Section 2

Management of diagnosed conditions
Notes:
## Section 2: Management of diagnosed conditions

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</tr>
</tbody>
</table>
Anxiety disorders

High risk groups
• Family history of anxiety
• Physical or emotional stress
• History of physical or emotional trauma
• Other mental health conditions

Considerations for women of child-bearing age
• Consider risk/benefit of psychotropic drugs in pregnancy

Urgent referral
• Refer immediately to the MO/NP or mental health team if there is any risk of harm to themselves or others
• Lifeline 1300 131 114 (local call)
• Kids Helpline 1800 55 1800 (free call)

1. What is an anxiety disorder?
• Anxiety is the anticipation of a future or perceived threat. While anxious feelings are a common response to a situation where a person feels under pressure, these quickly pass once the stressor is removed
• The feeling of anxiety may relate to perceived danger within oneself (internal) or outside oneself (external)
• A degree of arousal and anxiety improves performance, but high levels of anxiety diminish performance and can lead to decompensation
• Anxiety becomes known as a disorder when it is either excessive and/or cannot be controlled
• Anxiety symptoms may be primary or secondary to other physical or mental health conditions such as depression
• There are many types of anxiety disorders including
  – Generalised anxiety disorder (GAD). People with GAD experience generalised and persistent fatigue, muscle tension, headaches, irritability, restlessness, sleep disturbance and gastrointestinal system symptoms, which affects their ability to function. GAD is more common in women than men and has a chronic course that often spans a person’s life
  – Panic Disorder refers to recurrent unexpected panic attacks. These are abrupt surges of intense fear or discomfort that reach a peak within minutes and are associated with several symptoms (see Table 1). These attacks are not restricted to any particular situation or set of circumstances and can cause significant distress or disability
  – Post traumatic stress disorder (PTSD) arises as a delayed or protracted response (≥6 months) to a stressful event involving actual or threatened death, a serious injury, or threats to a person’s physical integrity. It is characterised by intrusive...
nightmares, flashbacks, thoughts and avoidance of reminders of the event, leading to sleep disturbance, irritability, hyper arousal and anger.6,7

- **Obsessive compulsive disorder (OCD)** is characterised by recurring and distressing intrusive thoughts, urges, obsessions and repetitive behaviours to reduce anxiety. Clients typically recognise their behaviour (e.g. hand washing, counting and checking) is excessive or unreasonable which can lead them to feel ashamed and attempt to conceal their symptoms from others.5,6

- **Social anxiety disorder** is characterised by the fear of scrutiny or judgement including doing or saying something embarrassing or being seen as inappropriately anxious in social situations. These social situations are either avoided or endured with anguish having a significant impact on quality of life.5,6

- **Specific phobia** is characterised by an intense and persistent fear of specific situations or objects such as: certain animals or insects, blood, injections, flying, thunder or heights. Confronting these phobic situations can set off overwhelming fear, panic and avoidance responses.5

### Table 1. Criteria for a panic attack

<table>
<thead>
<tr>
<th>A distinct period of intense fear or discomfort, in which 4 (or more) of the following symptoms developed abruptly and reached a peak within 10 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palpitations, pounding heart or accelerated heart rate</td>
</tr>
<tr>
<td>Sweating</td>
</tr>
<tr>
<td>Trembling or shaking</td>
</tr>
<tr>
<td>Sensations of shortness of breath or smothering</td>
</tr>
<tr>
<td>Feeling of choking</td>
</tr>
<tr>
<td>Chest pain or discomfort</td>
</tr>
<tr>
<td>Nausea or abdominal distress</td>
</tr>
<tr>
<td>Feeling dizzy, unsteady, lightheaded or faint</td>
</tr>
<tr>
<td>Derealisation or depersonalisation</td>
</tr>
<tr>
<td>Fear of losing control or going crazy</td>
</tr>
<tr>
<td>Fear of dying</td>
</tr>
<tr>
<td>Parasthesias (numbness or tingling sensations)</td>
</tr>
<tr>
<td>Chills or hot flushes</td>
</tr>
</tbody>
</table>

### 2. Diagnosis of anxiety disorders

- Diagnosis is made after a general health assessment, physical examination and mental health history. It is important to exclude medical conditions and substance abuse and withdrawal as a cause of the client’s symptoms.

- Anxiety disorders tend to be highly co-morbid. Identifying those situations that are feared or avoided as well as the associated thought content helps differentiate between these disorders and informs the clinician as to a specific diagnosis.3

- Defining the type of anxiety disorder is an important part of the underlying management strategy.
3. Management
Management of anxiety disorders primarily focuses on psychotherapy and medications.

For management strategies to be successful, it is important to identify and address all possible psychological and lifestyle factors which may cause or exacerbate the disorder.

3.1 Support client self management
- Provide information and resources about anxiety disorders (see Resource 2).
- Help the client to identify the signs and symptoms of anxiety and panic and recognise trigger factors (see Table 1).
- Discuss the role that modifying lifestyle behaviours has in improving general health.
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and create goals to overcome those barriers based on their capacity and understanding.
- Reassure the person that anxiety disorder is a real medical condition.
- Be aware of cultural factors that could influence the way symptoms are expressed or understood.

3.2 Social emotional support
- Anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 1). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis.
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition.
- Provide a safe, convenient and confidential environment with flexible appointments and short waiting times.
- Clinicians should be motivated, non-judgemental, considerate, easy to relate to, respectful, have good interpersonal and communication skills, treat people equitably and devote adequate time to the needs of the client.
- Ensure the client is well informed about services and their rights, are involved in service provision and encouraged to involve parental/carer support.
- Build strong therapeutic relationships which will form the basis of continuing care.

3.3 Psychotherapy
- Psychotherapy modalities are considered first line treatment for anxiety.
- The main form of psychotherapy treatment for anxiety disorders is cognitive behaviour therapy (CBT) which should be considered as first line treatment.
• Psychotherapy has been associated with lower relapse rates after 2-3 years\(^5\)

• Psychotherapy\(^5,6,8\)
  – can be as effective as medications for anxiety disorders
  – may provide skills which reduce risk of relapse
  – requires commitment by the person with anxiety disorders
  – requires referral to an appropriately trained expert therapist e.g. social worker, mental health worker or psychologist

• General principles of psychotherapy include
  – the client is assisted to problem-solve stressors which adversely affect their mental health as they present\(^5,6,8\)
  – the client is encouraged to challenge negative thoughts and replace them with more realistic thoughts, and to resist pessimism and self-criticism\(^5,6,8\)
  – specific behavioural tasks designed to assist in managing and overcoming anxiety

3.4 Physical and leisure activities

• Exercise has been shown to be beneficial in managing the symptoms of mild to moderate anxiety\(^6\) (see Physical activity, page 26)

• Consider and support community program activities such as walking groups or other traditional activities such as fishing or hunting

• Dissuade excessive use of computerised devices or television as a form of leisure activity as they are sedentary in nature

3.5 Relaxation training

• Relaxation training has been shown to be effective in reducing mild to moderate anxiety and has been shown to be as effective as CBT in the treatment of GAD

• Relaxation training has been shown to be more effective for PTSD and social anxiety disorder than no treatment

• For panic disorder, relaxation training has been shown to be as effective as drug treatments and psychological therapies including CBT

• There are several types of relaxation training including progressive muscle relaxation which teaches a person to relax by tensing and relaxing specific groups of muscles

• Relaxation training can be learned via professional intervention or self-taught\(^5,6,8\)

3.6 Internet and computer based treatment

• Information-based self-help tools have the greatest evidence of efficacy for specific phobias, and are most effective when the individual is highly motivated to undertake treatment

• Internet and computer based treatment provides learning materials with practise exercises that individuals can either choose to use by themselves or under professional guidance (see Resource 3)

• May be done without the aid of a therapist, although evidence suggests that better results are achieved with a therapist\(^5\)
4. Medications

- Psychotherapy modalities are considered first line treatment
- Use of medication is helpful in controlling symptoms in situations where psychotherapy is not available or the client has low motivation and/or acceptance of such therapies
- Discuss with the client that
  - selective serotonin reuptake inhibitors (SSRIs) and serotonin and noradrenaline reuptake inhibitors (SNRIs) are well tolerated, however there are a wide range of potential side effects
  - the symptoms of anxiety may worsen for a short time when starting or increasing medication doses
  - potential improvement in symptoms occurs up to 2 weeks after medication commencement
- Abrupt cessation of antidepressant treatment may result in withdrawal side effects
- There is evidence of an increased risk of suicidal behaviour in young people under 25 years of age taking SSRIs
- Clinical monitoring of response and side-effects is particularly important in this group
- Table 2 outlines general medications used for anxiety while Table 3 summarises management of specific anxiety disorders
Table 2. General medications for anxiety disorders\textsuperscript{1,4,9,11}

<table>
<thead>
<tr>
<th>Class</th>
<th>Recommended drugs</th>
</tr>
</thead>
</table>
| **Serotonin selective reuptake inhibitors (SSRIs)** | • Adverse effects include nausea, diarrhoea, constipation, insomnia, orthostatic hypotension, dizziness, hyponatraemia, increased risk of GI bleeding and sedation  
• Weight gains of more than 6 kgs may occur  
• Sexual dysfunction, including loss of libido, anorgasmia and ejaculatory disturbance, may also occur  
• Use with caution in pregnancy  
• Compatible with breastfeeding  
• If drowsiness occurs give in the evening  
• Careful titration and follow up is required |
|  | • Fluoxetine 10 mg mane up to 80 mg daily  
• Fluvoxamine 50 mg mane up to 300 mg daily (or b.d. for > 150 mg)  
• Escitalopram 5 mg mane up to 20 mg daily  
• Paroxetine 10 mg mane up to 60 mg daily  
• Sertraline 25 mg mane up to 200 mg daily  
• Citalopram 10 mg mane up to 40 mg daily |
| **Serotonin and noradrenaline reuptake inhibitors (SNRIs)** | • Adverse effects as above, plus tachycardia, hypertension  
• Use when other treatments have been unsuccessful or for severe anxiety disorders  
• Not to be used in children and adolescents  
• Careful titration and follow up is required  
• Consider SSRI as an alternative in pregnancy  
• Compatible with breastfeeding |
|  | • Duloxetine 30 mg daily up to 120 mg daily  
• Venlafaxine CR 75 mg mane (after food) up to 225 mg |
| **Tricyclic antidepressants (TCAs)** | • Not considered first line treatment due to adverse effects  
• Use with caution if co-existing depression or ideas of self-harm as toxic in overdose quantities |
|  | • Imipramine 25 - 75 mg nocte up to 75 - 150 mg daily  
• Clomipramine 25 - 75 mg nocte up to 75 - 150 mg daily |
| **Benzodiazepines** | • Addictive quality, ensure no previous history of problem drug or alcohol use  
• For short-term use only  
• Long-term use is associated with dependence, motor vehicle accidents and memory problems  
• Prescribe in small quantities  
• Ensure regular review of the client  
• At the end of a treatment course taper off over several weeks to avoid withdrawal symptoms  
• Reduces tension and increases relaxation |
| Use only for treatment during crises or if anxiety is causing the client unnecessary distress\textsuperscript{4} | • Oxazepam  
• Alprazolam  
• Diazepam |
Table 3. Management for specific anxiety disorders\(^{6,7,12,13,14,15,16}\)

<table>
<thead>
<tr>
<th>Generalised anxiety disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychotherapy</strong></td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
</tr>
<tr>
<td><strong>First line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Second line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Panic Disorder</strong></td>
</tr>
<tr>
<td><strong>Psychotherapy</strong></td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
</tr>
<tr>
<td><strong>First line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Second line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Post traumatic stress disorder</strong></td>
</tr>
<tr>
<td><strong>Psychotherapy</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
</tr>
<tr>
<td><strong>First line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Obsessive compulsive disorder</strong></td>
</tr>
<tr>
<td><strong>Psychotherapy</strong></td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
</tr>
<tr>
<td><strong>First line</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Second line</strong></td>
</tr>
</tbody>
</table>

(continued)
Social anxiety disorder

**Psychotherapy**
- CBT should incorporate exposure based therapy along with social skills training

**Pharmacotherapy**

<table>
<thead>
<tr>
<th>First line</th>
<th>Control of physiological symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSRI OR</td>
<td>Propranolol 10 - 40 mg, 30 - 60 minutes prior to social event</td>
</tr>
<tr>
<td>Venlafaxine CR 75 mg orally</td>
<td></td>
</tr>
<tr>
<td>mane after food up to</td>
<td></td>
</tr>
<tr>
<td>225 mg daily</td>
<td></td>
</tr>
</tbody>
</table>

**Specific phobias**

**Psychotherapy**
- For all specific phobias, psychological interventions are the treatment of choice

**Pharmacotherapy**
- Should not be considered for treatment of specific phobias on an ongoing basis

### 5. Care plan

**Table 4. Care plan for clients with anxiety disorders**

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full physical health check</td>
<td>✔</td>
<td>12 mthly</td>
</tr>
<tr>
<td>TFT, FBC, LFTs, UEC venous glucose,</td>
<td>✔</td>
<td>Dependent on any underlying medical condition and medication use</td>
</tr>
<tr>
<td>syphilis serology, fasting lipids</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>MSE</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>✔</td>
<td>Wkly for 6 wks then at 6 mths and 12 mthly. May need to be more regular</td>
</tr>
<tr>
<td>BP</td>
<td>✔</td>
<td>based on clinical presentation</td>
</tr>
<tr>
<td>Medication review</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Electrocardiogram</td>
<td>✔</td>
<td>Repeat at frequency determined by clinical condition on advice of MO</td>
</tr>
<tr>
<td>Self harm risk</td>
<td>✔</td>
<td>At each review</td>
</tr>
<tr>
<td>Medication recall</td>
<td>✔</td>
<td>As prescribed</td>
</tr>
<tr>
<td>ATODs service review</td>
<td>✔</td>
<td>As required</td>
</tr>
<tr>
<td>Mental Health Worker Review</td>
<td>✔</td>
<td>Wkly until stable</td>
</tr>
<tr>
<td>Mental Health team</td>
<td>✔</td>
<td>As required</td>
</tr>
<tr>
<td>MO/NP</td>
<td>✔</td>
<td>Wkly until stable and with medication review</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td></td>
<td>For moderate/severe anxiety disorders or immediately if self-harm is an issue</td>
</tr>
</tbody>
</table>
6. References


7. Resources


Section 2: Management of diagnosed conditions | Anxiety Disorders

esty.
ernet.
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esty/wns/pdf/lin/...
Asthma (adult and child over 12)

High risk groups
- Adults and children over 12 years of age with a diagnosis of asthma

Considerations for women of child-bearing age
- Asthma in pregnant women increases the risk of pre-eclampsia, preterm labour, low birth weight and babies small for gestational age
- Acute exacerbations should be treated aggressively to avoid fetal hypoxia

Urgent referral
- For any acute asthmatic episode see Acute asthma adult/child in the current edition of the PCCM and refer immediately to the MO/NP

Abbreviations
ICS Inhaled corticosteroids
OCS Oral glucocorticosteroids
SABA Short acting β₂ agonist (reliever puffers)
LABA Long acting β₂ agonist (preventer puffers)
MDI Metered dose inhaler
DPI Dry powder inhaler
LTRA Leukotriene receptor antagonist

1. What is asthma?
- Asthma is a chronic inflammatory disorder of the airways which can be triggered by a wide range of factors
- Asthma is defined by a variation in lung function (especially expiratory airflow) and episodic respiratory symptoms such as wheezing, shortness of breath, cough and tight chest as a result of inflammation
- These episodes are usually associated with airflow obstruction (excessive airway narrowing) that is often reversible either spontaneously or with treatment
- Airflow obstruction is due to swelling of the airway wall including oedema and mucus production
- Asthma is strongly associated with allergies such as eczema and allergic rhinitis
- After teenage years, asthma is more common in women than in men
- Asthma is more common among Indigenous Australians, particularly adults, than among other Australians

2. Diagnosis of asthma
- The first step to managing asthma is confirming the diagnosis as 25 - 35% of people with a diagnosis of asthma may not actually have asthma
- A prior diagnosis of asthma reported by a client should be corroborated by documentation of how the diagnosis was confirmed at the time, or by current evidence
- Wheezing, airflow limitation demonstrated on spirometry and other respiratory symptoms do not always mean a person has asthma\textsuperscript{2,4}

- Table 1. outlines findings that increase or decrease the likelihood of asthma

- Diagnosis is based on history, physical examination, consideration of other diagnoses and documented changes in airflow (spirometry) (see Resources 1 and 2)

### Table 1. Findings that increase or decrease the probability of asthma in adults and children over 12

<table>
<thead>
<tr>
<th>Asthma is more likely to explain the symptoms if any of these apply</th>
<th>Asthma is less likely to explain the symptoms if any of these apply</th>
</tr>
</thead>
</table>
| More than one of these symptoms  
- Wheeze  
- Breathlessness  
- Chest tightness  
- Cough |  
- Dizziness, light-headedness, peripheral tingling  
- Isolated cough with no other respiratory symptoms  
- Chronic sputum production  
- No abnormality detected on physical examination of chest when symptomatic (over several visits) |
| AND |  
- Any of these  
- Symptoms recurrent or seasonal  
- Symptoms worse at night or in the early morning  
- History of smoking  
- Symptoms obviously triggered by exercise, cold air, irritants, medicines (e.g. aspirin or beta blockers), allergies, viral infections, laughter  
- Family history of asthma or allergies (e.g. allergic rhinitis, atopic dermatitis)  
- Symptoms began in childhood  
- Widespread wheeze audible on chest auscultation  
- FEV\textsubscript{1} or PEF lower than predicted, without other explanation  
- Eosinophilia or raised blood IgE level, without other explanation  
- Symptoms rapidly relieved by a SABA bronchodilator |  
- Symptoms obviously triggered by exercise, cold air, irritants, medicines (e.g. aspirin or beta blockers), allergies, viral infections, laughter  
- Family history of asthma or allergies (e.g. allergic rhinitis, atopic dermatitis)  
- Symptoms began in childhood  
- Widespread wheeze audible on chest auscultation  
- FEV\textsubscript{1} or PEF lower than predicted, without other explanation  
- Eosinophilia or raised blood IgE level, without other explanation  
- Symptoms rapidly relieved by a SABA bronchodilator |

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- Differential diagnoses include
  - poor cardiopulmonary fitness
  - other respiratory conditions e.g. bronchiectasis, chronic obstructive pulmonary disease, inhaled foreign body, large airway stenosis, pleural effusion, pulmonary fibrosis, rhinitis/rhininosusitis, lung cancer
  - cardiovascular disease e.g. chronic heart failure
  - co-morbid conditions e.g. obesity, gastro-oesophageal reflux

- Figure 1. illustrates the steps to confirm an asthma diagnosis
Figure 1. Steps in the diagnosis of asthma in adults and children over 12

3. Management of asthma

3.1 Factors complicating management

In managing asthma the following co-morbidities and screening must be considered and treated where appropriate:

- Allergic rhinitis is reported in over 75% of people with asthma and is associated with worse asthma control.

- Gastro-oesophageal reflux disease (GORD) is reported by the majority of people with asthma which may contribute to bronchoconstriction by hyperresponsiveness, microaspiration and inflammation.

- Depression (see Depression, page 172), anxiety and panic disorders (see Anxiety disorders, page 62) are shown to be more common in people with asthma and is attributed to a client’s asthma symptom perception and medication adherence.
• Obesity (BMI ≥ 30 kg/m²) is associated with an increased prevalence of asthma via mechanical, inflammatory and genetic/developmental factors²⁴⁸ (see Overweight and obesity in adults, page 260 and Overweight and obesity in children, page 270)

• Obstructive sleep apnoea is higher among people with asthma and is associated with upper and lower airway inflammation²

3.2 Support client self management
• Provide culturally appropriate resources about asthma and support services details (see Resource 3)
• Identify and discuss asthma triggers (see Table 2)
• At each visit ensure the client and family members are aware
  – of symptoms that indicate that the asthma is worsening
  – of what to do when symptoms worsen
  – to seek medical intervention sooner rather than later
• At each visit ensure the client has developed and uses or follows an asthma action plan (asthma first aid) (see Resource 4)
• Clients who accept their chronic asthma symptoms as the norm, or do not recognise that they have symptoms, are known as poor perceivers⁹
• Poor perceivers live with under-treated asthma which puts them at risk of severe attacks and poor quality of life and as such require added information to show that symptoms and quality of life will improve with correct bronchodilator use and regular monitoring (see Resource 3)⁹
• See Smoking cessation, page 44 and Diet and nutrition, page 14
• Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional support
• Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 5. for examples). To make a diagnosis, rating scales should be supplemented by a clinical assessment by a suitably qualified clinician
• Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition.
### Table 2. Summary of asthma triggers

<table>
<thead>
<tr>
<th>Avoidable triggers</th>
<th>Unavoidable triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Always avoid</strong></td>
<td><strong>Do not avoid</strong></td>
</tr>
<tr>
<td>• Cigarette smoke</td>
<td>• Exercise</td>
</tr>
<tr>
<td></td>
<td>• Laughter</td>
</tr>
<tr>
<td><strong>Avoid or reduce if possible</strong></td>
<td><strong>Manage</strong></td>
</tr>
<tr>
<td><strong>Allergens</strong></td>
<td>Respiratory tract infections</td>
</tr>
<tr>
<td>• Animal allergens e.g. pets, animals</td>
<td>Certain medicines</td>
</tr>
<tr>
<td>• Cockroaches</td>
<td>• Aspirin (when given for purpose of desensitisation)</td>
</tr>
<tr>
<td>• House dust mite</td>
<td>• Anticholinesterases and cholinergic agents</td>
</tr>
<tr>
<td>• Moulds</td>
<td>• Beta blockers</td>
</tr>
<tr>
<td>• Workplace allergens</td>
<td>Co-morbid medical conditions</td>
</tr>
<tr>
<td>• Pollens</td>
<td>• Allergic rhinitis/rhinosinusitis</td>
</tr>
<tr>
<td></td>
<td>• Gastro-oesophageal reflux disease</td>
</tr>
<tr>
<td>Airborne/environmental irritants</td>
<td>• Nasal polyposis</td>
</tr>
<tr>
<td>• Cold/dry air</td>
<td>• Obesity</td>
</tr>
<tr>
<td>• Fuel combustion e.g. gas heaters</td>
<td>• Upper airway dysfunction</td>
</tr>
<tr>
<td>• Home renovation materials</td>
<td>Physiological and psychological changes</td>
</tr>
<tr>
<td>• Household aerosols</td>
<td>• Extreme emotions</td>
</tr>
<tr>
<td>• Moulds (airborne)</td>
<td>• Hormonal changes e.g. menstrual cycle</td>
</tr>
<tr>
<td>• Workplace irritants</td>
<td>• Pregnancy</td>
</tr>
<tr>
<td>• Outdoor industrial and traffic pollution</td>
<td>• Sexual activity</td>
</tr>
<tr>
<td>• Perfumes/scents/incense</td>
<td>Dietary triggers</td>
</tr>
<tr>
<td>• Smoke e.g. any bushfires and camp fires</td>
<td>• Food chemicals/additives (if person is intolerant)</td>
</tr>
<tr>
<td></td>
<td>• Thermal effects e.g. cold drinks</td>
</tr>
</tbody>
</table>

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### 3.4 Smoking cessation
- Regularly encourage the client to quit smoking
- Remind the client of the dangers of passive smoking, particularly in homes and cars
- Schedule planned checkups every 6 months to assess recent asthma symptom control for people who smoke, due to increased risk of flare-ups and increased rate of decline in lung function over time
- Offer the client Quitline details (see Resource 6)
3.5 Nutrition

- While people with demonstrated food allergies should avoid food triggers, routine dietary restrictions are not beneficial in people with asthma\(^3\)
- Weight reduction in overweight or obese people with asthma may reduce asthma symptoms\(^1,2\)
- There is no medical foundation for the widely held view that dairy products increase mucous secretions\(^1,2\)
- The following has been observed to reduce the risk of asthma flare-ups\(^2\)
  - a diet high in fresh fruits and vegetables
  - regular consumption of oily fish
- The following has been observed to increase the risk of developing asthma\(^2\)
  - consumption of fast foods\(^2\)
  - a ‘Westernised’ diet compared with an ‘Asian’ diet\(^2\)
  - high soft drink consumption
  - reduction in fresh fruit intake\(^2\)

3.6 Good sleep patterns

- Medications, difficulty with breathing, anxiety and depression may prevent people with asthma from sleeping well at night\(^2,4\)
- Measure a client’s daytime sleepiness by doing the Epworth Sleepiness Scale (see Resource 7)
- If they score highly refer to a sleep specialist or MO/NP to exclude obstructive sleep apnoea

3.7 Special considerations

- The clinician and client should be alert to and address the following risk factors for asthma flare-ups
  - exposure to cigarette smoke
  - socioeconomic disadvantage
  - access to health care
  - use of alcohol or illegal substances
  - social isolation
  - depression and anxiety
  - inadequate treatment
  - side effects or euphoria of OCS use
  - 2 or more hospitalisations in the last 12 months
  - 3 or more hospital presentations due to asthma in the last 3 months
  - use of more than 2 canisters of SABA per month
  - cardiovascular disease
3.8 Asthma control

- Ascertain the client’s recent level of asthma symptom control using Table 3.
- Recent asthma symptom control is based on symptoms over the previous 4 weeks.
- When counting the times a client uses their puffer (SABA) do not include times taken before exercise.

### Table 3. Definition of levels of recent asthma symptom control in adults and children over 12

<table>
<thead>
<tr>
<th>Good control</th>
<th>All of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Daytime symptoms ≤ 2 days per week</td>
</tr>
<tr>
<td></td>
<td>• Need for reliever ≤ 2 days per week †</td>
</tr>
<tr>
<td></td>
<td>• No limitation of activities</td>
</tr>
<tr>
<td></td>
<td>• No symptoms during night or on waking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partial control</th>
<th>One or two of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Daytime symptoms &gt; 2 days per week</td>
</tr>
<tr>
<td></td>
<td>• Need for reliever &gt; 2 days per week †</td>
</tr>
<tr>
<td></td>
<td>• Any limitation of activities</td>
</tr>
<tr>
<td></td>
<td>• Any symptoms during night or on waking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Poor control</th>
<th>Three or more of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Daytime symptoms &gt; 2 days per week</td>
</tr>
<tr>
<td></td>
<td>• Need for reliever &gt; 2 days per week †</td>
</tr>
<tr>
<td></td>
<td>• Any limitation of activities</td>
</tr>
<tr>
<td></td>
<td>• Any symptoms during night or on waking</td>
</tr>
</tbody>
</table>

### Sample questions for reviewing asthma control (adults and children over 12)

- How many weeks does the person’s reliever puffer last?
- How often does the person wheeze, become short of breath or cough?
- Does the person wake during the night due to wheezing, shortness of breath or coughing? How many times per month?
- How often does the person need to take reliever puffer? How many puffs?
- Has the person needed to use oral corticosteroids? How often and how much?
- Does the person use a preventer puffer? What dose? How many puffs per day?
- How often does the person need a new prescription for preventer medicine?
- Has the person missed time from school, work or sport due to asthma?
- How often does the person get colds?
- Is the person using other medicines for respiratory symptoms e.g. oral or intranasal antihistamines or intranasal corticosteroids?
- How many times has the person visited the GP/hospital emergency room for asthma symptoms? Specify time period, e.g. In the last year/month/2 weeks

† Not including SABA taken prophylactically before exercise (Record this separately and take into account when assessing management)

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4. Medications

4.1 Correct inhaler use
- Check inhaler instructions in the product packaging for specific instructions
- Monitor medication adherence and correct inhaler technique
- Video and printable instructions for correct inhaler use are available at the National Asthma Council Australia website (see Resource 8)

4.2 Medication precautions in asthma
- Whenever clients obtain new medicines, prescriptions or over the counter drugs, they should check with the pharmacist or MO/NP about its safety with asthma
- Sedatives are contraindicated during an acute asthma attack
- Complementary preparations like echinacea and royal jelly can precipitate life-threatening anaphylaxis in predisposed individuals with asthma
- Bronchoconstriction may occur when treating co-morbidities (such as hypertension and coronary heart disease) with beta-blockers
- NSAIDs and aspirin can cause exacerbation of asthma

4.3 Medication initiation and management
- Use Figure 2. to assist with the steps to determine practical management and optimal medications for the client with asthma

4.4 Medication review
- Clients should be reviewed
  - 2 - 4 weeks after an episode of exacerbation of their asthma OR
  - 1 - 3 months after an initial visit with preference given to 3 months to ascertain the effectiveness of the medication to control the asthma OR
  - every 3 months
- If client’s asthma is poor controlled after 1 - 3 months step up treatment
- If good control is achieved for 3 months step down treatment to the least medication required to maintain control
- Ongoing monitoring is necessary once good control is achieved so that adjustments can be made in response to worsening symptoms or episodes of exacerbations
Assign the client's level of asthma control (Table 3) to a treatment step (Figure 3) and treat accordingly (Table 4).

For a newly diagnosed client not on medications consider:
- Starting at Step 2. (Figure 3)
- If very symptomatic then Step 3. (Figure 3)

Review (Table 5)
- In 2 - 4 weeks if after an exacerbation OR
- In 1 - 3 months if after an initial visit OR
- Every 3 months

If good control is achieved then step down using Figure 3.

Control achieved
Continue to monitor asthma and adjust medication until good control is achieved at the lowest medication dose and treatment

Review every 3 - 6 months once good control is maintained for 3 months

If asthma is partially or poorly controlled then step up using Figure 3, until control is achieved

Control NOT achieved
REFER TO SPECIALIST

Figure 2. Intervention flowchart to achieve asthma control
### Section 2: Management of diagnosed conditions

#### Asthma (adult and child over 12)

**Referral**

- Few clients
  - ICS/LABA (medium to high dose)
  - Consider referral

**Some clients**
- ICS/LABA (low dose)
  - OR
- *ICS (low dose) + LTRA

**Most clients**
- ICS (low dose)
  - OR
- *LTRA

**All clients** use a reliever SABA as needed

---

*With regular review of recent control and triggers (see Tables 2 and 3)*

*LTRA can be used in children aged 12 - 14 years or in adults with exercise-induced asthma*

---

**Figure 3. Stepped approach to adjusting asthma medication in adults and children over 12**

1, 4, 10
Table 4. Medications for adults and children over 12 with asthma

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SABA</strong> (reliever)</td>
<td>• Salbutamol (MDI) &lt;br&gt; • Terbutaline (turbuhaler)</td>
<td>• 100 - 200 micrograms (1 puff) PRN &lt;br&gt; • 500 micrograms (1 puff) PRN</td>
</tr>
<tr>
<td><strong>LABA</strong> Always used with ICS never used as monotherapy</td>
<td>• Eformoterol (turbuhaler)</td>
<td>• 12 micrograms by inhalation b.d.</td>
</tr>
<tr>
<td></td>
<td>• Salmeterol (accuhaler)</td>
<td>• 50 micrograms by inhalation b.d.</td>
</tr>
<tr>
<td><strong>ICS</strong> Specific doses are tailored to the client’s level of asthma control</td>
<td>• Beclomethasone dipropionate (MDI)</td>
<td>• Low 100 - 200 micrograms daily &lt;br&gt; • Medium 250 - 400 micrograms daily &lt;br&gt; • High &gt; 400 micrograms daily</td>
</tr>
<tr>
<td></td>
<td>• Ciclesonide (MDI)</td>
<td>• Low 80 - 160 micrograms daily &lt;br&gt; • Medium 240 - 320 micrograms daily &lt;br&gt; • High &gt; 320 micrograms daily</td>
</tr>
<tr>
<td></td>
<td>• Fluticasone propionate (MDI or accuhaler)</td>
<td>• Low 100 - 200 micrograms daily &lt;br&gt; • Medium 250 - 500 micrograms daily &lt;br&gt; • High &gt; 500 micrograms daily</td>
</tr>
<tr>
<td><strong>Combined ICS/LABA</strong></td>
<td>• Budesonide and eformoterol (Turbuhaler)</td>
<td>• Low 100/6 micrograms 1 - 2 puffs b.d. &lt;br&gt; • Medium 200/6 micrograms 1 - 2 puffs b.d. &lt;br&gt; • High 400/12 micrograms 1 - 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>• Budesonide and eformoterol (Rapihaler)</td>
<td>• Low 50/3 micrograms 2 - 4 puffs b.d. &lt;br&gt; • Low 100/6 micrograms 2 puffs b.d. &lt;br&gt; • Medium 100/3 micrograms 2 - 4 puffs b.d. &lt;br&gt; • Medium 200/6 micrograms 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>• Fluticasone propionate and eformoterol (MDI)</td>
<td>• Low 50/5 micrograms 2 puffs b.d. &lt;br&gt; • Medium 125/5 micrograms 2 puffs b.d. &lt;br&gt; • High 250/10 micrograms 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>• Fluticasone propionate and salmeterol (MDI)</td>
<td>• Low 50/25 micrograms 2 puffs b.d. &lt;br&gt; • Medium 125/25 micrograms 2 puffs b.d. &lt;br&gt; • High 250/25 micrograms 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>• Fluticasone propionate and salmeterol (Accuhaler)</td>
<td>• Low 100/50 micrograms 1 puff b.d. &lt;br&gt; • Medium 250/50 micrograms 1 puff b.d. &lt;br&gt; • High 500/50 micrograms 1 puff b.d.</td>
</tr>
<tr>
<td><strong>LTRA</strong> (for 12 - 14 years)</td>
<td>• Montelukast (oral)</td>
<td>• 5 mg for 12 - 14 years &lt;br&gt; • An alternative to ICS (low dose)</td>
</tr>
</tbody>
</table>
Table 5. Reviewing and adjusting asthma preventer treatment for adults and children over 12\textsuperscript{1,3,4}

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Review</th>
<th>Treatment response</th>
</tr>
</thead>
<tbody>
<tr>
<td>SABA</td>
<td>4 weeks</td>
<td>• If asthma management factors optimal then \textbf{Step up} \begin{itemize} \item Add ICS (low dose) \item Review in 4 weeks \end{itemize}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If asthma management factors optimal then \textbf{Step up} \begin{itemize} \item Add ICS (low dose) \item Review in 4 weeks \end{itemize}</td>
</tr>
<tr>
<td>ICS (low dose)</td>
<td>4 weeks</td>
<td>\begin{itemize} \item If asthma management factors optimal then continue treatment and review in 3 months \item After 3 months \textbf{Step down} \end{itemize}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\begin{itemize} \item If asthma management factors optimal then continue treatment and review in 3 months \item After 3 months \textbf{Step down} \end{itemize}</td>
</tr>
<tr>
<td>ICS/LABA (low dose)</td>
<td>4 weeks</td>
<td>\begin{itemize} \item If asthma management factors optimal then increase ICS/LABA (medium to high dose) \item Review in 4 weeks \end{itemize}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\begin{itemize} \item If asthma management factors optimal then increase ICS/LABA (medium to high dose) \item Review in 4 weeks \end{itemize}</td>
</tr>
<tr>
<td>ICS/LABA (medium to high dose)</td>
<td>4 weeks</td>
<td>\begin{itemize} \item If asthma management factors optimal then refer for specialist review \end{itemize}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>\begin{itemize} \item If asthma management factors optimal then refer for specialist review \end{itemize}</td>
</tr>
</tbody>
</table>
5. Care plan

### Table 6. Care plan for adults and children over 12 with asthma

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Good control</th>
<th>Partial control</th>
<th>Poor control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>Annually until client stops growing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Inhaler technique</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Spirometry</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Self manage education</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Asthma action plan and asthma first aid</td>
<td>✓</td>
<td>At each visit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom review</td>
<td>✓</td>
<td>4 wkly when changing drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td>4 wkly when changing drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>RN/IHW R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Specialist MO</td>
<td>✓</td>
<td>Any uncontrolled or difficult to treat asthma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td></td>
<td>Annually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
<td>Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-morbidity management</td>
<td></td>
<td>Each time client is assessed for asthma control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. R

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

7. R

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9.
6. References


7. Resources

Asthma (child 12 and under)

High risk groups
- Children 12 and under with a diagnosis of asthma

Urgent referral
- For any acute asthmatic episode see Acute asthma adult/child in the current edition of the PCCM and refer immediately to the MO/NP

Abbreviations
- ICS  Inhaled corticosteroids
- OCS  Oral glucocorticosteroids
- SABA Short acting β₂ agonist (reliever puffers)
- LABA Long acting β₂ agonist (preventer puffers)
- MDI  Metered dose inhaler
- DPI  Dry powder inhaler
- LTRA Leukotriene receptor antagonist

1. What is asthma?
- Asthma is a chronic inflammatory disorder of the airways which can be triggered by a wide range of factors
- Asthma is defined by a variation in lung function (especially expiratory airflow) and episodic respiratory symptoms such as wheezing, shortness of breath, cough and tight chest as a result of inflammation
- These episodes are usually associated with airflow obstruction (excessive airway narrowing) that is often reversible either spontaneously or with treatment
- Airflow obstruction is due to swelling of the airway wall including oedema and mucus production
- Asthma is strongly associated with allergies such as eczema and allergic rhinitis

2. Diagnosis of asthma
- The first step to managing asthma is confirming the diagnosis
- A prior diagnosis of asthma reported by a client or carer should be corroborated by documentation of how the diagnosis was confirmed at the time, or by current evidence
- There is no single reliable test for diagnosing asthma
- In children asthma diagnosis is based primarily on clinical symptoms and frequency of exacerbations
- Diagnosing children with asthma is difficult because in this age group
  - spirometry can be difficult
  - respiratory symptoms such as cough and wheeze are common
  - the younger the child the greater the likelihood that an alternative diagnosis explains
a recurrent wheeze\textsuperscript{3} – those who respond to inhalers often do not have asthma when older

- Table 1. outlines findings that increase or decrease the likelihood of asthma

Table 1. Findings that increase or decrease the probability of asthma in children 12 and under

<table>
<thead>
<tr>
<th>Asthma more likely</th>
<th>Asthma less likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than one of these symptoms</td>
<td></td>
</tr>
<tr>
<td>• Wheeze</td>
<td></td>
</tr>
<tr>
<td>• Difficulty breathing</td>
<td></td>
</tr>
<tr>
<td>• Feeling of tightness in the chest</td>
<td></td>
</tr>
<tr>
<td>• Cough</td>
<td></td>
</tr>
<tr>
<td>AND</td>
<td></td>
</tr>
<tr>
<td>Any of</td>
<td></td>
</tr>
<tr>
<td>• Symptoms recur frequently</td>
<td></td>
</tr>
<tr>
<td>• Symptoms worse at night and in the early morning</td>
<td></td>
</tr>
<tr>
<td>• Symptoms triggered by exercise, exposure to pets, cold air, damp air, emotions, laughing</td>
<td></td>
</tr>
<tr>
<td>• Symptoms occur when child doesn’t have a cold</td>
<td></td>
</tr>
<tr>
<td>• History of allergies e.g. allergic rhinitis, atopic dermatitis</td>
<td></td>
</tr>
<tr>
<td>• Family history of allergies</td>
<td></td>
</tr>
<tr>
<td>• Family history of asthma</td>
<td></td>
</tr>
<tr>
<td>• Widespread wheeze heard on auscultation</td>
<td></td>
</tr>
<tr>
<td>• Symptoms respond to treatment trial of reliever, with or without a preventer</td>
<td></td>
</tr>
<tr>
<td>• Lung function measured by spirometry increases in response to rapid-acting bronchodilator</td>
<td></td>
</tr>
<tr>
<td>• Lung function measured by spirometry increases in response to a treatment trial with inhaled corticosteroid (where indicated)</td>
<td></td>
</tr>
</tbody>
</table>

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- Figure 1. illustrates the steps to confirm an asthma diagnosis in children 12 and under

- A marked improvement in a child’s condition during a trial of short-acting bronchodilators (SABAs) and inhaled corticosteroids (ICSs) can help confirm an asthma diagnosis\textsuperscript{1,3,4}

- Alternative causes of a recurrent wheeze in children include: viral lower respiratory tract infections (in infants), viral upper respiratory tract infections (in older children), aspiration of a foreign body, rhino-sinusitis, tuberculosis, cystic fibrosis, bronchopulmonary dysplasia, congenital malformation of the airways, immune deficiency or congenital heart disease\textsuperscript{4,3}
Episodic respiratory symptoms that suggest asthma

Does history and physical examination support asthma diagnosis? (See Table 1)

YES
Is client able to perform spirometry?

