Cardiovascular Health Network

Abdominal Aortic Aneurysm Model of Care

Health Networks Branch

Working Together to Create a Healthy WA

Department of Health

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EXECUTIVE SUMMARY

The Model of Care for Abdominal Aortic Aneurysm in Western Australia (The Model) provides the policy framework for the prevention, detection and management of Abdominal Aortic Aneurysms (AAA). The Model was developed by the Cardiovascular Health Network Abdominal Aortic Aneurysm Project Group, and draws together the evidence in relation to best practice. It is planned that The Model will link to other models of care that are developed by the Cardiovascular Health Network.

An AAA is the localised dilation of the aorta. It is defined as dilation greater than 30 mm in diameter. In Western Australia, the prevalence of AAAs is 5% in men aged 65 years and 10% in those aged 80 years (1) (2). The presence of an AAA in a patient can also be considered a marker for atherothrombosis and coronary heart disease. Abdominal Aortic Aneurysms are often asymptomatic in patients, however as the dilation of the aorta increases, so too does the risk of artery rupture, and sudden death. Therefore, early diagnosis, secondary prevention by risk factor modification, and ongoing monitoring of AAAs are key to preventing unnecessary mortality.

The Model aims to ensure patients receive the right care, at the right time, by the right team, and in the right place. The Model aims to raise the profile of the condition, and build on current service provision, where those identified with an AAA will be provided with integrated care involving support and monitoring of aneurysm size with a view to elective repair to prevent aneurysm rupture.

The Model is complemented by the Guidelines for General Practitioner referral for first specialist assessment (Appendix 1) and diagnostic imaging pathways for the surveillance of an Abdominal Aortic Aneurysm (Appendix 2).

METHODOLOGY

As part of the establishment of the Cardiovascular Health Network, Abdominal Aortic Aneurysm was identified as a priority area. As a result, Dr Lawrence-Brown led a project to develop The Model. The extensive program of AAA research in Western Australia carried out within the Western Australia Safety and Quality of Surgical Care Project (3), and covering the last fifteen years, initially formed the basis for the development of The Model. Following this, there was analysis of the current service provision, service utilisation, gaps in service and opportunities for improvement.

The draft Model was circulated to over 50 key stakeholders with the invitation to provide feedback. Five submissions were received and the Model was updated accordingly.

The Cardiovascular Health Network Executive Advisory Group endorsed The Model in May 2008.

MODEL OF CARE OVERVIEW

The Model is an articulation of best practice service provision for the prevention, detection and management of Abdominal Aortic Aneurysms across the continuum of patient care.

The Model has been divided into the following sections:

1. **Abdominal Aortic Aneurysm** – A definition of the condition and description of the current burden of disease.
2. **Current Service Provision for Abdominal Aortic Aneurysm** – An inventory of current services and their utilisation, example of a patient journey, and commentary on the gaps in services.
3. **The Model of Care for Abdominal Aortic Aneurysm** – An articulation of the principles, care and services comprising:
   - Primary Risk Reduction
   - Assessment, Detection and Management.
4. **Model of Care Recommendations and Implementation** – An outline of the recommendations and a proposed strategy for implementation.

1. ABDOMINAL AORTIC ANEURYSM

1.1 Definition of an Abdominal Aortic Aneurysm

An aneurysm is defined as localised dilation of an artery greater than 1.5 times the usual diameter of that particular artery (1). Aneurysms occur in various locations including the intra-cranial arteries, iliac and popliteal arteries and the aorta (thoracic and abdominal).

Aneurysms most commonly occur in the abdominal aorta and as such, a large proportion of the research and literature relates to this area. An Abdominal Aortic Aneurysm (AAA) is generally considered to be present when the diameter of the abdominal aorta exceeds 30mm. Other types of aneurysms are listed below (1):

- Thoracic Aortic Aneurysm – diameter greater than 40mm
- Common Illiac Artery Aneurysm – diameter greater than 20mm
- Popliteal Artery Aneurysm – diameter greater than 10mm.

