Cardiovascular Conditions

Version One December 2018

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BACKGROUND

The following document contains basic information on how to manage a variety of common and/or significant cardiovascular conditions. As with many medical conditions the presentation, clinical course and management of cardiovascular conditions can vary greatly and the recommendations in this document should be adapted as needed, to suit each individual case. However, NOT ASH outcomes relating to cardiovascular conditions can be particularly difficult to document correctly and where a specific NOT ASH reason has been provided, it is strongly recommended that you use these as this will aid in preventing confusion among applicants and LIAs, as well as prevention of complaints and IPT involvement in Residence applications.

If you are unsure of the correct outcome for any cardiovascular condition, please contact the Medical Officers for their advice.

Note: Terminology of Cardiovascular conditions

It is useful to remember that different countries use different terminology for various conditions and tests. In particular, an Exercise Tolerance Test (ETT) may be called a Treadmill Test (TMT) in some countries. For this reason, it is important to avoid using abbreviations that may be misunderstood when requesting FIR. For example, Exercise ECG is a suitable alternative for ETT that is easily understood internationally.

Also be aware of the use of Coronary Artery Disease and Ischaemic Heart Disease, as these are not the same thing.

- Coronary Artery Disease (CAD) can be used when the applicant has proven occlusions of the Coronary Arteries on imaging (e.g.angiogram), but does not have any symptoms or clinical disease.
- Ischaemic Heart Disease can be used when the applicant has symptoms or clinical evidence of heart disease +/- abnormalities on imaging.

Appendix One contains background information about CVD Risk assessments.

Appendix Two contains a link to background information about Atrial Fibrillation and management of this condition.

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ABNORMAL ECG

Depending on the abnormality, a formal Cardiologist assessment should be considered. The information requested should always relate to the specific abnormality. If the abnormality is suggestive of Coronary Artery Disease then a formal Cardiologist assessment should be requested.

For example:

ECG shows ST changes in the inferior leads:

- A Cardiologist assessment should be requested which includes an ECHO and Exercise ECG to assess for ischaemic heart disease.

ECG shows AF:

- A Cardiologist assessment should be requested which includes an ECHO and a request for a CHA_2DS_2-VASc score and information regarding the applicant's risk of stroke.

HYPERTENSION

All applicants with Hypertension should have their CVD Risk calculated (see the following section on how to do this). A formal Cardiologist assessment should be requested for all applicants with:

- Uncontrolled Hypertension (BP >160/90)
- CVD Risk >20%
- CVD Risk >15% and any CVD high risk markers

This should always include a request for ECG, ECHO and Exercise ECG. It is worth noting that some countries in the pacific do not have cardiologist or ECHOs available.

FIR/ AWC outcomes:

The following information is useful to include when requesting FIR or providing AWC outcomes relating to hypertension:

- Creatinine, eGFR, protein : creatinine ratio, cholesterol profile, blood pressure, smoking history and a medication list.
- Consider also adding HBA1c if the applicant is high risk for Diabetes.

If any of this information has already been provided, **do not** include it in a new FIR request unless it has the potential to alter the case outcome.

CVD RISK CALCULATORS

If an applicant has a known history of Hypertension, Hyperlipidaemia or Diabetes then their CVD Risk should be calculated. New NZ specific CVD Risk assessment guidelines were released in 2018, but at present this is not relevant to Immigration medical assessments as no new risk calculators have been developed or released yet.

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If the applicant has a history of Diabetes:

- The NZSSD online calculator should be used: https://www.nzssd.org.nz/cvd/

If the applicant has *NO* history of Diabetes:

- The QRisk online calculator should be used: https://qrisk.org/2017/

It is not necessary to request any additional information before calculating the applicant's CVD Risk.

The applicant's age, ethnicity, height, weight and blood pressure will be recorded in the examination findings. The MA should then assume the lowest possible risk for any information that they do not have. i.e. assume that the applicant:

- has never smoked;
- total cholesterol = 4, HDL = 1.2;
- ACR is normal.