NO
Treatment trial Clear response to treatment?

YES Spirometry FEV₁ before and 10-15 mins after bronchodilator Reversible airflow limitation? (FEV₁ increase ≥ 12% from baseline)

NO Refer for further investigations Consider bronchial provocation and cardiopulmonary exercise test Supports asthma diagnosis?

YES Asthma Start asthma treatment and review response

NO Refer for investigations for specific alternative diagnosis Alternative diagnosis confirmed?

YES Alternative diagnosis

NO Referral

Wheezing disorder Asthma not confirmed Monitor signs and symptoms and refer

Asthma (Child 12 and under)
3. Management of asthma

3.1 Factors complicating management

- In managing asthma the following co-morbidities and screening must be considered:
  - Allergic rhinitis is common in children with asthma and is associated with poor asthma control.\(^1\)
  - Obesity is associated with an increased prevalence of asthma via mechanical, inflammatory and genetic/developmental factors in children.\(^1,\,7\) (see Overweight and obesity in children, page 270)

3.2 Support client self management

- Management of asthma in children involves building a therapeutic partnership with parents or caregivers to support children to live productive and active lives by
  - helping the child avoid risk factors
  - ensuring the child understands and takes medication correctly
  - monitoring asthma level of control
  - supporting the child to recognise when the asthma is getting worse and when to seek medical help
  - See Lifestyle modification section with particular reference to avoiding cigarette smoke (see Smoking cessation, page 44) and improving nutrition (see Diet and nutrition, page 14)
  - Provide culturally appropriate resources about asthma and support services details (see Resource 1)
  - Identify and discuss asthma triggers (see Table 2)
  - At each visit ensure the client and family members are aware
    - of symptoms that indicate that the asthma is worsening
    - of what to do when symptoms worsen
    - to seek medical intervention sooner rather than later
  - At each visit ensure the client has developed and uses or follows an asthma action plan (see Resource 2)
  - Clients who accept their chronic asthma symptoms as the norm, or do not recognise that they have symptoms are known as poor perceivers.\(^8\)
  - Poor perceivers live with under-treated asthma which puts them at risk of severe attacks and poor quality of life and as such require added information to show that symptoms and quality of life will improve with correct bronchodilator use and regular monitoring (see Resource 1).\(^8\)
  - Encourage the child, family or carers to identify barriers to adequate lifestyle modification and clinical adherence and to set goals to overcome those barriers based on their capacity and understanding
### Table 2. Summary of asthma triggers

<table>
<thead>
<tr>
<th>Avoidable triggers</th>
<th>Unavoidable triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always avoid</td>
<td>Do not avoid</td>
</tr>
<tr>
<td>• Cigarette smoke</td>
<td>• Exercise</td>
</tr>
<tr>
<td>• Laughter</td>
<td></td>
</tr>
<tr>
<td>Avoid or reduce if possible</td>
<td>Manage</td>
</tr>
<tr>
<td>Allergens</td>
<td>Respiratory tract infections</td>
</tr>
<tr>
<td>• Animal allergens e.g. pets, animals</td>
<td>Certain medicines</td>
</tr>
<tr>
<td>• Cockroaches</td>
<td>• Aspirin (when given for purpose of desensitisation)</td>
</tr>
<tr>
<td>• House dust mite</td>
<td>• Anticholinesterases and cholinergic agents</td>
</tr>
<tr>
<td>• Moulds</td>
<td>• Beta blockers</td>
</tr>
<tr>
<td>• Allergens at school/daycare</td>
<td>Co-morbid medical conditions</td>
</tr>
<tr>
<td>• Pollens</td>
<td>• Allergic rhinitis/rhinosinusitis</td>
</tr>
<tr>
<td>Airborne/environmental irritants</td>
<td>• Gastro-oesophageal reflux disease</td>
</tr>
<tr>
<td>• Cold/dry air</td>
<td>• Nasal polyposis</td>
</tr>
<tr>
<td>• Fuel combustion e.g. gas heaters</td>
<td>• Obesity</td>
</tr>
<tr>
<td>• Home renovation materials</td>
<td>• Upper airway dysfunction</td>
</tr>
<tr>
<td>• Household aerosols</td>
<td></td>
</tr>
<tr>
<td>• Moulds (airborne)</td>
<td></td>
</tr>
<tr>
<td>• Irritants at school/daycare</td>
<td></td>
</tr>
<tr>
<td>• Outdoor industrial and traffic pollution</td>
<td></td>
</tr>
<tr>
<td>• Perfumes/scents/incense</td>
<td></td>
</tr>
<tr>
<td>• Smoke e.g. any bushfires and camp fires</td>
<td></td>
</tr>
<tr>
<td>Dietary triggers</td>
<td>Certain medicines</td>
</tr>
<tr>
<td>• Food chemicals/additives (if person is intolerant)</td>
<td>• Aspirin (when given for purpose of desensitisation)</td>
</tr>
<tr>
<td>• Thermal effects e.g. cold drinks</td>
<td>• Anticholinesterases and cholinergic agents</td>
</tr>
<tr>
<td></td>
<td>• Beta blockers</td>
</tr>
</tbody>
</table>

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### 3.3 Social emotional support

- Carers and parents of children with chronic conditions often experience high levels of stress and anxiety and should be:
  - assessed for anxiety and depression
  - referred to a social worker or psychologist to provide tools and skills for self care
  - offered behavioural or attachment based parenting support as children with chronic conditions often exhibit higher emotional and behavioural disturbances

- Carer or parent depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 3 for examples). Rating scales should be
supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis

- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Cigarette smoke avoidance

- Children should not be subjected to cigarette smoke as this has been identified as a primary trigger for developing and exacerbating asthma symptoms1,3,4
- Repeatedly support the parent or carer to quit smoking, whether or not the person shows interest in quitting (see Smoking cessation, page 44)
- Remind the parent or carer of the dangers of passive smoking, particularly in homes and cars
- When assessing a child’s recent asthma symptom control do so in conjunction with a parent or carer’s smoking behaviour and frequency1,4
- Offer the parent or carer Quitline details (see Resource 4)

3.5 Nutrition

- While people with demonstrated food allergies should avoid food triggers, routine dietary restrictions are not beneficial in people with asthma1,2
- Weight reduction in overweight or obese people with asthma may reduce asthma symptoms1,2 (see Diet and nutrition, page 14)
- There is no medical evidence to suggest dairy products increase mucous secretions1,2
- The following has been observed to reduce the risk of asthma flare-ups1
  - a diet high in fresh fruits and vegetables
  - regular consumption of oily fish
- The following has been observed to increase the risk of developing asthma1
  - consumption of fast foods1
  - a ‘Westernised’ diet compared with an ‘Asian’ diet1
  - high soft drink consumption
  - reduction in fresh fruit intake1

3.6 Special considerations

- Document and address risk factors for flare-ups, life-threatening asthma, decline in lung function and treatment related to adverse events including
  - exposure to cigarette smoke
  - socioeconomic disadvantage and poor access to health care
  - psychosocial problems such as social isolation
  - inadequate treatment
  - side effects or euphoria of OCS use
  - 2 or 3 hospitalisations in the last 12 months
  - 3 or more hospital presentations due to asthma in the last 3 months
  - use of more than one SABA inhaler per month
– ease of access to health care as part of management plan for clients living remotely
– cardiovascular disease

3.7 Client asthma control

• Ascertain the client’s recent level of asthma symptom control using Table 3.
• Recent asthma symptom control is based on symptoms over the previous 4 weeks
• When counting the times a client uses their puffer (SABA) do not include times taken before exercise

Table 3. Definition of levels of recent asthma symptom control in children 12 and under (regardless of current treatment regimen)\(^1, 3\)

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good control</td>
<td>All of</td>
</tr>
<tr>
<td></td>
<td>• Daytime symptoms ≤ 2 days per week (lasting only a few minutes and rapidly relieved by SABA)</td>
</tr>
<tr>
<td></td>
<td>• Need for reliever ≤ 2 days per week†</td>
</tr>
<tr>
<td></td>
<td>• No limitation of activities</td>
</tr>
<tr>
<td></td>
<td>• No symptoms during night or on waking</td>
</tr>
<tr>
<td>Partial control</td>
<td>Any of</td>
</tr>
<tr>
<td></td>
<td>• Daytime symptoms &gt; 2 days per week (lasting only a few minutes and rapidly relieved by SABA)</td>
</tr>
<tr>
<td></td>
<td>• Need for reliever &gt; 2 days per week†</td>
</tr>
<tr>
<td></td>
<td>• Any limitation of activities</td>
</tr>
<tr>
<td></td>
<td>• Any symptoms during night or on waking</td>
</tr>
<tr>
<td>Poor control</td>
<td>Either of</td>
</tr>
<tr>
<td></td>
<td>• Daytime symptoms &gt; 2 days per week (lasting from minutes to hours or recurring, and partially or fully relieved by SABA)</td>
</tr>
<tr>
<td></td>
<td>• ≥ 3 features of partial control within the same week</td>
</tr>
</tbody>
</table>

Sample questions for reviewing asthma control in children 12 and under

• How many weeks does the child’s reliever puffer last?
• How often does the child wheeze, become short of breath or cough?
• Does the child wake during the night due to wheezing, shortness of breath or coughing? How many times per month?
• How often does the child need to take reliever puffer? How many puffs?
• Has the child needed to use oral corticosteroids? How often and how much?
• Does the child use a preventer puffer? What dose? How many puffs per day?
• How often does the child need a new script for preventer medicine?
• Has the child missed time from childcare, school and/or sport due to asthma?
• How often does the child get colds?
• Is the child using other medicines for respiratory symptoms e.g. oral or intranasal antihistamines or intranasal corticosteroids?
• How many times has the child visited the GP/hospital emergency room for asthma symptoms?

Specify time period, e.g. In the last year/month/2 weeks

† Not including SABA taken prophylactically before exercise (record this separately and take into account when assessing management)

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4. Medications

- The medications should be reviewed by the MO or pharmacist according to above recommendations, client’s response and current condition

4.1 Correct inhaler use

- Inhaler technique in this age group may be poor and should be taught, illustrated and monitored regularly

- For all inhaled medications for children
  - under 4 years use a MDI plus a spacer with face mask
  - over 4 years use a MDI plus spacer with a spacer mouthpiece

- Check inhaler instructions in the product packaging for specific instructions

- Video and printable instructions for correct inhaler use are available at the National Asthma Council Australia website (see Resource 5)

4.2 Medication precautions in asthma

- Whenever clients obtain new medicines, prescriptions or over the counter drugs, they should check with the pharmacist or MO about its safety with asthma

- Sedatives are contraindicated during an acute asthma attack

- Complementary preparations like echinacea and royal jelly can precipitate life threatening anaphylaxis in predisposed individuals with asthma

4.3 Medication management of asthma in children 12 and under

- Use Figure 2. to assist with the process to determine optimal medication use for the child with asthma

4.4 Medication review

- Children should be reviewed
  - 2 - 4 weeks after an episode of exacerbation of their asthma OR
  - 1 - 3 months after an initial visit with preference given to 3 months to ascertain the medication’s effectiveness to control the asthma OR
  - every 3 months

- If client’s asthma is poorly controlled within 1 - 3 months step up treatment

- If good control is achieved for 3 months then step down treatment to the least medication required to maintain control

- Ongoing monitoring is necessary every 3 - 6 months once good control is achieved so that adjustments can be made in response to worsening symptoms or episodes of exacerbations

- Children should be reviewed 3 - 6 weeks after asthma therapy has been discontinued to assess for persistent symptoms

- Overuse of SABA requires review as this is a sign of poor control
Assign the client’s level of asthma control (Table 3) to a treatment step (Figure 3) and treat accordingly (Table 4).

**Address asthma management factors**

**Co-morbidities**
- Allergic rhinitis
- Obesity

**Lifestyle modification**
- Exposure to smoke
- Nutrition

**Triggers**
- Address triggers found in Table 2.

**Review inhaler technique**

---

**Review** (Table 5)
- in 2 - 4 weeks if after an exacerbation OR
- in 1 - 3 months after an initial visit (preferably 3 months to establish medication effectiveness in reaching control) OR
- every 3 months

---

If **good control** is achieved then **step down using Figure 3**.

**Control achieved**
Continue to monitor asthma and adjust medication until **good control** is achieved at the lowest medication dose and treatment.

Review every 3 - 6 months once **good control** is maintained for 3 months.

---

If asthma is **partially or poorly controlled** then **step up using Figure 3**, until control is achieved.

**Control NOT achieved**
Refer to specialist.

---

Consider addressing asthma management factors

**Figure 2. Intervention flowchart to achieve asthma control**
Section 2: Management of diagnosed conditions

**Asthma (Child 12 and under)**

**Some children**
- *A regular preventer ICS (low dose)
  - OR
  - LTRA
  - OR
  - A cromone

**Few children**
- *A regular preventer ICS (high dose)
  - OR
  - ICS (low dose) plus LTRA
  - OR
  - ICS/LABA (low dose)
  - OR
  - Consider a referral

All clients use a reliever SABA as needed

- Step 1
- Step 2
- Step 3
- Step 4

↔ Step up or down with worsening or improving condition ↔

* Preferred treatment option

*With regular review of recent control and risks (see Table 2. and Table 3)

**Figure 3. Stepped approach to adjusting asthma medication in children 12 and under**

1, 3, 4
Table 4. Medications for children 12 and under with asthma

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug and dose</th>
<th>Tips</th>
</tr>
</thead>
</table>
| SABA (reliever) | • Salbutamol (MDI) 100 - 200 micrograms (1 - 2 puffs) PRN  
• Terbutaline (DPI) 500 micrograms (1 puff) PRN | • Terbutaline requires adequate inspiratory flow to work  
• Not suitable for under 8 years old or during acute asthma |
| LRTA (2 - 12 years only) | • Montelukast (oral)  
• 4 micrograms once daily for 2 - 5 years of age  
• 5 micrograms for 6 - 12 years | • An alternative to ICS (low dose) |
| ICS (preventer) Specific doses are tailored to the client’s level of asthma control | • Beclomethasone dipropionate (MDI)  
• 50 micrograms b.d. up to 400 micrograms daily | • Can only be used with some small volume spacers without perfect seal  
• Only for use in children over 5 years |
|            | • Budesonide (DPI)  
• 100 - 200 micrograms b.d. up to 800 micrograms daily | • Requires an adequate inspiratory flow to work  
• Not suitable for children under 8 years |
|            | • Fluticasone propionate  
• 50 - 100 micrograms b.d. up to 500 micrograms daily |                                                     |
|            | • Ciclesonide (MDI)  
• Low 80 - 160 micrograms once daily | • Can only be used with some small volume spacers without perfect seal  
• Only for use in children over 6 years |

Table 5. Reviewing and adjusting asthma preventer treatment for children 12 and under \(^{1,3,4}\)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Review</th>
<th>Treatment response</th>
</tr>
</thead>
</table>
| SABA      | 4 weeks | • Continue SABA use  
• Review in 3 - 6 months | • If asthma management factors optimal then  
**Step up**  
• Add ICS (low dose)  
• Review in 2 - 4 weeks |
| ICS (low dose) | 4 weeks | • If asthma management factors optimal then continue treatment and review in 3 months  
• After 3 months **Step down** | • If asthma management factors optimal then  
**Step up**  
• Increase ICS (high dose) or  
• Add leukotriene to ICS (low dose)  
• Review in 2 - 4 weeks |
| ICS (high dose) or ICS (low dose) plus LTRA | 4 weeks | • If asthma management factors optimal then continue treatment and review in 3 months  
• After 3 months **Step down** | • If asthma management factors and inhaler technique optimal then  
Refer for specialist review |
5. Care plan

Table 6. Care plan for children 12 and under with asthma

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Good control</th>
<th>Partial control</th>
<th>Poor control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhaler technique</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Spirometry</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Self management education</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Asthma action plan and asthma first aid</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom review</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>RN/IHW R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Specialist MO</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-morbidity management</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Any uncontrolled or difficult to treat asthma
- Any child under 2 years of age requiring a SABA

Influenza vaccine: Recommended - see the current edition of the *Australian Immunisation Handbook* for schedule.

Pneumococcal vaccine: Each time client is assessed for asthma control.
6. References

7. Resources
Section 2: Management of diagnosed conditions

Asthma (child 12 and under)

Guidelines

J. Hart

www.asthmaone.org

www.guiderights.com/acts/ideas/aH
Chronic heart failure

High risk groups
- Clients with a diagnosis of chronic heart failure (CHF)
- Those with a cardiac history including hypertension, valvular or coronary heart disease, left ventricular hypertrophy and cardiomyopathy
- Those with diabetes
- People who smoke cigarettes and/or drink alcohol above recommended limits
- People who lead sedentary lifestyles or are overweight
- Those with shortness of breath, fatigue or oedema

Considerations for women of child-bearing age
- CHF greatly increases the risk of maternal and neonatal morbidity and mortality
- Fertility planning
- CHF may worsen as medication is altered and fluid volume changes with pregnancy
- Many CHF medications are contraindicated in pregnancy

Urgent referral
- MO/NP, cardiologist, or refer to the current edition of the Primary Clinical Care Manual for any
  - increasing dyspnoea (breathlessness) at rest and/or sudden onset dyspnoea
  - weight gain or loss of 2 kg or more over 48 hours

Special considerations
- In managing CHF the following co-morbidities must be considered
  - Diabetes type 2, page 196
  - Hypertension, page 228
  - Coronary heart disease, page 142

1. What is chronic heart failure (CHF)?
- CHF is a complex clinical syndrome caused by the heart’s inability to provide adequate circulation
- Characterised by a structural abnormality or cardiac dysfunction that impairs the ability of the left ventricle (LV) to fill with or eject blood, particularly during physical activity
- This results in congestive symptoms such as breathlessness with or without physical activity (exertional dyspnoea), fatigue and peripheral oedema (see Table 1)
- The most well understood form of CHF is heart failure with reduced ejection fraction (HFREF) which is a weakened ability of the left ventricle to contract and eject blood
- Heart failure with preserved ejection fraction (HFPEF) sometimes called diastolic heart failure, is the inability of the left ventricle to adequately fill due to slow early relaxation or myocardial stiffness resulting in poor stroke volume
• HFREF (LVEF < 40%) and HFPEF (LVEF > 40%) often occur together but the distinction between them is relevant to the therapeutic approach^{1,2}

• Common causes of CHF include coronary heart disease, hypertension and diabetes^{1,3}

• The New York Heart Association (NYHA) functional classification provides a simple way of classifying the extent of functional disability in heart failure^{1,3}

### Table 1. NYHA grading of symptoms in CHF

<table>
<thead>
<tr>
<th>NYHA grading</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I Asymptomatic LV dysfunction</td>
<td>No limitations. Ordinary physical activity does not cause undue fatigue, dyspnoea or palpitations</td>
</tr>
<tr>
<td>Class II (Mild)</td>
<td>Slight limitation of physical activity. Ordinary physical activity results in fatigue, palpitations, dyspnoea or angina pectoris</td>
</tr>
<tr>
<td>Class III (Moderate)</td>
<td>Marked limitation of physical activity. Less than ordinary physical activity leads to symptoms</td>
</tr>
<tr>
<td>Class IV CHF (Severe)</td>
<td>Unable to carry out any physical activity without discomfort. Symptoms of CHF present at rest</td>
</tr>
</tbody>
</table>

### 2. Diagnosis of CHF

• Diagnosis is often difficult as symptoms of CHF have many differential diagnoses and as such many cases go undetected until the condition is well advanced^{2,3}

• The clinician should always have a high index of suspicion in clients who have risk factors for CHF (see Figure 1)

• Clinical diagnosis of CHF is often unreliable in obese clients, those with pulmonary disease and the elderly^{1}

• Initial diagnosis is based on clinical features and confirmed by evidence of structural abnormality and/or cardiac dysfunction with an echocardiogram, chest x-ray and ECG^{1,2} (see Figure 1)

• Where the availability of echocardiography is limited, measuring B-type natriuretic peptide (BNP or NT-pro-BNP) blood concentrations is an alternative approach to diagnosis (non Medicare rebateable). This group of hormones are secreted in large amounts in response to ventricular stretch^{2,3}

• Investigations and client response to treatment helps determine diagnosis, prognosis and management

• Early diagnosis and management of LV dysfunction is the key to prevent or slow disease progression
Initial suspicion of CHF
• Shortness of breath
• Fatigue
• Oedema

Examinations
• Pulse rate and rhythm
• Blood pressure
• Elevated JVP
• Cardiomegaly
• Cardiac murmurs
• Lung crepitations
• Hepatomegaly

Investigations
• Full blood count
• Electrolytes
• Renal function
• Liver function
• Thyroid function
• Consider B-type natriuretic peptide (BNP or NT-pro-BNP)
• Electrocardiogram
• Chest x-ray

Risk factors of CHF
• Angina/MI
• Hypertension
• Diabetes
• Valvular heart disease
• Coronary heart disease
• LV hypertrophy
• FHx cardiomyopathy
• Alcohol/tobacco use
• Medications
• Sedentary lifestyle
• Overweight

Clinical history
• Dyspnœa
• Orthopnoea
• Paroxysmal nocturnal dyspnoea
• Fatigue
• Oedema
• Palpitations/syncope

Clinical diagnosis or suspicion of CHF

If fluid overloaded refer to Acute pulmonary oedema in the PCCM

Confirm diagnosis with an echocardiogram

Structural abnormality e.g. myopathic, valvular

Pathophysiological diagnosis
Systolic dysfunction (LVEF < 40%)
Diastolic dysfunction (LVEF > 40%)

Specialist referral for further investigation

Begin treatment see Figure 2.

Figure 1. Diagnosis of CHF

Adapted with permission from Diagnosis Guidelines for the prevention, detection and management of chronic heart failure in Australia. © 2014 National Heart Foundation of Australia.
3. Management

3.1 Factors complicating management

- In managing CHF the following co-morbidities must be considered
  - Coronary heart disease, page 142
  - Hypertension, page 228
  - Diabetes type 2, page 196
  - It is important to check for these complications along with calculation of absolute cardiovascular risk using Appendix 1: Australian cardiovascular risk charts, page 494

3.2 Support client self management

- See Lifestyle modification section
- Discuss what CHF is and how it progresses
- Support client to monitor fluid and dietary sodium intake
- Explain the signs of worsening CHF (e.g. weight gain, breathlessness, breathlessness while laying flat, swelling of feet) and advise to seek timely access to health services
- Provide CHF resources (see Resources 1 to 5)
- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and to set goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional support

- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (for examples see Resource 6). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Fluid management

- Determine the client’s ideal ‘dry’ or ‘euvolaemic’ weight i.e. the client’s steady weight with no remaining signs of overload after treatment with a diuretic¹
- Using this ideal weight as a goal, encourage client to keep a daily weight and fluid intake diary (see Resource 7)
- A steady weight gain over a number of days indicates fluid retention, weight loss below the dry weight indicates dehydration due to over-diuresis
- If a client gains or loses more than 2 kg over 2 days they should seek medical help and be referred to the MO/NP
- Generally fluids should be limited to < 2 litres/day but during episodes of fluid retention limit fluids to < 1.5 litres/day¹
- Discuss symptoms of fluid overload including dyspnoea, oedema and bloating (see Resource 8)
- Alcohol should be avoided as it is a direct myocardial toxin and may impair cardiac contractility, contribute to fluid intake, increase body weight due to its caloric
load and alter metabolism of some medicines used in heart failure\(^1\)

- Caffeine intake should be limited to 1 - 2 cups per day as it may exacerbate arrhythmias, increase heart rate and blood pressure, contribute to fluid intake and alter plasma electrolyte levels in clients taking diuretics\(^1\)

### 3.5 Physical activity

- Regular physical activity for clients with CHF leads to overall reduction in mortality and reduction in hospitalisation\(^1\)\(^4\)
- Physical activity improves functional capacity, symptoms and neurohormonal abnormalities\(^1\)
- When medically stable, all clients should be referred to a specifically designed physical activity program\(^4\)
- Functional ability of clients with CHF varies greatly and a program should be initiated under the supervision of a suitably trained professional, who provides direction according to clinical features\(^1\) (see Table 1)
  - NYHA class I or II symptoms - progress gradually to at least 30 minutes of physical activity (continuously or in 10 minute bouts) of up to moderate intensity on most, if not all, days of the week
  - NYHA class III symptoms - short intervals of low intensity activity, with frequent rest days
  - NYHA class IV symptoms - requires gentle mobilisation as symptoms allow

### 3.6 Nutrition

- Being overweight places increased demands upon the heart and obesity increases the risk of developing CHF\(^1\)\(^5\)\(^6\)
- Weight reduction in morbidly obese (BMI > 35) clients with CHF should be considered in order to prevent progression of CHF, decrease symptoms, and improve wellbeing\(^6\)\(^7\)
- Intentional weight loss is not recommended in NYHA class III or IV since anorexia and unintentional weight loss are common consequences\(^6\)
- Constipation, caused by gastrointestinal hypoperfusion, is common in CHF clients, and should be reviewed and managed by a dietitian
- For clients with severe CHF, frequent small meals may avoid shunting of the cardiac output to the gastrointestinal tract, thus reducing the risk of angina, dizziness, dyspnoea or bloating\(^6\)
- Malnutrition, cardiac cachexia (wasting) and anaemia contributes to debilitating weakness and fatigue, and is associated with a poor prognosis and should be investigated by a dietitian for nutritional support
- Because excessive dietary sodium intake contributes to fluid overload and is a major cause of preventable hospitalisation the client requires a referral to a dietitian to optimise the following (see Resource 9)
  - NYHA class I or II symptoms - limiting sodium intake to 3000 mg per day is sufficient to control extracellular fluid volume
  - NYHA class III or IV symptoms - a diuretic regimen as required and a restricted sodium intake of 2000 mg per day should be applied
3.7 Obstructive sleep apnoea (OSA)
- OSA occurs due to upper airway collapse and is likely to aggravate CHF\(^1\)
- There is a strong relationship between obesity and OSA, both conditions being common in clients with CHF\(^1\)
- Weight loss in obese clients (BMI > 30), smoking cessation, alcohol abstinence, continuous positive airway pressure (CPAP) therapy and medication treatment are the accepted effective treatments for OSA in CHF\(^1,6,7\)
- Measure the client’s daytime sleepiness by doing the Epworth Sleepiness Scale (see Resource 10). If they score highly refer to sleep specialist to exclude OSA

3.8 Palliation support
- Palliative care should be considered in all clients with advanced NYHA class IV symptoms resistant to pharmacological and non-pharmacological treatments where the possibility of death within 12 months is high\(^1\)
- In conjunction with the client and the multidisciplinary team assess the impact of CHF and arrange for visiting physiotherapist and/or occupational therapist for home assessment and other support such as wheel chairs and bedding
- Assess impact of CHF on activities of daily living, physical activity, employment, finances, family routines and emotions
- Assess for in home falls risk (see Resource 11)
- Refer eligible clients to Home and Community Care (HACC) services and Medical Aid Subsidy Scheme (MASS) (see Resource 12)

4. Medications
- Support clients to continue taking medications to avoid exacerbation of CHF
- Avoid over counter medications without medical consult
- Do not use sildenafil citrate (Viagra\(^®\)) if the client has used any nitrate preparation (GTN/isosorbide) in the last 24 hours or is hypotensive
- Avoid taking diuretics close to sleep times to minimise sleep disruption\(^8\)
- Medications that exacerbate CHF include NSAIDs, COX-2 inhibitors, thiozolidinediones, tyrosine kinase inhibitors, trastuzumab and moxonidine\(^8\)
- Caution should be exercised in the use of DPP-4 inhibitors (sitagliptin, vildagliptin, linagliptin and saxagliptin) which may increase risk of fluid retention\(^8,9\)
- Caution should be exercised with calcium channel blocker use especially the dihydropyridines (amlodipine, felodipine, lercanidipine, nifedipine) as they can exacerbate peripheral and occasionally pulmonary oedema\(^8,9\)
- A client on multiple medications should be reviewed by a pharmacist
- Use a medication heart failure titration plan (see Resource 13) to assist with medication therapy
- Use Figure 2. to assist with the management of CHF
Chronic heart failure

**LVEF < 40%**
- HFREF

**Exacerbations**
- Avoid drugs that worsen CHF
- Address non-adherence
- Manage cardiac ischaemia

**Co-morbidities**
- Diabetes type 2, page 196
- Hypertension, page 228
- Coronary heart disease, page 142

**Lifestyle modification**
- Physical activity program
- Low salt diet
- Fluid intake management
- Healthy eating
- Smoking cessation
- Sleep apnoea
- Alcohol reduction

**LVEF > 40%**
- HFPEF or diastolic heart failure

**Fluid overload?**
- NO
  - Commence ACEi *

**YES**
- Commence loop diuretic and ACEi *
  - Oedema persists
    - Spironolactone
    - Digoxin
    - Nitrates

**Asymptomatic or oedema settled**
- add β-blocker
  - (show uptitration)

**If fluid overloaded**
- Treat with diuretic
- Otherwise
- Optimum management of HFPEF is to aggressively address risk factor reduction predominantly diabetes
  - (see Diabetes type 2, page 196)
  - and hypertension (see Hypertension, page 228)

* Use an ARB if client does not tolerate an ACEi

**Figure 2. Management of chronic heart failure**
### Table 2. Recommended medications for chronic heart failure

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th>Starting and maintenance dosages</th>
<th>Tips and monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACEi</strong></td>
<td>Ramipril</td>
<td>Start at 1.25 mg daily/Up to 5 - 10 mg daily</td>
<td>Used as first line agent/Titrate to maximum tolerated dose for most prognostic benefit/Side effects include dry cough, hypotension, impaired renal function, hyperkalaemia, rarely angioedema (stop immediately)/Monitor BP, U&amp;E, eGFR/ACEi and ARB not to be used together/Clients on high dose diuretics should reduce dose 24 - 48 hrs before starting ACEi/Beware of first dose hypotension</td>
</tr>
<tr>
<td></td>
<td>Perindopril arginine</td>
<td>Start at 2.5 mg daily/Up to 5 - 10 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lisinopril</td>
<td>Start at 2.5 mg daily/Up to 20 - 40 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Captopril</td>
<td>Start at 6.25 mg b.d./Up to 25 - 75 mg b.d.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enalapril</td>
<td>Start at 2.5 mg daily/Up to 10 - 20 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quinapril</td>
<td>Start at 2.5 mg daily/Up to 20 - 40 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perindopril erbumine</td>
<td>2 mg daily/Up to 4 - 8 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fosinopril</td>
<td>5 mg daily/Up to 20 - 40 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trandolapril</td>
<td>Start at 0.5 mg daily/Up to 2 - 4 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>ARB</strong></td>
<td>Valsartan</td>
<td>Start at 20 mg b.d./Up to 40 - 160 mg b.d.</td>
<td>For ACEi intolerant clients/ACEi and ARB not to be used together/Secondary preventative agent where client BP will allow/Monitor BP, U&amp;E, eGFR/Start on lower dose if on diuretics</td>
</tr>
<tr>
<td></td>
<td>Candesartan</td>
<td>Start at 2 mg daily/Up to 32 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Beta blockers</strong></td>
<td>Carvedilol</td>
<td>Start at 3.125 mg b.d./Up to 25 mg b.d.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nebivolol</td>
<td>Start at 1.25 mg daily/Up to 10 mg daily</td>
<td>Start low and go slow/Ensure sitting systolic BP &gt; 85 mm/Hg before starting/Begin only when the client’s HF is stable/Nebivolol used in the elderly/Monitor BP and HR</td>
</tr>
<tr>
<td></td>
<td>Metoprolol succinate CR</td>
<td>Start at 23.75 mg daily/Up to 190 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bisoprolol</td>
<td>Start at 1.25 mg daily/Up to 10 mg daily</td>
<td></td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Table 2. Recommended medications for chronic heart failure (continued)(^3,8,9,10,11)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class</strong></td>
</tr>
</tbody>
</table>
| Aldosterone antagonists | • Spironolactone 12.5 - 50 mg daily | • For clients with sitting systolic BP > 85 mmHg  
• Start with low doses and increase slowly  
• Do not use as first line diuretic therapy during acute decompensation  
• Has improved survival rates and reduced hospitalisations in CHF clients  
• For clients with NYHA Class II or worse symptoms despite beta-blocker, ACEi and diuretic therapy  
• Side effects of severe hyperkalemia and gynaecomastia  
• Check K⁺ levels 1 week, 1, 2, 3, 6, 9 and 12 months or if unwell or dehydrated  
• Eplerenone must be started within 14 days of MI for PBS benefits |
| • Eplerenone 25 - 50 mg daily | | |
| Diuretics | • Frusemide 20 - 40 mg daily  
• Up to 400 mg in divided daily dose | • First line treatment of fluid retention and breathlessness  
• Dose titrated against client’s symptoms of heart failure and weight gain  
• Monitor electrolytes, renal function, daily if very unwell  
• Increase dose if weight gain, decrease dose if weight loss  
• Assess fluid and bloods 3 - 7 days post reduction  
• Hydrochlorothiazide recommended in clients with persistent peripheral oedema  
• Ethacrynic acid is only approved for clients with an allergy to frusemide  
• Monitor for hypotension |
| • Hydrochlorothiazide 25 - 100 mg daily mane or 3 to 5 days each week | | |
| • Ethacrynic acid 50 mg daily | | |
| • Bumetanide 1 - 8 mg daily  
• In divided doses higher than 1 mg | | |
| Other Drugs | | |
| **Drug** | **Dosage and monitoring** |
| Digoxin | • 62.5 - 250 micrograms daily, according to age, eGFR and plasma digoxin concentration  
• For CHF not controlled by optimal doses of beta blocker, ACEi, diuretic and aldosterone antagonists  
• For AF to control rapid ventricular rate  
• Assess renal function prior to use  
• Assess levels 2 weeks after starting then 6 monthly to yearly unless increasing dose  
• Mortality benefit when digoxin levels from 0.5 - 0.9 micrograms/L |
| Ivabradine | • 2.5 - 7.5 mg twice daily, with dose adjusted according to heart rate  
• Direct sinus node inhibitor that reduces heart rate  
• Recommended for impaired systolic function and heart rate (sinus rhythm) > 77 bpm despite maximum tolerated dose of beta blockers |
5. Care plan