The Model focuses on the prevention, diagnosis and management of abdominal aortic aneurysms given the depth of data available. However the principles of care outlined may be relevant to aneurysms of the common iliac and popliteal arteries.

1.2 The Cause of Abdominal Aortic Aneurysms

The cause of AAA is not well understood. The incidence of AAA increases as people age and it is also relatively higher in men than women (3). Some individuals have inherently weaker arteries, and this appears to be genetically controlled, and a family history of AAA is not uncommon in patients with AAAs. Most aneurysms are caused by a breakdown in the proteins (collagen and elastin) that provide the structural strength to the wall of the aorta. These proteins gradually deteriorate with age, but these processes may be accelerated, even in younger people, by smoking, high blood pressure and the inflammation that is associated with atherosclerosis.

1.3 Risk Factors for Abdominal Aortic Aneurysm

The major risk factors or accelerators for AAA include older age, male gender, genetic factors (relating to ethnicity or positive family history of aneurysm), a history of ever smoking and hypertension.

1.4 The Burden of Disease

1.4.1 Prevalence and incidence

In Western Australia, the prevalence of AAA (diagnosed AAA 3cm or greater in diameter) rises from 4.8% in men aged 65-69 years to 10.8% in those aged 80 year and over (4). The prevalence for AAAs large enough to warrant elective surgery (diagnosed AAA 5.5 or greater in diameter) is about 0.5% in men aged 65 years and over. The prevalence of AAAs in women is about five times less for all age groups, although outcomes in women with AAAs are worse than in men (5). The incidence of AAAs has increased worldwide over the last few decades, however there is some evidence that the incidence of AAAs has stabilised in WA (6).

1.4.2 Mortality

The mortality from ruptured AAA in WA (including those patients that die before reaching hospital) is approximately 80% (3). The mortality from elective open repair is about 4%, and the crude 5 year survival after elective surgery for AAA is about 80% (7).

2. CURRENT SERVICE PROVISION FOR ABDOMINAL AORTIC ANEURYSM

The current service provision for Abdominal Aortic Aneurysm (AAA) is displayed below:

General Services	■ General Practice / Aboriginal Medical Service ■ Palliative care and support ■ Ultrasound Services
Specialist Services	■ Hospitals with a vascular service - services providing ambulatory care services (also referred to as outpatients), private consultations and elective and emergency repair of AAA
Abdominal Aortic Aneurysm Resources	■ Clinical Priority Access Guidelines for Abdominal Aortic Aneurysm ■ Diagnostic Imaging Pathway for Abdominal Aortic Aneurysm

2.1 Hospitalisations for Abdominal Aortic Aneurysm

In Western Australia, the age-standardised hospitalisation rate for AAA for the period 1999-2006 was 31.2 per 100,000 persons. There were 525 hospitalisations for AAA per annum during this period and the rate appears stable. The average length of stay was also stable, at approximately 7 days. The crude number of hospitalisations for ruptured AAA appears to be falling; from 84 in 2000-01 to 53 in 2005-06 (this remains to be validated).

2.2 Gaps within the Current Service Provision for Abdominal Aortic Aneurysm

2.2.1 Service Gaps

- Lack of, or limited capacity of, services that support people to **modify their risk factors** for AAA.
- Variable levels of medical assessment for those aged over 65 years, and **inconsistent assessment for vascular disease** (including AAA) when other cardiovascular disease is identified, and vice versa.
- Delayed **referral to appropriate services**, such as ultrasound for those who are at high risk of AAA, and referral to vascular surgeons for assessment and monitoring.
- Variable advice provided to patients on **exercise**, potentially leading to patients with AAA exercising at intensities higher than recommended levels, increasing risk of rupture.
- Limited service and support for patients and health professionals residing within **rural and remote communities**.