If the applicant has a CVD Risk ≥20%, or has any ECG changes consistent with CAD:

- A Cardiologist assessment is required and should include a request for an ECG, ECHO, Exercise ECG.

If the applicant has a CVD Risk between 15 - 20%:

- Consider requesting a Cardiologist assessment if the applicant has any high risk markers*

High risk markers indicating significant increased cardiovascular risk include:*

- Uncontrolled hypertension;
- Uncontrolled hyperlipidaemia;
- LV impairment of any sort;
- Regional Wall Abnormalities (RWMAs);
- Peripheral vascular disease;
- Cerebrovascular disease;
- DM II with complications;
- Multiple or recurrent previous cardiac events;
- Implantable Cardioverter Defibrillators (ICD);
- Atrial fibrillation (AF);
- High calcium score on CT.

*** as per Dr Ralph Stewart, Cardiologist*

Note:
When assessing CVD Risk for a Fijian Indian please use "Indian" ethnicity not "Pacific".

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CARDIOMEGALY

Any applicant with cardiomegaly (CTR ≥55% for Temp visa, or CTR ≥50% for residence visa), or marked LVH type appearances on CXR should be referred for an ECG (reported) and ECHO. If this is an incidental finding, with no other medical history of note – these can be requested by themselves, without a formal Cardiology assessment.

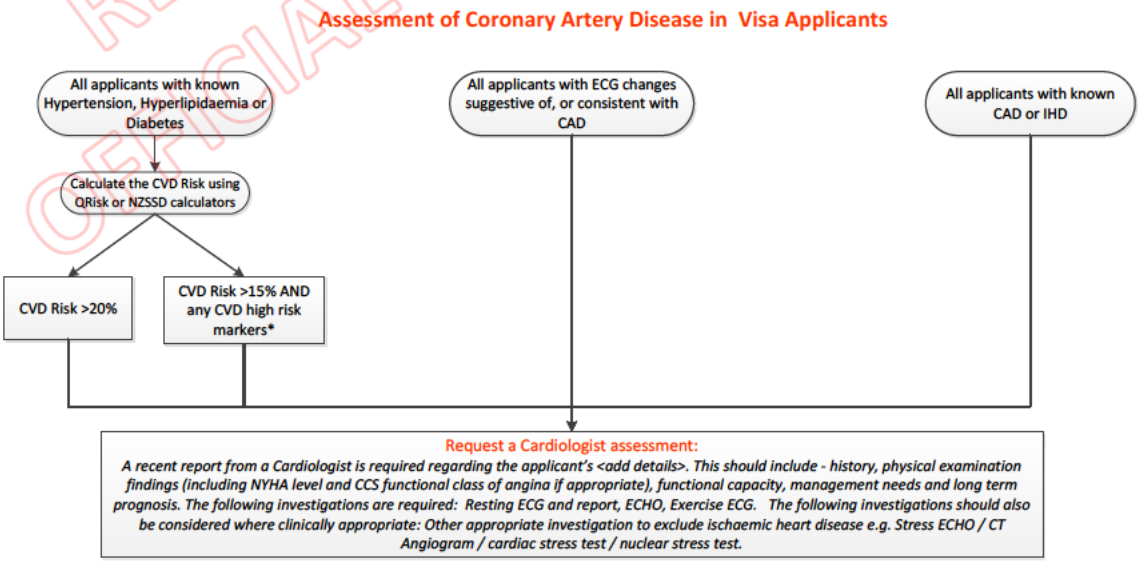
However, if the applicant has any known cardiac conditions or other high risk markers* then a formal Cardiology assessment, including ECG, ECHO and an Exercise ECG should be requested.

CAD / IHD ASSESSMENTS

A formal Cardiologist assessment should always be considered for all applicants with:

- Known CAD or IHD
- ECG changes suggestive of, or consistent with CAD
- CVD Risk >20%
- CVD Risk >15% and any CVD high risk markers*

This should always include a request for ECG, ECHO and Exercise ECG.