Table 3. Care plan for chronic heart failure

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Review frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>Once only</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>Daily for 2 wks then as clinically required</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Pulse rate and rhythm</td>
<td>✓</td>
<td>Each time medications supplied or client visits clinic</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>Each time medications supplied or client visits clinic</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Fasting blood glucose</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>✓</td>
<td>At diagnosis and as clinically indicated</td>
</tr>
<tr>
<td>Thyroid function</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>BNP</td>
<td>✓</td>
<td>Can be used to assess LV function in absence of echocardiogram as below</td>
</tr>
<tr>
<td>Echocardiogram</td>
<td>✓</td>
<td>If significant change in clinical condition otherwise every 2 yrs</td>
</tr>
<tr>
<td>UEC</td>
<td>✓</td>
<td>1 wk after starting or changing medication. If significant fluid loss occurs check the next day then 6 mth</td>
</tr>
<tr>
<td>eGFR</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Digoxin level</td>
<td>✓</td>
<td>2 wks after starting or changing dose then 6 mth</td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Self management education</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Self weight and fluid monitoring</td>
<td>✓</td>
<td>Daily</td>
</tr>
<tr>
<td>Fluid management</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Cardiac rehabilitation</td>
<td>✓</td>
<td>1 - 6 wk program</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td>Recommended - see the current edition of the Australian Immunisation Handbook for schedule</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td>2 wks and 6 mthly after increasing dose then 12 mth</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>RN/IHW R/V</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Specialist MO</td>
<td>✓</td>
<td>6 - 12 mthly as per specialist recommendations</td>
</tr>
<tr>
<td>Palliation support</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Assess falls risk</td>
<td>✓</td>
<td>As condition alters</td>
</tr>
</tbody>
</table>
6. References

1. National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand (Chronic Heart Failure Guidelines Expert Writing Panel). Guidelines for the prevention, detection and management of chronic heart failure in Australia. Updated October 2011


7. Resources

1. National Heart Foundation Heart Failure information available at www.heartfoundation.org.au/your-heart/cardiovascular-conditions/Heart-failure/Pages/default.aspx

2. Living well with chronic heart failure available at www.heartfoundation.org.au/SiteCollectionDocuments/Living%20well%20with%20chronic%20heart%20failure.pdf

3. Heart Support Australia available at http://heartnet.org.au


Chronic kidney disease

**High risk groups**
- 60 years or older
- Those with diabetes
- Those with a family history of kidney disease
- Those with established cardiovascular disease
- Those with hypertension
- Obese clients (body mass index ≥ 30)
- Smokers
- Aboriginal and Torres Strait Islander peoples
- Maori and Pacific Islander peoples
- Those at severe socioeconomic disadvantage
- Those with evidence of kidney damage (albuminuria, proteinuria, haematuria after exclusion of urological causes)

**Abbreviations**
- CKD Chronic kidney disease
- eGFR estimated glomerular filtration rate

**Considerations for women of child-bearing age**
- Women with early CKD with preserved renal function (eGFR > 60 mL/min/1.73 m²) are advised they can fall pregnant if they wish to do so provided their blood pressure is well controlled¹
- Pregnancy with CKD is associated with increased risks of gestational hypertension, pre-eclampsia, eclampsia, maternal death, premature births, intra-uterine growth retardation, small-for-gestational age, neonatal mortality, stillbirth and low birth weight¹
- Angiotensin receptor blockers (ARBs) and ACEi are contraindicated in pregnancy and alternatives should be discussed with the obstetrician

**Urgent referral**
- Anyone with signs of acute nephritis (oliguria, haematuria, acute hypertension or oedema) should be regarded as a medical emergency and referred to the emergency department without delay²,³
- Referral to a specialist renal service or nephrologist should be considered in the following situations²,³
  - eGFR < 30 mL/min/1.73m²
  - persistent significant albuminuria (urine ACR ≥ 30 mg/mmol)
  - a consistent decline in eGFR from a baseline of < 60 mL/min/1.73m² (a decline > 5 mL/min/1.73m² over a 6 month period which is confirmed on at least 3 separate readings)
  - glomerular haematuria with macroalbuminuria
  - CKD with uncontrolled hypertension despite at least 3 antihypertensive agents
1. What is chronic kidney disease (CKD)?

- When kidneys are working properly, excess minerals, fluids and waste products leave the body in urine
- Many waste products are toxic if they are not removed from the body
- Healthy kidneys filter creatinine (a waste product made by the muscles) from blood and excrete it in urine
- When kidneys are not working well, creatinine builds up in the blood
- To determine the flow rate of filtered fluid through the kidney, the glomerular filtration rate (GFR) can be calculated by a blood test
- CKD is defined as a GFR < 60 mL/min/1.73m² or evidence of kidney damage that is present for ≥ 3 months

2. Diagnosis of CKD

- All individuals in the high risk group should be offered a kidney check test
- Irrespective of the cause, diagnosis is made on any of the following features being present on at least 2 occasions over at least a 3 month period
  
  - an eGFR or measured glomerular filtration rate (GFR) < 60 mL/min/1.73 m² (see Table 1) or
  
  - with or without evidence of kidney damage i.e.
    - presence of protein and/or blood in the urine on urinalysis or microscopic examination, where sexually transmitted infection (STI) and urinary tract infection (UTI) have been excluded
    - haematuria after exclusion of urological or menstrual causes
    - structural abnormalities e.g. on kidney imaging tests
    - pathological abnormalities e.g. renal biopsy

- Clinical presentation is commonly asymptomatic but may include: tiredness, anaemia, puffiness around eyes and ankles, shortness of breath, anorexia, nausea, vomiting, changes in the amount and frequency of urination especially at night, high blood pressure, itching, restless legs and chest pain
- Early detection and management of kidney disease may slow progression to end-stage renal failure

2.1 Albumin creatinine ratio (ACR-urine test)

- A large amount of protein in the urine is a key marker of kidney damage
- Urine ACR is an accurate and sensitive test in predicting the level of risk of damage to the kidneys and heart
- ACR is performed on a single urine sample (most accurate first morning void)
- Normal values are < 3.5 mg/mmol for women and < 2.5 mg/mmol for men
- A positive ACR test (exceeds normal values) should be repeated to confirm the presence of albuminuria
- Albuminuria is present when 2 out of the 3 ACR tests are positive
- CKD is present if albuminuria is persistent for 3 or more months
Table 1. Risks of progressive CKD

<table>
<thead>
<tr>
<th>Kidney function stage</th>
<th>GFR (mL/min/1.73m²)</th>
<th>Normo albuminuria</th>
<th>Micro albuminuria</th>
<th>Macro albuminuria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ACR (mg/mmol)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>≥ 90</td>
<td>≥ 2.5 (M)</td>
<td>2.5 - 25 (M)</td>
<td>&gt; 25 (M)</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>≤ 3.5 (F)</td>
<td>3.5 - 35 (F)</td>
<td>≤ 35 (F)</td>
</tr>
<tr>
<td>2</td>
<td>60 - 89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3A</td>
<td>45 - 59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mild-moderate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>30 - 44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate-severe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>15 - 29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&lt; 15 or dialysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>End stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Not CKD unless haematuria, structural or pathological abnormalities present
- Low risk of CKD progressing
- Moderate risk of CKD progressing
- High risk of CKD progressing

2.2 Glomerular filtration rate (GFR-blood test)

- GFR is the best measure of kidney function
- GFR is written as mL/min/1.73m² which refers to the amount of blood filtrated through the glomerulus in 1 minute per surface area of the client
- Normal GFR is > 90 mL/min/1.73m² but further investigations based on GFR are only done if the GFR value drops below 60
- A GFR < 60 mL/min/1.73m² should be considered in the context of other clinical situations and be retested in 14 days. These include:
  - acute changes in renal function
  - dialysis clients
  - certain diets (vegetarian, high protein, recent ingestion of cooked meat)
  - extremes of body size
  - muscles diseases (may overestimate) or high muscle mass (may underestimate)
  - children < 18 years of age
  - severe liver disease
- A GFR below 60 in the elderly, although common, should be treated as significant and
not considered physiological

- Calculated GFR along with ACR is used to stage kidney function (see Table 1)

3. Management

- All newly diagnosed clients with CKD should be evaluated by a renal physician/nephrologist to develop a management action plan

- Managing CKD primarily focuses on diet, nutrition and medication interventions targeting cholesterol and blood pressure as well as glycaemic control to improve renal and cardiovascular outcomes

- Management targets for CKD are outlined in Table 2.

<table>
<thead>
<tr>
<th>Table 2. Management targets for CKD&lt;sup&gt;3,8,9&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Blood pressure</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Proteinuria</td>
</tr>
<tr>
<td>Lipids</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Blood glucose (if diabetic)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Parathyroid hormone (PTH)</td>
</tr>
<tr>
<td>Serum albumin</td>
</tr>
<tr>
<td>Vitamin D (25-hydroxyvitamin D)</td>
</tr>
<tr>
<td>Bicarbonate level (HCO₃⁻)</td>
</tr>
<tr>
<td>Iron studies</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Phosphate (PO₄⁻)</td>
</tr>
<tr>
<td>Potassium (K⁺)</td>
</tr>
<tr>
<td>Calcium (Ca)</td>
</tr>
</tbody>
</table>

3.1 Factors complicating management

- In managing CKD the following co-morbidities must be considered
  - Diabetes type 2, page 196
  - Hypertension is both a cause and a complication of CKD which increases the progression of CKD<sup>1</sup> (see Hypertension, page 228)
  - Coronary heart disease, page 142
  - It is important to check for these complications along with calculation of absolute cardiac risk see Appendix 1: Australian cardiovascular risk charts, page 494
3.2 Support client self management
• See Lifestyle modification with particular regard to Diet and nutrition, page 14
• Discuss what CKD is and how it progresses
• Explain the signs of worsening CKD and advise to seek timely access to health services
• Provide CKD resources (see Resources 1)
• Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding

3.3 Staging and classification of CKD
• The stages of CKD are based and reported on the combination of kidney function (GFR) and kidney damage (ACR) irrespective of the underlying diagnosis, which will determine management
• The risk of CKD progressing can be determined by correlating kidney function with kidney damage (see Table 1)

3.4 Social emotional support
• Depression can affect 1 in 5 people with CKD, and 1 in 3 individuals on dialysis
• Depression in people with CKD has detrimental effects on mortality, rates of hospitalisation, medication and treatment adherence, nutrition and overall quality of life
• Depression and anxiety can be screened for by using self- or clinician-rated mood scale (for examples see Resource 2). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
• Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms and rate of progression of their condition

3.5 Nutrition and diet
• All clients diagnosed with progressive CKD should have an individualised dietary plan developed by a dietitian
• Clients with early CKD (stages 1 to 3) should be encouraged to
  – reduce any excessive protein intake and consume a normal protein diet
  – avoid a low protein diet to slow CKD progression as this is not recommended due to the risk of malnutrition
  – restrict their dietary sodium (salt) intake to reduce their blood pressure and albuminuria
  – avoid salt substitutes that contain high amounts of potassium salts
  – restrict dietary potassium intake (bananas, dark leafy greens, baked potatoes, dried apricots, salmon, avocados and mushrooms) for those with persistent hyperkalaemia
  – consume a Mediterranean diet high in fruits, vegetables, fish and fibre to improve dyslipidemia and hypertension and reduce mortality in clients with CKD
those with diabetic nephropathy should consume a carbohydrate-restricted, low-iron-available, polyphenol-enriched diet to slow the progression of diabetic nephropathy
– overweight/obese clients should restrict calorie intake to improve their CKD
– drink fluids to satisfy thirst
– there is no need to restrict dietary phosphate in kidney function stages 1 to 3

3.6 Palliation support

• When the client has end stage kidney disease (stage 5) it may be necessary to consider end of life decisions including
  – advanced care directives (wills, guardianship etc.) to outline wishes for future health and personal care
  – non-dialysis treatment (no dialysis or transplantation) and
  – palliative care arrangements

• In conjunction with the client and the multidisciplinary team, assess the impact of CKD and arrange for visiting physiotherapist and/or occupational therapist for home assessment and other support such as wheel chairs and bedding

• Assess impact of CKD on activities of daily living, physical activity, employment, finances, family routines and emotions

• Assess for home falls risk (see Resource 3)

• Refer eligible clients to Home and Community Care (HACC) services and Medical Aid Subsidy Scheme (MASS) (see Resource 4)

• Refer for palliative care as required

4. Medications

4.1 Calculating CKD medication dosage

• Both eGFR and Creatinine Clearance (CrCl) can be used to estimate renal drug clearance

• The measure to use when determining drug dosages is at the discretion of the clinician

• If eGFR is used for drug dosing it is important to consider the client’s body size as well as referring to the drug product information

• This is particularly relevant where clients may be very large or very small and the normalised body surface area (BSA) of 1.73 m² may not be applicable. In these circumstances eGFR should be calculated to the client’s BSA

• For the purposes of this manual CrCl is used

• CKD medication dosing recommendations are based on the degree of renal impairment and fall into three categories
  – Mild impairment - CrCl 25 - 50 mL/min
  – Moderate impairment - CrCl 10 - 25 mL/min
  – Severe impairment - CrCl < 10m L/min

• CrCl is calculated using the Cockcroft-Gault Formula (see Table 3)
Table 3. CKD medication dosage calculators

<table>
<thead>
<tr>
<th>Calculation of CrCl is done using the Cockcroft-Gault Formula(^{11, 12})</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrCl (mL/minute) = ((140 - \text{age}) \times (\text{ideal weight in kg}) / (0.815 \times \text{serum Cr (micromol/L)}))</td>
</tr>
<tr>
<td>For females multiply the above result by 0.85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calculation of ideal body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Males: [(Height in cm - 152 cm) x 0.9] + 50 kg</td>
</tr>
<tr>
<td>• Females: [(Height in cm - 152 cm) x 0.9] + 45.5 kg</td>
</tr>
<tr>
<td>• Add 10% for a heavy frame and subtract 10% for a light frame</td>
</tr>
</tbody>
</table>

Both these Australian Medicines Handbook calculators are available online (see Resource 5)

4.2 Special considerations

• Clients with CKD should have their medication and dose requirements reviewed by a nephrologist or pharmacist
• Careful consideration and followup should be given to medication dosages when CrCl is < 10 mL/min
• Aspirin therapy should not be routinely recommended as the risk/benefit for primary prevention of cardiovascular disease in clients with early (stage 1 to 3) CKD is uncertain\(^{13}\)
• Use of some uric acid lowering agents (such as allopurinol) is not routinely recommended in people with early CKD (stages 1 to 3) who have asymptomatic hyperuricaemia\(^{14}\)

The combination of an ACE inhibitor (or ARB) with a diuretic and NSAID (except low-dose aspirin) in clients with CKD can result in a potentially serious interaction, the “triple whammy”

• Antimicrobials and/or their metabolites that are excreted totally or in part by the kidneys may accumulate and rapidly reach toxic concentrations, and dosage adjustment may be required e.g. aminoglycosides\(^{15}\)
• NSAIDs increase renal impairment and risk of bleeding in CKD\(^{16}\)
• Metformin should\(^{16}\)
  – not exceed 2 g daily when CrCl is 60 - 90 mL/min
  – not exceed 1 g daily when CrCl is 30 - 60 mL/min and
  – be ceased if CrCl < 30 mL/min
• Radio-contrast material should be avoided in renal disease, however the risks need to be weighed against benefits for each individual
• Figure 1. illustrates medication management of hypertension in clients with CKD
Figure 1. Management of hypertension in people with CKD

**Address lifestyle risk factors**

**Co-morbidities**
- Diabetes type 2, page 196
- Hypertension, page 228
- Coronary heart disease, page 142

**Lifestyle modification**
- Physical activity program
- Low salt diet
- Fluid intake management
- Healthy eating

---

**Does the client have diabetes or albuminuria?**

**YES**
- Start ACEi or ARB

**NO**

**If K+ < 6.0 (ACEi/ARB tolerated)**

**YES**
- Review antihypertension medication and dose

**NO**

**Is BP ≤ 140/90 or ≤ 130/80 with diabetes or albuminuria?**

**YES**
- Consider adding
  - Ca²⁺ channel blocker or
  - Diuretic or
  - β-blocker

**NO**
- Increase ACEi or ARB

**Check eGFR and K⁺ after 7 days**

**If K⁺ > 6.5 mmol/L then emergency referral**

**If K⁺ 6 - 6.5 mmol/L then**
- Reduce dose of ACEi or ARB
- Start K⁺ wasting diuretic
- Restrict dietary K⁺

**If K⁺ ≤ 6.0 mmol/L**

**YES**
- Stop ACEi, ARB or spironolactone

**NO**
- Continue to monitor BP and address lifestyle risk factors

**Review antihypertension medication and dose**

---

**If K⁺ < 6.0 mmol/L?**

**YES**
- Is BP ≤ 140/90 or ≤ 130/80 with diabetes or albuminuria?

**NO**
- Stop ACEi, ARB or spironolactone

**Check K⁺ after 7 days**

---

**If K⁺ falls by more than 25% below baseline then**
- Stop medications
- Refer to nephrologist

---

**Does the client have diabetes or albuminuria?**

**YES**
- Start ACEi or ARB

---

**If eGFR falls by more than 25% below baseline then**
- Stop medications
- Refer to nephrologist

---

**Continue to monitor BP and address lifestyle risk factors**

---

**Address lifestyle risk factors**

---

**Figure 1. Management of hypertension in people with CKD**
Table 4. Suggested medications and doses for CKD\textsuperscript{8,9,12,17,18,19,20}

<table>
<thead>
<tr>
<th>Medication</th>
<th>CrCl Range</th>
<th>Dose Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACEi</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Used as first line agent</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Cautiously titrate upwards to target dose and response</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Side effects include dry cough, hypotension, impaired renal function, hyperkalaemia, rarely angioedema (stop immediately)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Monitor BP, U&amp;E, eGFR</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ACEi and ARB not to be used together</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Clients on high dose diuretics should reduce dose 24 - 48 hours before starting ACEi</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Beware of first dose hypotension</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ramipril</strong></td>
<td>If CrCl 20 - 50 mL/min then 1.25 - 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 20 mL/min then 1.25 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 1.25 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Perindopril arginine</strong></td>
<td>If CrCl 30 - 60 mL/min then 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 15 - 30 mL/min then 2.5 mg on alternate days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 15 mL/min then 2.5 mg on day of dialysis</td>
<td></td>
</tr>
<tr>
<td><strong>Perindopril erbumine</strong></td>
<td>If CrCl 30 - 60 mL/min then 2 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 15 - 30 mL/min then 2 mg on alternate days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 15 mL/min then 2 mg on alternate days or on day of dialysis</td>
<td></td>
</tr>
<tr>
<td><strong>Lisinopril</strong></td>
<td>If CrCl 30 - 70 mL/min then 2.5 - 5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 2.5 - 5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Captopril</strong></td>
<td>Start at 6.5 mg according to CrCl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 30 - 60 mL/min then 2 - 3 times daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then twice daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then once to twice daily</td>
<td></td>
</tr>
<tr>
<td><strong>Enalapril</strong></td>
<td>If CrCl 30 - 60 mL/min then 2.5 - 5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 2.5 mg daily or on dialysis days</td>
<td></td>
</tr>
<tr>
<td><strong>Fosinopril</strong></td>
<td>If CrCl 30 - 60 mL/min then 5 - 10 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min then 5 mg daily or on dialysis days</td>
<td></td>
</tr>
<tr>
<td><strong>Quinapril</strong></td>
<td>If CrCl 30 - 60 mL/min then 2.5 - 5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min then 2.5 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Trandolapril</strong></td>
<td>If CrCl 30 - 60 mL/min then 0.5 - 1 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 0.5 mg daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min then 0.5 mg daily</td>
<td></td>
</tr>
</tbody>
</table>
**Table 4. Suggested medications and doses for CKD (continued)**

<table>
<thead>
<tr>
<th>ARB</th>
<th>Use ARB when ACEi intolerant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Irbesartan</strong></td>
<td>If CrCl 30 - 60 mL/min then 75 - 150 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 75 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 75 mg once daily</td>
</tr>
<tr>
<td><strong>Candesartan</strong></td>
<td>If CrCl 30 - 60 mL/min then 4 - 8 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 4 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 4 mg once daily</td>
</tr>
<tr>
<td><strong>Losartan</strong></td>
<td>If CrCl 30 - 60 mL/min then 25 - 50 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 25 - 50 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 25 - 50 mg once daily</td>
</tr>
<tr>
<td><strong>Olmesartan</strong></td>
<td>If CrCl 30 - 60 mL/min then 20 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 30 mL/min contraindicated</td>
</tr>
<tr>
<td><strong>Valsartan</strong></td>
<td>If CrCl 30 - 60 mL/min then 80 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl 10 - 30 mL/min then 40 - 80 mg once daily</td>
</tr>
<tr>
<td></td>
<td>If CrCl &lt; 10 mL/min or dialysis then 40 mg once daily</td>
</tr>
</tbody>
</table>

| Beta blockers | Ensure sitting systolic BP > 85 mm/Hg before starting                                         |
|              | Begin only when the client’s heart failure is stable                                          |
|              | Nebivolol used in the elderly                                                                |
|              | Monitor BP and HR                                                                            |
| **Atenolol**  | If CrCl 35 - 60 mL/min then 25 - 50 mg once daily                                             |
|              | If CrCl 15 - 35 mL/min then 25 mg once daily or 50 mg on alternate days                      |
|              | If CrCl < 15 mL/min then 25 mg once daily or 25 - 50 mg on alternate days                    |
| **Metoprolol** | If CrCl 30 - 60 mL/min then normal dose                                                       |
|              | If CrCl 10 - 30 mL/min then normal dose (may initiate at 12.5 - 25 mg b.d.)                  |
|              | If CrCl < 10 mL/min or dialysis then 12.5 - 25 mg                                            |

| Diuretics    | Individual dose range of frusemide is large, doses are determined by individual client requirements |
|              | Second line therapy for hypertension in CKD                                                   |
|              | Avoid using hydrochlorothiazide and indapamid as diuretics if CrCl < 30 mL/min, as they are less effective as diuretics (but they retain some antihypertensive effect) |
| **Frusemide** | If CrCl 30 - 60 mL/min then normal dose                                                       |
|              | If CrCl 10 - 30 mL/min then normal dose (range 120 - 500 mg/day)                             |
|              | If CrCl < 10 mL/min or dialysis then normal dose (range 120 mg - 1 g daily)                 |
| **Hydrochlorothiazide** | If CrCl 30 - 60 mL/min then normal dose                                                        |
|              | If CrCl 10 - 30 mL/min then 12.5 - 25 mg daily                                                |
|              | If CrCl < 10 mL/min or dialysis then 12.5 - 25 mg daily                                      |
| **Indapamide** | If CrCl 30 - 60 mL/min then normal dose                                                        |
|              | If CrCl 10 - 30 mL/min then normal dose                                                        |
|              | If CrCl < 10 mL/min or dialysis then normal dose                                               |
Table 4. Suggested medications and doses for CKD (continued) 8,9,12,17,18,19,20

<table>
<thead>
<tr>
<th>Calcium channel blockers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amlodipine</strong></td>
<td></td>
</tr>
<tr>
<td>• 2.5 - 5 mg daily</td>
<td>Normal doses for calcium channels blockers apply, but they should be used in caution in clients with impaired renal and liver function</td>
</tr>
<tr>
<td>• Up to 10 mg daily</td>
<td>Second line therapy for hypertension in CKD</td>
</tr>
<tr>
<td><strong>Diltiazem</strong></td>
<td></td>
</tr>
<tr>
<td>• For angina, AF, atrial flutter 180 - 360 mg CR once daily</td>
<td>Severe bradycardia and heart block when used with beta-blockers</td>
</tr>
<tr>
<td>• For hypertension 180 - 240 mg CR once daily</td>
<td></td>
</tr>
<tr>
<td><strong>Verapamil</strong></td>
<td></td>
</tr>
<tr>
<td>• Start at 40 - 80 mg immediate release 2 - 3 times daily</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statin</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Atorvastatin</strong></td>
<td></td>
</tr>
<tr>
<td>• 10 mg daily</td>
<td></td>
</tr>
<tr>
<td>• Up to 80 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Simvastatin</strong></td>
<td></td>
</tr>
<tr>
<td>• 10 mg daily</td>
<td></td>
</tr>
<tr>
<td>• Up to 80 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Pravastatin</strong></td>
<td></td>
</tr>
<tr>
<td>• 10 - 20 mg daily</td>
<td></td>
</tr>
<tr>
<td>• Up to 80 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Rosuvastatin</strong></td>
<td></td>
</tr>
<tr>
<td>• Start at 5 mg according to CrCl</td>
<td>Recomended in CKD to reduce the risk of atherosclerotic events</td>
</tr>
<tr>
<td>• If ≥ 30 mL/min then once daily up to a max of 40 mg</td>
<td>• +/- ezetimibe below</td>
</tr>
<tr>
<td>• If ≤ 30 mL/min then once daily up to a max of 10 mg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vitamin D supplement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcitriol</strong></td>
<td>For clients with early CKD who are not exposed to direct sunlight for at least 1 to 2 hours per week</td>
</tr>
<tr>
<td>• 0.25 micrograms daily titrated to response</td>
<td>Contraindicated in hypercalcaemia</td>
</tr>
<tr>
<td></td>
<td>May suppress development of secondary hyperparathyroidism</td>
</tr>
<tr>
<td></td>
<td>Beware of hypercalcaemia especially when taken in conjunction with thiazides</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Iron</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ferrous sulphate</strong></td>
<td>For diagnosed iron deficiency</td>
</tr>
<tr>
<td>• 100 - 200 mg daily oral</td>
<td>Parenteral preferred to oral as more likely to achieve Hb target level</td>
</tr>
<tr>
<td>• See CPI for parenteral use</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cholesterol absorption inhibitor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ezetimibe</strong></td>
<td>Normal dosing applies</td>
</tr>
<tr>
<td>• 10 mg daily</td>
<td></td>
</tr>
</tbody>
</table>
Table 4. Suggested medications and doses for CKD (continued)  8,9,12,17,18,19,20

<table>
<thead>
<tr>
<th>Phosphate binder</th>
<th>Calcium carbonate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 600 - 3000 mg (240 - 1200 mg elemental calcium) with meals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aluminium hydroxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 600 - 1200 mg with food</td>
</tr>
<tr>
<td>• Up to 3600 mg daily</td>
</tr>
</tbody>
</table>

• Calcium salts should be the initial choice when serum Ca\(^{2+}\) < 2.4 mmol/L and parathyroid hormone (PTH) is in the target range

• Beware of additional intake of calcium from vitamin D analogues

• Aluminium salts should be avoided when PTH is lower than the target range

• Aluminium salts may accumulate in tissues and should be avoided unless target phosphate levels cannot be achieved using maximal tolerated doses of calcium based binders
## 5. Care plan

### Table 5. Care plan for people with chronic kidney disease

<table>
<thead>
<tr>
<th>eGFR with microalbuminuria OR eGFR with normoalbuminuria</th>
<th>Stage 1 and 2</th>
<th>Stage 3</th>
<th>Stage 4 and 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60</td>
<td>30 - 59</td>
<td>All eGFR &lt; 30 OR macroalbuminuria</td>
<td></td>
</tr>
<tr>
<td>45 - 59</td>
<td>30 - 44</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Height</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>1 - 3 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Calcium (Ca²⁺)</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>✓</td>
<td>As clinically indicated</td>
</tr>
<tr>
<td>Aluminium salts</td>
<td></td>
<td>When taking aluminium hydroxide at the discretion of the MO</td>
</tr>
<tr>
<td>Phosphate (PO₄³⁻)</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Vitamin B12 and folate</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>FBC</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Parathyroid hormone (PTH)</td>
<td></td>
<td>6 - 12 mthly if eGFR &lt; 45 mL/min/1.73m²</td>
</tr>
<tr>
<td>UEC</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>HbA1c (for people with diabetes)</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Fasting blood glucose</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>eGFR</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Urine ACR</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Fasting lipids</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Iron studies</td>
<td>✓</td>
<td>As clinically indicated</td>
</tr>
<tr>
<td>Client self management support</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Diet modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Assess falls risk</td>
<td>✓</td>
<td>As condition alters</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td></td>
<td>Recommended - see the current edition of the Australian Immunisation Handbook for schedule</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Medication review</td>
<td>✓</td>
<td>At each visit to monitor stabilility in condition</td>
</tr>
<tr>
<td>HW/RN review</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>MO/NP review</td>
<td>✓</td>
<td>1 - 3 mthly</td>
</tr>
<tr>
<td>Nephrologist</td>
<td>✓</td>
<td>As per specialist recommendation</td>
</tr>
<tr>
<td>Palliation support</td>
<td></td>
<td>when indicated</td>
</tr>
</tbody>
</table>
6. References

15. Renal impairment and antimicrobial dosing [revised June 2010]. In: eTG complete [Internet]. Melbourne: Therapeutic Guidelines Limited; March 2014

7. Resources


Chronic obstructive pulmonary disease

High risk groups
- Adults with risk factors or symptoms of shortness of breath
- All people who are smokers or ex-smokers over 35 years of age
- People with stable chronic obstructive pulmonary disease (COPD)
- People exposed to occupational and environmental dusts, chemicals and airborne hazards
- Aboriginal and Torres Strait Islander peoples and people from culturally and linguistically diverse backgrounds

Considerations for women of child-bearing age
- Pregnant women with airways disease should be seen by a specialist

Urgent referral
- For acute exacerbation of COPD refer to the MO/NP and the current edition of the Primary Clinical Care Manual (PCCM)

1. What is chronic obstructive pulmonary disease (COPD)?
- A preventable and treatable disease of the lungs and airways resulting in worsening shortness of breath on exertion
- The main underlying disease process is non-reversible airways obstruction and/or emphysema, in which the air sacs in the lungs are destroyed and the lungs are less able to move air
- As a result people have difficulty breathing because
  - lung tissue is damaged
  - the airways narrow, becoming obstructed and
  - air is trapped
- The major contributing factor is smoking
- A major problem associated with COPD is the occurrence of exacerbations, or periodic worsening of symptoms and lung function
- Symptoms during exacerbations include
  - increased shortness of breath
  - increased cough
  - increased sputum volume and/or increased sputum purulence
  - general malaise
  - reduced exercise tolerance

2. Diagnosis of COPD
- A clinical diagnosis of COPD should be considered in any client who has
  - shortness of breath or worsening shortness of breath
Section 2: Management of diagnosed conditions

Chronic obstructive pulmonary disease

– recurrent chest infections
– chronic cough and/or sputum production
– a history of or exposure to the main risk factor, smoking

• In clinical practice, diagnosis is usually based on:
  – a history of smoking, or exposure to other noxious agents
  – FEV1/FVC ratio < 0.7 post-bronchodilator

• Some people do not experience cough, sputum production or dyspnoea and only present when breathing gets worse with a respiratory tract infection

• One third of COPD clients present with bronchiectasis which should be excluded with early chest imaging which will also rule out pulmonary malignancy

• Bronchiectasis presents as:
  – a productive cough for more than 8 weeks
  – recurrent chest infections
  – sinusitis and fatigue
  – haemoptisis (blood stained sputum)
  – less commonly wheezing and weight loss

• Exclude bronchiectasis with high resolution computerised tomography (e.g. if symptoms include: haemoptysis, chronic sinusitis, dental disease) as treatment is very different

• See Table 1. for the stages of COPD according to airflow obstruction and severity of symptoms

2.1 Identify risk factors

• Smoking history i.e. age started and stopped and cigarettes per day

• Medical history, including: asthma, allergy, sinusitis or nasal polyps, respiratory infections in childhood, and other respiratory diseases

• Family history of COPD or other chronic respiratory diseases or lung cancer

• History of exacerbations or previous hospitalisations for respiratory disorders

Table 1. Classification of COPD according to airflow obstruction

<table>
<thead>
<tr>
<th>Stages</th>
<th>Airflow obstruction and severity of symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>• The individual may not be aware that his or her lung function is abnormal</td>
</tr>
<tr>
<td></td>
<td>• Airflow limitation (FEV₁ ≈ 60 - 80% predicted)</td>
</tr>
<tr>
<td>Moderate</td>
<td>• People usually seek medical attention because of chronic respiratory symptoms</td>
</tr>
<tr>
<td></td>
<td>• or an exacerbation of their disease</td>
</tr>
<tr>
<td></td>
<td>• Worsening airflow limitation (FEV₁ ≈ 40 - 59% predicted)</td>
</tr>
<tr>
<td>Severe</td>
<td>• Greater shortness of breath, reduced exercise capacity, and repeated exacerbations which have an impact on the person’s quality of life</td>
</tr>
<tr>
<td></td>
<td>• Airflow limitation (FEV₁ &lt; 40% predicted)</td>
</tr>
</tbody>
</table>
3. Management

3.1 Factors complicating management

- In managing COPD the following must be considered
  - Chronic heart failure, page 100
  - Rheumatic heart disease, page 290
  - Smoking (see Smoking cessation, page 44)

3.2 Support client self management

- Support the client with lifestyle modification with particular attention to Smoking cessation, page 44 and pulmonary rehabilitation (see 3.13 Pulmonary rehabilitation program)

- Discuss COPD and
  - provide supportive resources (see Resource 1)
  - controlling breathlessness and anxiety
  - airway clearance and breathing techniques (see Resource 2)
  - medication usage, effects and compliance

- Refer client to The COACH Program, a free phone coaching service which helps clients manage their condition (see Resource 3)

- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and to set goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional wellbeing

- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 4). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis

- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Monitor health status

- Temperature, pulse, respiration rate, blood pressure, weight and body mass index (BMI)

- Breathlessness and amount and colour of sputum

- Perform regular spirometry before and 10 - 15 minutes after salbutamol 4 puffs with spacer, and establish client’s best attainable lung function (see Resources 5. and 6)

- Oxygen saturation at rest and after a short walk on a level surface

- FBC for polycythaemia and anaemia

- ECG for heart failure or ischaemic heart disease

- Chest x-ray for evidence of bronchiectasis, emphysema, lung hyperinflation, heart failure

- Appropriateness of current medical treatments

- Use the COPD Assessment Test (CAT) to measure the impact of COPD on the client, and
Section 2: Management of diagnosed conditions | 131

how this changes over time (see Resource 7)

- Monitor any swallowing difficulties and refer to the speech pathologist if required

3.5 Smoking cessation

- See Smoking cessation, page 44

- Clients who stop smoking give themselves the best opportunity to prevent the development and progression of COPD

- Education about exposure to risk factors e.g. smoking, occupational dust and chemicals, indoor and outdoor pollutants

- Perform spirometry on all adults who are smokers or ex-smokers with recurrent episodes of acute respiratory infections and frequent and unusual sputum production.

