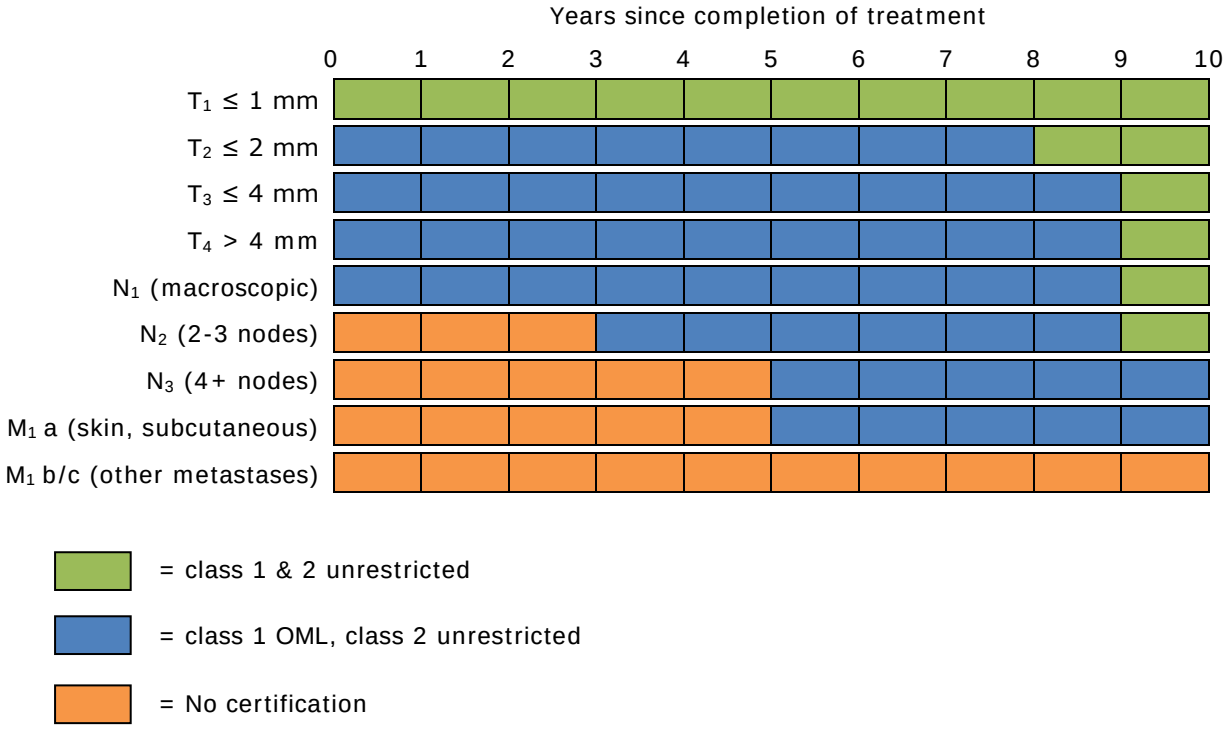
Prognosis	NPI	15 year survival
Good	< 3,4	80%
Moderate	3,4 – 5,4	42%
Poor	> 5,4	13%

The most significant indicators of prognosis are tumour grade, stage as indicated by histological lymph node involvement and tumour size. The Nottingham Prognostic Index (NPI) (Haybittle, 1982) uses these factors to predict outcome on an individual basis by applying the formula:

NPI = 0,2 × size (in cm) + Stage (I-III) + Grade (1-3; good, moderate, poor)

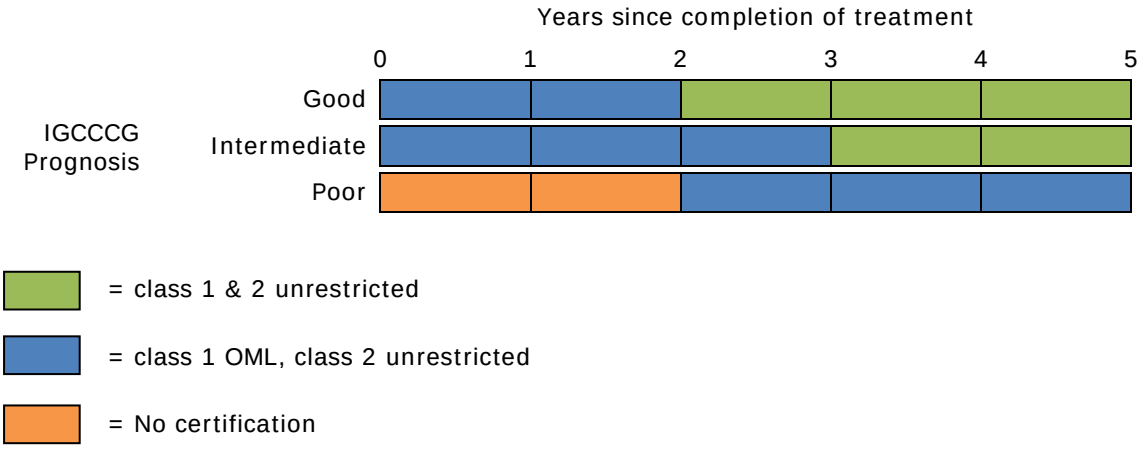
- Stage I = No lymph node involvement
- Stage II = Lower axillary or internal mammary nodes positive
- Stage III = Apex or both axillary and mammary nodes positive