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***High risk markers indicating significant increased cardiovascular risk include:**

- Uncontrolled hypertension;
- Uncontrolled hyperlipidaemia;
- LV impairment of any sort;
- Regional Wall Abnormalities (RWMAs);
- Peripheral vascular disease;
- Cerebrovascular disease;
- DM II with complications;
- Multiple or recurrent previous cardiac events;
- Implantable Cardioverter Defibrillators (ICD);
- Atrial fibrillation (AF);
- High calcium score on CT.

Cardiac Investigations:

The initial investigation should always include an ECG, ECHO and Exercise ECG.
Exercise ECG - the applicant needs to achieve a minimum of 85% maximum heart rate (MHR) otherwise this is considered non-diagnostic. If the test is non-diagnostic, then CAD is not excluded and further assessment is required.

If an applicant is unable to do an Exercise ECG, or if the Exercise ECG is non-diagnostic or reported as equivocal, then an equivalent test can be requested by an MA. For example a minimally invasive test such as a CT angiography/calcium score. It can be useful to always include this option in the proforma wording (see below).

Invasive screening e.g. coronary angiogram **should not** be requested by an MA because of the risks associated with these tests. However, if a Cardiologist has recommended further assessment with an angiogram, then it is ok for the MA to request this information.

The proforma Cardiologist FIR request should be used and should be modified as needed, for example: include the following:

A recent report from a Cardiologist is required regarding the applicant's CVD Risk. This should include - history, physical examination findings (including NYHA level and CCS functional class of angina if appropriate), functional capacity, management needs and long term prognosis. The following investigations are required: Resting ECG and report, ECHO, Exercise ECG. The following investigations should also be considered where clinically appropriate: Other appropriate investigation to exclude ischaemic heart disease e.g. Stress ECHO / CT Angiogram / cardiac stress test / nuclear stress test.

If the applicant has other related abnormalities, such as Hypertension or an abnormal creatinine and eGFR, then additional information can be added to this FIR request. For example a cholesterol profile or protein : creatinine ratio.

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Old Coronary Angiogram reports:
It can be really useful to ask for a copy of any previous angiogram reports. This can be a simple way of identifying whether people are at risk of progression of pre-existing disease. If an applicant had an MI and is reported to have had a stent, always consider requesting a copy of the angiogram report as part of the new Cardiologist FIR.

Requesting the previous angiogram report allows you to review the old information and identify if there were other stenoses that might now be considered clinically significant. For example, the applicant may have had a stent placed for a 90% stenosis, but the angiogram report shows that there were 4 other 50% stenoses that were not stented at the time. Depending on the time frame, these could now have progressed to being a significant risk. In this scenario it would be important to then ask the Cardiologist to comment on the applicant's risk of a further event.

Alternatively, there might have been 2 other 20% lesions which are not likely to have progressed over time and can safely be managed with medical treatment only. Assuming all the rest of the FIR information is normal (i.e. ECG, ECHO and Exercise ECG), there would be no need further cardiac investigation at this point in time.

CAD / IHD OUTCOMES

Positive Exercise ECG:

- If the applicant has had a positive Exercise ECG as part of this assessment (or a recent medical assessment) they are most likely to be NOT ASH.
- It is then the applicant's responsibility to provide further information that supports an ASH outcome.

Residence Visa:

- **NOT ASH Reason:**
  Chronic recurring medical condition(s) likely to impose significant costs in excess of NZ$41,000 over the predicted course of the Condition(s)

- **Please make it clear that:**
  The applicant has had a positive exercise ECG result, consistent with Coronary Artery Disease. It is highly likely that the applicant will also require cardiac intervention such as cardiac stenting or bypass surgery. The applicant's suspected Coronary Artery Disease is a chronic, recurring condition considered likely to impose significant costs in excess of $41,000 over the course of the applicant's condition.

- Please **only** use the A4.10.1 condition when you have specific evidence that the applicant has a 'severe ischaemic heart disease' such as a cardiologist letter stating this.

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- You **do not** need to include costs as part of your NOT ASH reason.