2.2.1 Process and Procedural Gaps

- Variable use of formalised **register and recall systems**, particularly within General Practice for AAA surveillance.
- Lack of comprehensive **implementation of guidelines** for the management of AAA. Similarly, lack of awareness of defined guidelines and processes for referral.
- **Delays** between patient presentation to the emergency department and transfer to theatre. This may be particularly relevant for patients initially presenting to primary or secondary health services requiring transfer.
- Provision of intermediate **resuscitation** in the emergency department subsequently raising blood pressure prior to the artery being controlled.

2.2.3 Knowledge Gaps

- Variable community and health professional awareness that the **risk factors** for coronary heart disease also apply to AAA.

3. THE MODEL OF CARE FOR ABDOMINAL AORTIC ANEURYSM

The Model comprises the following components:

3.1 **Overarching Principles** – The principles guiding the direction of services

3.2 **Primary Risk Reduction** – A strategy for reducing risk in the well population

3.3 **Assessment, Detection and Management** – A patient centred, integrated approach to Abdominal Aortic Aneurysm detection and management

3.4 **Future Horizons** – An overview on the future advancements which may shape the provision of services

3.1 Overarching Principles

The Model of Care for Abdominal Aortic Aneurysm aims to ensure patients receive the right care, at the right time, by the right team and in the right place.

The Model is guided by the following overarching principles:

- Improving **community awareness** of Abdominal Aortic Aneurysm and associated risk factors. Ensuring that primary and secondary prevention measures are in place to decrease the prevalence of modifiable risk factors for Abdominal Aortic Aneurysm.
- Early identification of patients with an Abdominal Aortic Aneurysm, through **incidental case detection** of population groups at high risk of the condition, where the clinician considers that the patient is otherwise well enough to benefit from AAA surgery.
- Provision of patient centred care with the inclusion of carers (8). This includes the delivery of **integrated surveillance and intervention services** to monitor aneurysm size with a view to elective repair as a means of preventing aneurysm rupture. To provide pain control and carer/family support for those with an Abdominal Aortic Aneurysm who may have previously declined elective repair or are ineligible for repair of ruptured Abdominal Aortic Aneurysm.
- Integrated and coordinated care between General Practitioners and Vascular Surgeons, supported by **guidelines, pathways and protocols** in order to deliver timely and appropriate care for patients.

3.2 Primary Risk Reduction

Population Group in Focus:

Men over 65 years and women over 70 years (reduced for those with a positive family history of aneurysm)

Key Objectives

- To improve the awareness of the existence of, and the risk factors for, Abdominal Aortic Aneurysm
- To deliver medical assessment for those at risk
- To provide programs which aim to decrease the prevalence of modifiable risk factors for Abdominal Aortic Aneurysm

Domain:

- Community
- General Practice

In line with the *Health Promotion Strategic Framework 2007-2011* (9), healthy lifestyle promotion is included right across the continuum of care for AAA patients, particularly men over 65 years and women over 70 years. *The Chronic Conditions Framework for Western Australia* (10) recognises that preventative actions at the following levels are required to support individuals maximise healthy behaviours and reduce risky behaviours. Actions undertaken at the various levels of the health system can be defined as:

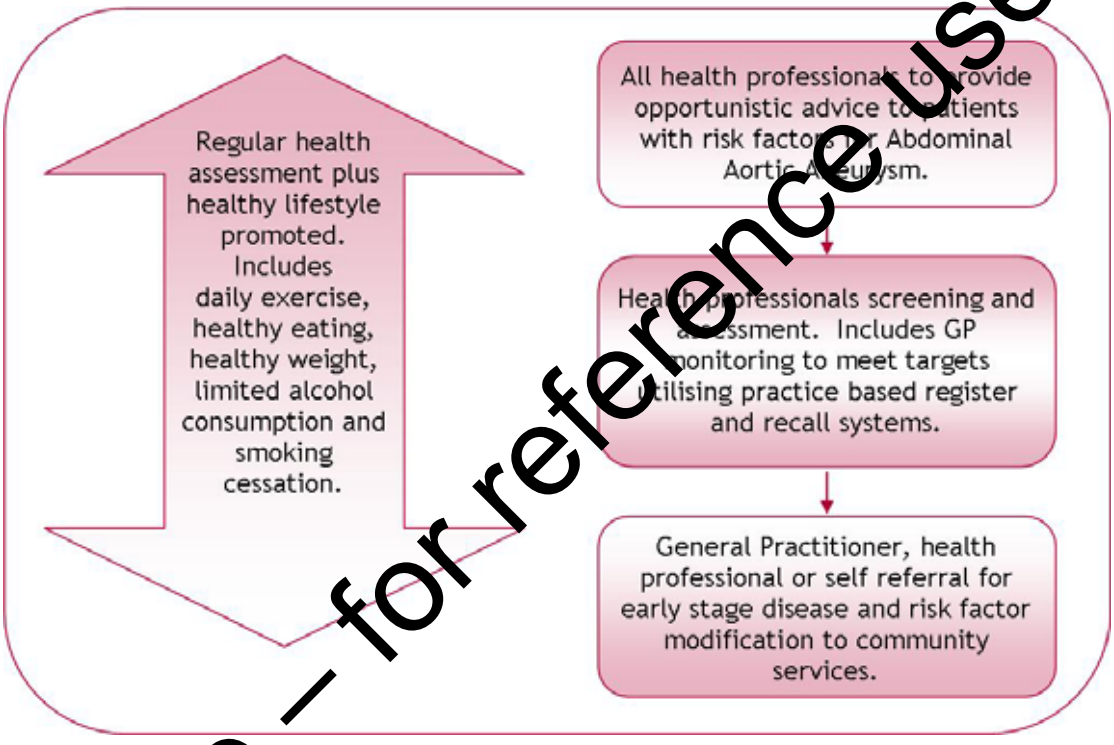
- Individual level – actions undertaken by individuals, including single health practitioners, patients and carers
- Health care and community organisation level – actions undertaken by health care organisations or community organisations
- Policy level – actions directed by policy as a key driver for all activities at the patient care level.

At the population level, prevention includes mass media health promotion campaigns, brochures or posters about health issues relevant to the aged population. At the individual patient/health practitioner level, interactions should include preventative advice, early detection, and early intervention. Primary risk reduction for Abdominal Aortic Aneurysm should focus on health professionals increasing their awareness of the links between risk factors and accelerators for Abdominal Aortic Aneurysm.

The Model supports the following manuals, *Putting Prevention into Practice: An Education Manual and Smoking, Nutrition, Alcohol and Physical activity: A population health guide to behavioural risk factors in General Practice* (11) produced by the Royal Australian College of General Practitioners and *Healthy Lifestyles 2002-2007: A Strategic Framework for Primary Prevention of Diabetes and Cardiovascular Disease in WA* (12)

The primary risk reduction component of The Model is displayed in Figure 1.

Figure 1. Primary Risk Reduction



3.3 Assessment, Detection and Management

Population Group in Focus

- Men over 65 years and women over 70 years (reduced for those with a positive family history of aneurysm)
- Individuals with Abdominal Aortic Aneurysms requiring surveillance with a view to elective repair