- This can be done by using the Piko-6 spirometer to make an objective assessment of the client’s level of broncho-constriction (see Resource 8)

- Educate that giving up smoking is the most effective means of preventing the development of COPD

- Refer to ATODs worker or other smoking cessation facilitator to assist with strategies to give up smoking

- Refer to MO/NP for nicotine replacement therapy (see Table 2)

- Ensure client is fully vaccinated for preventable respiratory diseases i.e. influenza and pneumonia

3.6 Improvement in physical activity tolerance

- See Physical activity, page 26

- Encourage client to keep as active as possible

- Incidental daily physical activity such as walks or vacuuming

- Pace activities of daily living

- Attend special events such as family and friend gatherings

- Encouragement of regular supported, monitored exercise with plenty of rests to recover breath

- Refer to physical activity groups such as pulmonary rehabilitation programs

3.7 Nutrition

- Diet and nutrition, page 14

- Lung disease increases the risk of poor nutrition, weight loss and reduced muscle strength because of
  - increased energy needs
  - changes in appetite (decrease or if on steroids an increased appetite)
  - lack of energy to shop, cook and eat meals
  - an increased need for certain vitamins, minerals and antioxidants
• Refer to MO or dietitian if there is unintended weight loss or weight gain

3.8 Good sleep patterns
• Medications, difficulty with breathing, anxiety and depression may prevent people with COPD from sleeping well at night
• Assess how well the client is sleeping by doing the Epworth Sleepiness Scale (see Resource 9)
• If they score highly refer to sleep specialist to exclude obstructive sleep apnoea

3.9 Prevent respiratory infections
• Influenza vaccine annually
• Pneumovax as per the current edition of the Australian Immunisation Handbook
• dTpa vaccine at age 50 years and above

3.10 COPD action plan
• Helps client to self-monitor and intervene early to prevent exacerbations
• Helps client to stay well and know what to do when symptoms get worse, what to do during a severe attack, and how to recognise danger signs
• Ensure client is well trained and confident in its implementation (see Resource 10)

3.11 Home oxygen
• Oxygen is beneficial for clients who have
  – PaO$_2$ ≤ 55 mmHg or SaO$_2$ ≤ 88%
  – PaO$_2$ between 55 mmHg and 60 mmHg or SaO$_2$ of 88% with evidence of cardiac failure, pulmonary hypertension, oedema
• Evaluation for use of home O$_2$ should be made when the person has stable COPD not during exacerbation
• Medical Aids Subsidy Scheme (MASS) can supply home oxygen to eligible clients (see Resource 11)

3.12 Prevention of complications
• Identify risk status for osteoporosis by assessing
  – vitamin D levels
  – mobilisation
  – use of high dose corticosteroids
  – underlying decreased bone mineral density
  – bone densitometry where appropriate
  – see Osteoporosis, page 250
• Assess cardiac disease risk by using the Absolute Cardiovascular Risk Assessment tool (see appendix 1: Australian cardiovascular risk charts, page 494)
3.13 Pulmonary rehabilitation program

- Ideally offered to all people with moderate and severe COPD
- Symptomatic clients with more than 2 exacerbations per year, should be referred to pulmonary rehabilitation as an important hospital avoidance strategy
- If there is no program in your community advocate for a service or refer to the Pulmonary Rehabilitation Toolkit (see Resource 12)
- Contact your local district chronic disease coordinator or the Lung Foundation for rehabilitation program details and/or training (see Resource 13)

3.14 Active cycle of breathing technique (ACBT) (see Resource 2)

- Used to help clear secretions from the lungs, especially with chest infections
  1. Start with 5 deep abdominal breaths. Expand chest fully, starting with the diaphragm and lower ribs. Avoid lifting or shrugging shoulders
  2. Do 30 - 60 seconds of relaxed breathing. Breathe from the diaphragm. With their hand the client should feel their stomach rising and falling with each breath. Shoulders should be kept as relaxed as possible
  3. Do another 5 deep abdominal breaths
  4. Follow this with 30 - 60 seconds of relaxed breathing
  5. Take a medium sized breath in and huff the air out a little more forcefully
  6. Start with 3 cycles of gentle huffs. Finish with 2 cycles of more forceful huffs
  7. Finish with a cough to clear any secretions left in the main airways
  8. Repeat the cycle 2 - 3 times or until no more secretions can be removed
- Refer to the physiotherapist for further assistance if client is unable to clear lung secretions

3.15 Falls prevention

- Screen for individual falls risk (see Resource 14)
- Refer to a physiotherapist and a balance and strength group
- Refer to an occupational therapist to assess whether home modifications are required to minimise slip and fall hazards

3.16 Palliation support

- Palliative care should be considered in all clients where the possibility of significant deterioration is high
- In conjunction with the client and the multidisciplinary team arrange for a visiting physiotherapist and/or occupational therapist for home assessment and other supports such as wheel chairs and bedding
- Assess impact of the client’s function on employment, finances, family routines and emotions
- Feelings of grief and loss need to be anticipated from the time of diagnosis to death and grief and bereavement counselling should be available to client, family and carers
• A conference with the family can provide an opportunity to discuss end of life issues.

• The use of advance care planning (i.e. enduring powers of attorney or advanced health directives) will assist the client retain some control over their care and personal lives.

• Refer eligible clients to Home and Community Care (HACC) services and Medical Aid Subsidy Scheme (MASS) (see Resource 11).

4. Medications

• The MO/NP or pharmacist will review medications according to above recommendations, client’s response and current condition.

• Check inhaler instructions in the packaging for specific instructions.

• Monitor medication adherence and correct inhaler technique.

• Video and printable instructions for correct inhaler use are available at the National Asthma Council Australia website (see Resource 15).

• Use Figure 1. as a guide to manage stable COPD.

• For acute presentations of COPD refer to the current edition of the PCCM.

To improve medication efficacy using spacers is now the preferred option when providing clients with inhalers.
Figure 1. Stepwise management of stable COPD

**Symptom Relief LAMA and/or LABA**
Check Inhaler Usage - Technique and adherence to medication

**Pharmacological interventions**
Consider low dose theophylline
Consider montelukast
Consider combined ICS/LABA, Cease LABA and check lung function

**Prevention of Exacerbations**
When FEV₁ < 50% predicted

**Non-pharmacological interventions**
Consider O₂ therapy, surgery and palliation support (see 3.16 Palliation support)

**Address Risk Factors**

**Address Co-morbidities**
Osteoporosis, page 250, chronic heart failure, page 100, anxiety disorders, page 62.

**Dealing with Symptoms**
Severe
- Dyspnoea on mild exertion
- Excessive sputum production
- Chronic cough
- Difficulty in activities

Moderate
- Dyspnoea on level ground
- Increasing limitation of daily activities
- Increasing sputum production

Mild
- Little or no effect on daily activities
- Breathing discomfort on level ground
- Frequent chest infections
- Few symptoms

**Typical Symptoms**
- Breathing discomfort on moderate exercise
- Dealing with symptoms

**Lung Function**
- FEV₁ < 40\% predicted
- FEV₁ = 40 - 59\% predicted
- FEV₁ ≥ 60 - 80\% predicted

**Typical Symptoms**
- Dyspnoea on level ground
- Increasing limitation of daily activities
- Increasing sputum production
- Chronic cough
- Excessive sputum production

**Depression, page 172 and lung cancer**
### Table 2. Medications for all stages of COPD\(^6,7,8\)

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-acting bronchodilators</strong></td>
<td></td>
</tr>
<tr>
<td>β2-agonists (SABA)</td>
<td>- Salbutamol MDI 100 - 200 micrograms 1 - 2 puffs PRN</td>
</tr>
<tr>
<td></td>
<td>- Terbutaline sulphate turbuhaler 500 micrograms 1 puff PRN</td>
</tr>
<tr>
<td></td>
<td>- Best used with spacer</td>
</tr>
<tr>
<td></td>
<td>- Takes effect immediately</td>
</tr>
<tr>
<td><strong>Short-acting anti-cholinergic bronchodilators (SAMA)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ipratropium bromide MDI 42 micrograms 1 - 2 puffs PRN</td>
</tr>
<tr>
<td></td>
<td>- Best used with spacer</td>
</tr>
<tr>
<td></td>
<td>- 20 minutes to take effect but longer lasting than above</td>
</tr>
<tr>
<td><strong>Long-acting antimuscarinic antagonist (LAMA)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Tiotropium bromide DPI 18 micrograms 1 puff daily</td>
</tr>
<tr>
<td></td>
<td>- Umeclidinium bromide 55 micrograms 1 puff daily</td>
</tr>
<tr>
<td></td>
<td>- Glycopyrronium 50 micrograms 1 puff daily</td>
</tr>
<tr>
<td></td>
<td>- Aclidinium 322 micrograms 1 capsule inhaled b.d.</td>
</tr>
<tr>
<td></td>
<td>- Teach and check technique</td>
</tr>
<tr>
<td></td>
<td>- Cease ipratropium bromide to avoid double dosing</td>
</tr>
<tr>
<td></td>
<td>- May cause dry mouth, blurred vision, dizziness and urinary retention</td>
</tr>
<tr>
<td></td>
<td>- May precipitate acute angle-closure crisis</td>
</tr>
<tr>
<td><strong>Long-acting bronchodilators β2-agonists (LABA)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Eformoterol 12 micrograms 1 puff b.d.</td>
</tr>
<tr>
<td></td>
<td>- Salmeterol 50 micrograms 1 puff b.d.</td>
</tr>
<tr>
<td></td>
<td>- Indacaterol 150 - 300 micrograms 1 capsule daily</td>
</tr>
<tr>
<td><strong>Combination long-acting β2-agonists + inhaled corticosteroids (ICS/LABA)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Salbutamol/Fluticasone 125 micrograms/25 micrograms MDI 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>- 250micrograms/25 micrograms MDI 2 puffs b.d.</td>
</tr>
<tr>
<td></td>
<td>- 500 micrograms/50 micrograms Accuhaler 1 puff b.d.</td>
</tr>
<tr>
<td></td>
<td>- Use with spacer to reduce local side effects</td>
</tr>
<tr>
<td></td>
<td>- Cease other LABA puffers to avoid double dosing</td>
</tr>
<tr>
<td></td>
<td>- LAMA with combination ICS/LABA is tolerated</td>
</tr>
<tr>
<td><strong>Combination LABA/LAMA</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Indacaterol/glycopyrronium 100 micrograms/50 micrograms 1 capsule inhaled daily</td>
</tr>
<tr>
<td></td>
<td>- Vilanterol/umeclidinium 25 micrograms/62.5 micrograms 1 puff daily</td>
</tr>
<tr>
<td><strong>Theophylline</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SR tablets 100 - 300 mg b.d.</td>
</tr>
<tr>
<td></td>
<td>- Monitor plasma concentrations to ensure safe therapeutic levels</td>
</tr>
</tbody>
</table>
### Table 2. Medications for all stages of COPD (continued)\(^6,7,8\)

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoking cessation</strong> (see Smoking cessation, page 44 for further details)</td>
<td></td>
</tr>
<tr>
<td>Nicotine receptor antagonist blocker</td>
<td>• Bupropion and varenicline tartrate but not available on QH List of Approved Medicines (LAM)</td>
</tr>
</tbody>
</table>
| Nicotine replacement therapy (NRT) | • Transdermal patches  
• Consider combination therapies e.g. nicotine chewing gum, nicotine inhalers or nicotine minitabs |

### Complementary medications

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested actions</th>
</tr>
</thead>
</table>
| Oxygen therapy      | • Used to improve blood oxygen levels in clients who have chronically low blood oxygen (SpO₂ < 88%) with the aim of reducing cardiac workload and eventually heart strain (heart failure)  
• Long-term low flow oxygen (> 16 hours per day, between 1 - 3 L/m via nasal prongs) increases survival for clients with chronic respiratory failure  
• Exercise caution in clients with PaCO₂ > 45 mmHg  
• For clients with stable COPD when breathing air at rest and awake, and who have partial pressure of oxygen (PaO₂) on arterial blood gases consistently < 55 mmHg  
• For clients with stable COPD and evidence of either polycythaemia, pulmonary hypertension, or right-sided heart failure, and with PaO₂ ≤ 60 mmHg  
• Where access to arterial blood gases is not possible a pulse oximetry O₂ reading of 88% or less on room air |
| Oral ti-costeroids  | • A short course is useful in exacerbations to shorten duration of episode for clients with stable COPD  
• Long term monotherapy with oral corticosteroids is not recommended in COPD because of an unfavourable benefit-to-risk ratio |
| Antibiotics         | • Useful for treating exacerbations of COPD due to bacterial infections  
• Used in frequent relapses/exacerbators with high sputum volume and concomitant bronchiectasis/asthma |
| Anti-tussives       | • Trial of antitussive/expectorant for chronic sputum producers e.g. Bromhexine (Bisolvon, non PBS)  
• Regular use of antitussives is contraindicated in stable COPD |
| Symptom relief      | • Nebulised saline 5 - 10 mL QID prn |

6 Reference: [1]  
7 Reference: [2]  
8 Reference: [3]
5. Care plans

Table 3. Care plan for people at high risk of COPD

<table>
<thead>
<tr>
<th>Action</th>
<th>Review frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dx</strong></td>
<td><strong>Ongoing</strong></td>
</tr>
<tr>
<td>Height</td>
<td>✓ 2 yrly</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>✓ Each visit</td>
</tr>
<tr>
<td>Physical activity</td>
<td>✓ Each visit</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓ Each visit</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓ Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
</tbody>
</table>
Table 4. Care plan summary for people with COPD

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Pulse rate</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Respirations</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Spirometry</td>
<td>✓</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Oxygen saturations</td>
<td>✓</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification education</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social emotional support</td>
<td>✓</td>
<td></td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Inhaler puffer technique</td>
<td>✓</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>2 mthly</td>
<td></td>
</tr>
<tr>
<td>COPD action plan</td>
<td>✓</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>Anually</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Recommended - see the current edition of the Australian Immunisation Handbook for schedule</td>
</tr>
<tr>
<td>FBC</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self monitoring</td>
<td>✓</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>HW/RN review</td>
<td>✓</td>
<td></td>
<td>6 mthly</td>
<td>6 mthly</td>
<td>2 mthly</td>
</tr>
<tr>
<td>MO/NP review</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>6 mthly</td>
<td></td>
</tr>
<tr>
<td>Medication review</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary rehabilitation</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist MO</td>
<td>✓</td>
<td>2 yrly</td>
<td>12 mthly</td>
<td>12 mthly</td>
<td></td>
</tr>
</tbody>
</table>
6. References

1. NACCHO, Evidence base to a preventive health assessment Aboriginal and Torres Strait Islander peoples in Preventive health assessment in Aboriginal and Torres Strait Islander peoples. 2012, RACGP: Melbourne

7. Resources


Coronary heart disease

High risk groups
- People with diagnosed coronary artery disease such as stable or unstable angina, myocardial infarction (MI), heart failure or other vascular or heart disease

Considerations for post-menopausal women
- Oestrogen and progestin agents should not be prescribed for primary or secondary prevention of coronary heart disease (CHD)\(^1\)
- If hormone replacement therapy is prescribed for other conditions, risks and benefits must be considered\(^1\)

Urgent referral
- For acute cardiovascular conditions (e.g. MI) or a sudden deterioration in condition, refer to Cardiovascular emergencies in the current edition of the PCCM, the MO/NP or cardiologist

Special considerations
- In managing CHD the following co-morbidities and screening must be considered
  - Dyslipidaemia, page 210
  - Hypertension, page 228
  - Diabetes type 2, page 196
  - Chronic kidney disease, page 112

1. What is coronary heart disease (CHD)?
- Also called coronary artery disease (CAD) and ischaemic heart disease (IHD)
- An inflammatory disorder involving the slow build-up of fatty cholesterol-containing deposits (plaque) in the inner wall of one or more of the heart’s arteries (coronary arteries)
- The narrowing of the coronary arteries prevents oxygenated blood from reaching heart muscle causing ischaemia and pain (angina pectoris)
- When there is partial narrowing of the coronary arteries, chest pain may occur that lasts several minutes and is relieved with rest and nitroglycerine medication. This is known as stable angina\(^2\)
- Pain lasting longer than 15 minutes or occurring at rest is more likely to be a sign of an acute coronary syndrome\(^3\)
- Acute coronary syndrome is a term used collectively to describe acute myocardial infarction or unstable angina and is diagnosed by electrocardiogram (ECG), blood test results and clinical history
- Myocardial infarctions occur when the plaque ruptures and a clot forms to completely block blood flow to part of the heart muscle. This is a life-threatening situation which requires immediate management
- Heart failure can occur because of poor left ventricular function due to CHD
2. Diagnosis of CHD

- Based on history, clinical presentation and risk factors
- May be confirmed with changes on the resting 12 lead ECG, and/or elevation of the cardiac enzymes (blood results)
- Further assessment may include a cardiac stress test or coronary angiography
- Many women report an ache, tightness, pressure or fatigue, not pain

3. Management

3.1 Factors complicating management

- In managing CHD the following co-morbidities and screening must be considered
  - Dyslipidaemia, page 210
  - Hypertension, page 228
  - Acute coronary syndromes often unmask pre-diabetes or type 2 diabetes. These people may not experience chest pain due to poor sensation (neuropathy) but may have symptoms such as shortness of breath, feeling ‘unwell’, clamminess and poor colour (see Diabetes type 2, page 196)
  - Chronic kidney disease, page 112
  - Assess for asthma, peripheral vascular disease, anaemia and thyroid disease

3.2 Support client self management

- Evidence links depression and social isolation with CHD
- Particular regard must be made to lifestyle modification to meet target management goals (see Table 1)
- Provide culturally appropriate information to the client about CHD and its risk factors
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding
- Support the client to monitor any chest pain: how often they get it, when it occurs (rest or activity) or any changes to the pattern of pain (frequency, intensity and duration)
- Provide client with a CHD action plan (see Resource 1)
- Refer client to The COACH Program, a free phone coaching service which helps clients manage their condition (see Resource 2)
- Start a newly diagnosed CHD client on a Cardiac Rehabilitation care plan supplied by the Physiotherapist of the discharging facility
Table 1. Target management goals for risk factors

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>• Cease smoking completely and avoid secondhand smoke</td>
</tr>
</tbody>
</table>
| Diet and nutrition | • Limiting saturated fats to < 7% and trans fats to < 1% of total energy intake  
|                 | • Limiting salt intake ≤ 4g/day (1550 mg sodium)                      |
| Alcohol         | • ≤ 2 standard alcoholic drinks per day                               |
| Physical activity | • At least 30 minutes of moderate intensity (that which causes a noticeable increase in depth and rate of breathing) physical activity on most, if not all, days |
| Weight          | • Healthy waist circumference for men is < 94 cm                       |
|                 | • Healthy waist circumference for women is < 80 cm                    |
|                 | • BMI of 18.5 kg/m² - 24.9 kg/m² is considered a healthy weight range |
| Lipids          | • LDL-C < 2.0 mmol/L (< 1.8 mmol/L in stented clients)                 |
|                 | • Triglyceride (TG) < 2.0 mmol/L                                    |
|                 | • HDL-C > 1.0 mmol/L                                                  |
|                 | • NHDL-C < 2.5 mmol/L                                                 |
| Blood pressure  | • < 130/80 mmHg                                                       |
| Diabetes        | • Fasting blood glucose level between 4.0 and 6.0 mmol/L              |
|                 | • HbA1c ≤ 7%                                                          |

3.3 Social emotional wellbeing

- Depression is approximately three times more common in clients after an MI than in the rest of the population
- Prognosis is worse for clients with both CHD and major depression or elevated depressive symptoms, than in clients with CHD alone
- Depression is also associated with decreased adherence to medicines and reduces the chances of successful modification of other risk factors and participation in cardiac rehabilitation
- Assess the client’s level of social support, as a lack of social support is a significant risk factor for CHD
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale. (for examples see Resource 3) Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 After significant cardiac event

- Eligible clients include those who have had a myocardial infarction and unstable angina, exertional angina, controlled heart failure, revascularisation procedures or any other cardiac surgical procedures
- Provide education and counselling around the cardiac event, the need for heart rehabilitation, lifestyle changes, medications, how to manage CHD and the need for
ongoing monitoring
• Suspend CHD care plan and begin a cardiac rehabilitation care plan
• This written plan outlines staged resumption of exercise and activities
• Assigned by referring hospital by referral or on electronic information system
• Cardiologist/cardiac rehabilitation nurse review at 6 - 8 weeks
• Cardiothoracic surgeon review 6 - 8 weeks post surgery

4. Medications
• The aim of drug treatment is to reduce the risk of MI or death and to provide relief from symptoms
• A selective serotonin reuptake inhibitor (SSRI) is safe and effective to manage depression in people with comorbid CHD¹ (potential interaction with Warfarin)
• All clients with CHD should be on statin medication to control cholesterol²
• Do not use sildenafil citrate if the client has used any nitrate preparation (GTN) isosorbide in the last 24 hours or is hypotensive
• Consider GTN spray for a client who has recently experienced chest pain
• Encourage client to identify any barriers and solutions to taking medications
• MO/NP or pharmacist to review medications
### Table 2. Medications for coronary heart disease

<table>
<thead>
<tr>
<th>Suggested medications</th>
<th>Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antiplatelet</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Aspirin               | • 75 - 100 mg unless contraindicated  
|                       | • If aspirin is contraindicated use Clopidogrel  
|                       | • After stenting 300 mg daily for 4 weeks then as above |
| Clopidogrel           | Recommended in combination with Aspirin for  
| Ticagrelor            | • 1 year after all Acute Coronary Syndrome (ACS)  
|                       | • 1 year after drug eluting stent implant and 6 weeks after bare metal stenting |
| **ACE inhibitors (ACEi)** |      |
| Perindopril           | Recommended in combination with Aspirin for  
| Ramipril              | • 1 year after all ACS  
| Lisinopril            | • 1 year after drug eluting stent implant and 6 weeks after bare metal stenting |
| **Beta-blockers**     |      |
| Atenolol              | • In all clients unless contraindicated  
| Metoprolol            | • For high risk clients including those with left ventricular (LV) systolic dysfunction, persistent evidence of ischaemia and ventricular arrhythmias  
| Carvedilol            | • Maximise dose against heart rate  
| Bisoprolol            | • Change to these beta-blockers in clients with left ventricular (LV) dysfunction |
| Metoprolol XL         |      |
| **Statin**            |      |
| Atorvastatin          | • Statin therapy is recommended for all people with CHD and primary prevention in clients at high risk of coronary disease  
| Simvastatin           | • High dose atorvastatin 80 mg nocte in clients who have had ACS |
| Pravastatin           |      |
| Rosuvastatin          |      |
| **Anticoagulant**     |      |
| Warfarin              | • Should be considered in clients who have atrial fibrillation. Indicated for clients with ventricular thrombus as complication of ACS. Can be combined with Aspirin but should be monitored closely  
|                       | • For those with AF, where warfarin is inappropriate, consider Dabigatran, Rivaroxaban or Apixaban |
| **Calcium channel blockers** |      |
| Amlodipine            | • Diltiazem and Verapamil may be used instead of beta blockers as anti-anginal agents when beta blockers are contra-indicated  
| Diltiazem             | • Amlodipine may be added to a beta blocker if symptoms are not controlled  
| Verapamil             | • Diltiazem and Verapamil may cause severe bradycardia and heart block when used with beta-blockers  
|                       | • Amlodipine may cause palpitations and tachycardia |
| **Anti-anginal medications** |      |
| GTN spray or tablets or patches | • These medications are of no prognostic benefit – symptomatic relief only  
| Isosorbide-Mononitrate |      |
| Nicorandil            |      |
| Ivabradine            |      |
5. Care plan

Table 3. Coronary heart disease care plan

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>Once</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Heart rate</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>BP</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>FBC</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>UEC</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Fasting lipids</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Fasting blood glucose</td>
<td>✓</td>
<td>12 mthly or more frequently if not on target or if medications recently altered</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>ACR</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Risk factor education</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
<td>Recommended - see the current edition of the Australian Immunisation Handbook for schedule</td>
</tr>
<tr>
<td>MO/NP review</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>HW/RN review</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Cardiologist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Cardiac rehabilitation</td>
<td>✓</td>
<td>After cardiac event</td>
</tr>
<tr>
<td>CV risk assessment</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
</tbody>
</table>
6. References


2. The State of Queensland (Queensland Health) and the Royal Flying Doctor Service (Queensland Section) 2013. Primary Clinical Care Manual. Cairns


7. Resources


1. What is dementia?

- Dementia is a clinical syndrome characterised by a progressive and irreversible deterioration in cognition (which can include language, memory, perception and personality) resulting in overall functional decline.
- It is not a normal part of ageing and typically affects people over the age of 65.
- Consciousness is not impaired.
- Impairment of cognitive function is commonly accompanied by deterioration in emotional control, social behaviour and motivation.

Signs and symptoms include:
- Memory loss, especially of recent events
- Difficulty performing familiar tasks
- Confusion about time and place
- Language problems
- Problems with abstract thinking
- Poor or decreased judgement
- Problems misplacing things
- Personality or behavioural change
- Loss of initiative

- The rate of dementia in Aboriginal and/or Torres Strait Islander peoples is up to 5 times higher than non-Indigenous Australians.
- There is considerable evidence to suggest lifestyle modification (see Lifestyle modification section) to manage vascular risk factors may also reduce the risk of developing dementia.
- Common types of dementia include:
  - Alzheimer's disease (50 - 75%)
  - Vascular dementia (20 - 30%)
Section 2: Management of diagnosed conditions

- dementia with Lewy Bodies (5 - 10%)
- frontotemporal dementia (up to 5%)

- The course of dementia is characterised in 3 stages
  - mild or early stage dementia where deficits such as self care and memory changes may become evident
  - moderate or middle stage dementia where deficits usually become obvious and the person requires assistance to maintain function
  - severe or late stage dementia characterised by high dependence

- An increased risk of dying prematurely amongst those with dementia

2. Diagnosis

- Dementia is a clinical diagnosis that has no single test to categorically confirm its presence or absence (see Figure 1)

- Initial screening may include the use of tools such as
  - the Kimberley Indigenous Cognitive Assessment (KICA) Screen or KICA Carer can be used for Aboriginal and Torres Strait Islander people from 45 years of age and should be followed by cognitive assessment using the KICA-Cog tool (see Resource 1)
  - the General Practitioner (GP) assessment of cognition (GPCOG) is designed for use by GPs for the general population (see Resource 2)
  - other screening tools include the Mini Mental State Examination (MMSE) and the Rowland Universal Dementia Assessment Scale (RUDAS) (see Resource 3)
  - functional assessment tools, such as the Functional Activities Questionnaire (FAQ) or the Barthel Index, assess a person's activity of daily living function and level of disability

- Routine laboratory investigations along with evaluation of thyroid hormone levels, vitamin B12, folate and calcium should be undertaken to identify other potential co-morbidities and exclude differential diagnoses

- Neurological imaging should be undertaken to exclude intracranial pathology

- Differential diagnosis may include: drug or alcohol factors, thyroid disease, vitamin deficiency, medication side effects or mental illness such as severe depression, all of which could result in cognitive impairment

- Since dementia, delirium and depression have overlapping features and can co-exist, it is important to distinguish between these conditions using validated scales (see Resource 4) such as
  - the Confusion Assessment Method (CAM) to distinguish delirium from dementia and
  - the Geriatric Depression Scale (GDS) or the Cornell Scale for Depression in Dementia (CSDD) to distinguish depression from dementia

- Comprehensive assessment by a specialist is required to confirm the diagnosis and classify the dementia type
3. Identification of cognitive decline reported by the individual or carer through screening

Refer to MO

- **Cognitive assessment**
  - KICA tool
  - GPCog tool
  - Other tools

- **Laboratory**
  - FBC, TSH, Chem20, B12, folate, MSU & BGL

- **Activities of daily living (ADL) assessment**
  - e.g. Functional Activities Questionnaire (FAQ)

- **Assess**
  - co-morbidities
  - depression, delirium, others

**Neurological imaging**
  - to identify sub-type and exclude intracranial pathology

Is delirium, depression or other pathology excluded?

- **NO**
  - Treat delirium, depression or other pathology and reassess in 6 - 12 months

- **YES**
  - Likely diagnosis of dementia
    - Refer to geriatrician/specialist for confirmation of diagnosis and sub-type and advice concerning appropriate medications

  **Provide client and carer education**
  - Signs and symptoms
  - Course and prognosis of sub-type
  - Treatments
  - Local care/support services/transport
  - Financial, legal and advocacy advice

  - Refer to community and access support services. See useful resources at end of guide

**Figure 1. Recognition, assessment and diagnosis care pathway**
3. Management

• Dementia is a stigmatising diagnosis

• All individuals with dementia have a life history and they are often aware when they are not consulted or valued as experts in their own health and lifestyle

• An understanding of the person with dementia is important, and inclusive language is one key element in reducing stigma and facilitating best care

• It is essential that people with dementia be respected and supported to maximise their involvement in their own care

• Management of dementia involves building a therapeutic partnership with the individual and the caregiver(s) who will support the person to live a productive and active life

3.1 Support client self management

• Provide resources to the individual with dementia (see Resource 5)

• Maximise independent living by supporting initiatives such as counselling, education, behaviour modification and exercise training as appropriate

• Utilise community support services to enhance safety, reduce risk and support the person to stay in their own home (e.g. Home and Community Care) (see Resource 6)

• Promote safety through awareness of hazards such as trips, slips, burns, fires and security doors

• Encourage the person, family and/or carers to identify barriers to adequate lifestyle modification and clinical adherence and to set goals to overcome those barriers based on their capacity and understanding

3.2 Social emotional support

• Individuals are often already aware there is something wrong and diagnosis may provide some relief²

• Providing diagnosis will allow individuals to plan for future issues such as advanced care directives, financial control, enduring powers of attorney and guardianship²

• Be alert for signs and symptoms of depression and anxiety noting that major depression may be difficult to detect in people with dementia (see Resource 4)¹⁰,¹¹

• Acknowledge concerns of the person with dementia or their carers and provide reassurance and support

3.3 Behavioural changes

• Unless there is imminent risk of harm, understanding behavioural changes due to medical factors (e.g. pain, constipation and incontinence), poor carer communication and unmet emotional needs is recommended before commencing medication

• As a consequence of brain changes a person with dementia may show signs of changing, and sometimes concerning, behaviours⁵

• Behaviours may resolve on their own or escalate as the disease progresses⁵
A concerning behaviour is that which causes stress, worry, risk of or actual harm to the person, their carers, staff, family members or those around them and may include:

- verbal or physical aggression
- repetitive actions or questions
- resistance or refusal of personal care or services
- sexually inappropriate behaviour
- problems associated with eating
- socially inappropriate behaviour
- intrusiveness, disorientation or agitation/frustration
- sleep disturbance

Concerning behaviours are an obstacle to achieving the best quality of life for the person with dementia and need to be addressed.

Discuss behaviour changes as they can be distressing for both the individual and carer (see Resource 7).

- identify triggers to negative behavioural exacerbations
- advise carers not to take behaviour personally and to recognise inappropriate behaviour as a symptom of dementia
- use behavioural modification techniques, routine and medication to manage behavioural changes if required
- music therapy has been successful with behavioural changes
- avoid conflict by listening to the person’s perspective whenever possible
- use distraction only after empathetically listening and addressing concerns
- maintain routine with regular activities and tasks
- invest time in enjoyable activities that help soothe and calm the person with dementia
- communicate quietly and calmly

3.4 Client functional capacity

A referral to an occupational therapist should be made to regularly assess individual and carer ADLs (activities of daily living) and IADLs (instrumental activities of daily living) to ensure individual health, safety and support.

3.5 Carer support

Dementia is an increasing source of carer stress and burden.

Over 80% of carers of people with dementia are family members.

Provide the carer with resources to assist with their own needs (see Resources 5. and 8).

Ensure the carer is provided opportunities for support and is referred to all available service co-ordination and interventions.

Encourage active participation in educational interventions for caregivers.

Refer carers in remote areas to visiting services, telephone or online support.

Carers may experience isolation and abuse if the person with dementia has become violent or agitated.
Referral to respite allows carers to have a break and for the person with dementia to stay in their home longer (see Resource 9).

Tips for the carer of a person with dementia include:

- Depending on the severity of the dementia, explain to the person who you are, what you want to do and why.
- The person is likely to take cues from you and will mirror your relaxed and positive body language and tone of voice.
- Move slowly and be mindful of fast hurried movements which might convey agitation.
- If the person is resistant or aggressive but is not causing harm, leave them alone to provide time to settle down.
- Distract the person by talking about things they enjoyed in the past, and by giving them a non-threatening item, such as a face washer, to hold while you are providing care.
- Avoid arguing with the person.
- Maintaining a quiet comfortable environment by regularly reducing noise levels (e.g. turning off the radio and television) and avoiding invasion of personal space may reduce agitation and the risk of assault and aggression.
- Provide orienting cues such as a clock and calendar.
- Provide reassurance when providing care, lower yourself to the person’s level and make eye contact, maintaining personal safety if the person becomes aggressive (e.g. provide care from the side to avoid being hit or kicked).
- Monitor food and fluid intake and elimination as dehydration and/or constipation can exacerbate confusion.
- Walk with the person or engage them in an activity to help maintain mobility and physical activity.
- Monitor compliance with medication and general physical health.