Temporary Visa:

- **NOT ASH Reason:**
  Likely to impose significant health costs OR demands

- **Please make it clear that:**
  The applicant has had a positive exercise ECG result, consistent with Coronary Artery Disease. It is highly likely that the applicant will require cardiac intervention such as cardiac stenting or bypass surgery. The applicant's suspected Coronary Artery Disease is considered likely to impose significant costs and demands on the New Zealand health system.

- You **do not** need to include costs as part of your NOT ASH reason.

Positive Exercise ECG with recent stenting or a bypass:

If the applicant has had a positive Exercise ECG as part of this assessment (or a recent medical assessment) they may also provide evidence of subsequent cardiac stenting or bypass surgery.

If the applicant has been successfully treated and the time since intervention is sufficient to confirm this (usually 3 months post intervention), it may be appropriate to give them an ASH or AWC outcome. However, it is important to ensure that you have all the relevant information before providing an outcome.

If the applicant has not provided a new full Cardiologist report, including current examination findings, a copy of the angiogram report, details of what intervention has occurred and when, as well as a follow up assessment post intervention (including a new ECHO and Exercise ECG, or suitable alternative), then further information is required. A new Cardiologist FIR should be requested.

Residence Visa:

If necessary, the applicant can be deferred for up to 3 months to allow for recovery and a new Cardiologist assessment post intervention. This new Cardiologist assessment must include: current examination findings, a copy of the angiogram report, details of what intervention has occurred and when, as well a new ECHO and Exercise ECG, or suitable alternative. The outcome will depend on the information provided post intervention.

Temporary Visa:

This should be approached in the same way as a Residence case and the same information will be required before an outcome can be determined. However, Temporary visas CANNOT be deferred.

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POTENTIAL OUTCOMES:

An applicant could be considered ASH if:

- They have had successful intervention; and
  - They are asymptomatic; and
  - They have no residual abnormalities on ECG, ECHO, Exercise ECG; and
  - They have no other medical reasons why they might be considered NOT ASH.**

****Other medical reasons that might warrant a NOT ASH outcome:**

- Poor compliance with medication;
- Unfavourable Cardiologist report;
- Other NOT ASH medical conditions.

An applicant should be considered NOT ASH if:

- They do not meet the ASH criteria above.

Residence NOT ASH Reason:

Chronic recurring medical condition(s) likely to impose significant costs in excess of NZ$41,000 over the predicted course of the Condition(s)

Temporary NOT ASH Reason:

Likely to impose significant health costs OR demands

NOT ASH wording:

- Please acknowledge the recent intervention, but make it clear why the applicant still does not meet the ASH criteria.
- Please **DO NOT** use the A4.10.1 condition for Residence visas, as it can be difficult to justify that the applicant has a 'severe ischaemic heart disease'.
- Please **DO NOT** include costs as part of your NOT ASH reason for either visa type.

If you have any reservations or concerns about what outcome to provide, or how to word the outcome, please discuss the case with a Medical Officer.

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MURMURS

All applicants with a murmur need to provide a new, or a recent echocardiogram. This is because we have no way of knowing what degree of valve abnormality they have without imaging. An ECHO dated within the past year is considered acceptable.

Always check whether the applicant has any previous cases under Client History before requesting a new assessment. If they do, have a look to see what the most recent ECHO showed and whether there was any advice from a Cardiologist regarding when they would next need a follow up ECHO.

This applies to all visa types. Even an applicant applying for a short 3 month visitor visa may become unwell and need a valve replacement during that time. They may be too sick to send home and may need an immediate valve replacement in New Zealand.

This is a high cost and high demand health condition. If an applicant declines to get an ECHO please discuss this with the Medical Officers, as we cannot be sure they will not impose significant costs and demands on the NZ health system during their visa period.

VALVE DISEASE

Any applicant with known cardiac valve disease needs a recent ECHO to confirm that their valve disease is not significant and does not require surgical repair in the near future.

Always check whether the applicant has any previous cases under Client History before requesting a new assessment. If they do, have a look to see what the most recent ECHO showed and whether there was any advice from a Cardiologist regarding when they would next need a follow up ECHO.