Key Objectives

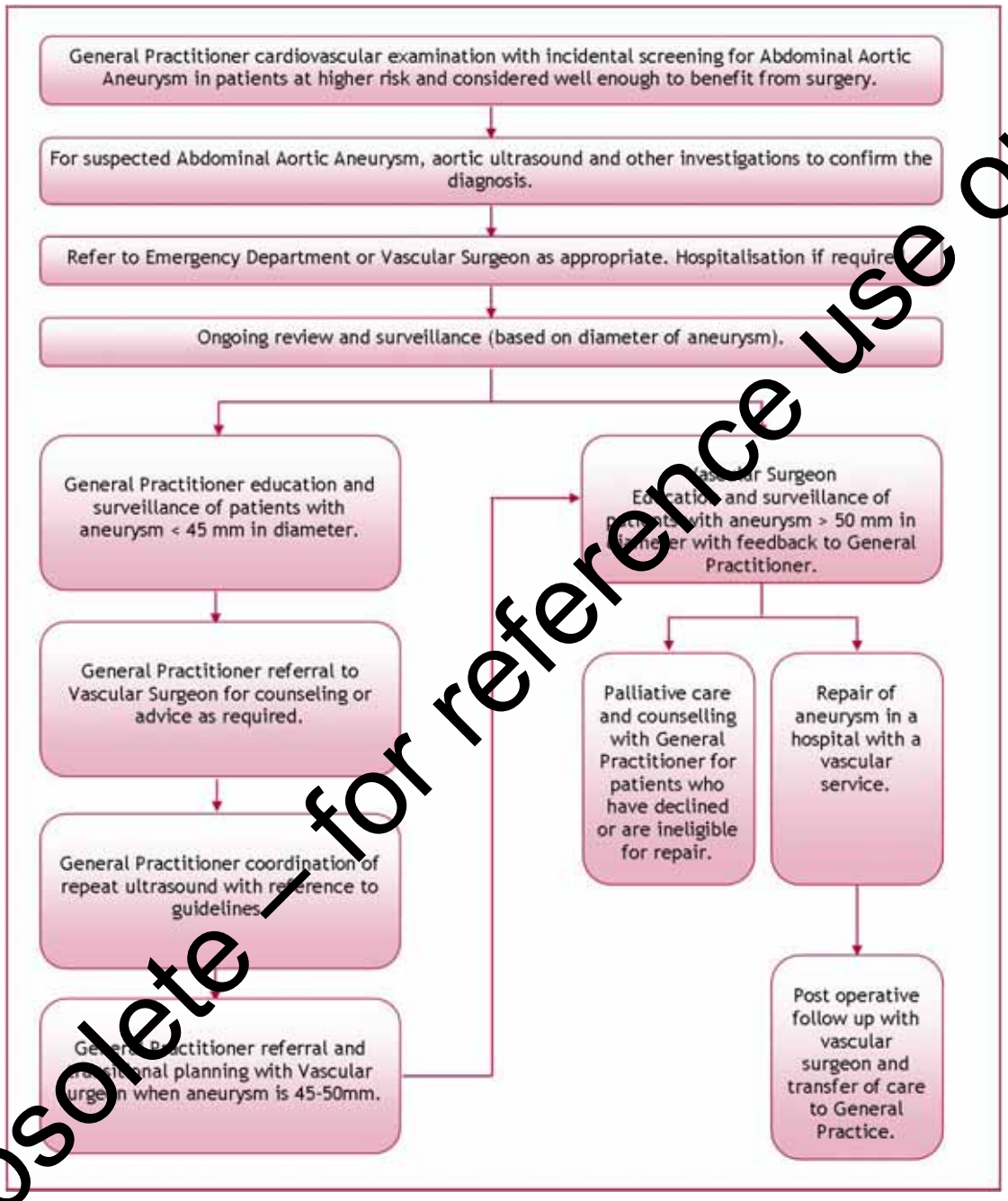
- To provide cardiovascular examination including aortic ultrasound of selected patients for incidental case detection of Abdominal Aortic Aneurysm
- To provide integrated surveillance and intervention services to monitor aneurysm size with a view to elective repair
- To deliver timely and coordinated acute care for repair of ruptured aneurysm, including post acute care
- To provide pain control and carer/family support for those with an Abdominal Aortic Aneurysm who may have previously declined elective repair or are ineligible for repair of ruptured Abdominal Aortic Aneurysm

Domain

- Community
- General Practice
- Hospitals with a Vascular Service

The Assessment, Detection and Management components of The Model is displayed in Figure 2.

Figure 2. Assessment, Detection and Management



3.3.1 Screening for Suspected Abdominal Aortic Aneurysm

The assessment and detection component of The Model is predominantly within the domain of General Practice. As part of regular General Practitioner assessment of patients, there will be identification of the population with cardiovascular disease and at elevated risk of Abdominal Aortic Aneurysms, whom the General Practitioner considers is otherwise well enough to benefit from surgery if found to have an Abdominal Aortic Aneurysm. This patient group includes:

- Men aged 65 years of over (55 years in patients with positive family history).
- Women aged 70 years or over (60 years in patients with positive family history).