3.6 Physical activity

- Attention to cardiovascular risk factors may improve cognitive function and/or reduce dementia risk.
- Consider increased physical activity as early intervention for dementia.
- Depending on client capability, encourage weekly:
  - 150 - 300 minutes of moderate intensity physical activity or
  - 75 - 150 minutes of vigorous intensity physical activity.
- Be active on most, preferably all, days every week.
- Be mindful of the risk of falling during exercise, especially in combination with medications.
- Do muscle strengthening activities on at least 2 days each week to maintain strength, prevent falls, and to reduce risk factors for cardiovascular disease and type 2 diabetes.
- Refer to a strength and balance group.
• Avoid long periods of sitting as much as possible

3.7 Diet and nutrition

• See Diet and nutrition, page 14
• Ensure the person has regular access and ability to find food and fluids
• Engage dietitian and speech pathologist assistance if required
• People with dementia may need to be encouraged to eat and drink orally for as long as possible

3.8 Palliation support

• Feelings of grief and loss need to be anticipated from the time of diagnosis to death and grief and bereavement counselling should be available to people with dementia and carers
• A conference with involved clinicians and the family can provide an opportunity to discuss end-of-life issues
• The use of advance care planning will help the person with dementia to retain some control over their care and personal life and should be considered where the possibility of death within 12 months is high
• The MO/NP in conjunction with the person should assess the impact of dementia on ADLs, arrange for visiting physiotherapist and/or occupational therapist for home assessment and other support such as wheelchairs and bedding
• Assess for home falls risk (see Resource 10)
• Individuals should be assessed for the risk of developing pressure ulcers using The Waterlow Pressure Ulcer Risk Assessment Tool (see Resource 11)
• Management of pressure ulcers involves
  – addressing contributing factors e.g. continence, diabetes, age and immobility
  – wound care
  – use of pressure beds, mattresses or cushions
  – regular mobilisation and repositioning
• If consenting, refer eligible people to community support services e.g. HACC and MASS (see Resource 6. and 12)

4. Medications

• Use of medications may slow cognitive decline but does not halt disease progression
• Minimise or eliminate medications that contribute to cognitive impairment
• Simplify medication regime by using blister/webster packs, electronic dispensers or provide medication prompting (by clinician or third party service)
• Table 1. provides specific medications for the treatment of dementia
• Consider anti-psychotics for behavioural or psychological symptoms such as anxiety, depression or agitation where there has been poor response to psychosocial interventions and for people who have a low to moderate risk of stroke
– second generation anti-psychotics are safer than first generation
– always start on the lowest dose with gradual dosing increases as tolerated
– benzodiazepines should not be used for longer than 2 weeks
– be mindful of the falls risk when prescribing benzodiazepines

- Table 2. provides medication choices for the treatment of mood and behavioural changes in the person with dementia
- Treatment of depression in people with dementia should focus on non-drug therapies and carer interventions
- Ensure regular review of medications and the person’s response to them

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholinesterase inhibitors</td>
<td>• Donepezil 5 mg orally nocte for 4 weeks up to 10 mg nocte&lt;br&gt;• Galantamine PR 8 mg orally mane for 4 weeks up to 16 mg (if deterioration after initial good response increase dose to 24 mg daily if tolerated)&lt;br&gt;• Rivastigmine 4.6 mg transdermally, applied daily for 24 hours for 4 weeks up to 9.5 mg&lt;br&gt;• Rivastigmine 1.5 mg orally b.d. for 2 weeks up to 3 mg b.d. with further increases to 4.5 mg and 6 mg b.d. may be considered every 4 weeks as tolerated&lt;br&gt;• Requires specialist approval&lt;br&gt;• May stabilise cognitive and functional decline in early stages&lt;br&gt;• Side effects include gastrointestinal symptoms, insomnia, lethargy, depression, drowsiness, vivid dreams and weight loss&lt;br&gt;• Use with caution in clients with asthma, COPD, peptic ulcer disease and cardiac conduction abnormalities</td>
</tr>
<tr>
<td>Glutamate blocker</td>
<td>• Memantine 5 mg orally mane 1st week; 5 mg b.d. 2nd week; 10 mg mane and 5 mg nocte in 3rd week, thereafter 10 mg b.d.&lt;br&gt;• Requires specialist approval&lt;br&gt;• For advanced dementia&lt;br&gt;• May be used in conjunction with a cholinesterase inhibitor&lt;br&gt;• Side effects include confusion, dizziness, drowsiness, headaches, insomnia, agitation and hallucinations&lt;br&gt;• Should be used with care in clients with renal impairment</td>
</tr>
</tbody>
</table>
### Table 2. Medications for mood and behavioural changes in dementia¹⁰,¹¹,¹³,¹⁴,¹⁵

<table>
<thead>
<tr>
<th>Class</th>
<th>Recommended drug and dose</th>
</tr>
</thead>
</table>
| Antipsychotic  | • Risperidone 0.25 mg orally b.d. gradually increasing by 0.25 mg every 2 days if needed up to 2 mg daily  
• Olanzapine 2.5 mg orally daily gradually increasing by 2.5 mg every 2 days if needed up to 10 mg daily in single or 2 divided doses (non PBS)  
• Sometimes effective for psychotic symptoms (hallucinations and delusions) and behavioural symptoms (physical aggression)  
• Avoid in people with a history of Parkinson's disease or who respond with strong extrapyramidal effects (muscle rigidity, tremor and Parkinsonism) and in those who have dementia with Lewy bodies  
• Favour those with sedating qualities  
• Where appropriate, seek informed consent from the client or caregiver  
• Use of antipsychotics may increase the risk of stroke  
|                |                                                                                                                                                                                                                                                                                                                                                     |
| Benzodiazepines| • Temazepam 5 - 10 mg orally before bedtime  
• Oxazepam 7.5 mg orally, 1 - 3 times daily  
• Benzodiazepines may be useful for anxiety  
• Shorter acting temazepam and oxazepam are preferred over longer-acting agents  
• May increase confusion, sedation, increased falls risk, immobility, hypotension and reduced engagement  
• Not recommended for severe aggression  
|                |                                                                                                                                                                                                                                                                                                                                                     |
| Antidepressants (SSRIs preferred) | • Citalopram  
• Mirtazapine  
• Sertraline  
• For details see Depression, page 172  
|                |                                                                                                                                                                                                                                                                                                                                                     |
### 5. Care plan

**Table 3. Dementia care plan**

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
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<td>Once</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>BP</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>FBC, TSH, Chemzo (E/LFT's), B12, Folate</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓</td>
<td>Each visit to assess for infection</td>
</tr>
<tr>
<td>Continence</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Carer education and support</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Nutrition</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓</td>
<td>Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>HW/RN review</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>MO/NP review</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Specialist review</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>HACC</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>MASS</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Falls risk assessment</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Palliation</td>
<td>✓</td>
<td>As required</td>
</tr>
</tbody>
</table>
6. References

7. Abbey J, et al., Clinical Practice Guidelines and Care Pathways for People with Dementia Living in the Community. 2008, Brisbane: Queensland University of Technology
8. Alzheimer’s Australia, Towards a National Dementia Preventative Health Strategy. 2010: Canberra

7. Resources


Dental caries and periodontal disease

High risk groups

- People with poor diets due to poor choices or limited access to fresh foods
- People with diabetes, cardiovascular disease and other chronic conditions
- Pregnant women
- People with intellectual or physical impairment
- People living in areas without fluoridated tap water
- People living in rural and remote locations
- Aboriginal and Torres Strait Islander peoples
- Low income and socially disadvantaged persons

Considerations for women of child-bearing age

- Periodontal disease is a risk factor for pre-term and low birth weight babies

Urgent referral

- A MO/NP or dentist should review any client with facial swelling, avulsed (knocked out) teeth or significant soft tissue trauma
- For acute periodontal disease and toothache see the current edition of the Primary Clinical Care Manual (PCCM)

1. What is dental caries and periodontal disease?

- The two main oral diseases experienced by Australians are dental caries (tooth decay) and periodontal disease (gum disease)
- Dental caries is a pathological process resulting from localised destruction of tooth tissue
  - the process begins with demineralisation of the hard tissue by acids originating from plaque bacteria metabolising carbohydrates (from sugary foods and drinks)
  - in the presence of acid, calcium and phosphate ions that make up the tooth surface diffuse out of the tooth enamel (demineralisation). The enamel eventually breaks down to form a hole or cavity (dental caries or decay)
  - saliva plays an important role in the remineralisation of the tooth surface
  - the risk of dental caries is increased by any medical condition, medication or behaviour that causes a dry mouth
- Periodontal disease is a chronic inflammation of the gums and structures that support the teeth
  - caused by plaque bacteria which results in deep inflammation of the gums
  - progresses slowly and is often painless
  - the teeth loosen and may eventually be lost
  - if left untreated, may destroy the attachment that holds the tooth in the bone leaving a space or ‘pocket’ where more bacteria can collect and cause permanent bone loss
- Oral diseases impact on other disease processes, such as diabetes and heart disease
2. Diagnosis of dental caries and periodontal disease

- Identification of dental caries and periodontal disease is usually a simple case of gaining a brief history and examining the mouth.

- Dental caries can be identified by:
  - holes/cavities or structural damage which can be brown or black in appearance
  - early non-cavitated lesions which are white or frosty in appearance
  - symptoms such as pain or sensitivity
  - bad breath or a bad taste in the mouth
  - x-rays by a dental practitioner

- Periodontal disease can be identified by:
  - gums that spontaneously bleed or bleed during brushing
  - inflamed and swollen or receding gums
  - pain or tenderness
  - bad breath or a bad taste in the mouth
  - sensitive, loose or lost teeth

3. Management

- The most effective way of improving and maintaining oral health is through effective oral hygiene, a healthy diet and regular dental visits.

- While the use of fluoride is an important strategy in the prevention of dental caries, it is important for dental practitioners and health professionals to encourage evidence-based behaviours which promote and maintain oral health, namely:
  - practise good oral hygiene
  - choose healthy snacks like fruits, cheese and vegetables
  - limit sugary foods and drinks
  - chew sugar free gum
  - do not smoke (see Smoking cessation, page 44)
  - breastfeed where possible
  - wear a mouthguard when playing contact sports
  - seek regular dental care
  - arrange for children to have a dental assessment by 2 years of age
  - drink plenty of tap water

3.1 Support client self management

- See Lifestyle modification section with particular reference to Smoking cessation, page 44, Alcohol reduction, page 4 and Diet and nutrition, page 14

- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and provide goals to overcome those barriers based on their capacity and understanding

- Provide educational material regarding dental caries and periodontal disease and how they progress (Resource 1)
3.2 Social emotional support

- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (for examples see Resource 2). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis.
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition.

3.3 Diet and nutrition

- See Diet and nutrition, page 14
- The frequency of exposure to sugars and acids is the most significant dietary factor in the development of dental caries.
- All fermentable carbohydrates e.g. sugars and starches can contribute to dental caries.
- The frequency (not the amount) to which the oral environment is exposed to carbohydrates plays a major role in the decay process.
- Sticky foods e.g. dried fruit and lollies are a higher risk to teeth than foods which are easily washed away, e.g. cheese and fruits.
- Frequent snacking increases the length of time acids are present in the mouth and their contact with tooth surfaces.
- Greater time between snacking reduces acid and allows greater time for remineralisation (repair process).
- Limit the frequency of consumption of sweet and acidic drinks such as soft drinks, diet soft drinks, sports drinks and juice.
- Avoid chewing or sucking acidic vitamin tablets.

3.4 Fluorides

- Water fluoridation is the most effective, equitable and efficient measure for reducing dental caries in a community.
- In communities where there is no access to a fluoridated drinking water supply:
  - dental practitioners can provide advice about access to alternate sources of fluoride such as mouth rinses, high fluoride toothpastes and fluoride supplements.
  - dental practitioners and other health professionals can advocate on behalf of their community for water supplies to be fluoridated while encouraging behaviours which promote and maintain oral health.
- For further information about fluoride efficacy and safety see Resource 3.

3.5 Smoking cessation

- See Smoking cessation, page 44
- Smoking reduces the blood oxygen supply to the gums and increases the risk of developing periodontal disease.
• Smoking causes bad breath and stained teeth and contributes to greater levels of tooth loss
• Acute ulcerative gingivitis occurs predominantly in smokers\textsuperscript{11}
• Smoking and excessive alcohol consumption are significant risk factors for developing oral cancers\textsuperscript{2}
• Provide literature and refer client to a suitable smoking cessation program (see Resource 3)

3.6 Toothpastes and gels
• Toothpastes and gels are the most common substances used by Australians for brushing teeth
• Use of these should be encouraged as they\textsuperscript{4}
  – provide a source of fluoride and promote remineralisation of the tooth surface
  – can reduce tooth sensitivity
  – reduce the build up of bacteria and plaque and
  – assist in the removal of surface stains

• From 6 months (the age that teeth first erupt) to 18 months of age
  – children's teeth should be cleaned without toothpaste by a responsible adult\textsuperscript{10}
  – for children living in areas with unfluoridated water supplies, teeth should be brushed twice a day with a small pea-sized amount of low fluoride toothpaste by a responsible adult

• Between 18 months and 5 years of age
  – the teeth should be cleaned twice a day with a small pea-sized amount of low fluoride children's toothpaste
  – when finished children should spit out, not swallow, and not rinse
  – children should always use toothpaste under the supervision of a responsible adult\textsuperscript{10}
  – children should avoid licking or eating toothpaste

• For everyone over 6 years of age
  – the teeth should be cleaned twice a day or more frequently with standard fluoride toothpaste
  – when finished spit out, do not swallow, and do not rinse\textsuperscript{10}

• Children should not be allowed to dispense toothpaste without supervision
• Keep toothpaste out of reach of children

3.7 Toothbrush or denture brush
• The use of a brush is the primary home-care strategy for most people
• A brush should be selected for maximum cleaning efficiency of all exposed tooth surfaces or prostheses
• The grip, head size, shape and flexibility of the bristles are important factors to match to the needs of the individual
• Its effectiveness depends on the technique used by, and the physical ability of, the
individual

- Hard brushes and abrasive toothpastes can damage the teeth and soft tissues, resulting in tooth wear, ulcerations and gum recession
- Electric toothbrushes are an effective, often superior, plaque removal tool and are especially useful where a person’s manual dexterity is limited
- Replace the toothbrush after 3 - 4 months or sooner if bristles become frayed with use

3.8 Interdental cleaning

- Toothbrushes do not adequately remove plaque from between teeth
- Used correctly, dental floss, ribbon and tape are effective means of removing plaque from between teeth
- Pre-threaded flossing tools and interdental brushes are available for people with limited dexterity

3.9 Fluoride varnish

- Can be used for the prevention of dental caries and those deemed at risk of dental caries
- In Queensland only dental practitioners can apply fluoride varnish
- Fluoride varnish releases fluoride over 24 hours to increase calcium fluoride reserves and long term fluoride release
- Can be applied to all teeth or as spot application on individual teeth or localised areas

3.10 Sugar-free chewing gum

- Can act as a mechanical salivary stimulant
- Accelerates the clearance of dietary substances and micro-organisms
- Dilutes and buffers acid
- Can also act as a vehicle for anti-plaque and re-mineralising agents

3.11 Reduce xerostomia (dry mouth)

- Saliva is the body's natural defence against tooth decay and
  - washes away food debris from around the teeth
  - neutralises harmful acids produced by plaque and foods and drinks
  - protects the soft tissues of the mouth
  - prevents fungal infections
  - acts as a vehicle for minerals such as fluoride, calcium and phosphate, which help strengthen tooth enamel
- Reduced saliva flow is attributed to
  - increasing age
  - Sjögren's syndrome, lupus, diabetes, Alzheimer’s disease and stroke
  - antidepressants, antihistamines, decongestants, antihypertensives, painkillers and diuretics
— chemotherapy and radiotherapy
— smoking and drinking alcohol or caffeinated beverages
— snoring and breathing through your mouth
— depression and stress
— dehydration from fever, vomiting, diarrhoea, exercise or low fluid intake

- Actions to improve saliva production and relieve a dry mouth include
  — chewing sugar-free gum
  — using ‘saliva substitutes’ (available from most pharmacies)
  — spraying water into the mouth frequently using an atomiser
  — taking frequent small sips of water
  — avoiding sugary sweets or drinks to relieve the feeling of a dry mouth
  — not smoking
  — limiting alcohol consumption
  — limiting intake of caffeinated drinks such as tea, coffee and soft drinks
  — using gravies and sauces to make food softer and easier to chew and swallow

3.12 Mouth rinses
- Should be used only as an adjunct to toothbrushing to deliver a therapeutic or cosmetic effect to the teeth
- Therapeutic agents in mouth rinses may be effective in reducing plaque and gingivitis
- Fluoride containing mouth rinses have caries-inhibiting effects
- Fluoride containing mouth rinses should only be prescribed by a dental practitioner
- Avoid mouth rinses containing alcohol

4. Medications
- For all clients with an acute periodontal disease or toothache see the current edition of the Primary Clinical Care Manual (PCCM) or refer to a dentist

4.1 Fluoride supplements
- The effectiveness of water fluoridation and fluoride toothpaste is well established
- Fluoride supplements (tablets or drops) are not recommended for use in Australia as a public health measure due to low levels of compliance
- Those living in regions with unfluoridated water supplies should be encouraged to consult a dentist for personal options on the use of fluoride supplements

4.2 Antibiotic prophylaxis
- Antibiotic prophylaxis for the prevention of infective endocarditis may be required before some dental procedures for clients (see Table 2) with certain cardiac conditions including
  — cardiac valve repair
  — previous infective endocarditis
- congenital heart disease (under certain conditions)
- cardiac transplantation
- rheumatic heart disease

• Anticoagulants may need to be ceased prior to dental procedures

### Table 1. Topical applications to reduce dental caries

<table>
<thead>
<tr>
<th>Application</th>
<th>Use in clients at high risk of dental caries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluorides</strong></td>
<td></td>
</tr>
<tr>
<td>Fluoride varnish 22,600 ppm (22.6 mg/mL)</td>
<td>• Applied to all at-risk dental surfaces by a dental practitioner only&lt;br&gt;• Twice a year depending on caries risk</td>
</tr>
<tr>
<td>Fluoride mouthwash 200 ppm (0.2 mg/mL)</td>
<td>• Can be used daily by adults and children aged 6 years or more who are at high risk of developing dental caries&lt;br&gt;• After rinsing, the mouthwash should be spat out, not swallowed&lt;br&gt;• Can be used daily by adults and children aged 10 years or more who are at high risk of developing dental caries</td>
</tr>
<tr>
<td>Neutral fluoride mouthwash 220 ppm (0.22 mg/mL)&lt;br&gt;900 ppm (0.9 mg/mL)</td>
<td></td>
</tr>
<tr>
<td>Neutral fluoride toothpaste 5000 ppm (5 mg/g)</td>
<td></td>
</tr>
<tr>
<td><strong>Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP)</strong></td>
<td></td>
</tr>
<tr>
<td>CPP-ACP sugar-free gum</td>
<td>• Can be used 4 times daily, preferably after meals and after cleaning teeth with a toothpaste containing fluoride</td>
</tr>
<tr>
<td>CPP-ACP cream</td>
<td>• Adults can apply the cream nightly to teeth after teeth cleaning and not rinse out</td>
</tr>
</tbody>
</table>
Table 2. Dental procedures requiring antibiotic prophylaxis for those at risk of infective endocarditis\(^{14}\)

**Prophylaxis always required**
- Extraction
- Periodontal procedures including surgery, subgingival scaling and root planing
- Replanting avulsed teeth
- Other surgical procedures e.g. implant placement, apicectomy

**Prophylaxis required in some circumstances**
- Consider prophylaxis for the following procedures, if multiple procedures are being conducted, the procedure is prolonged or periodontal disease is present
  - Full periodontal probing for clients with periodontitis
  - Intraligamentary and intraosseous local anaesthetic injection
  - Supragingival calculus removal/cleaning
  - Rubber dam placement with clamps (where risk of damaging gingiva)
  - Restorative matrix band/strip placement
  - Endodontics beyond the apical foramen
  - Placement of orthodontic bands
  - Placement of interdental wedges
  - Subgingival placement of retraction cords, antibiotic fibres or antibiotic strips

**Prophylaxis not required**
- Oral examination
- Intraligamental and block local anaesthetic injection
- Restorative dentistry
- Supragingival rubber dam clamping and placement of rubber dam
- Intracanal endodontic procedures
- Removal of sutures
- Impressions and construction of dentures
- Orthodontic bracket placement and adjustment of fixed appliances
- Application of gels
- Intraoral radiographs
- Supragingival plaque removal

**Standard prophylaxis**
- Amoxycillin 2 g (child: 50 mg/kg up to 2 g) orally, 1 hour before the procedure OR
- Amox/ampicillin 2 g (child: 50 mg/kg up to 2 g) IV, just before the procedure OR
- Amox/ampicillin 2 g (child: 50 mg/kg up to 2 g) IM, 30 minutes before the procedure

**OR for those**
- Hypersensitive to penicillin
- On long-term penicillin therapy or
- Who have taken penicillin or a related beta-lactam antibiotic more than once in the previous month
- Cephalosporin 2 g (child 30 mg/kg up to 2 g) IV, within 1 hour (ideally 15 - 30 minutes) before the procedure

**OR**
- Cephalosporin 2 g (child 30 mg/kg up to 2 g) IM, 30 minutes before the procedure

**OR for those with**
- Immediate hypersensitivity to penicillin
- Clindamycin 600 mg (child 20 mg/kg up to 600 mg) orally, 1 hour before the procedure OR
- Clindamycin 600 mg (child 20 mg/kg up to 600 mg) IV over at least 20 minutes, just before the procedure
## 5. Care plan

Table 4. Care plan for dental caries and periodontal disease

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral health education</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Self manage education</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Dentist or therapist R/V</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>RN/IHW R/V</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Dental specialist</td>
<td>✓</td>
<td>As per MO/NP or dentist referral</td>
</tr>
</tbody>
</table>
6. References


7. Resources

1. **What is depression?**

- Depression is a low or irritable mood, resulting in a loss of enjoyment or pleasure, which can be long lasting or recurrent and substantially impairs an individual’s ability to function.

- Clinical depression is common, serious and treatable. If left untreated, it can result in disability and even death.

- Risk of recurrences are common even when treated appropriately, with each new episode increasing the risk of future episodes of depression.

- Depression varies for each person and may change over time.

- Signs of a depressive episode can include:
  - unusually sad or irritable mood that doesn’t go away
  - withdrawal from friends, family and from previously enjoyed activities
  - difficulty concentrating or remembering things
  - deterioration in school or work performance

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**High risk groups**

- Permanent aged care facility residents
- Those who are physically inactive
- Those who are obese
- Those who consume high risk amounts of alcohol
- Aboriginal, Torres Strait Islander and culturally and linguistically diverse groups
- Those from a sexual minority or gender diverse group
- The homeless
- Those with disabilities
- Post partum women until child is 3 years of age

**Considerations for women of child-bearing age**

- A high index of suspicion for depression in both the antenatal and postnatal periods
- Check compatibility and consider the risks and benefits of using antidepressants with pregnancy and lactation
- All women should be assessed for symptoms of depression at least once during the antenatal and postnatal period using the Edinburgh Postnatal Depression Scale (EPDS)

**Urgent referral**

- Refer immediately to the MO/NP or mental health team if there is any risk of harm to themselves or others
- Lifeline 1300 131 114 (local call)
- Kids Helpline 1800 55 1800 (free call)
– lack of energy, enthusiasm or motivation
– feeling slowed down
– restlessness or agitation
– changes in eating habits, body weight or sleeping patterns
– feelings of guilt or worthlessness
– thinking of death or suicide

• Types of depression include
– **Major depression** occurs in episodes, in which at least 5 of the symptoms listed above need to have been present for at least 2 weeks for a diagnosis to be considered
– **Dysthymia** is a milder version of major depression but often lasts longer, sometimes for months. It has fewer physical symptoms than major depression, but is defined by more emotional symptoms such as dark or gloomy thoughts
– **Psychotic depression** is an extreme case of depression, in which a person’s thoughts are characterised by: profound despair, guilt and self-loathing, strongly-held false beliefs, agitation, hallucinations and severe social withdrawal
– **Bipolar disorder** is characterised by symptoms of depression and mania at different times. A manic episode is a period of elevated mood with symptoms such as rapid speech, reduced need for sleep and excessive behaviours like gambling, promiscuity and shopping sprees
– **Perinatal depression** is experienced by approximately 10% of pregnant women and 16% of new mothers. The first 6 months of parenthood are the most vulnerable. Depression arising before baby’s 3rd birthday is considered postnatal depression. Prevalence is higher amongst Aboriginal and Torres Strait Islander women and culturally and linguistically diverse women

2. Diagnosis of depression

• Diagnosis of depression is summarised into 2 clinical processes
– the initial assessment
  – engaging the client explaining that assessment aims for an understanding of their situation to guide further actions
  – establishing the context of the client’s strengths e.g. their place in the family, school and/or employment and the local environment
  – the use of screening tools (see Resource 1) to provide a framework for psychosocial assessment
  – considering other explanations for distress (e.g. grief, conflict, stressful events) from developmental, familial or sociocultural events
  – reports and perspectives from other sources (e.g. family, carers, teachers) of changes in symptoms over time
– assessment of depressive symptoms
  – symptoms consistent with depression diagnostic criteria (see Table 1)
  – use of validated tools (see Resource 2)
  – excluding other causes of depressive symptoms such as mental health conditions, substance use or co-morbidities
  – assessing the risk of suicide and self harm when depressive symptoms are present
### Table 1. Criteria for diagnosis of depression

- Five (or more) of the following symptoms have been present during the same 2 week period and represent a change from previous functioning and
- At least one of the symptoms is either dysphoria or anhedonia
- Do not include symptoms that are clearly attributable to the physiological effects of a substance or to another medical condition

<table>
<thead>
<tr>
<th>Condition or state</th>
<th>Manifestation</th>
</tr>
</thead>
</table>
| Dysphoria (depressed mood)                | • Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g. feels sad or empty) or observation made by others (e.g. appears tearful)  
  • In children and adolescents, can be irritable mood |
| Anhedonia (loss of interest or pleasure)  | • Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day  
  • As indicated by either subjective account or observation made by others |
| Weight loss or gain                       | • Significant weight loss when not dieting, or weight gain (e.g. a change of more than 5% of body weight in 1 month), or decrease or increase in appetite nearly every day  
  • In children, consider failure to make expected weight gains |
| Insomnia or hypersomnia                   | • Nearly every day |
| Psychomotor agitation or retardation      | • Nearly every day  
  • Observable by others, not merely subjective feelings of restlessness or being slowed down |
| Fatigue or loss of energy                 | • Nearly every day |
| Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) | • Nearly every day  
  • Not merely self-reproach or guilt about being sick |
| Diminished ability to think or concentrate, or indecisiveness | • Nearly every day  
  • Either by subjective account or as observed by others |
| Recurrent thoughts of death or suicide    | • Not just fear of dying  
  • Recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide |
| Functioning                               | • The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning |
| Not explained by other psychotic disorders | • Such as schizophrenia, a delusional disorder or an unspecified schizophrenia spectrum |
| Lack of mania                             | • There has never been a manic episode or a hypomanic episode |
3. Management

- Most depression is managed successfully in primary care and community settings with attention to relevant acute and chronic stressors, nature and course of the depression, the treatment options and follow up.
- Ensure continuity of care by involving the client, carer and the care co-ordinator in all feedback and communications.

3.1 Special considerations

- Ensure cultural appropriateness of interaction and develop a management plan for the course of treatment.
- Good outcomes require sound alliance between the clinician and the client, adequate duration and co-ordination of treatment.
- Exclude risk factors for suicide and/or self-harm.
- For coexisting mental health issues, treat concurrently with depression.
- Consider early referral for those
  - with protracted or severe depression
  - with atypical features
  - experiencing psychotic episodes
  - at high risk of suicide or self-harm.

3.2 Suicide risk

- Depression is a significant risk factor for suicidal thinking and attempts, especially when combined with substance misuse.
- All clinicians should have a high index of suspicion for suicide in the following clients with depression
  - male
  - age < 20 years and > 45 years of age
  - past major depressive episodes
  - previous suicidal attempts
  - excessive drug use
  - loss of rational thinking i.e. psychosis or severe depression
  - loss of a partner, social isolation or community separation (shame)
  - loss of supports, isolation or lack of community connection
  - a suicide plan
  - the client has the resources and ability to carry out their plan
  - a chronic or terminal illness.
- Assess the client for suicidal risk using questions in Table 2.
- In the absence of suicidal ideation, clients must be given the contact details for support services such as Life Promotion Officers and crisis counselling. In the event that suicidal thoughts or feeling arise see Resource 3.
For people who have attempted suicide, or for those supporting a person who has attempted suicide, provide them with relevant resources (see Resource 4).

### Table 2. Questions to assess suicide risk

<table>
<thead>
<tr>
<th>Assessment of suicide risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• When people feel like you are/have been feeling, they sometimes think that life is not worth living - have you been thinking like that or have you ever thought like that?</td>
</tr>
<tr>
<td>• Have you been thinking of harming yourself?</td>
</tr>
<tr>
<td>• Are you thinking of suicide?</td>
</tr>
<tr>
<td>• If yes, how often are you having these thoughts?</td>
</tr>
<tr>
<td>• Have you thought about how you would act on these?</td>
</tr>
<tr>
<td>• Is there a plan? (the clinician should explore if the plan seems feasible, if the method is available to the client, and whether it is likely to be successful)</td>
</tr>
<tr>
<td>• Have you thought about when you might act on this plan?</td>
</tr>
<tr>
<td>• Are there any things/reasons that stop you from acting on these thoughts?</td>
</tr>
<tr>
<td>• Have you tried to harm yourself in the past?</td>
</tr>
<tr>
<td>• If yes, how many times?</td>
</tr>
<tr>
<td>• When was the most recent time?</td>
</tr>
<tr>
<td>• Do you know anyone who has tried to harm themselves?</td>
</tr>
<tr>
<td>• Have you had a friend who has suicided?</td>
</tr>
<tr>
<td>• Do you feel safe at the moment?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If a suicide attempt has been made</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What did you hope would happen as a result of your attempt? (Did they want to die, or end their pain?)</td>
</tr>
<tr>
<td>• Do you regret that you did not succeed?</td>
</tr>
<tr>
<td>• Do you still have access to the method used?</td>
</tr>
<tr>
<td>• Did you use alcohol or drugs before the attempt? What did you use?</td>
</tr>
<tr>
<td>• Do you have easy access to a weapon?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment of risk of harm to others</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you thought of hurting anyone else?</td>
</tr>
<tr>
<td>• If yes, have you acted on these thoughts?</td>
</tr>
<tr>
<td>• Have you been involved in any fights recently?</td>
</tr>
<tr>
<td>• If yes, were you using drugs or alcohol at the time?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Added alerts to consider for Aboriginal or Torres Strait Islander people</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recent social group bereavement?</td>
</tr>
<tr>
<td>• Recent social group suicide?</td>
</tr>
<tr>
<td>• Recent imprisonment?</td>
</tr>
<tr>
<td>• Previous or current trouble with legal issues?</td>
</tr>
<tr>
<td>• Conflict in social group?</td>
</tr>
</tbody>
</table>

**If you suspect your client is at risk of harm to themselves or others, refer immediately by phoning your local mental health unit**
3.3 Support client self management

- Provide relevant depression related resources (see Resources 5. and 6)
- Discuss the role lifestyle modification has in improving self esteem and mood with particular regard to physical activity and its effectiveness in treating major depression\(^2\)^\(^{11}\)
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding
- Encourage women with depression during pregnancy and in the year following the birth of a child, to regularly perform the Edinburgh Postnatal Depression Scale (EPDS) (see Resource 7)

3.4 Social emotional support

- Provide a safe, convenient and confidential environment with flexible appointments and short waiting times\(^{10}\)
- Clinicians should be motivated, non-judgemental, considerate, easy to relate to, have good interpersonal and communication skills, treat all people with equity and allow adequate time for the needs of the client\(^{10}\)
- Ensure the client is well informed about services and their rights, are involved in service provision and encouraged to involve parental/carer support\(^{10}\)
- Build strong therapeutic relationships which will form the basis of continuing care\(^{10}\)

3.5 Carer support

- The burden of caring for someone with depression is an increasing source of depression (and stress) in its own right
- Provide the carer with resources to assist with their own needs (see Resource 8)
- Ensure carer is supported and engaged in service coordination\(^6\)
- Refer carers in remote areas to available carer support services
- Carers may experience isolation and abuse if client has become violent or agitated
- Referral to respite allows carers to have a break and enables clients to stay in their home longer (see Resource 9)

3.6 Substance abuse

- It is important to recognise that identification and management of co-occurring substance abuse is vital to effective treatment of depression\(^7\)
- Symptoms of depression and substance abuse need to be given equal priority in treatment
- Referral to Alcohol Tobacco and Other Drugs Services (ATODS) to help client if dual diagnosis or substance abuse exists
- Refer to Alcohol reduction, page 4 and Smoking cessation, page 44

3.7 Psychotherapy

- There are several forms of psychotherapy including cognitive behaviour therapy (CBT),
and interpersonal psychotherapy (IPT) which should be considered as first line treatment

- Psychotherapy has been associated with lower relapse rates after two to three years
- Psychotherapy
  - can be as effective as antidepressants for mild to moderate depression
  - may provide skills which reduce risk of relapse
  - requires considerable commitment by the person with depression
  - requires referral to an appropriately trained expert therapist i.e. social worker, mental health worker or psychologist
- General principles of psychotherapy include
  - the client is assisted to problem-solve stressors which adversely affect their mental health as they present and
  - the client is encouraged to resist negative thoughts and replace them with more realistic thoughts, and to resist pessimism and self-criticism
  - behavioural tasks designed to improve mood by increasing activity (behavioural activation)

3.8 Relapse and recurrent depression

- Depression is often recurrent and most presentations will be for a second or subsequent episode of depression
- Key to effective intervention is continuing with treatment, the quality of the therapeutic relationship and the extent to which treatment goals are shared
- Identify any barriers to medication adherence (e.g. nausea and sexual dysfunction) and discuss solutions (e.g. medication change or counselling)
- Check adequacy of dose and adequacy of treatment period
- Check diagnosis and consider a second opinion
- Consider second line treatments
- Maintain the client’s understanding of and their participation in their treatment regimen for at least 1 year for a first episode and 3 years for recurrent depression

4. Medications

- In clients who have benefited from initial antidepressant treatment, treatment should not be stopped before 9 to 12 months after recovery
- Medications should be monitored regularly, with special attention to adherence
- Interactions with medications, alcohol and other drugs such as beta-blockers, antihypertensive medication, oral contraceptives and corticosteroids can occur
- Tricyclic antidepressants should not be used for treating major depressive disorder in adolescents
- There is evidence of an increased risk of suicidal behaviour in young people under 25 years of age taking SSRIs
- Figure 1. illustrates medication management of clients with depression
4.1 Antidepressant choice

- When choosing an antidepressant start with any first line medication (see Table 2)
- Ensure regular client follow up every 2 - 4 weeks once therapy has been commenced until satisfactory response has been achieved
- There is currently little evidence to guide the choice of drug selection when changing drugs\(^1\)
- An alternate antidepressant is indicated where there is good adherence and
  - no therapeutic response despite medication dose increases over 4 - 8 weeks
  - only a partial response despite maximal dosing
- To reduce the risk of drug interactions when changing or commencing antidepressants, consider
  - their class and
  - an adequate washout period has elapsed (refer to the *Australian Medicines Handbook* or the *Therapeutic Guidelines* for details)\(^1\)
- Discuss with the client that
  - SSRIs and SNRIs are well tolerated, however there are a wide range of potential side effects
  - potential improvement in symptoms occurs from 2 weeks after medication use
**Depression**

Use any first line antidepressant.