Depending on the information provided:

- You may not need any further information at this point in time and can provide an outcome;
- You may be able to simply request a new ECHO;
- You may need to request a new Cardiologist assessment with new specialist advice around the need for future valve replacement.

FIR example: Cardiologist Assessment

> *A new Cardiologist assessment is required regarding the applicant's known Mitral Valve Regurgitation. This should include – history, management to date, current examination findings, ECG, ECHO, ongoing management needs and long term prognosis. In particular, please comment on whether the applicant is likely to require cardiac valve surgery in the future and if so, when.*

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MA Outcomes:

Residence Visa applicants:

- The A4.10.1 INZ Listed NOT ASH conditions include:
  - Valve disease with a high probability of surgical and/or other procedural intervention in the next 5 years.

- Valve replacements may also be considered a chronic, recurring medical condition:
  - For example if the applicant is likely to require several valve replacements over the course of their lifetime.
  - *However, please discuss each case with a Medical Officer before providing a final outcome under chronic, recurring medical condition.*

Temporary Visa applicants:

Depending on the degree of valve disease, the applicant may require further assessment when they next apply for a visa.

- A trivial or mild valve abnormality is not generally considered significant and does not need follow up. The applicant can be given an ASH outcome.

- A moderate valve abnormality should be considered significant and an AWC outcome might be given depending on the visa length and any advice from the Cardiologist as to when a replacement is likely to be needed:
  - *The applicant has known cardiac valve disease. The next visa application will require a new Cardiologist assessment regarding the applicant's Mitral Valve Regurgitation. This should include – history, management to date, current examination, ECG, ECHO, ongoing management needs and long term prognosis. In particular, please comment on whether the applicant is likely to require cardiac valve surgery in the future and if so, when.*

- Any applicant with a severe valve abnormality must have a Cardiologist assessment, including requesting the following information:
  - *Please comment on whether the applicant is likely to require cardiac valve surgery in the future and if so, when.*
- If an applicant may require surgery within the timeframe of their visa, they should be considered NOT ASH.

For example:

  - An applicant applying for a 2 year visa who is reported to be likely to require a Mitral Valve replacement in 3 years time may be considered NOT ASH as their valve disease may progress faster than expected.

  - An applicant applying for a 2 year visa who is reported to be likely to require a Mitral Valve replacement in 5 years time should be considered AWC.

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EP STUDIES

The following information was provided in a NZ Cardiologist report in 2016.
The cost of a screening EP study in private would be $15,330.00, and a separate later ablation $25,130.00. However, if this procedure was performed in the public system they would be combined and the cost would be under $15,000.00. The short term and long term prognosis is excellent and your WPW condition should not affect the quality of your future life.

This would be considered NOT ASH for a Temporary Visa, however does not meet the $41,000 cost level for a Residence visa.

PACEMAKERS

Pacemakers and Implantable Cardioverter Defibrillators (ICD) may be considered high cost, depending on the visa type and time frame. If the applicant is reported to have a Pacemaker or ICD, then further information is required. A Cardiologist assessment should be requested, including the following information:

- *Please comment specifically on the ongoing management needs relating to the ICD including – how often this needs to be checked, how often it needs replacing, whether it is the batteries or the entire unit that is replaced and the cost of repairing / replacing it.*

Depending on when the unit needs replacing and the cost of this, versus the visa length – the applicant may be ASH, AWC or NOT ASH.

CARDIOMYOPATHY

Cardiomyopathy is usually progressive and is associated with progressive heart failures, requiring recurrent hospital admissions. Depending on the cause of the Cardiomyopathy, various cardiac interventions may also be required.

Residence Visas:
Cardiomyopathy is an A4.10.1 INZ Listed Condition for Residence visa applications. You will need a cardiologist report outlining the diagnosis and the likely management and treatment.

Temporary Visas:
Temporary visa assessments are less straightforward than the Residence visas. As with many of the cardiac conditions, the applicant's current health status, as well as the rate of progression needs to be considered in relation to the visa length. The type of visa application also needs to be considered, i.e. are they fit for purpose, or are they unable to perform their expected duties due to their cardiac symptoms.