As a means of case detection for Abdominal Aortic Aneurysm, patients will undergo aortic ultrasound to complete the cardiovascular examination. This may occur incidentally where ultrasound is conducted for other medical reasons. It is acknowledged that formalised population based screening for aneurysm is not cost effective and this approach is not recommended.

To support this, health professionals should be aware of vascular disease risk factors and the need for health assessment and incidental case detection.

3.3.2 Management of Abdominal Aortic Aneurysm

The long term care component of The Model aims to ensure that patients can access education, secondary prevention and management care that is integrated across General Practice and Vascular Services. Clinical audit of interventions and management of Abdominal Aortic Aneurysm is supported.

The long term care of patients with an Abdominal Aortic Aneurysm includes:

1. Education
2. Secondary Prevention
3. Support and Surveillance
4. Repair of Aneurysm

There should be clear communication and mechanisms to support linkages between all care providers.

1. Education

Patients and carers will be informed to ensure that they have awareness of the condition, the trajectory of the condition and community-based service options.

To support this, there will be hard copy and online education materials developed on the diagnosis and management of Abdominal Aortic

Aneurysms. These will be culturally appropriate and developed in consultation with patients to ensure information is relevant and appropriate. Resources will be accessible by the community and health practitioners.

2. Secondary Prevention

Healthy lifestyles will be encouraged. This includes:

- daily exercise (at an appropriate level of intensity);
- healthy eating including a low salt diet;
- limited alcohol consumption and
- maintaining a healthy weight.

Patients will also be able to self refer or be referred by health professionals and General Practitioners to community-based secondary prevention and rehabilitation options that emphasise exercise at an appropriate intensity.

3. Support and Surveillance

Based on the size of the Abdominal Aortic Aneurysm, patients will either be cared for by a General Practitioner or a Vascular Surgeon. To support surveillance of patients with an Abdominal Aortic Aneurysm, the use of register and recall systems by health professionals is encouraged.

General Practitioners will take a lead role in the management of patients with Abdominal Aortic Aneurysms less than 50mm in diameter. General Practitioners can refer for a Vascular Surgeon consultation for patient examination and counselling as required. The Clinical Priority Access Criteria are guidelines that can be used as a reference for the referral process for first specialist assessment (Appendix 1).

The diagnostic imaging pathways for Abdominal Aortic Aneurysm outline the timeframes for repeat ultrasound based on aorta diameter (Appendix 2). These guidelines will also flag the point at which care planning should occur to support the transition of care to a Vascular Surgeon.

Vascular Surgeons will take a lead role in the management of patients with an Abdominal Aortic Aneurysm greater than 50mm in diameter. Vascular Surgeons will be based at a hospital with a Vascular Service. Vascular Surgeons will discuss options for elective repair, which is highly successful, as a means of preventing aneurysm rupture with low mortality and morbidity.

4. Repair of Aneurysm

Patients should have access to timely, coordinated and integrated inpatient services for repair of an Abdominal Aortic Aneurysm. Patients may undergo repair of aneurysm as elective surgery or repair of ruptured aneurysm in patients who were previously undiagnosed or declined elective repair of AAA.

There will be systems for the retrieval and transport of patients from rural and remote setting to a hospital with a vascular service for repair of an Abdominal Aortic Aneurysm. General Practitioners and medical practitioners in regional and remote centres should have the capacity to make a diagnosis of aneurysm rupture and make arrangements for the patient to be transported to a hospital with a vascular service.

There are two intervention pathways available for patients admitted for repair of an Abdominal Aortic Aneurysm. The first is intervention using open surgical repair and the second is using endovascular stent graft repair technology. Case selection will guide clinical decisions on intervention pathways. Following the repair, there will be post operative follow up by a Vascular Surgeon, with care to be transitioned to the General Practitioner.