**Provide and regularly review non-pharmacological interventions**

**Psychotherapy**
- CBT and/or IPT

**Lifestyle modification**
- Address substance abuse
- Physical activity program
- Healthy eating

**Social emotional support**

**Carer support**

Review after 2 - 4 weeks

**Urgent referral if**
- Signs of psychosis
- Significant risk of suicide
- Physically unwell

- Responds well: Continue at current dose
- If no initial or partial response: Increase the dose

Review after 2 - 4 weeks

- If no response or there are unacceptable side effects:
  - Switch to a different drug
  - If partial response, increase dose within recommended range
  - If unable to increase dose, switch to a different drug

Review after 2 - 4 weeks

- Only choose a second line drug if:
  - After unsuccessful trials of at least 2 first line treatments OR
  - For clients who responded well to second line drugs previously

**Figure 1. Medication management of depression**

---

13
### Table 3. Medications for depression

<table>
<thead>
<tr>
<th>Class</th>
<th>Recommended drug and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First line medications</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Serotonin selective reuptake inhibitors (SSRIs) | • Fluoxetine 20 mg mane up to 80 mg  
• Fluvoxamine 50 mg mane up to 300 mg  
• Escitalopram 10 mg mane up to 20 mg  
• Paroxetine 20 mg mane up to 60 mg  
• Sertraline 50 mg mane up to 200 mg  
• Citalopram < 65 years old 20 mg  
mane > 65 years old 10 mg mane |
|                                        | • Adverse effects include: nausea, diarrhoea, constipation, insomnia, orthostatic hypotension,  
  dizziness, hyponatraemia, increased risk of GI bleeding and sedation  
• Weight gain of more than 6 kgs may occur  
• Sexual dysfunction, including loss of libido, anorgasmia and ejaculatory disturbance, may also occur  
• Use with caution in pregnancy  
• Compatible with breastfeeding  
• If drowsiness occurs give in the evening  
• Careful titration and follow up is required |
| Serotonin and noradrenaline reuptake inhibitors (SNRIs) | • Desvenlafaxine CR 50 mg mane up to 200 mg  
• Venlafaxine CR 75 mg mane up to 375 mg  
• Duloxetine 60 mg mane up to 120 mg |
|                                        | • Adverse effects as above, plus tachycardia, hypertension  
• Useful when other treatments have been unsuccessful or for severe anxiety disorders  
• Not to be used in children and adolescents  
• Careful titration and follow up is required  
• Consider SSRI as an alternative in pregnancy  
• Compatible with breastfeeding |
| Atypical                               | • Mirtazapine 15 - 30 mg nocte up to 60 mg                                                |
| **Second line medications**            |                                                                                           |
| Monoamine oxidase (MAOs)               | • Moclobemide 300 - 450 mg daily up to 600 mg                                             |
| Tricyclic antidepressants (TCAs)       | • Amitriptyline 25 - 50 mg nocte up to 300 mg  
• Nortriptyline 25 - 50 mg daily up to max of 150 mg  
• Clomipramine, Dothiepin, Doxepin and Imipramine 25 - 50 mg daily up to max dose of 300 mg daily |
|                                        | • If a TCA is to be used, nortriptyline has the lowest incidence of sedation, orthostatic hypotension and anticholinergic effects |
| Combination MT agonist and 5-HT antagonist | • Agomelatine 25 mg nocte up to 50 mg                                                   |
| Selective noradrenaline reuptake inhibitors | • Reboxetine 2 - 4 mg b.d. up to 10 mg                                                      |
5. Care plan

<table>
<thead>
<tr>
<th>Table 4. Care plan for clients with depression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Full physical health check</td>
</tr>
<tr>
<td>TFT, FBC, LFTs, UEC, glucose, syphilis serology, fasting lipids</td>
</tr>
<tr>
<td>BP</td>
</tr>
<tr>
<td>Height, weight and BMI</td>
</tr>
<tr>
<td>Waist circumference</td>
</tr>
<tr>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Self harm risk</td>
</tr>
<tr>
<td>Medication review</td>
</tr>
<tr>
<td>MSE</td>
</tr>
<tr>
<td>Lifestyle modification</td>
</tr>
<tr>
<td>ATODs service review</td>
</tr>
<tr>
<td>Mental Health Worker review</td>
</tr>
<tr>
<td>Mental health team</td>
</tr>
<tr>
<td>MO/NP R/V</td>
</tr>
<tr>
<td>Psychiatrist</td>
</tr>
</tbody>
</table>

6. References


7. Resources


3. Life promotion and counselling support is available at BluePage at www.bluepages.anu.edu.au or beyondblue at www.beyondblue.org.au or depressionNet at www.depressionNet.org.au or the Black Dog Institute at www.blackdoginstitute.org.au or Lifeline 1300 131 114 (local call) or Kids Helpline 1800 55 1800 (free call)

4. For support after a suicide attempt; Finding your way back (a resource for people who have attempted suicide), Guiding their way back (a resource for people who are supporting a person after a suicide attempt) and Finding your way back (a resource for Aboriginal and Torres Strait Islander peoples after a suicide attempt) all available at http://www.beyondblue.org.au/the-facts/suicide-prevention/support-after-a-suicide-attempt


6. For perinatal depression related resources see PANDA perinatal depression helpline 1300 726 306 available at http://www.panda.org.au or Queensland Centre for Perinatal and Infant Mental Health (see their promotion and prevention resources) available at http://www.health.qld.gov.au/qcpimh

7. The Edinburgh Postnatal Depression Scale is available at http://www.beyondblue.org.au/resources/for-me/pregnancy-and-early-parenthood/edinburgh-postnatal-depression-scale and a site to assist clinicians with understanding the validity and limitation of the EPDS available at http://meta4RN.com/edp


Developmental delay in children

High risk groups

- Children of women with a substance dependency during pregnancy
- Children of women who give birth over the age of 35
- People with family history of developmental delay
- Aboriginal and Torres Strait Islander children
- Children living in remote communities
- Children living in out of home care
- Children who live with medical and/or mental health co-morbidities
- Children from culturally and linguistically diverse backgrounds
- Children who have survived adverse events as neonates

Considerations for women of child-bearing age

- Consider inherited and persisting environmental causes of developmental delay and implications for future children
- Provide information and support for women to avoid using alcohol and other substances in pregnancy
- Assist family to consider future reproductive choices and offer contraception if desired

Urgent referral

- Refer to a MO/NP, paediatrician or allied health professional if there is
  - strong parental concerns
  - significant loss of developmental skills
  - lack of response to sound or visual stimuli
  - poor interaction with adults or other children
  - difference between right and left sides of the body in strength, movement and tone
  - loose and floppy movements (low tone) or stiff and tense movements (high tone)
  - poor achievement of developmental milestones
  - suspicion of poor growth (see Poor growth in children, page 278)
  - any suspicion of developmental delay

Child safety notification

- Refer to Appendix 2: Child safety reporting, page 498 if
  - psychosocial factors during the presentation suggest risk of harm to child
  - substance use during pregnancy is likely to impact on a parent’s ability to meet a child’s needs
1. What is a developmental delay in a child?

- Development is influenced from birth by interaction with the environment and is facilitated by secure and loving relationships with primary caregivers.
- Child development describes the child’s ability to change and adapt over time to achieve increasing complexity of function across given domains including:
  - gross motor
  - fine motor and speech
  - hearing and language
  - social, emotional and cognition
- These domains develop incrementally with new skills built on what has already been achieved.
- Rates of development will vary within normal ranges for a child’s age.
- Developmental delay is when the rates of development fall behind in one or more domains compared to what is expected.
- Developmental delay can be:
  - transient e.g. when a child recovers from serious illness, prolonged hospitalisation, family stress or extreme prematurity or prematurity.
  - persistent (ongoing) which is usually related to issues of understanding, communication, hearing, seeing and/or moving.
- Persistent developmental impairments have a direct effect on the child’s functional ability (see Table 1).
- Risk factors for persistent developmental delay are due to events that occur before, during and after birth (see Table 2).
- Early recognition of developmental delay, impairment and disability in children can minimise long term complications and improve outcomes.

2. Diagnosis of developmental delay in a child

- Diagnosis of developmental delay is made by a thorough history and examination of the child.
- History features include:
  - skills that are not acquired
  - skills that do not progress or remain static
  - regression in skills and unusual behaviours
  - identifying childhood risk factors such as: prenatal exposures (e.g. to alcohol), prematurity, disability and sensory impairments, genetic factors and syndromes, neonatal factors, illness, emotional difficulty, temperament, behaviour, abuse and neglect, stressful life events.
  - identifying family risk factors such as: parental psychopathology, family dysfunction, family violence, poverty, substance abuse, family structure.
  - identifying community risk factors such as prejudicial social demographic factors.
- A multi-organ examination may reveal: dysmorphology, neurocutaneous stigma.
neurological dysfunction, poor growth and nutrition and hearing and vision problems

- Developmental screening may be undertaken using screening tools such as the Parents Evaluation of Developmental Status (PEDS) and the Ages and Stages Questionnaire (ASQ) (see Resource 1)
- The ‘Red Flag’ guide is a helpful tool to assist clinicians identify developmental delay (see Resource 2)

### Table 1. Functional effects of developmental impairments

<table>
<thead>
<tr>
<th>Function</th>
<th>Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive functioning</td>
<td>Compromised ability to plan, predict, organise, prioritise, sequence, initiate, follow through, set goals, comply with contractual expectations, be on time and adhere to a schedule</td>
</tr>
<tr>
<td>Memory</td>
<td>Information input, integration, forming associations, retrieval, learning from past experiences</td>
</tr>
<tr>
<td></td>
<td>Will repeat mistakes in spite of punishment</td>
</tr>
<tr>
<td>Abstract concepts</td>
<td>Time, maths or money</td>
</tr>
<tr>
<td>Judgement</td>
<td>Difficulty making sound decisions, differentiating safety from danger, friend from stranger or fantasy from reality</td>
</tr>
<tr>
<td>Information processing</td>
<td>Difficulty forming links and associations</td>
</tr>
<tr>
<td></td>
<td>Unable to apply a learned rule in new setting</td>
</tr>
<tr>
<td>Communication and language</td>
<td>Difficulty comprehending the meaning of language</td>
</tr>
<tr>
<td></td>
<td>Difficulty answering questions accurately</td>
</tr>
<tr>
<td></td>
<td>May agree, make things up or fill in the blanks to appear understood</td>
</tr>
<tr>
<td></td>
<td>May talk excessively, yet be unable to engage in a meaningful conversation</td>
</tr>
<tr>
<td></td>
<td>Appears to understand instructions, but does not comprehend and fails to apply them</td>
</tr>
<tr>
<td></td>
<td>Disengaged socially</td>
</tr>
<tr>
<td></td>
<td>Lack of eye contact</td>
</tr>
<tr>
<td>Cognitive pace</td>
<td>May think more slowly</td>
</tr>
<tr>
<td></td>
<td>May require minutes to generate an answer rather than seconds</td>
</tr>
<tr>
<td>Perseveration</td>
<td>May be rigid, get stuck, have difficulty stopping an activity or starting a new one</td>
</tr>
<tr>
<td></td>
<td>May react strongly to changes in setting, program or personnel</td>
</tr>
<tr>
<td>Maturity</td>
<td>Functions socially, emotionally and cognitively at a younger level of development than chronological age</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>Acts first and then sees the problem after the fact</td>
</tr>
<tr>
<td>Auditory pace</td>
<td>Central auditory delay means language is processed more slowly, requiring more time to comprehend</td>
</tr>
<tr>
<td></td>
<td>Child processes every third word of normally paced speech</td>
</tr>
</tbody>
</table>
### Table 2. Causes of persistent developmental delay\(^2,4,6\)

<table>
<thead>
<tr>
<th><strong>Prenatal factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chromosomal</strong></td>
</tr>
<tr>
<td>• Trisomy 21 (Down Syndrome)</td>
</tr>
<tr>
<td>• Fragile X Syndrome</td>
</tr>
<tr>
<td>• 22 qII deletion (velocardiofacial syndrome)</td>
</tr>
<tr>
<td><strong>Genetic</strong></td>
</tr>
<tr>
<td>• Tuberous Sclerosis</td>
</tr>
<tr>
<td>• Metabolic disorder e.g. phenylketonuria</td>
</tr>
<tr>
<td><strong>Syndromes</strong></td>
</tr>
<tr>
<td>• Rare syndromes such as Williams Syndrome, Prader-Willi Syndrome and Cornelia de Lange Syndrome</td>
</tr>
<tr>
<td><strong>Infections</strong></td>
</tr>
<tr>
<td>• Rubella virus, Cytomegalovirus</td>
</tr>
<tr>
<td><strong>Drugs and toxins</strong></td>
</tr>
<tr>
<td>• Excessive alcohol (FASD)</td>
</tr>
<tr>
<td>• Inhalants</td>
</tr>
<tr>
<td>• Medications</td>
</tr>
<tr>
<td><strong>Major structural anomalies of the brain</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Perinatal factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low birth weight children are at risk of these complications after birth</strong></td>
</tr>
<tr>
<td>• Lack of oxygen (hypoxia)</td>
</tr>
<tr>
<td>• Trauma</td>
</tr>
<tr>
<td>• Infections</td>
</tr>
<tr>
<td>• Biochemical abnormalities such as low sugar levels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Postnatal factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head injuries</strong></td>
</tr>
<tr>
<td>• Motor car accidents</td>
</tr>
<tr>
<td>• Near drowning accidents</td>
</tr>
<tr>
<td><strong>Infections such as meningitis and encephalitis</strong></td>
</tr>
<tr>
<td><strong>Poisons</strong></td>
</tr>
<tr>
<td><strong>Social emotional</strong></td>
</tr>
<tr>
<td>• Living in a remote location</td>
</tr>
<tr>
<td>• Exposure to violence, abuse and neglect</td>
</tr>
<tr>
<td>• Children in care</td>
</tr>
<tr>
<td>• Parental mental health and physical health concerns</td>
</tr>
</tbody>
</table>

### 3. Management

- This may be a critical and stressful period for parents and caregivers and it is important to work with and support them during this difficult time\(^7\)
- Early intervention is important in achieving best outcomes for children\(^7\)
- Children with developmental delay have a range of special needs and require a variety of supports at critical periods during their lives\(^5,6\)
3.1 Support child and family self management

• Managing developmental delay involves building a therapeutic partnership with parents or caregivers to support children to live healthy productive lives by:
  — providing a safe, engaging environment where children can explore, experiment and develop their skills
  — being available and supporting children when they need help, care or attention
  — dealing consistently with inappropriate behaviour

• Early intervention and identification of the strengths of the child, parent or carer will assist in goal setting and monitoring development to achieve best outcomes for the child

• Provide resources and support service information for developmental delay (see Resource 1)

• Provide the parent or carer with practical strategies to support the development of the child with a developmental delay (see Table 3)

• Consider ongoing developmental needs and the impact of developmental delays at different ages, including long term implications as appropriate, to enable families to plan for support over time

• Present a progressive lifelong picture of strengths and difficulties for the family rather than a single diagnosis

• Provide information about available services

• Consider practical supports available to families such as: therapy interventions, community supports, support services available from education providers, respite and financial assistance such as carer’s allowance

• Where appropriate, provide harm minimisation information to assist women and families to avoid environmental risk factors in future pregnancies (see Alcohol reduction, page 4, Smoking cessation, page 44, Sexual and reproductive health, page 32)

• Encourage the child, parent or carer to identify barriers to adequate lifestyle modification and treatment adherence and develop goals to overcome those barriers based on their capacity and understanding

2 Social emotional support

• The child with a developmental delay can place great stress on carers, who may be unaware of the needs of these children (see Table 3)

• Assess the emotional position of the carer or parent of the child

• Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (for examples see Resource 4). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis

• See Depression, page 172 and Anxiety disorders, page 62
Table 3. Strategies to support the development of the child with a developmental delay

<table>
<thead>
<tr>
<th>Social emotional development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assist the child to separate from the parent e.g. a routine in saying goodbye</td>
</tr>
<tr>
<td>• Value and acknowledge the child’s efforts</td>
</tr>
<tr>
<td>• Provide opportunities for the child to play in proximity to, and, with others</td>
</tr>
<tr>
<td>• Expand the child’s reciprocal play skills e.g. tickling, peek-a-boo, chase</td>
</tr>
<tr>
<td>• Encourage independent play</td>
</tr>
<tr>
<td>• Ask the child to visualise how their behaviour might affect others</td>
</tr>
<tr>
<td>• Use clear, calm instructions when dealing with problem behaviour</td>
</tr>
<tr>
<td>• Follow through with consequences for poor behaviour (see Resource 3)</td>
</tr>
<tr>
<td>• Ask the child to identify appropriate behaviour</td>
</tr>
<tr>
<td>• Encourage the child to use language to describe feelings</td>
</tr>
<tr>
<td>• Provide praise for desirable behaviour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speech and language development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use pictures to reinforce language</td>
</tr>
<tr>
<td>• Speak slowly, deliberately and directly to the child</td>
</tr>
<tr>
<td>• Paraphrase what the child has said</td>
</tr>
<tr>
<td>• Establish alternative communication means for non-verbal children</td>
</tr>
<tr>
<td>• Label objects with words</td>
</tr>
<tr>
<td>• Model clear speech</td>
</tr>
<tr>
<td>• Actively listen to the child</td>
</tr>
<tr>
<td>• Use storybook interactions as a basis for talking, learning and turn taking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plan physical activities for times when the child has the most energy</td>
</tr>
<tr>
<td>• Provide simple, fun obstacle courses that the child is capable of completing</td>
</tr>
<tr>
<td>• Provide opportunities and activities for the child to use handheld tools and objects</td>
</tr>
<tr>
<td>• Incorporate singing and dancing into many activities</td>
</tr>
<tr>
<td>• Place objects in the child’s hand to hold and feel</td>
</tr>
<tr>
<td>• Give the child blocks, clay, paper, pencils, crayons, safety scissors and play dough, to manipulate and use (cutting, pasting, drawing and writing)</td>
</tr>
<tr>
<td>• Take the child outside to run, climb and jump around</td>
</tr>
<tr>
<td>• Have the child practise buttoning and unbuttoning, zipping clothes, and opening and closing doors and items in their immediate environment</td>
</tr>
<tr>
<td>• Get the child involved with meal preparation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adaptive behaviour development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Teach life skills related to daily living and self care</td>
</tr>
<tr>
<td>• Break skills into steps (use visual cues if appropriate)</td>
</tr>
<tr>
<td>• Plan experiences that are relevant to the child’s world</td>
</tr>
<tr>
<td>• Teach how to apply skills to other settings e.g. at the park</td>
</tr>
<tr>
<td>• Minimise distractions and the possibility for over stimulation</td>
</tr>
<tr>
<td>• Teach and model personal hygiene habits such as hand washing</td>
</tr>
<tr>
<td>• Allow the child to practise feeding dressing and toileting themselves</td>
</tr>
<tr>
<td>• Teach and model rules and practices for playground safety, staying with the group and safety in the classroom</td>
</tr>
<tr>
<td>• Teach the child to provide personal identification information when asked</td>
</tr>
<tr>
<td>• Teach procedures to deal with dangerous situations e.g. in the event of a fire or stranger danger</td>
</tr>
</tbody>
</table>

(continued)
Table 3. Strategies to support the development of the child with a developmental delay (continued)

<table>
<thead>
<tr>
<th>Cognitive development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide teachers with the child's preferences and interests to structure education</td>
</tr>
<tr>
<td>Allow the child time to complete tasks and practise skills</td>
</tr>
<tr>
<td>Demonstrate concepts rather than giving directions verbally</td>
</tr>
<tr>
<td>Provide visual information to complement verbal i.e. show as well as tell</td>
</tr>
<tr>
<td>Demonstrate how things work</td>
</tr>
<tr>
<td>Be consistent with routines</td>
</tr>
<tr>
<td>Use age appropriate learning materials</td>
</tr>
<tr>
<td>Use short, simple sentences to ensure understanding</td>
</tr>
<tr>
<td>Repeat instructions or directions frequently and ascertain if further clarification is necessary</td>
</tr>
<tr>
<td>Minimise distractions and transitions</td>
</tr>
<tr>
<td>Provide a positive learning environment</td>
</tr>
<tr>
<td>Avoid overwhelming the child with multiple or complex instructions</td>
</tr>
<tr>
<td>Encourage participation in school activities</td>
</tr>
<tr>
<td>Use visual discrimination games such as “I spy”</td>
</tr>
</tbody>
</table>

3.3 Children in care

- The two main factors which have an influence on whether children with developmental delay might enter the care system are
  - evidence of abuse and/or neglect and
  - risks to growth and development, including failure to thrive (see Poor growth in children, page 278)

- Children with developmental difficulties are at higher risk of harm than those without developmental problems

- Developmental difficulties also impact on a child’s ability to cope with change

- Moving between family of origin, kinship care and foster care involves changes in culture, language and location which challenges the child with a developmental delay and further impacts on behaviour

- Children in care can experience
  - repeated attempts at reunification with birth or extended family
  - access with family which may be planned or unplanned
  - placement breakdown
  - multiple placements prior to long term placements being identified
  - changes in childcare or school depending on placement

- Be mindful of the stress and anxiety imposed upon the child with a developmental delay

3.4 Carer support

- Caring for children with developmental delay may be time consuming and difficult and early intervention strategies can be resource intensive

- Depending on the level of developmental delay, some children may require intensive care and supervision and can often be in need of high level health service co-ordination
• A large number of carers raising children with developmental delay are foster carers or grandparents and other kin, rather than biological parents

• Ensure parents and carers are provided with opportunities and support and are engaged in service coordination and intervention

• Encourage active participation in educational interventions for caregivers

• Refer parents and carers in remote areas to visiting carer support services, social worker and psychologist

• Referral to respite allows parents and carers to have a break from the demands of difficult to manage children (see Resource 5. and 6)

3.5 Learning

• Children with developmental delay typically have difficulty with the stimulating, demanding and complicated environment of school and homework which becomes more apparent in the classroom context

• Ensure parent and child are engaged with education services such as Education Queensland early childhood development programs and guidance officers

3.6 Early intervention support services

• Consider assessments, interventions and management by a multidisciplinary team for delays in multiple domains

• Engage allied health professionals, community providers and education providers to provide comprehensive management and support strategies

• Consider periodic review and support from child development services, including speech therapists, occupational therapists, physiotherapists and psychologists

• Liaise with other providers including disability and education services

• Clinicians should assist the parent to access services

• Other appropriate referrals may include
  – paediatrician
  – mental health team
  – social worker
  – Disability Services Queensland
  – Home and Community Care (HACC)

• Consider practical supports available to families such as
  – daycare
  – mums and bubs groups
  – playgroup
  – local community services
  – online supports (see Resource 7)

• Providing parents or carers of children with a developmental delay with a behaviour or attachment based parenting program can provide the strategies and skills to deal with more difficult behavioural problems (see Resource 8)
3.7 Monitoring

- Provide ongoing monitoring of physical health, growth and nutrition by local clinicians and paediatrician including
  - milestones
  - growth charts (height, weight, head circumference and BMI)
  - eyes and vision
  - ears and hearing
- Investigations may be ordered by the paediatrician e.g. imaging, blood and urine tests, if required
- Consider review by other specialists as required e.g. geneticist or neurologist

4. Medications

- There are no medications recommended for the broad treatment of developmental delay
- Medications may however be required at the discretion of the treating specialist to help with certain symptom complexes
### 5. Care plan

**Table 4. Care plan for children with a developmental delay**

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>At each child health check</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>At each child health check</td>
</tr>
<tr>
<td>Head circumference</td>
<td>✓</td>
<td>At each child health check</td>
</tr>
<tr>
<td>Hearing</td>
<td>✓</td>
<td>With routine health checks. Consider formal testing if concerns about developmental delay</td>
</tr>
<tr>
<td>Vision</td>
<td>✓</td>
<td>With routine health checks. Consider formal testing if concerns about developmental delay</td>
</tr>
<tr>
<td>Neurobehavioural assessment and testing</td>
<td>✓</td>
<td>As guided by clinical need. Consider formal testing around time of school entry if significant concerns</td>
</tr>
<tr>
<td>Formal developmental assessments</td>
<td>✓</td>
<td>ASQ or PEDS as determined by suitably trained clinician</td>
</tr>
<tr>
<td>Client self management support</td>
<td>✓</td>
<td>At each appointment and providing anticipatory guidance at significant points such as birth, early childhood, school entry, puberty, transition to adulthood</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>At each contact</td>
</tr>
<tr>
<td>RN/HW R/V</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Speech pathologist</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Paediatrician</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Psychologist</td>
<td>✓</td>
<td>As required</td>
</tr>
<tr>
<td>Social worker</td>
<td>✓</td>
<td>As required</td>
</tr>
</tbody>
</table>
6. References


7. Resources


5. Carers Queensland www.carersaustralia.com.au


8. The Positive Parenting Program (PPP) is available at http://www.triplep.net/glo-en/home/ and the Circle of Security (COS) parenting program is available at http://circleofsecurity.net/
Section 2: Management of diagnosed conditions | Developmental Delay in Children
Diabetes type 2

High risk groups

- Aboriginal and Torres Strait Islander peoples
- Non-Indigenous people over 40 years with high blood pressure, are overweight or have a family history of diabetes
- Young people who are overweight or obese
- History of gestational diabetes (GDM)
- Polycystic ovarian syndrome who are obese
- Those over 55 years of age

Considerations for women of child-bearing age

- Infertility in obese women
- Multiple early miscarriages
- Monitoring of blood glucose levels to avoid increased risk of adverse outcome of pregnancy including fetal abnormalities
- Early screening for undiagnosed type 2 and GDM if pregnant

Urgent referral

- Refer to the MO/NP and the current edition of the PCCM for
  - Diabetic ketoacidosis (DKA) or a hyperosmolar hyperglycaemic state
  - High risk foot complications such as wound infection, gangrene or osteomyelitis
  - Hypoglycaemia i.e. a BGL of ≤ 4.0 mmol/L

Special considerations

- In managing type 2 diabetes the following co-morbidities and screening must be considered
  - Dyslipidaemia, page 210
  - Chronic kidney disease, page 112
  - Hypertension, page 228
  - Child Eyes and vision - child, page 374 and adult Eyes and vision - adult, page 446
  - Foot screening for peripheral neuropathy and peripheral vascular disease

1. What is diabetes?

- Diabetes is a chronic metabolic disease characterised by high blood glucose (BGL) levels and disturbance of carbohydrate, fat and protein metabolism

- There are two major types of diabetes
  - type 1 diabetes mellitus, typically occurring in children, and
  - type 2 diabetes mellitus, which predominantly occurs in adults

- Inadequately controlled diabetes can affect the vascular system (blood vessels) causing microvascular (small blood vessels) and macrovascular (large blood vessels) complications
• Poor blood flow to nerves reduces their ability to function (diabetic neuropathy)\(^5\)
• People who develop type 1 diabetes have an abrupt onset and symptoms are obvious
• People who develop type 2 diabetes may be asymptomatic but can also present with symptoms such as thirst, frequent urination and weight loss

1.1 Type 2 diabetes

• The most common type of diabetes occurring in 90% of people with diabetes
• There is a growing trend for young people to develop this disease due to the obesity epidemic
• Aboriginal and Torres Strait Islander peoples are particularly prone to type 2 diabetes
• Characterised initially by hyperinsulinaemia and insulin resistance
• Over time, insulin production decreases, contributing to hyperglycaemia

1.2 Pre-diabetes

• Pre-diabetes is blood glucose levels elevated above normal range but does not meet the criteria for a diagnosis of diabetes mellitus\(^6\)
• People with pre-diabetes are at increased risk of developing diabetes and cardiovascular diseases (myocardial infarction, stroke, peripheral vascular disease)
• Individuals with pre-diabetes should be encouraged to increase physical activity and maintain a healthy weight to prevent progression to type 2 diabetes

2. Diagnosis

• Blood glucose levels using a blood glucose meter may be used for testing for undiagnosed diabetes as long as it is confirmed by venous plasma measurement\(^6\) (see Table 1)

<table>
<thead>
<tr>
<th>Table 1. Diagnostic criteria for type 2 diabetes(^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting blood glucose (FBG) (mmol/L)</td>
</tr>
<tr>
<td>Normal (unlikely)</td>
</tr>
<tr>
<td>Pre-diabetes (do OGTT)</td>
</tr>
<tr>
<td>Diabetes (likely)</td>
</tr>
</tbody>
</table>

• FBG ≥ 7.0 mmol/L on two separate occasions
• 2 hour postprandial ≥11.0 mmol/L OGTT on two separate occasions
• HbA1c ≥ 6.5% (48 mmol/mol) on two separate occasions (a medicare rebateable diagnostic test)

• The following clinical signs and symptoms may be present
  – tiredness and lethargy
  – hunger
  – excessive thirst
  – excessive urination
– numbness/tingling in feet or legs
– blurred vision
– itching and skin infections e.g. boils/thrush
– weight loss

3. Management

• The long term goals of managing type 2 diabetes are to prevent complications, improve quality of life and prevent premature death (see Table 2)

• A long term effective way for clients to maintain adequate blood glucose levels and avoid diabetes related complications is to modify their lifestyles (see Lifestyle modifications section)

• For further clinical principles of management for adults with diabetes see Resource 1.

<table>
<thead>
<tr>
<th>Table 2. Goals for management&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
</tr>
<tr>
<td>Blood glucose level (BGL)</td>
</tr>
<tr>
<td>HbA1c</td>
</tr>
<tr>
<td>Total cholesterol (TC)</td>
</tr>
<tr>
<td>LDL-C</td>
</tr>
<tr>
<td>HDL-C</td>
</tr>
<tr>
<td>Non-HDL-C</td>
</tr>
<tr>
<td>Triglycerides (TG)</td>
</tr>
<tr>
<td>Blood pressure (BP)</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Urinary albumin excretion (ACR)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Cigarette consumption</td>
</tr>
<tr>
<td>Alcohol intake</td>
</tr>
<tr>
<td>Physical activity</td>
</tr>
</tbody>
</table>

3.1 Factors complicating management

• In managing type 2 diabetes the following comorbidities and screening must be considered

  – **Dyslipidaemia, page 210** is a common comorbidity in people with type 2 diabetes and independent risk for macrovascular complications<sup>6</sup>

  – **Chronic kidney disease, page 112** is a common result of poorly controlled blood glucose and high blood pressure<sup>6</sup>
Section 2: Management of diagnosed conditions

3.2 Supporting client self management

- See Lifestyle modification section
- Discuss what type 2 diabetes is and how it progresses
- Provide relevant diabetes resources (see Resources 1, 2, and 3)
- Refer client to The COACH Program, a free phone coaching service which helps clients manage their condition (see Resource 4)
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding
- Refer to a diabetes educator for ongoing education, self management and health promotion

3.3 Social emotional support

- A self or clinician-rated mood scale can be used to assess for altered mood (for examples see Resource 5) Rating scales should be supplemented by a clinical assessment by suitably qualified mental health clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Diet modification and weight control

- Diabetes magnifies the effects of dyslipidaemia (such as cholesterol and triglycerides found in nutritional poor foods) which block arteries and cause acute myocardial infarcts
- Refer to a dietitian and reinforce a healthy eating plan
- Encourage client to maintain a healthy BMI (see Diet and nutrition, page 14 and Overweight and obesity in adults, page 260)
- Encourage any degree of weight loss in clients with overweight or obese BMI
- Eat foods in amounts appropriate for energy requirements to lose weight
- Avoid foods that cause high blood fats including: deep-fried foods, turtle fat, dugong fat, fatty meats, chips, pies and full fat dairy products
- Avoid high energy sugary foods like biscuits, cakes, alcohol and sports and soft drinks
- Substitute a high fat and high sugar diet with a high fibre and 2 serves of fruit and 5 serves of vegetables each day
- Steam foods or use a non stick pan with spray oils
- Add fish 3 times per week and choose lean cuts of meat with plenty of vegetables

- Hypertension, page 228 in diabetes increases the risk of macrovascular disease, retinopathy, neuropathies and the progression of chronic kidney disease
- it is important to check for these complications along with calculation of absolute cardiac risk using the Appendix 1: Australian cardiovascular risk charts, page 494
- reducing cardiovascular risk requires regular assessment and management of blood pressure, renal function and lipids
3.5 Physical activity

- At least 30 minutes of moderate physical activity (activity that makes you “puff”) on most, if not all, days of the week (total ≥ 150 minutes/week)
- Improves glucose tolerance (as insulin sensitivity increases), blood pressure and lipid profiles
- Increases weight loss, wellbeing and work capacity
- See Physical activity, page 26

3.6 Infections

- Poorly controlled diabetes
  - causes damage to the inside of the blood vessels leading to poor wound healing and increased chance of infection and
  - stops the blood cells that fight infection (white blood cells) from working properly
- Infections raise blood glucose levels
- People with diabetes are at higher risk of contracting chest, urinary tract, skin and kidney infections
- Teach the client to be aware of wounds
- Cover any wounds and seek treatment immediately
- Any client experiencing cloudy, bloody or painful urination should seek treatment immediately
- Influenza and pneumococcal vaccines are recommended for people with diabetes

3.7 Neuropathy

- Poorly controlled diabetes causes peripheral nerve damage resulting in pins-and-needle sensations in the feet and legs which may be painful or cause loss of sensation
- Nerve damage may also result in decreased sensation with loss of ability to feel pain and touch
- Any client with type 2 diabetes presenting with peripheral neuropathy should be referred to the MO/NP for evaluation

3.8 Foot care

- Look for injury, cuts, blisters, ulcers, calluses or foot deformity
- Provide treatment early (on the same day) if any problems are found
- Apply moisturising cream to dry/tough/thickened skin (not between the toes)
- Wear well-fitting walking or sports shoes or rubber-soled sandals with soft socks as much as possible
- Before putting on your shoes, check inside with your hand for rough spots, stones and grass seeds
- Seek help with nail trimming if necessary
- If a client has difficulty seeing their feet then recommend family or any health
professional to review
- Refer to a podiatrist for review of an active foot wound or complication
- A foot check is completed every year to review, check and inform current foot risk status

3.9 Teeth and gums
- High blood glucose leads to high glucose in saliva (spit), less saliva production, dry mouth, gum infection, loose teeth and tooth decay
- Client should
  - choose to drink water over sports and soft drinks
  - clean their teeth and gums at least twice a day
  - use floss and mouthwashes
- Refer for dental review every 6 months
- See Dental caries and periodontal disease, page 162

3.10 Eye damage
- For visual health checks in children refer to Eyes and vision - child, page 374 and in adults, Eyes and vision - adult, page 446
- Inform client that poorly controlled diabetes increases the risk of developing eye problems
- High blood glucose levels alters the lens shape causing blurriness
- Correction glasses are prescribed once blood glucose levels are stabilised
- Cataract (cloudiness of the lens) occurs early in people with diabetes causing blurred vision, glare intolerance, poor night vision and difficulty interpreting colours. Surgical treatment is necessary when this affects lifestyle
- Retinopathy occurs as a result of microvascular disease of the retina causing permanent visual distortion unable to be corrected
- Maculopathy (changes to the macula) is the most common cause of visual loss in people with diabetes
- All newly diagnosed clients should be referred to an ophthalmologist or optometrist
- All Indigenous clients with diabetes should have an eye exam annually or for non-Indigenous clients, second yearly

3.11 Sexual function
- High blood glucose levels can cause
  - damage to the autonomic nervous system
  - deterioration in penile blood vessels and nerves
  - a reduction in penile sensation
  - difficulty in penile erection
  - vaginal infections
- Medications are available (non-Pharmaceutical Benefits Scheme)
• Do not use sildenafil citrate, tadalafil or vardenafil if the client has used any nitrate preparation in the last 24 hours or is hypotensive

3.12 Pre-diabetes
• As with all above but with intensive lifestyle modification
• Annual oral glucose tolerance testing (OGTT) or HbA1c
• Frequency can be reduced if no deterioration in results and client’s modifiable lifestyle has improved

4. Medications
• Medications assist in maintaining the blood glucose levels within healthy limits
• Reinforce the importance of taking medications
• A small number of clients commenced on metformin may experience gastrointestinal side effects including diarrhoea
• All decisions to start or change client’s medication must be done in conjunction with the MO/NP or diabetes educator
• Figure 1. provides a management process for blood glucose control in type 2 diabetes

4.1 Oral hypoglycaemics
• Oral medications (e.g. metformin, sulphonylureas) should be continued when using insulins as
  – early cessation before blood glucose targets are achieved can result in significant hyperglycaemia
  – ongoing use can reduce weight gain
  – ongoing use allows a smaller insulin dose and can reduce the risk of hypoglycaemia or hyperglycaemia
• See Table 3. for a list of oral hypoglycaemics
Section 2: Management of diagnosed conditions

### 203 Diabetes type 2

Address lifestyle modification factors including
- Diet and nutrition, page 14
- Physical activity, page 26
- Smoking cessation, page 44

If HbA1c is > 53 mmol/mol (7%) move down the algorithm

1st Line
- Metformin is the usual 1st line therapy unless contraindicated or not tolerated

<table>
<thead>
<tr>
<th>Therapy</th>
<th>SU</th>
<th>DPP-4 inhibitor</th>
<th>SGLT2 inhibitor</th>
<th>GLP-1RA</th>
<th>Insulin#</th>
<th>Acarbose</th>
<th>TZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2nd Line
- If metformin was not used as 1st line, add it now if not contraindicated
- Sulphonylureas (SUs) are the recommended initial agent to add to metformin
- If SUs are contraindicated or not tolerated, another agent is recommended

<table>
<thead>
<tr>
<th>Therapy</th>
<th>SU</th>
<th>DPP-4 inhibitor</th>
<th>GLP-1RA</th>
<th>SGLT2 inhibitor</th>
<th>Insulin#</th>
<th>Acarbose</th>
<th>TZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3rd Line
- Consider triple oral therapy or GLP-1R agonist or insulin

<table>
<thead>
<tr>
<th>Therapy</th>
<th>SU</th>
<th>DPP-4 inhibitor</th>
<th>GLP-1RA</th>
<th>Insulin#</th>
<th>SGLT2 inhibitor</th>
<th>Acarbose</th>
<th>TZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THEN
One of the following

- If on triple oral therapy
  - Switch one or more oral agents to
    - GLP-1RA or insulin# or another oral agent