Primary cutaneous melanoma



Pathological stage	Clinical stage	Tumour thickness	Nodes	Metastases
I	T1	≤ 1 mm	No	No
	T2	1 – 2 mm	No	No
II	T3	2 – 4 mm	No	No
	T4	> 4 mm	No	No
III	N1	Any	1	No
	N2	Any	2 – 3	No
	N3	Any	4+	No
IV	M	Any	Yes / No	Yes

Germ cell tumour of the testis



International Germ Cell Cancer Collaborative Group (IGCCCG) Prognosis

Good prognosis

All seminoma except non-pulmonary metastases

NSGCT: AFP < 1.000
hCG < 5.000
LDH < 1,5 × normal

Intermediate prognosis

Seminoma with non-pulmonary metastases

NSGCT: AFP < 10.000
hCG < 50.000
LDH up to 10 × normal

Poor prognosis

NSGCT: AFP > 10.000
hCG > 50.000
LDH more than 10 × normal

AFP = alphafoetoprotein in ng/ml
hCG = human chorionic gonadotrophin in iu/l
LDH = lactate dehydrogenase

Information – Prostate cancer guidance

Note: All class 1 holders should be referred to the Medical Assessor.

A. On reporting a diagnosis of prostate cancer the pilot should be assessed as unfit pending receipt of satisfactory reports.

B. A specialist report is required to include:

1. Grade (Gleason score)
2. Stage
3. Any extra-capsular spread
4. Any distance spread
5. Pre and post treatment PSA
6. Imaging results: MRI, bone scan
7. Treatment, including dates
8. Prognosis
9. Follow-up plan: clinical reviews / PSA tests / imaging

C. Requirements for recertification:

1. No metastases. (Note: exceptionally, class 2 with OSL may be possible; such cases should be referred to the Medical Assessor)
2. Satisfactory treatment response, demonstrated by decrease in PSA level, if elevated. (Note: 15% of prostate cancer is associated with normal PSA levels)
3. Full recovery from treatment.
4. No symptoms / complications that could affect flying. If any complications, appropriate investigations and specialist referral is required.
5. Time to recertification depends on treatment received (see table below).

D. Time to recertification after common treatments:

Treatment	**Prostatectomy** (TURP / Radical)	**Radiotherapy** (External)	**Brachy-therapy** (Internal)	**Hormone therapy ***	**'Watchful waiting' / Active surveillance**
Requirements	Minimum of 6 weeks after prostatectomy	Minimum of 4 weeks after last dose radiotherapy	Minimum of 6 weeks after insertion	Minimum of 4 weeks on maintenance dose, stable and without side-effects.	Minimum of 3 monthly specialist reviews with PSA tests. Follow-up reports must be submitted to the: Medical Assessor for class 1 and AME for class 2
Certification	Class 1 unrestricted (high grade or extra-capsular spread may require an OML) Class 2 unrestricted				Class 1 OML Class 2 unrestricted
Follow-up requirements after recertification					AME will require follow up reports after each clinical review, or at least annually. A recurrence of symptoms, or rise in PSA suggestive of a recurrence, should entail unfitness.

* Acceptable treatments: anti-androgens, e.g. bicalutamide, LHRH agonists, e.g. goserelin.

Note: Other treatments (such as but not limited to chemotherapy, cryotherapy, steroids and High Intensity Focused Ultrasound) should be referred to the Medical Assessor.

Bijlagen

- Application Form Nederlands
- Application Form English
- Instructions for completion of the application form for a medical certificate
- Medical Examination Report Nederlands
- Medical Examination Report English
- Instructions for completion of the medical examination report forms
- Ophthalmology Examination Report Nederlands
- Ophthalmology Examination Report English
- Instructions for completion of the ophthalmology examination report form
- Otorhinolaryngology Examination Report Nederlands
- Otorhinolaryngology Examination Report English
- Instructions for completion of the otorhinolaryngology examination report form
- Medical flight test report
- Zwangerschap en vliegen

Colofon

Adres	ILT-vestiging Amsterdam team medisch luchtvaart Kingsfordweg 1 1043 GN Amsterdam
Postbus	ILT – team medisch luchtvaart Postbus 16191 2500 BD Den Haag
Contact	088-4890000 (MIC)
Website	www.ilent.nl