Patients who decline repair or are considered ineligible should be supported to receive palliative care and counselling in liaison with the patient's General Practitioner. This should include advanced care directives, pain control, discharge planning and counselling and support for patients and their families.

3.4 Future Horizons

It is acknowledged that models of care are time limited and will need to be dynamic given the changing health environment. Key advancements which may influence the Model of care include refinements in pharmaceuticals. However, as AAA is a complex disease, the identification of a susceptibility gene for AAA leading to a simple genetic test to identify individuals at risk for developing an AAA is unlikely.

4. MODEL OF CARE RECOMMENDATIONS

Recommendation 1:

That the Model of Care for Abdominal Aortic Aneurysm is endorsed by the State Health Executive Forum.

Recommendation 2:

The Cardiovascular Health Network will support the development and implementation of a strategy to improve awareness of Abdominal Aortic Aneurysms in the population at risk. This includes the development of standardised patient and carer information resources on Abdominal Aortic Aneurysms.

Recommendation 3:

The Cardiovascular Health Network will endorse and support the dissemination of appropriate current evidence-based protocols and patient pathways for the detection and management of Abdominal Aortic Aneurysm in WA including:

- Guidelines for screening populations at risk through cardiovascular examination and incidental case detection of Abdominal Aortic Aneurysm.
- Guidelines for General Practitioner referral for first specialist assessment (Appendix 1)
- Diagnostic imaging pathways for the surveillance of an Abdominal Aortic Aneurysm (Appendix 2)

Recommendation 4:

The Cardiovascular Health Network collaborates with stakeholders to investigate and develop workforce strategies. In partnership with WA GP Network, develop and implement an education strategy for General Practitioners on the risk factors, screening and management of Abdominal Aortic Aneurysms.

Recommendation 5:

The Cardiovascular Health Network will conduct periodic (biannual or annual) review of The Model of Care to identify and address gaps in the future.

Recommendation 6:

The Cardiovascular Health Network will identify research needs to inform and enhance Abdominal Aortic Aneurysm care in WA, particularly those which must be undertaken locally.

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APPENDICES

Appendix 1: Clinical Priority Access Criteria Guidelines for First Specialist Assessment