- If on a GLP-1RA
  - Change to Premixed# or Basal insulin#

- If on insulin#
  - Intensify insulin Basal bolus or Basal plus#

**Figure 1. Management algorithm for blood glucose control in type 2 diabetes**

- SU=sulfonylurea. TZD= thiazolidinedione. DPP-4 = dipeptidyl peptidase. GLP1RA= glucagon like peptide 1 receptor agonist. SGLT2 = sodium glucose transporter
- Blue boxes indicate usual therapeutic strategy
- White boxes indicate alternative approaches
- Compliance should always be assessed before changing or adding new therapies
- Therapies which do not improve glycaemia should be ceased
- *Switching an oral agent is likely to have the smallest impact on glycaemia
- #Unless metformin is contraindicated, or not tolerated, it is often therapeutically useful to continue it in combination with insulin in people with type 2 diabetes
<table>
<thead>
<tr>
<th>Suggested medications</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred medications</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Biguaines** (usually first line therapy unless contraindicated) | • Metformin | • eGFR at initiation
• Fasting plasma glucose at 2 weeks
• HbA1c and eGFR at 3 months
• When eGFR 30 - 60 ml/min, decrease to total daily dose of 1 g
• Cease if eGFR < 30 ml/min |
| Sulphonylureas | • Gliclazide
• Gliclazide MR
• Glimepiride | • Fasting plasma glucose 2 weeks
• HbA1c at 3 months
• Glimepiride may cause hypoglycaemia in presence of renal impairment |
| DPP4 inhibitors | • Sitagliptin
• Vildagliptin
• Alogliptin
• Saxagliptin
• Linagliptin | • Fasting and post prandial glucose
• HbA1c 3 monthly
• Vildagliptin not indicated in clients with creatinine > 130 μmol/l |
| GLP-1RA | • Liraglutide
• Exenatide | • Fasting and post prandial glucose
• HbA1c 3 monthly |
| SGLT 2 inhibitors | • Dapagliflozin
• Canagliflozin
• Empagliflozin | • Rely on adequate renal function
• eGFR at initiation and yearly thereafter
• eGFR 6 monthly when 60 - 90 ml/min
• eGFR when starting other medications that reduce renal function
• Cease dapagliflozin when CrCl < 60 ml/min and canagliflozin and empagliflozin if < 45 ml/min
• Not recommended if volume depleted or taking diuretics
• AST and ALT at baseline
• UEC at baseline and 6 monthly thereafter
• May be associated with weight loss
• Increase risk of urogenital infections |

**Poorly tolerated or potential for adverse reactions (review CMI)**

| Sulphonylureas | • Glibenclamide
• Glipizide | • Glibenclamide has high potential for hypoglycaemia particularly in elderly and renally impaired
• Glipizide not routinely used |
| Glitazones (TZDs) | • Pioglitazone
• Rosiglitazone | • AST and ALT at baseline
• Signs of fluid overload e.g. ankle oedema, SOB, sleeping upright
• Risk of bladder cancer with pioglitazone |
| Alpha-glucosidase inhibitor | • Acarbose | • Postprandial glucose at initiation
• Hypoglycaemia
• HbA1c at 3 months
• Hepatic enzymes for hepatotoxicity
• Flatulence, diarrhoea, abdominal pain and distension are common |
4.2 Insulins

- **Guide to insulin treatment**

  - **Step 1.** Check that diet, activity and oral medication are appropriate and co-morbidities are managed

  - **Step 2.** Decide the time and type of insulin (Table 4). Usually this would be once daily basal insulin (glargine) before dinner or premixed insulin twice daily, before breakfast and dinner

  - **Step 3.** Dosage
    - decide on the target range (Table 5)
    - decide the dose, ‘start low and go slow’
    - single dose, morning or evening
    - less may be required in the elderly, active, thin client and more in the overweight inactive client

  - **Step 4.** Adjust doses
    - Change doses in increments of 10 - 20% (e.g. 2 - 4 units if dose is 20 units) at intervals of 2 - 4 days

### Table 4. Insulins

<table>
<thead>
<tr>
<th>Insulin type</th>
<th>Insulin name</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Onset of action</td>
</tr>
<tr>
<td>Long acting (analogues)</td>
<td>Glargine (Lantus)</td>
<td>1 - 2 hours</td>
</tr>
<tr>
<td>Long acting (human)</td>
<td>Protaphane</td>
<td>1 - 2.5 hours</td>
</tr>
<tr>
<td>Long acting premixed</td>
<td>NovoMix 30</td>
<td>15 minutes</td>
</tr>
<tr>
<td>(analogues)</td>
<td>Humalog Mix 25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humalog Mix 50</td>
<td></td>
</tr>
<tr>
<td>Long acting premixed</td>
<td>Mixtard 50/50</td>
<td>30 minutes - 1 hour</td>
</tr>
<tr>
<td>(human)</td>
<td>Mixtard 30/70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humulin 30/70</td>
<td></td>
</tr>
<tr>
<td>Ultra short acting</td>
<td>NovoRapid</td>
<td>15 minutes</td>
</tr>
<tr>
<td>(analogues)</td>
<td>Humalog</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apidra</td>
<td></td>
</tr>
<tr>
<td>Short acting (human)</td>
<td>Actrapid</td>
<td>30 minutes</td>
</tr>
<tr>
<td></td>
<td>Humulin R</td>
<td></td>
</tr>
</tbody>
</table>
### Table 5. Targets for glycaemic control in type 2 diabetes

<table>
<thead>
<tr>
<th>Pre-prandial blood glucose (mmol/L)</th>
<th>Post-prandial (2 hours after food) (mmol/L)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 - 6.0</td>
<td>4.0 - 7.7</td>
<td>Normoglycaemia</td>
</tr>
<tr>
<td>6.1 - 8.0</td>
<td>6.0 - 10.0</td>
<td>NHMRC values</td>
</tr>
<tr>
<td>&gt; 8.0</td>
<td>&gt; 10.0</td>
<td>High</td>
</tr>
</tbody>
</table>

#### 5. Care plans

### Table 6. Care plan for clients with pre-diabetes

<table>
<thead>
<tr>
<th>Action</th>
<th>Review frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dx</td>
<td>Minimum standard care</td>
</tr>
<tr>
<td>Height</td>
<td>When stops growing</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Waist circumference</td>
<td>Monitor every 3 mths to encourage weight loss</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
</tr>
<tr>
<td>Fasting lipids</td>
<td>12 mthly if stable on hypolipidaemics</td>
</tr>
<tr>
<td>Random BGL</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Fasting BGL</td>
<td>12 mthly initially. Then individualise. If evidence of lifestyle modification exists and no deterioration, alter to 2 - 3 yrly</td>
</tr>
<tr>
<td>OGGT or HbA1c</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Dietitian</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Absolute cardiovascular risk assessment</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>6 mthly</td>
</tr>
<tr>
<td>MO/NP/RN R/V</td>
<td>12 mthly</td>
</tr>
</tbody>
</table>
### Table 7. Care plan summary for people with type 2 diabetes

<table>
<thead>
<tr>
<th>Action</th>
<th>Review frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dx Ongoing</strong></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>✓ When stops growing</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>BMI</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>BGL</td>
<td>✓ At each visit for client on insulin</td>
</tr>
<tr>
<td>Lifestyle modification education</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>Social emotional support</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Foot/amputation check</td>
<td>✓ 6 mths; 3 mths if high risk; 2 mths if previous ulcer</td>
</tr>
<tr>
<td>Visual acuity</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Retinal camera/eye examination</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>FBC</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Liver function test (LFT)</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>UEC</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>eGFR</td>
<td>✓ 12 mthly; 3 mthly if abnormal</td>
</tr>
<tr>
<td>HbA1c</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>Fasting lipids</td>
<td>✓ 12 mthly if stable on hypolipidaemcs</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>ACR</td>
<td>✓ 12 mthly; 3 mthly if abnormal</td>
</tr>
<tr>
<td>ECG</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Insulin</td>
<td>✓ As per MO/NP</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓ Annually</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓ Recommended. See the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓ 12 mthly; wkly for active wound</td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓ 3 mthly</td>
</tr>
<tr>
<td>Diabetes educator</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓ 12 mthly</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓ 6 mthly</td>
</tr>
<tr>
<td>High risk foot service team</td>
<td>✓ As required e.g. non-healing foot wound</td>
</tr>
<tr>
<td>Podiatrist</td>
<td>✓ 12 mthly; 2 mthly if previous ulcer/high risk foot</td>
</tr>
<tr>
<td>Physician/ Endocrinologist</td>
<td>✓ On referral by MO/NP</td>
</tr>
</tbody>
</table>
6. References


7. Resources


Section 2: Management of diagnosed conditions

General:

[www.amh.org.uk](http://www.amh.org.uk)

Feb

le at

works/www.straitages.pdf
Dyslipidaemia

High risk groups
• Children and adolescents who are overweight or obese for their age
• People with multiple cardiovascular risk factors
• Aboriginal and Torres Strait Islander peoples > 18 years of age

Considerations for women of child-bearing age
• Dyslipidaemia in pregnancy does not require treatment
• Women who are on statins and are contemplating pregnancy should discuss medication use with the MO/NP

Urgent referral
• Clients who have co-morbidities and resistant high cholesterol levels (triglyceride level > 8 mmol/L or TCcholesterol > 9 mmol/L) despite treatment should see a specialist

Special considerations
• In managing dyslipidaemia the following co-morbidities and screening must be considered
  – Chronic heart failure, page 100
  – Chronic kidney disease, page 112
  – Coronary heart disease, page 142
  – Diabetes type 2, page 196
  – Hypertension, page 228
  – Overweight and obesity in adults, page 260
  – Overweight and obesity in children, page 270
  – Stroke and transient ischaemic attack, page 300

1. What is dyslipidaemia?
• Dyslipidaemia (sometimes referred to as hyperlipidaemia) is the term used to describe various lipid (fat)/lipoprotein abnormalities which may occur in the serum due to the interaction between genetic and environmental factors
• Cholesterol is a type of fat that is part of all animal cells
• Cholesterol is essential for many of the body’s metabolic processes including
  – building cell membranes
  – making hormones like oestrogen and testosterone
  – helping metabolism e.g. for the production of vitamin D
  – producing bile acids which help digest fat and absorb nutrients
• When fats are ingested, the liver processes and returns cholesterol to the bloodstream
• Too much circulating blood cholesterol can build up fatty deposits in the walls of blood vessels
• Arteries can narrow and block completely, leading to heart disease and stroke
• A 10% increase in total cholesterol is associated with a 27% increase in the incidence of coronary heart disease irrespective of smoking, hypertension or history of vascular disease\(^3\)
• Lipoproteins carry cholesterol in the blood
• High density lipoproteins (HDL-cholesterol) are considered beneficial
• Low density lipoproteins (LDL-cholesterol) are considered harmful
• Very low density lipoproteins (VLDL-cholesterol) carry triglycerides (TG) in the bloodstream

1.1 Primary dyslipidaemia
• Genetic or hereditary disorder for high cholesterol such as familial hypercholesterolaemia

1.2 Secondary dyslipidaemia
• Most commonly caused by lifestyle factors, chronic conditions or diseases and medications (see Table 1)

2. Diagnosis of dyslipidaemia
• Diagnosis is confirmed with a venous blood sample taken 12 hours after ceasing any food or drink
• Once a blood test identifies abnormal lipid levels (see Table 4), the need for management in the context of the client’s absolute cardiovascular risk (see Appendix 2: Australian cardiovascular risk charts, page 494) and the cause of the dyslipidaemia should be initiated

Table 1. Common causes of secondary dyslipidaemia\(^2\)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect on lipid profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothyroidism, nephrotic syndrome, cholestasis, anorexia nervosa</td>
<td>• Increases LDL-C</td>
</tr>
<tr>
<td>Type 2 diabetes, obesity, renal impairment, smoking, drug therapy</td>
<td>• Increases triglycerides</td>
</tr>
<tr>
<td></td>
<td>• Decreases HDL-C</td>
</tr>
<tr>
<td>Diet high in saturated fat</td>
<td>• Increases LDL-C</td>
</tr>
<tr>
<td>Alcohol abuse and/or oestrogen use</td>
<td>• Increases triglycerides</td>
</tr>
<tr>
<td>Sedentary lifestyle</td>
<td>• Increases LDL-C</td>
</tr>
<tr>
<td></td>
<td>• Decreases HDL-C</td>
</tr>
<tr>
<td>β-blockers</td>
<td>• Increases TC</td>
</tr>
<tr>
<td></td>
<td>• Decreases HDL-C</td>
</tr>
<tr>
<td>Diuretics</td>
<td>• Increases TC</td>
</tr>
<tr>
<td></td>
<td>• Increases TG</td>
</tr>
</tbody>
</table>
3. Management

• Management of dyslipidaemia primarily focuses on diet and medication

3.1 Factors complicating management

• In managing dyslipidaemia the following co-morbidities and screening must be considered
  – Diabetes type 2, page 196
  – Chronic kidney disease, page 112
  – Hypertension, page 228
  – Coronary heart disease, page 142
  – Chronic heart failure, page 100
  – Stroke and transient ischaemic attack, page 300
  – Overweight and obesity in adults, page 260
  – Overweight and obesity in children, page 270

• It is important to check for these complications along with calculation of absolute cardiovascular risk. See Appendix 1: Australian cardiovascular risk charts, page 494

3.2 Support client self management

• Discuss the positive effects of lifestyle modification (see Lifestyle modification section) on lipid levels (see Table 2) with particular regard to Diet and nutrition, page 14

• Provide information about dyslipidaemia and its association with heart disease, stroke and pancreatitis

• Every 1.0 mmol/L reduction in LDL-C is associated with a corresponding 22% reduction in cardiovascular disease (CVD) mortality and morbidity

• Provide relevant dyslipidaemia resources (see Resources 1)

• Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding

---

**Target lipid levels**

- Total cholesterol (TC) < 4.0 mmol/L
- Triglycerides (TG) < 2.0 mmol/L
- HDL-cholesterol (HDL) > 1.0 mmol/L
- LDL-cholesterol (LDL) < 2.0 mmol/L (< 1.8 mmol/L with coronary stent)
- Non-HDL-cholesterol (NHDL) < 2.5 mmol/L
- TC:HDL-C ≤ 4.5 mmol/L
**Table 2. Lifestyle modification effect on lipid levels**

<table>
<thead>
<tr>
<th>Lifestyle intervention</th>
<th>To reduce TC and LDL-C levels</th>
<th>To reduce TG levels</th>
<th>To increase HDL-C levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce excessive body weight</td>
<td>♥</td>
<td>❀❀❀</td>
<td>❀</td>
</tr>
<tr>
<td>Increase physical activity</td>
<td>❀</td>
<td>❀</td>
<td>❀</td>
</tr>
<tr>
<td>Reduce dietary trans fat</td>
<td>❀❀</td>
<td></td>
<td>❀</td>
</tr>
<tr>
<td>Reduce intake of mono and disaccharides</td>
<td>❀❀</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce dietary saturated fat</td>
<td>❀❀</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consume foods high in phytosterol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol in moderation only</td>
<td></td>
<td>❀❀</td>
<td></td>
</tr>
<tr>
<td>Reduce total amount of dietary carbohydrates</td>
<td></td>
<td>❀</td>
<td></td>
</tr>
<tr>
<td>Consume polyunsaturated fat</td>
<td></td>
<td>❀</td>
<td></td>
</tr>
<tr>
<td>Increase dietary fibre</td>
<td>❀</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce dietary cholesterol</td>
<td>❀</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce dietary carbohydrates and replace with unsaturated fat</td>
<td></td>
<td>❀</td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consume soy protein products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replace saturated fat with mono- or polyunsaturated fat</td>
<td></td>
<td>❀</td>
<td></td>
</tr>
</tbody>
</table>

♥♥♥ Great effect  ♥♥ Good effect  ♥ Adequate effect

### 3.3 Social emotional support
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (for examples see Resource 2). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis.
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition.

### 3.4 Body weight and physical activity
- Overweight, obesity and central obesity contributes to dyslipidaemia and particularly decreases HDL.
- A 5 - 10% body weight reduction improves lipid levels and favourably affects other cardiovascular risk factors often present in dyslipidaemic clients.
- Weight reduction can be achieved by decreasing dietary saturated fats and engaging in regular physical exercise of moderate intensity i.e. 30 minutes/day of exercise that makes you breathless.

### 3.5 Nutrition and diet
- Provide the client with nutrition and diet related resources (see Resource 3).
- Dietary saturated fats (take-away meals, potato chips, cakes, biscuits, pies, butter, full-fat milk, cream and cheese) have the strongest impact on raising LDL-C levels.
• Clients with high TG levels particularly, should avoid food and drinks with added sugar e.g. softdrinks, sports drinks, lollies and cakes

• Clients with high TG levels should cease alcohol consumption

• Avoid using or cooking with salt and instead choose fresh or frozen foods "low in salt" or with "no added salt"

• Polyunsaturated fats help lower blood cholesterol e.g. fish, unsalted nuts, and polyunsaturated margarines and oils

• Regular fish consumption is associated with a reduced cardiovascular risk

• Phytosterols found in vegetable oils and dietary fibre found in legumes, avocado, plain nuts, fruit, vegetables, and wholemeal cereals, have a direct cholesterol lowering effect

• Implement diet modification to lower lipid levels (see Table 3)
  – diet modification for low risk groups runs for 6 weeks
  – if lipid levels remain high, commence medications
  – for high risk groups, diet modification must be started concurrently with medication

• See Diet and nutrition, page 14

### Table 3. Dietary options to lower TC and LDL-C

<table>
<thead>
<tr>
<th>Types</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>• Whole grains, oats</td>
</tr>
<tr>
<td>Vegetables</td>
<td>• Raw, cooked, frozen or tinned vegetables</td>
</tr>
<tr>
<td>Legumes</td>
<td>• Beans, lentils, including soy and soy protein</td>
</tr>
<tr>
<td>Fruit</td>
<td>• Fresh, frozen or tinned fruit</td>
</tr>
<tr>
<td>Eggs, meat and fish</td>
<td>• Lean meat, oily fish, skinless chicken and egg white</td>
</tr>
<tr>
<td>Dairy foods</td>
<td>• Skimmed milk and yoghurt</td>
</tr>
<tr>
<td>Cooking procedures</td>
<td>• Grilling, boiling, steaming, oven bake and microwave</td>
</tr>
</tbody>
</table>

### 4. Medications

• MO or NP to commence and review medications

• Statins are the first line, proven and efficacious therapy for lowering elevated LDL-C plasma levels

• Identify medications which interact with those used for dyslipidaemia
  – ß-blockers increase TC and decreases HDL
  – Diuretics increase TC and TG

• Provide client education around medication use and safety

• Begin medication therapy if 6 weeks of lifestyle modification intervention has failed to reduce lipid levels below the therapy threshold (see Table 4)
### Table 4. Medication therapy thresholds for high risk groups

<table>
<thead>
<tr>
<th>Population</th>
<th>Cholesterol thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td>People with diabetes</td>
<td>• TC &gt; 5.5 mmol/L</td>
</tr>
<tr>
<td>Clients with</td>
<td>• TC &gt; 4.0 mmol/L</td>
</tr>
<tr>
<td>• Coronary heart disease</td>
<td>• LDL &gt; 2.0 mmol/L (&lt; 1.8 mmol/L in stented clients)</td>
</tr>
<tr>
<td>• Cerebrovascular disease</td>
<td>• HDL &lt; 1.0 mmol/L</td>
</tr>
<tr>
<td>• Peripheral vascular disease</td>
<td>• TG &gt; 2.0 mmol/L</td>
</tr>
<tr>
<td>• NHDL-C &lt; 2.5 mmol/L</td>
<td></td>
</tr>
<tr>
<td>People with chronic kidney disease</td>
<td>• TC &gt; 4 mmol/L</td>
</tr>
<tr>
<td>• LDL &gt; 0.5 mmol/L</td>
<td></td>
</tr>
<tr>
<td>Aboriginal and Torres Strait Islander peoples without diabetes or other</td>
<td>• TC &gt; 6.5 mmol/L or</td>
</tr>
<tr>
<td>high risk</td>
<td>• TC &gt; 5.5 mmol/L and HDL &lt; 1 mmol/L</td>
</tr>
<tr>
<td>People with hypertension alone</td>
<td>• TC &gt; 6.5 mmol/L or</td>
</tr>
<tr>
<td>• TC &gt; 5.5 mmol/L and HDL &lt; 1 mmol/L</td>
<td></td>
</tr>
<tr>
<td>Dyslipidaemia in</td>
<td>• TC &gt; 7.5 mmol/L or</td>
</tr>
<tr>
<td>• Men aged 35 - 75 years</td>
<td>• TG &gt; 4 mmol/L</td>
</tr>
<tr>
<td>• Post-menopausal women up to 75 years</td>
<td></td>
</tr>
<tr>
<td>Familial hypercholesterolaemia or family history of symptomatic coronary</td>
<td>• ≤ 18 years LDL &gt; 4 mmol/L</td>
</tr>
<tr>
<td>heart disease</td>
<td>• &gt; 18 years</td>
</tr>
<tr>
<td>• before age 60 years in one or more first degree relatives</td>
<td>• LDL &gt; 5 mmol/L or</td>
</tr>
<tr>
<td>• before age 50 years in one or more second degree relatives</td>
<td>• TC &gt; 6.5 mmol/L or</td>
</tr>
<tr>
<td>• ≤ 18 years LDL &gt; 4 mmol/L</td>
<td>• TC &gt; 5.5 mmol/L and HDL &lt; 1 mmol/L</td>
</tr>
<tr>
<td>Begin medication treatment on all others who have these lipid levels</td>
<td>• TC &gt; 9 mmol/L or</td>
</tr>
<tr>
<td></td>
<td>• TG &gt; 8 mmol/L</td>
</tr>
</tbody>
</table>

**Begin medications when cholesterol remains greater than the above thresholds after 6 weeks of lifestyle modification has failed**

<table>
<thead>
<tr>
<th>Target lipid levels for those on medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol (TC)</td>
</tr>
<tr>
<td>Triglycerides (TG)</td>
</tr>
<tr>
<td>HDL-cholesterol (HDL)</td>
</tr>
<tr>
<td>LDL-cholesterol (LDL)</td>
</tr>
<tr>
<td>Non-HDL-cholesterol (NHDL)</td>
</tr>
<tr>
<td>TC:HDL-C</td>
</tr>
</tbody>
</table>
Table 5. Recommended medications and combinations

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statin</strong></td>
<td>• Atorvastatin</td>
<td>10 - 80 mg daily</td>
</tr>
<tr>
<td></td>
<td>• Pravastatin</td>
<td>20 - 80 mg daily</td>
</tr>
<tr>
<td></td>
<td>• Rosuvastatin</td>
<td>5 - 40 mg daily</td>
</tr>
<tr>
<td></td>
<td>• Simvastatin</td>
<td>10 - 80 mg daily</td>
</tr>
<tr>
<td></td>
<td>• Fluvastatin</td>
<td>20 - 80 mg daily</td>
</tr>
<tr>
<td><strong>Lipase inhibitor</strong> (when</td>
<td>• Ezetimibe</td>
<td>10 mg daily</td>
</tr>
<tr>
<td>intolerant of statin or as</td>
<td></td>
<td>Reduces LDL-C by between 15 - 22%</td>
</tr>
<tr>
<td>add-on when target not reached)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cholestyramine</td>
<td>4 - 8 g daily increasing up to 24 g in divided doses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduces LDL-C by between 18 - 25%</td>
</tr>
<tr>
<td></td>
<td>• Colestipol</td>
<td>5 - 10 g daily up increasing up to 30 g daily in divided doses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduces LDL-C by between 18% - 25%</td>
</tr>
<tr>
<td><strong>Nicotinic acid</strong></td>
<td>• Nicotinic acid</td>
<td>250 mg b.d. with food increasing slowly to 1500 mg b.d. or 1000 mg t.d.s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Raises HDL-C up to 25%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduces LDL-C by 15 - 18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduces TG by 20 - 40%</td>
</tr>
<tr>
<td>**Statin + bile acid binding</td>
<td>• As above</td>
<td>Reduces LDL-C by a further 10 - 20%</td>
</tr>
<tr>
<td>resins**</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statin + lipase inhibitor</strong></td>
<td>• As above</td>
<td>Reduces LDL-C by a further 10 - 15%</td>
</tr>
</tbody>
</table>

**Treatment for hypercholesterolaemia**

- First line treatment
- Reduces circulating LDL-C up to 60%
- Increases HDL-C by 5 - 10%

**Treatment for hypertriglyceridaemia**

- 145 mg daily
- Reduce dose in clients with renal impairment eGFR 20 - 60 mL/min 96 mg daily eGFR 10 - 20 mL/min 48 mg daily
- Reduces TG levels
- Modest HDL-C raising effects

- 600 mg b.d.
- Reduces TG levels
- Modest HDL-C raising effects

- 1.2 - 3.6 g omega-3 daily
- Reduces TG by up to 30%

- Statins + fibrates reduce LDL-C and TG
- Statins + nicotinic acid reduce TG
- Both combinations raise HDL-C
- Both combinations increase risk of myopathy
### 5. Care plan

#### Table 6. Care plan for clients with dyslipidaemia

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>UEC</td>
<td>✓</td>
<td>12 mthly</td>
</tr>
</tbody>
</table>
| **Fasting blood lipids**        | ✓  | • Prior to initial drug treatment then every 2 mths until target reached  
                                 |    | • Annually once target levels reached  |
| **LFT and ALT**                 | ✓  | • 2 mths after medication changes then annually if liver enzymes remain below upper limit  
                                 |    | • Check if client develops myalgia or weakness  
                                 |    | • If liver enzymes become raised on medications  
                                 |    | • if ≤ 3 x upper limit of normal continue therapy and recheck in 4 wks  
                                 |    | • if > 3 x upper limit of normal stop or reduce statin and recheck in 4 wks  |
| **Creatinine kinase (CK)**      | ✓  | • Prior to medication treatment  
                                 |    | • Routine monitoring not required  
                                 |    | • Check if client develops myalgia or weakness  
                                 |    | • Stop medications if CK > 5 x upper limit of normal, check and monitor every 2 wks  
                                 |    | • If medicated and ≤ 5 x upper limit of normal and no muscle symptoms then continue statin, if muscle symptoms then monitor CK regularly  |
| **Client self management support** | ✓  | Each visit                        |
| Lifestyle modification         | ✓  | Each visit                        |
| Diet modification              | ✓  | Wkly for 6 wks                    |
| Social emotional wellbeing     | ✓  | Each visit                        |
| Influenza vaccine              | ✓  | Recommended - see the current edition of the *Australian Immunisation Handbook* for schedule |
| Dietitian                      | ✓  | Wkly for 4 wks; at 2 mth then 3 mthly |
| Medication review              | ✓  | Each visit                        |
| Dentist                        | ✓  | 12 mthly                          |
| HW/RN R/V                      | ✓  | 3 mthly                          |
| MO/NP R/V                      | ✓  | 6 mthly                          |
| Specialist R/V                 | ✓  | On MO/NP referral                |
6. References


7. Resources

Hepatitis B

High risk groups
- Aboriginal and Torres Strait Islander peoples
- Peoples from Asia-Pacific countries
- People with a history of exposure to infected blood or body fluids
- Household members or sexual partners with hepatitis B infection
- People with tattoos or piercings not performed cleanly
- Cultures with unsterile cultural practices e.g. initiation ceremonies
- Injecting drug users
- Detainees of correctional facilities
- Those on haemodialysis
- Those with HIV or other diseases affecting immunity
- Workers with occupational exposure e.g. health workers etc.
- Sexually active men who have sex with men
- Disabled people attending residential or daycare facilities
- Recipients of certain transplants and blood products

Considerations for women of child-bearing age
- All pregnant women should be screened for hepatitis B as part of routine antenatal care (See the current edition of Primary Clinical Care Manual or the Clinical Practice Guidelines: Antenatal Care - Module 1 for further information)
- Management should be discussed with a specialist early in a pregnancy as women with a high viral load can be offered treatment
- Infants born to women who are HBsAg positive must be given hepatitis B immunoglobulin (HBIG) and a dose of monovalent hepatitis B vaccine on the day of birth
- Any baby born to a mother with chronic hepatitis B (CHB) should be tested for HBsAg and anti-HBs at 9 - 12 months of age (at least 3 months after completing the primary vaccination course)

Urgent referral
- For acute presentations of hepatitis B refer to the current edition of the Primary Clinical Care Manual (PCCM), MO/NP, gastroenterologist or infectious diseases physician

1. What is hepatitis B?
- A very infectious virus that infects and damages the liver
- The virus can be spread
  - from mother to infant at birth
  - by sexual contact
  - by using contaminated equipment to inject drugs
  - by close household contact such as sharing toothbrushes and razors
— person to person transmission through contact between open sores or wounds

- CHB infection poses significant long term health risks to the client, as well as the risk of infection to others
- Up to 25% of those who are chronically infected will die prematurely as a result of either cirrhosis or hepatocellular carcinoma (HCC)
- The prevalence of chronic hepatitis B infection is very high in many Australian Aboriginal and Torres Strait Islander communities
- Aboriginal and Torres Strait Islander peoples are more likely to have contracted hepatitis B at birth or in early childhood
- Acquisition as a neonate or child carries a much higher risk of developing chronic hepatitis B (90% and 30% respectively), than if the infection is acquired as an adult (< 10%)
- Antiretroviral treatment is available to reduce these outcomes
- Acute hepatitis B infections are less commonly seen than CHB

2. Diagnosis of hepatitis B

2.1 Acute hepatitis B
- For acute episodes of hepatitis B refer to the current edition of the *Primary Clinical Care Manual*

2.2 Chronic hepatitis B (CHB)
- Is often asymptomatic (no symptoms)
- Is identified by venous blood serology for HBsAg, anti-HBs and anti-HBc (triple test)
- Once documented evidence of hepatitis B serology exists refer to Figure 1.

3. Management

3.1 Support client self management
- See Lifestyle modification section with particular focus on *Alcohol reduction, page 4*
- Encourage the client to identify barriers to adequate lifestyle modification and medical compliance and to set goals to overcome those barriers based on their capacity and understanding
- Discuss what hepatitis B is and how it progresses (see Resource 1)
- Avoid alcohol and kava use
- Safe sex should be encouraged to avoid co-infection with other viruses
- Provide hepatitis B support services details and material (see Resource 1)
Figure 1. Interpretation of hepatitis B serology

Is there documented evidence of previous testing?

YES

Take bloods for
- HBsAg
- anti-HBc
- anti-HBs

No further action or testing required

HBsAg -ve
anti-HBc -ve
anti-HBs < 10 IU/L
Susceptible to infection

Refer to Figure 2.

HBsAg +ve
anti-HBc +ve
anti-HBs < 10 IU/L
Likely CHB

Refer to Figure 3.

HBsAg -ve
anti-HBc -ve
anti-HBs > 10 IU/L
Immune due to vaccination

No further action or testing required

HBsAg -ve
anti-HBc +ve
anti-HBs > 10 IU/L
(or < 10 IU/L)
Immune due to past resolved infection

No further action or testing required

HBsAg -ve
anti-HBc -ve
anti-HBs < 10 IU/L
Susceptible to infection

Refer to Figure 2.

HBsAg +ve
anti-HBc +ve
anti-HBs < 10 IU/L
Likely CHB

Refer to Figure 3.

HBsAg -ve
anti-HBc -ve
anti-HBs > 10 IU/L
Immune due to vaccination

No further action or testing required

HBsAg -ve
anti-HBc +ve
anti-HBs > 10 IU/L
(or < 10 IU/L)
Immune due to past resolved infection

No further action or testing required
Figure 2. Clinical response for people with anti-HBc -ve, HBsAg -ve, anti-HBs < 10 IU/L

3.2 Social emotional support
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 2). Rating scales should be supplemented with a clinical assessment by a suitably qualified clinician to make a diagnosis.
- Acknowledge any client concerns and reassure them that good adherence to appropriate clinical treatment can improve the symptoms of their condition.

3.3 Reduce the risk of developing complications
- People with active hepatitis B can be effectively treated with anti-viral agents to reduce the risk of long term liver damage (see 4. Medications).
- Initial assessment and ongoing monitoring as per careplan (Table 1).
- Provide vaccination, especially hepatitis A, to optimise liver health.

3.4 Minimise risk of spreading the virus
- Contact tracing of sexual contacts.
- Regular sexual contacts, close household and family (especially parents and siblings) contacts should be tested for hepatitis B and offered immunisation if:
  - there is no evidence of prior infection and
  - they have not previously received 3 doses of hepatitis B vaccine.
- Use of condoms to protect sexual contacts.
- Avoid sharing toothbrushes or razors with others, and cover wounds or cuts.
- Clean up spilt blood with gloves and bleach.
- Harm minimisation for intravenous drug users should be advocated to avoid
co-infection with HIV or hepatitis C

3.5 Screening for hepatocellular carcinoma (HCC or liver cancer)

- If left untreated HCC is a terminal condition
- Consider screening for HCC if after counselling the client wants and could tolerate curative treatment and the client
  - has a proven or suspected cirrhosis or
  - is Aboriginal and/or Torres Strait Islander aged 50 or over or
  - has a first degree family history of HCC or
  - is an Asian male over 40 years or female over 50 years or
  - is an African over 20 years
- If a client is at risk of HCC then refer to a specialist for assessment
- Screening for HCC should be individually assessed by a specialist, taking into account the patient, clinical picture, co-morbidities, habitual alcohol consumption and co-infection with hepatitis C or HIV
- Screening for HCC involves a 6 monthly ultrasound and Alpha-Foetoprotein blood test\textsuperscript{12,13}

3.6 Serological management

- Attend to ongoing serological monitoring and per Figure 2. and Figure 3. as well as attending to co-morbid conditions

4. Medications

- Treatment of chronic hepatitis B is complex, undergoing rapid change and must be individualised. Seek specialist advice
- There are currently 2 types of medications used for hepatitis B
  - pegylated interferon - injection once a week for 48 weeks, and
  - antiviral medications - tablets once a day, generally for life. The more commonly used antiviral medications are entecavir and tenofovir
- Tenofovir should be offered from 32 weeks gestation until 8 weeks post-partum to all mothers with HBV DNA $> 10$ million IU/mL
- Adherence to antivirals is crucial due to the risk of a liver flare
- Antivirals will be prescribed by and after a specialist review
Figure 3. Chronic hepatitis B management

* HBV DNA level is considered high if $> 2000$ IU/ml (104 copies/ml) in people who are hepBeAg negative, and $> 20000$ IU/ml (105 copies/ml) in people who are hepBeAg positive

# If someone from Pathway 1. develops a constantly raised ALT ($> 19$ IU/L women and $> 30$ IU/L men14), and a clinical review fails to identify other causes of liver dysfunction (medications, fatty liver, alcohol) then refer to Pathway 3.