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It is therefore important to ensure that you have a Cardiologist assessment which provides all of this information: *For example:*

FIR: Cardiologist
A recent report from a Cardiologist is required regarding the applicant's known Cardiomyopathy. This should include - history, physical examination findings (including NYHA level), functional capacity, management needs and long term prognosis. The following investigations are required: Resting ECG and report, ECHO, Exercise ECG. Please specifically comment on the underlying cause of the applicant's Cardiomyopathy, the impact on the applicant's daily functioning and ability to work, as well as the expected rate of progression over time.

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APPENDIX ONE: CVD RISK SCREENING – A GUIDE FOR MEDICAL ASSESSORS

Written by Dr Rob Kofoed (Medical Officer), 2016

Background:

Even though the government has announced a decrease in the total number of permanent residents, there will still be 45-50,000 per annum new permanent residents of which about 10-15% would be over 55 years of age (the majority from UK, India, China, SE Asia and the pacific).

If we didn't screen any of these applicants, then the cost to our health services would be significant. Hypothetically, if we estimate that 20% of these applicants have diabetes and/or CVD and if the cost per annum for each individual with CVD and/or diabetes is an extra $2400 (this figure is based on a study from CMDHB in 2008 estimating that on average, each person with CVD and/or diabetes is associated with $2,400 more health care costs compared to a person without CVD or diabetes.- see: www.cmdhb.org.nz/About_CMDHB/Planning/Health-Status/Health-Status.htm) then the annual cost of not screening for this cohort is approximately an extra $2,500,000 on our health services; and as 45-50,000 new residents arrive in each year this will increase by $2,500,000 each year during the lifetime of all these new residents.

As MAs our role is to assess cardiovascular risk to reduce the average health cost per person (knowing that we won't be able to reduce this to zero) by screening out the highest risk applicants. By screening for the highest risk applicants and NOT ASHng those who do not meet the current ASH criteria as described in the Immigration Instructions, this should significantly reduce the average cost per person as individuals in higher risk groups are likely to incur the highest health costs.

CVD Risk assessment:

The cardiovascular risk calculators and tools we currently use are population based calculators designed primarily to determine when cost effective targeted intervention is recommended at each level of risk.

As MAs we are using these calculators to determine if an individual is at a high level of risk and form an opinion on whether the applicant's condition will likely result in high cost health services for that individual.

What Calculators?

To get consistency we should all be using the same cardiovascular risk calculators. During a discussion with Professor Rod Jackson from the University of Auckland in 2016, his comments were:

'We have developed new CVD risk prediction equations, which will be available shortly, but they are designed for people already living in NZ. They will include an option to predict risk for Pacific peoples, which no other risk calculators have, so that would be useful for screening people from the pacific Islands. It will also include options for predicting risk for Indians and

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Chinese. As far as I am aware only the UK QRISK calculator also includes these ethnicities (https://qrisk.org/2016/)
If people already have a personal history of CVD, then their risk is probably over 20% in 5 years. However it is really difficult to know if any of these calculators would apply to people from other countries, particularly low and middle income countries and also those with multi-morbidities. They may have very different risks and there is no good data available. I really wouldn't know how to estimate risk in these groups and your guess would be as good as mine.'

Following this discussion it was decided to use the QRisk calculator for non-diabetics and the NZSSD calculator for diabetics or applicants with HBA1c >50: http://www.nzssd.org.nz/cvd/

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APPENDIX TWO: ATRIAL FIBRILLATION AND ABLATION

The following link is for a NZ Ministry of Health report from 2012 regarding "Catheter Ablation for the Treatment of Atrial Fibrillation". It contains background information on Atrial Fibrillation, including NZ specific information and may be of interest in better understanding the significance of Atrial Fibrillation in our immigration applicants.
http://www.moh.govt.nz/notebook/nbbooks.nsf/0/69B1EE7B091E66E8CC257F7F00789C2E/$file/catheter-ablation-technology-note-jul2013.pdf