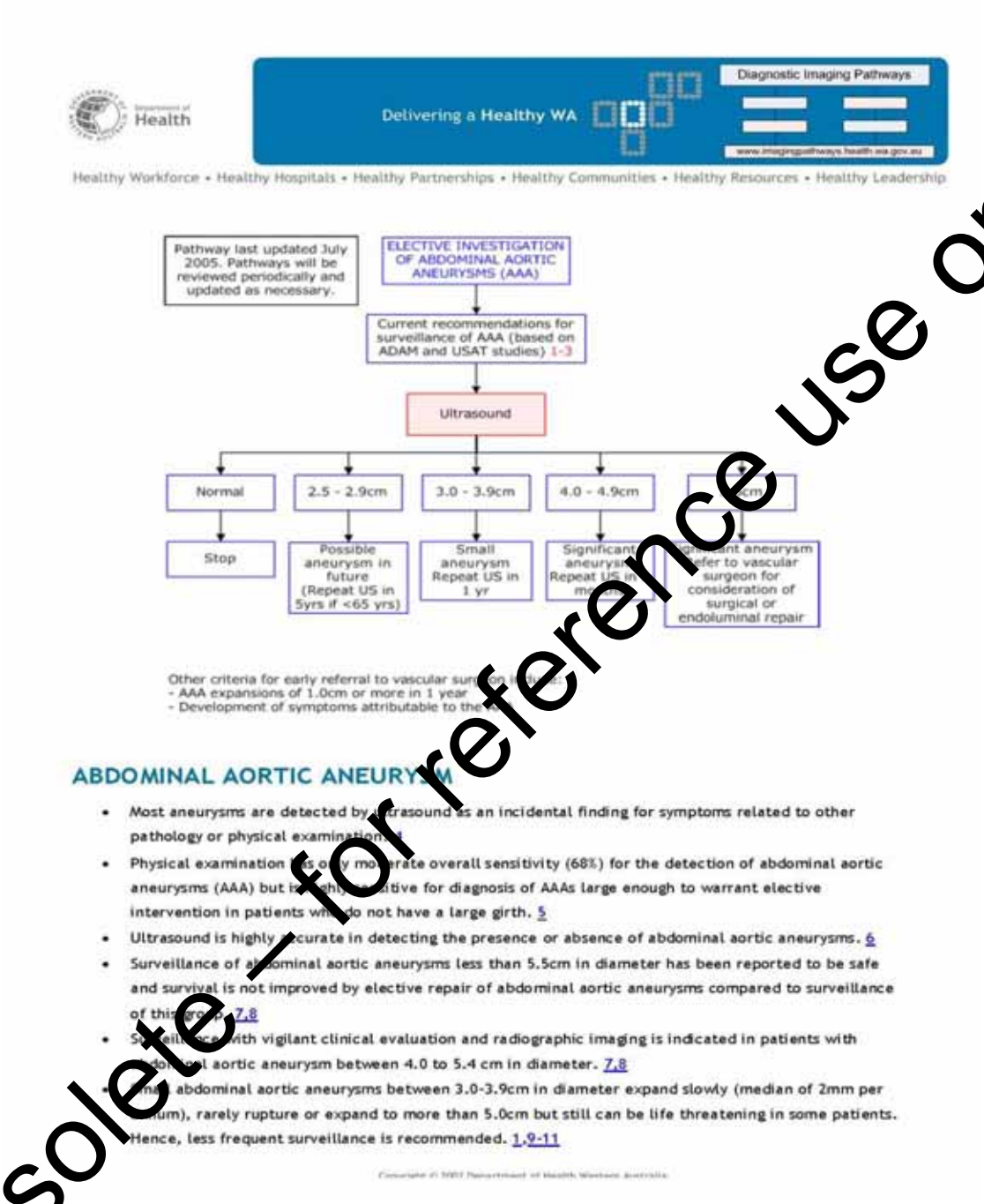
Source: Outpatient and Elective Services Referral Website: www.gp.health.wa.gov.au/CPAC/Home

How to use these guidelines:

Step 1	Go to Guidelines for First Specialist Assessment [Recommendations for Aneurysm outlined below]
Step 2	Based on provisional diagnosis, search Specialist Area [Vascular Surgery]
Step 3	Follow suggested evaluation and management options for condition
Step 4	Complete Referral Form and suggest CPAC category as per guidelines [available on website above]
Step 5	Forward Referral Form and other information to hospital or as instructed by guideline [available on website above]

VASCULAR SURGERY REFERRAL RECOMMENDATIONS			
Diagnosis / Symptomatology	**Evaluation**	**Management Options**	**Referral Guidelines**
▪ Thoracic Aortic Aneurysm.	Usually presents from routine chest x-ray. Cardiovascular assessment. Investigations: Routine FBC, glucose, creatinine, electrolytes.	Control risk factors. CT scan if radiological report recommends.	Refer if large sacular aneurysm greater than 5 cm as semi-urgent – Category 3. Otherwise, refer as routine referral.
Abdomen: ▪ Aortic aneurysm.	Standard history and risk factors above, particularly positive family history. Abdominal examination: Most significant abdominal aortic aneurysms are palpable. Investigations: Abdominal ultrasound, full blood count, glucose, creatinine, electrolytes.	Managing risk factors, particularly smoking cessation.	Instigate General Practitioner surveillance of the abdominal aorta if greater than 3 cm. Referral to Vascular Clinic, in male if greater than 4.5 cm and female if greater than 4.0 cm, as routine referrals – Category 4. Surveillance in consultation with General Practice. Aneurysms 5 cm or greater or tender aneurysms should be referred as semi-urgent, Category 3, to the Vascular Service.

Appendix 2: Diagnostic Imaging Pathway for Abdominal Aortic Aneurysm



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Website

For more information go to www.imagingpathways.health.wa.gov.au

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