Anyone with CHB being considered for immunosuppressive treatment or with symptoms of chronic liver disease needs specialist review
### 5. Care plan

**Table 1. Care plan summary for a person with chronic hepatitis B**

<table>
<thead>
<tr>
<th>Action</th>
<th>Pathway 1. normal ALT level low HBV DNA eAg +ve or -ve</th>
<th>Pathway 2. normal ALT level high HBV DNA eAg +ve or -ve</th>
<th>Pathway 3. raised ALT level high or low HBV DNA eAg +ve or -ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waist circumference</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx and 6 mthly</td>
</tr>
<tr>
<td>BMI</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx and 6 mthly</td>
</tr>
<tr>
<td>Lifestyle education</td>
<td>Dx and at each encounter</td>
<td>Dx and at each encounter</td>
<td>Dx and at each encounter</td>
</tr>
<tr>
<td>Check immune status of sexual partner(s) household and family contacts and offer vaccination</td>
<td>Dx and at each encounter</td>
<td>Dx and at each encounter</td>
<td>Dx and at each encounter</td>
</tr>
<tr>
<td>HBeAg serology</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx</td>
</tr>
<tr>
<td>HBV DNA viral load testing</td>
<td>Dx and 12 mthly</td>
<td>Dx and 12 mthly</td>
<td>Dx and 12 mthly</td>
</tr>
<tr>
<td>Hepatitis A serology and offer vaccination if -ve</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx</td>
</tr>
<tr>
<td>Hepatitis C serology</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx</td>
</tr>
<tr>
<td>Hepatitis D serology</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx</td>
</tr>
<tr>
<td>HIV serology</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx</td>
</tr>
<tr>
<td>LFT, ALT, AST</td>
<td>Dx and 12 mthly</td>
<td>Dx and 6 mthly</td>
<td>Dx and 6 mthly</td>
</tr>
<tr>
<td>Full blood count (FBC)</td>
<td>Dx and 12 mthly</td>
<td>Dx and 12 mthly</td>
<td>Dx and 12 mthly</td>
</tr>
<tr>
<td>INR</td>
<td>Dx</td>
<td>Dx</td>
<td>Dx and 12 mthly</td>
</tr>
<tr>
<td>Liver ultrasound</td>
<td>If &gt; 40 yrs perform at diagnosis</td>
<td>Dx consider 6 mthly</td>
<td>Dx consider 6 mthly</td>
</tr>
<tr>
<td>Fibroscan</td>
<td>Annually for active disease phase otherwise at Dx then 2nd yrly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpha-Foetoprotein (AFP)</td>
<td>Consider 6 mthly</td>
<td>Consider 6 mthly</td>
<td></td>
</tr>
<tr>
<td>Coagulation profile</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid function test (TFT)</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron studies</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caeruloplasmin and copper</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANA (anti nuclear antibodies)</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMA (mitochondrial antibody)</td>
<td>Dx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>Dx and 12 mthly</td>
<td>Dx and 6 mthly</td>
<td>Dx and 3 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>Dx and 12 mthly</td>
<td>Dx and 6 mthly</td>
<td>Dx and 3 mthly</td>
</tr>
<tr>
<td>Physician/specialist review</td>
<td>Dx</td>
<td></td>
<td>Dx</td>
</tr>
</tbody>
</table>
6. References

5. NACCHO/RACGP. National Guide to a Preventive Health Assessment for Aboriginal and Torres Strait Islander People. 2nd Edition RACGP 2012

7. Resources

1. All you wanted to know about hepatitis B available at http://www.ashm.org.au/HBV
Hypertension

High risk groups
• Any person with a blood pressure (BP) reading higher than 140/90 mmHg
• Any person with cardiovascular risk factors
• People under 15 years of age who have an overweight or obese BMI range

Considerations for women of child-bearing age
• Hypertension may be worse in pregnancy or be pregnancy induced (see Resource 1)

Urgent referral
• If systolic BP ≥ 200 mmHg and/or diastolic BP ≥ 120 mmHg then refer to the current edition of the PCCM and the MO/NP

Special considerations
In managing hypertension the following co-morbidities must be considered
• Dyslipidaemia, page 210
• Chronic kidney disease, page 112
• Overweight and obesity in adults, page 260
• Diabetes type 2, page 196

1. What is hypertension?
• Hypertension is an elevated blood pressure (BP) and is defined as ≥ 140/90 mmHg
• Thresholds for elevated blood pressure vary between individuals depending on age, gender and the presence of risk factors
• Higher BP readings are associated with greater risk of cardiovascular and renal disease and death
• Lowering BP by lifestyle modification (see Lifestyle modification section) and medication is associated with reduced risk
• Hypertension in most cases has no warning signs or symptoms
• People usually do not know they have hypertension until their BP is checked
• There are two types of hypertension: primary hypertension and secondary hypertension
• Primary hypertension is attributed to lifestyle behaviours, age and genetic factors
• Secondary hypertension is attributed to potentially reversible causes such as: medications, pregnancy, sleep apnoea, kidney disease and certain endocrine (hormone) disorders

2. Diagnosis
• Diagnosis involves a review of client medical history and all cardiovascular disease risk factors
• A cardiovascular system physical examination includes: BP, pulse, signs of lower limb
swelling (peripheral oedema), heart sounds and lung auscultation

- Clients should avoid consuming caffeine or cigarettes 2 hours prior to measuring BP as this increases the reading particularly when used in combination

- During initial assessment BP is measured on both arms

- If BP varies by more than 5 mmHg use the arm with the higher reading for all subsequent BP measurements

- In clients where postural hypotension might be suspected (e.g. elderly, those with diabetes), measure both sitting and standing BP

- Repeat the measurement after the client has been standing for 2 minutes

- A raised BP in response to the assessment itself (“white coat” hypertension) should be considered and ruled out

- The diagnosis of hypertension should be based on multiple BP measurements taken on separate occasions

- Signs and symptoms suggestive of secondary hypertension include
  - sudden onset hypertension in young or elderly clients
  - abnormal renal function and proteinuria
  - sleep apnoea
  - episodes of sudden onset flushing, headaches, sweating and palpitations
  - existing medication use that may raise the client’s blood pressure

- BP should be checked every 2 years from 18 years of age for non-Aboriginal or Torres Strait Islander and annually from 18 years of age for all Aboriginal and/or Torres Strait Islander people

3. Management

- Management of hypertension should follow a comprehensive strategy that includes lifestyle modification, and medication when appropriate, to reduce cardiovascular risk profile and prevent end organ disease (see Table 2)

- Management decisions will be influenced by co-morbidities, age, gender, smoking and physical activity

3.1 Factors complicating management

- In managing hypertension the following co-morbidities must be considered
  - Dyslipidaemia, page 210
  - Chronic kidney disease, page 112
  - Diabetes type 2, page 196
  - Overweight and obesity in adults, page 260
  - It is important to check for these complications along with calculation of absolute cardiac risk using Appendix 1: Australian cardiovascular risk charts, page 494
3.2 Support client self management

- Refer to the Lifestyle modification section
- Provide education to the client about what hypertension is and how it affects blood vessels, cardiovascular risk and other chronic diseases (see Resource 2)
- Regular aerobic exercise can lower systolic BP by an average of 4 mmHg and diastolic BP by an average of 2.5 mmHg
- Blood pressure will increase during rigorous exercise
- Salt restriction can reduce systolic BP by approximately 4 - 5 mmHg in hypertensive individuals and 2 mmHg in normotensive individuals
- In people with normal renal function increasing dietary potassium can reduce systolic BP by 4 - 8 mmHg if hypertensive and 2 mmHg if normotensive
- Every 1% reduction in body weight lowers systolic BP by an average of 1 mmHg. Weight loss of 4.5 kg can reduce BP and/or prevent hypertension in a large proportion of overweight people, while a loss of 10 kg can reduce systolic BP by 6 - 10 mmHg
- Reducing alcohol consumption can substantially lower BP in some clients
- Inform the client of the importance of taking blood pressure medications
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and to set goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional support

- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (for examples see Resource 3). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Renal monitoring

- Dip stick urinalysis for blood and protein
- FBC, UEC, eGFR, fasting glucose, fasting cholesterol/triglycerides/LDL/HDL and ACR to monitor diabetes, dyslipidaemia, liver or kidney problems

3.5 Cardiac monitoring

- Client progresses toward addressing cardiovascular risk factors
- Adherence with agreed management strategies to lower blood pressure
- Regular review of blood pressure history
- ECG at diagnosis to look for left ventricular hypertrophy. Repeat 1 - 2 yearly
- Echocardiogram referral in the presence of heart failure or murmur
4. Medications

- Medications are reviewed by MO or NP
- A therapeutic plan should be implemented in all people with hypertension
- Record any current or past medication use and its efficacy
- Identify drugs that can raise blood pressure, such as alcohol, oral contraceptive pill, non-steroidal anti-inflammatory drugs (NSAIDs), steroids, nasal decongestants and amphetamines
- Provide medication information, discuss barriers to taking medications and devise a plan with the client to ensure medication adherence
- For all major anti-hypertensive drug classes the beneficial effect is by lowering BP regardless of their mode of action
- Combination therapy is often necessary. Fewer than 50% of people treated for hypertension will achieve an optimal blood pressure response with a single agent

4.1 Steps to medication treatment

- Step 1.
  - classify the client’s blood pressure level (see Table 1)
  - attempt to reach recommended targets

| Table 1. Definition and classification of blood pressure (BP) levels |
|-------------------|------------------|------------------|
| **Category**      | **Systolic mmHg (SBP)** | **Diastolic mmHg (BP)** |
| Normal            | < 120             | < 80             |
| High normal       | 120 - 139         | 80 - 89          |
| Grade 1 (mild) hypertension | 140 - 159 | 90 - 99          |
| Grade 2 (moderate) hypertension | 160 - 179 | 100 - 109        |
| Grade 3 (severe) hypertension | ≥ 180            | ≥ 110            |
| Isolated systolic hypertension | ≥ 140            | < 90             |
| Isolated systolic hypertension with widening pulse pressure | ≥ 160            | ≤ 70             |

**Blood pressure targets for adults**

- People with proteinuria > 1 g per day (with or without diabetes) | < 125 | < 75 |
- People with co-morbidities or end organ damage e.g. coronary heart disease, diabetes, chronic kidney disease, proteinuria > 300 mg/day, stroke / TIA | < 130 | < 80 |
- People with none of the above conditions | < 140 | < 90 |

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**Step 2.**
identify conditions that warrant immediate treatment with antihypertensive drugs, regardless of BP or overall cardiovascular risk profile (see Table 2)

### Table 2. Conditions requiring immediate antihypertensive treatment

<table>
<thead>
<tr>
<th>Associated clinical conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diabetes</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Cerebrovascular disease</strong></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Coronary heart disease</strong></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Chronic heart failure</strong></td>
</tr>
<tr>
<td><strong>Chronic kidney disease</strong></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Aortic disease</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Peripheral arterial disease</strong></td>
</tr>
<tr>
<td><strong>Dyslipidaemia</strong></td>
</tr>
<tr>
<td><strong>Family history</strong></td>
</tr>
<tr>
<td><strong>Previous diagnosis</strong></td>
</tr>
<tr>
<td><strong>Left ventricular hypertrophy</strong></td>
</tr>
<tr>
<td><strong>Microalbuminuria</strong></td>
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<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Chronic kidney disease</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Vascular disease</strong></td>
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</tbody>
</table>

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Step 3.
– determine if the client requires ongoing monitoring of their hypertension or initiation of drug treatment (see Figure 1)

Are any of the following present?
• SBP ≥ 180 or DBP ≥ 110
• Isolated systolic hypertension with widened pulse pressure
• Associated conditions or end organ damage (see Table 2)

YES ♥
Start drug treatment immediately

NO
Confirmed hypertension grades 1 or 2. All other adults assess 5 year absolute cardiovascular risk ♥

HIGH > 15%

Start drug treatment immediately ♥

MODERATE 10 - 15%

Monitor BP and reassess 5 year absolute cardiovascular risk in 3 - 6 months ♥

LOW < 10%

Monitor BP and reassess 5 year absolute cardiovascular risk in 6 - 12 months ♥

HIGH > 15%

MODERATE 10 - 15%

LOW < 10%

SBP < 140 mmHg and DBP < 90 mmHg ♥

SBP ≥ 140 mmHg or DBP ≥ 90 mmHg ♥

SBP ≥ 150 mmHg or DBP ≥ 90 mmHg ♥

SBP 140 - 150 mmHg and DBP < 90 mmHg ♥

Continue monitoring ♥

Start drug treatment immediately ♥

Continue monitoring ♥

Figure 1. When to initiate blood pressure lowering drug treatment
♥ Continue lifestyle modification, monitor BP, manage associated conditions and reassess absolute cardiovascular risk regularly. Note that clients with mild hypertension will require antihypertensive drug treatment if their absolute risk of cardiovascular disease is elevated due to changes in other risk factors. For Aboriginal and/or Torres Strait Islander adults, consider managing as though at a higher risk level

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**Step 4.**
- determine the best combination of drugs for newly diagnosed hypertensive clients utilising Figure 2. and Table 3.
- start with lowest dose of selected first line agent
- if initial drug is not well tolerated change to a drug of a different class
- if target or significant reduction is not reached with monotherapy (50 - 75% of clients with hypertension will not\(^3\)) add a second agent from an appropriate different pharmacological class rather than increasing the dose of the first agent

**FIRST CHOICE**
- ACE inhibitor (or angiotensin II receptor antagonist)
  - or
  - calcium channel blocker
  - or
  - low-dose thiazide diuretic (consider for people aged ≥ 65 years only)

**IF TARGET BP NOT REACHED**
- ACE inhibitor (or angiotensin II receptor antagonist) + calcium channel blocker
  - or
  - ACE inhibitor (or angiotensin II receptor antagonist) + low-dose thiazide diuretic

**IF TARGET BP NOT REACHED**
- ACE inhibitor (or angiotensin II receptor antagonist) + calcium channel blocker + low-dose thiazide diuretic

**IF TARGET BP NOT REACHED**
- seek specialist advice

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**Figure 2. Initiating drug treatment for newly diagnosed hypertension\(^3\)**
Section 2: Management of diagnosed conditions

Table 3. Suggested medications for hypertension

<table>
<thead>
<tr>
<th>Thiazide diuretics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• It is usually unnecessary to exceed the doses shown</td>
</tr>
<tr>
<td>• Thiazide diuretics are not recommended for younger clients due to risk of diabetes associated with long term use</td>
</tr>
<tr>
<td>• Potentially beneficial for post stroke (low-dose) and in heart failure</td>
</tr>
<tr>
<td>• Contraindicated or potentially harmful in type 1 or type 2 diabetes (with proteinuria or microalbuminuria) and gout</td>
</tr>
<tr>
<td>Chlorothalidone</td>
</tr>
<tr>
<td>Hydrochlorothiazide</td>
</tr>
<tr>
<td>Indapamide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beta-blockers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Not recommended as first line therapy for patients with uncomplicated hypertension because they are less effective than other first line drugs in reducing the risk of stroke. However, they are useful in clients with both hypertension and stable angina, and after myocardial infarction</td>
</tr>
<tr>
<td>• For clients on current atenolol monotherapy, consider replacing with another beta-blocker or another drug class</td>
</tr>
<tr>
<td>• Potentially beneficial in post myocardial infarction (except oxprenolol), atrial fibrillation (rate control) and in heart failure (bisoprolol, carvedilol, metoprolol controlled release)</td>
</tr>
<tr>
<td>• Contraindicated or potentially harmful in type 1 or type 2 diabetes (with proteinuria or microalbuminuria), pregnancy (atenolol, oxprenolol), uncontrolled heart failure, depression, bradycardia, 2° or 3° AV block, asthma, COPD</td>
</tr>
<tr>
<td>Bisoprolol</td>
</tr>
<tr>
<td>Atenolol</td>
</tr>
<tr>
<td>Carvedilol</td>
</tr>
<tr>
<td>Labetalol</td>
</tr>
<tr>
<td>Metoprolol tartrate</td>
</tr>
<tr>
<td>Metoprolol succinate (controlled release)</td>
</tr>
<tr>
<td>Oxprenolol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calcium channel blockers – dihydropyridine</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Amlodipine and felodipine: lowest doses are recommended, particularly in the elderly</td>
</tr>
<tr>
<td>• Nifedipine: long-acting formulations are preferable</td>
</tr>
<tr>
<td>• Contraindicated or potentially harmful in heart failure</td>
</tr>
<tr>
<td>Amlodipine</td>
</tr>
<tr>
<td>Felodipine</td>
</tr>
<tr>
<td>Lercanidipine</td>
</tr>
<tr>
<td>Nifedipine</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calcium channel blockers – nondihydropyridine</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Potentially beneficial in atrial fibrillation (rate control)</td>
</tr>
<tr>
<td>• Contraindicated or potentially harmful in heart failure, bradycardia and 2° or 3° AV block</td>
</tr>
<tr>
<td>Diltiazem</td>
</tr>
<tr>
<td>Verapamil</td>
</tr>
</tbody>
</table>

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### Table 3. Suggested medications for hypertension

<table>
<thead>
<tr>
<th>ACE inhibitors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commence at the lowest dose in elderly clients and those taking diuretics</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Potentially beneficial in type 1 or type 2 diabetes (with proteinuria or microalbuminuria), post stroke, chronic kidney disease, post myocardial infarction, heart failure and atrial fibrillation (remodelling)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Contraindicated or potentially harmful in bilateral renal artery stenosis (unilateral in client with solitary kidney) and pregnancy</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Commence at the lowest dose in elderly clients and those taking diuretics</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use with caution in those who have experienced angioedema with ACE inhibitors</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Potentially beneficial in type 1 or type 2 diabetes (with proteinuria or microalbuminuria), post stroke, chronic kidney disease, heart failure, gout (losartan) and atrial fibrillation (remodelling)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Contraindicated or potentially harmful in bilateral renal artery stenosis (unilateral in client with solitary kidney) and pregnancy</strong></td>
<td></td>
</tr>
<tr>
<td>Captopril</td>
<td>12.5 - 50 mg twice daily</td>
</tr>
<tr>
<td>Enalapril</td>
<td>5 - 40 mg once daily or in 2 equally divided doses</td>
</tr>
<tr>
<td>Fosinopril</td>
<td>10 - 40 mg once daily</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>5 - 40 mg once daily</td>
</tr>
<tr>
<td>Perindopril erbumine</td>
<td>4 - 8 mg once daily</td>
</tr>
<tr>
<td>Perindopril arginine</td>
<td>5 - 10 mg once daily</td>
</tr>
<tr>
<td>Quinapril</td>
<td>5 - 40 mg once daily or in 2 equally divided doses</td>
</tr>
<tr>
<td>Ramipril</td>
<td>2.5 - 10 mg once daily or in 2 equally divided doses</td>
</tr>
<tr>
<td>Trandolapril</td>
<td>1 - 4 mg once daily</td>
</tr>
</tbody>
</table>

### Angiotensin II receptor antagonists

| **Commence at the lowest dose in elderly clients and those taking diuretics** | |
| **Use with caution in those who have experienced angioedema with ACE inhibitors** | |
| **Potentially beneficial in type 1 or type 2 diabetes (with proteinuria or microalbuminuria), post stroke, chronic kidney disease, heart failure, gout (losartan) and atrial fibrillation (remodelling)** | |
| **Contraindicated or potentially harmful in bilateral renal artery stenosis (unilateral in client with solitary kidney) and pregnancy** | |
| Candesartan | 8 - 16 mg once daily |
| Eprosartan | 600 - 800 mg once daily |
| Irbesartan | 150 - 300 mg once daily |
| Losartan | 50 - 100 mg once daily |
| Telmisartan | 20 - 80 mg once daily |
| Olmesartan | 20 - 40 mg once daily |

### Other drugs

| **Clonidine: rebound hypertension may occur on sudden cessation** | |
| **Hydralazine: generally used only in combination with a beta-blocker or verapamil, which prevent reflex tachycardia. Maintenance doses above 100 mg daily are associated with increased risk of lupus-like syndrome and should not be given without determining client’s acetylator status** | |
| **Contraindicated or potentially harmful in depression (clonidine, methyldopa, moxonidine)** | |
| Clonidine | 50 - 300 micrograms twice daily |
| Hydralazine | 12.5 - 100 mg twice daily |
| Methyldopa | 125 - 500 mg twice daily |
| Moxonidine | 200 - 600 micrograms daily |
| Prazosin | 0.5 - 10 mg twice daily |

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• **Step 5.**
  – monitor medications according to client response (see Figure 4)
  – trial each drug regimen for 6 weeks if client is stable³
  – it may be more convenient to use combined preparations to encourage full adherence

![Antihypertensive drug treatment initiated](image)

Support client to address any barriers to medication adherence

**Target BP achieved**

**Medium-low risk**
- Check every 6 months
- Monitor BP and risk factors
- Reinforce lifestyle measures

**High risk**
- Check every 3 months
- Monitor BP and risk factors
- Reinforce lifestyle measures

**Target BP not achieved at 3 months**

**Medium-low risk**
- Intensify lifestyle advice
- If partial BP response: add drug from another class at low dose

**High risk**
- Check every 3 months
- Add second agent from another class
- Increase doses to achieve target BP

**Significant adverse effects or no BP reduction**

- If monotherapy, change to another agent
- If adverse effects occur with combination therapy, identify agent responsible and replace with an agent from another class

---

**If target still not achieved despite treatment adjustments**
- Consider specialist care
- Further investigations as indicated

♥ As per Appendix 1: *Australian cardiovascular risk charts, page 494*

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*Figure 4. Stabilisation, maintenance and follow up after initiation of antihypertensive drug therapy*
## 5. Care plan

### Table 4. Care plan summary for people with hypertension

<table>
<thead>
<tr>
<th>Action</th>
<th>Review frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dx</td>
</tr>
<tr>
<td>Height</td>
<td>✓</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
</tr>
<tr>
<td>Lifestyle modification education</td>
<td>✓</td>
</tr>
<tr>
<td>Social emotional support</td>
<td>✓</td>
</tr>
<tr>
<td>Visual acuity</td>
<td>✓</td>
</tr>
<tr>
<td>Retinal imaging and fundoscopy</td>
<td>✓</td>
</tr>
<tr>
<td>FBC</td>
<td>✓</td>
</tr>
<tr>
<td>UEC</td>
<td>✓</td>
</tr>
<tr>
<td>eGFR</td>
<td>✓</td>
</tr>
<tr>
<td>Fasting blood lipids</td>
<td>✓</td>
</tr>
<tr>
<td>Fasting blood glucose</td>
<td>✓</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>✓</td>
</tr>
<tr>
<td>ACR</td>
<td>✓</td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
</tr>
<tr>
<td>Echocardiogram</td>
<td>✓</td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>✓</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓</td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>✓</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
</tr>
<tr>
<td>Medication review</td>
<td>✓</td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
</tr>
<tr>
<td>Specialist cardiac or renal physician</td>
<td>✓</td>
</tr>
</tbody>
</table>
6. References


2. The State of Queensland and the Royal Flying Doctor Service (Queensland Section) 2013. Primary Clinical Care Manual. Cairns


7. Resources


Osteoarthritis

High risk groups

• Female gender
• Those who are overweight or obese
• Those with previous joint injury
• Those with a family history of osteoarthritis
• Those with occupations where repetitive stress is placed on joints

Urgent referral

• Clients with ongoing pain and/or dysfunction, who are unresponsive to conservative therapy, should be referred before significant functional decline occurs

Special considerations

• In managing osteoarthritis any underlying conditions should be addressed including
  – Cognitive impairment
  – Coronary heart disease, page 142
  – Chronic heart failure, page 100
  – Hypertension, page 228
  – Chronic kidney disease, page 112
  – Diabetes type 2, page 196
  – Asthma (adult and child over 12), page 72
  – Depression, page 172 and Anxiety disorders, page 62
  – Overweight and obesity in adults, page 260
  – Back pain
  – Falls risk
  – Medications (especially polypharmacy and potential drug interactions)

1. What is osteoarthritis (OA)?

• Osteoarthritis (OA) is the most common chronic joint disease in Australia and the leading cause of pain and disability affecting 1.2 million people

• OA can affect any joint, but occurs more commonly in the hands, the cervical and lumbar spine, the hips and knees

• OA causes pain, stiffness, swelling, joint instability and muscle weakness, all of which can lead to impaired physical function and reduced quality of life

• OA commonly develops over the age of 45, increasing with age from less than 1% of people aged under 25 to 49% of people aged over 65 years

• Arthritis and musculoskeletal conditions are the second most frequent problem managed by GPs, accounting for almost 17% of all presentations
2. Diagnosis of osteoarthritis\textsuperscript{3-4}

- Diagnosis is usually based on client history, presence of risk factors and examination
- Weight bearing radiographs may confirm a diagnosis but the findings are often non specific
- Other laboratory tests to exclude alternative diagnoses include: erythrocyte sedimentation rate (ESR), rheumatoid factor (RhF) and synovial fluid analysis\textsuperscript{5}

- Features suggestive of OA include
  - increased age
  - symmetrical joint pain, tenderness and early morning stiffness
  - decreased joint mobility
  - joint swelling
  - crepitus

- Assessment of a client with OA should also include assessment of obesity, muscle strength, joint alignment and other conditions that may impact on the management of OA

3. Management

- Progression of OA can be slowed, pain relieved, disability minimised and the need for surgery postponed or avoided, with appropriate early intervention strategies\textsuperscript{6}

- The aims of management are to\textsuperscript{6}
  - recognise and control symptoms early
  - optimise and maintain function
  - optimise and maintain quality of life
  - slow disease progression

- Management is based on a collaborative multidisciplinary approach divided broadly into\textsuperscript{6,7}
  - non-pharmacological interventions involving: disease management, education and support, manual therapy, diet and nutrition, physical activity and exercise, occupational therapy and psychosocial support
  - pharmacological intervention aimed at pain management with ongoing medication review and adjustment as required

3.1 Factors complicating management

- In managing osteoarthritis any underlying conditions should be addressed including
  - Cognitive impairment
  - Coronary heart disease, page 142
  - Chronic heart failure, page 100
  - Hypertension, page 228
  - Chronic kidney disease, page 112
  - Diabetes type 2, page 196
  - Asthma (adult and child over 12), page 72
– Depression, page 172 and Anxiety disorders, page 62
– Overweight and obesity in adults, page 260
– Back pain
– Falls risk
– Medications (especially poly-pharmacy and potential drug interactions)

3.2 Support client self management

- Provide the client with OA resources (see Resource 1)
- Maximise independent living using behaviour modification and exercise training
- Utilise community support services (e.g. Home and Community Care) to enhance safety, reduce risk and support the client to stay in their own home (see Resource 2)
- Ensure the home is safe from hazards such as trips, slips and burns
- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and develop goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional support

- Be alert for signs and symptoms of depression and anxiety as up to 50% of OA sufferers will develop these conditions (see Resource 3)
- Acknowledge any client or carer concerns and reassure them that good adherence to appropriate treatment can improve the symptoms and rate of progression of the condition

3.4 Pain control

- Pain management is based on a combination of non-pharmacological and pharmacological strategies
- Non-pharmacological interventions should be applied first and include
  - Diet and nutrition, page 14
  - Physical activity, page 26
  - Topical application of cold or heat may reduce pain and allow continuation or resumption of physical activity
  - Acupuncture may provide benefits in terms of pain and function
  - Walking sticks, massage, manual therapy, transcutaneous electrical nerve stimulation (TENS) and knee taping and braces may provide short term benefits for pain relief
- Non-pharmacological interventions should continue even after pharmacological initiation
- Pharmacological treatment is initiated in a stepped approach (see Figure 1) starting with simple analgesics and working upward to stronger medications and dosages as symptoms dictate using simple analgesia, topical agents, oral non-steroidal anti-inflammatory medications, intra-articular corticosteroid injections and opioids
- Persistent pain and severe ongoing disability, despite multiple treatment modalities, will require surgical intervention
3.5 Physical activity

• Regular physical activity and exercise is recognised as one of the most effective lifestyle strategies to produce improvements in function, maximum peak bone strength and pain control in those with OA.\(^1,10,11\)

• Depending on client capability, encourage weekly\(^10\)
  – 150 to 300 minutes of moderate intensity physical activity or
  – 75 to 150 minutes of vigorous intensity physical activity

• Be active on most, preferably all, days every week

• Be mindful of the risk of falling during exercise, especially in combination with medications

• Do muscle strengthening activities on at least 2 days each week to maintain strength and prevent falls\(^12\)

• Refer to a physiotherapist to initiate and reinforce an exercise regime such as a strength and balance group\(^11\)

• See Physical activity, page 26

3.6 Weight control

• Achieve and maintain a healthy body weight to maintain muscle mass, particularly guarding against underweight and overweight\(^8\)

• Overweight and obesity is a modifiable risk factor for knee and hip OA by increasing joint load\(^13\)

• Weight loss increases gait speed and decreases knee pain\(^11\)

• Approximately 25 - 50% of all knee replacements can be avoided if those who are overweight and obese reduce their weight by 5 kg or to within the normal body mass index (BMI) range\(^6\)

• See Overweight and obesity in adults, page 260

3.7 Alcohol reduction

• Excessive alcohol intake
  – is a cause of fracture due to an increased propensity to fall
  – impairs bone formation

• Drinking no more than 4 standard drinks for men and women, on a single occasion, reduces the risk of alcohol related injury for that occasion\(^14\)

• See Alcohol reduction, page 4

3.8 Falls prevention

• Screen for individual falls risk (see Resource 4)

• Review medications and minimise sedatives especially benzodiazepines

• Refer to a physiotherapist and a balance and strength or fall prevention group

• Refer to an occupational therapist to assess whether home modifications are required to minimise slip and fall hazards
3.9 Surgery
• Around 30% of clients with osteoarthritis will have disease that progresses to a severity requiring surgical referral\textsuperscript{6}
• Timely access to osteotomy or joint replacement surgery is a cost effective intervention for people with OA\textsuperscript{6,7,9}
• Clients with ongoing pain and/or dysfunction, who have exhausted clinical therapy interventions, should be referred before significant functional decline occurs\textsuperscript{6,7}

4. Medications
• Medications are used to treat persistent underlying symptoms of pain and stiffness as well as manage acute exacerbations of pain when required

4.1 Pain relief
• It is important to approach treatment of symptoms in a stepwise fashion (see Figure 1) using simple analgesia, topical agents, oral non-steroidal anti-inflammatory drugs (NSAIDs), intra-articular corticosteroid injections and opioids\textsuperscript{9,15}
• At each step, medications are reviewed in relation to the client’s symptoms with the aim to control symptoms at the lowest medication dose and treatment option\textsuperscript{9,15}
• Medication review should include
  – 3 monthly renal function and full blood count (FBC) testing and
  – 6 monthly LFTs for those using NSAIDs or COX-2 inhibitors\textsuperscript{17}

![Figure 1. Stepped approach to pain management in OA\textsuperscript{5,9,15,16}](image)
4.2 Simple analgesics and NSAIDs

- Pain relief is primarily treated with simple analgesics, topical agents and NSAIDs (see Table 1).
- Clients requiring NSAIDs should be evaluated for their risk of developing upper GI bleeding and where appropriate begun on Proton-pump inhibitor (PPI) therapy.

<table>
<thead>
<tr>
<th>Suggested drug and dose</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celecoxib 100 - 200 mg orally 1 - 2 times daily up to maximum of 400 mg daily</td>
<td>• Serious adverse effects, including heart failure, renal impairment and GI bleeding are associated with all NSAIDs and COX-2 inhibitors</td>
</tr>
<tr>
<td>Diclofenac 25 - 50 mg orally 2 - 3 times daily up to 200 mg maximum daily</td>
<td>• No difference in efficacy has been demonstrated between different NSAIDs in the treatment of osteoarthritis</td>
</tr>
<tr>
<td>Ibuprofen orally 200 - 400 mg daily 3 - 4 times daily up to 2400 mg maximum daily</td>
<td>• Addition of an NSAID to regular paracetamol may produce additive benefit and limit the dose of NSAID required</td>
</tr>
<tr>
<td>Ketoprofen 100 mg orally daily up to 200 mg maximum daily</td>
<td>• Short courses of NSAIDs may provide benefit that can be maintained with simple analgesics</td>
</tr>
<tr>
<td>Mefenamic acid 500 mg orally 3 times daily up to 1500 mg maximum daily</td>
<td>• If NSAIDs are ineffective, contraindicated or not tolerated, consider intra- or peri-articular corticosteroids, opioid analgesics or surgery</td>
</tr>
<tr>
<td>Meloxicam 7.5 - 15 mg orally daily up to 15 mg maximum daily</td>
<td></td>
</tr>
<tr>
<td>Naproxen 250 - 500 mg orally 2 times daily up to 1250 mg maximum daily</td>
<td></td>
</tr>
<tr>
<td>Piroxicam 10 - 20 mg orally daily up to 20 mg maximum daily</td>
<td></td>
</tr>
<tr>
<td>Paracetamol 1 g orally 4 - 6 hrly up to maximum 3 g daily</td>
<td>• As effective as and better tolerated than NSAIDs, especially if OA is mild-to-moderate in severity</td>
</tr>
</tbody>
</table>

4.3 Topical agents

- These over the counter creams, ointments, gels, liniments and sprays contain:
  - counter-irritants to provide a sensation of warmth, which may be comforting in painful OA e.g. eucalyptus oil, turpentine oil, nicotinate, nonivamide, salicylates and camphor
  - NSAIDs e.g. benzydamine
  - agents that produce a feeling of coolness e.g. menthol
  - capsaicin which is used as a topical analgesic but may cause a stinging or burning sensation

- Adverse effects are rare but may include skin irritation (superficial, partial thickness and full thickness chemical burns have been reported), erythema, itching, rash, bronchospasm, dyspnoea (salicylates), nausea, contact dermatitis, photo-sensitivity and hypersensitivity

- Product is applied 2 - 4 times daily for up to 14 days then reviewed for efficacy
4.4 Intra-articular corticosteroid injections\(^9,15,16\)

- For acute exacerbation of symptoms consider intra-articular corticosteroid injections where appropriate to provide pain relief in OA.
- Should only be given by, or under the supervision of, experienced clinicians.
- Local anaesthetic may be used before, or mixed with, the corticosteroid.
- Corticosteroid injections are used for specific purposes including:
  - betamethasone sodium phosphate plus betamethasone acetate is usually used for injection into smaller joints.
  - methylprednisolone acetate is not suitable for injection into small joints or superficial soft tissue sites, where it may cause fat atrophy and can be an irritant. It could be used in a large bursa such as a trochanteric bursa.
  - triamcinolone acetonide is the least soluble injection and provides the longest duration of action (up to 21 weeks).
- Table 2. provides examples of appropriate doses.
- Dose must be adjusted to the specific requirements of the client according to the size of the joint, the severity of the condition, the response obtained and the client’s tolerance of the corticosteroid.
- Do not give > 4 injections/year into any single joint as this may increase the risk of cartilage damage.
- Avoid further injections if there is no response after 2 consecutive injections.
- Clients should not overuse the joint following injection as there may be a risk of further joint deterioration and beneficial effects may be reduced.

<table>
<thead>
<tr>
<th>Local corticosteroid injections</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betamethasone sodium phosphate + betamethasone acetate 5.7 mg/mL</td>
<td>Small joint (e.g. hand)</td>
</tr>
<tr>
<td>Methylprednisolone acetate 40 mg/mL</td>
<td>Medium joint (e.g. wrist)</td>
</tr>
<tr>
<td>Triamcinolone acetonide 10 mg/mL</td>
<td>Large joint (e.g. knee)</td>
</tr>
<tr>
<td>Triamcinolone acetonide 40 mg/mL</td>
<td>Soft tissue (e.g. bursa)</td>
</tr>
</tbody>
</table>

Table 2. Intra-articular corticosteroid injections for OA\(^9,15,16\)
4.5 Opioids

- Weak or strong opioids should be considered for treating moderate to severe pain of the hip or knee where
  - the client does not respond to or tolerate oral analgesics or NSAIDs
  - joint replacement surgery has been contraindicated or delayed\textsuperscript{10,16}

- Commence at low dose, titrate dose, monitor for adverse events and follow the stepped approach to pain relief\textsuperscript{8}

- See Table 3. for opioid choices for OA

<table>
<thead>
<tr>
<th>Table 3. Opioid medications for OA\textsuperscript{9,18}</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended drug and dose</strong></td>
</tr>
</tbody>
</table>
| Oxycodone 5 - 10 mg orally (immediate release) every 4 - 6 hours when required | • Beware of constipation from opioids  
• Beware of accumulation of active metabolites in renal failure  
• Used in moderate to severe pain  
• Preferred in renal impairment (dose adjusted)  
• Mild to moderate pain |
| Oxycodone 10 mg orally CR b.d. when required |  |
| Codeine 15 - 60 mg orally every 4 - 6 hours when required. Max daily dose 360 mg/day | • Mild to moderate pain  
• Not first line opioid medication |
| Morphine 10 - 30 mg orally (immediate release) every 4 hours when required |  |
| Morphine 15 mg orally CR every 8 - 12 hours when required |  |
| Tramadol 50 - 100 mg orally (immediate release) every 4 - 6 hours when required. Max daily dose 400 mg/day | • Moderate to severe pain |
| Tapentadol 50 mg twice daily initially  
Max daily dose 500 mg |  |
5. Care plan

Table 4. Care plan for osteoarthritis

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>Once</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>BP</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>FBC</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Renal function</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>LFTs</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Carer education and support</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>✓</td>
<td>Ongoing support as required</td>
</tr>
<tr>
<td>Physical activity</td>
<td>✓</td>
<td>Exercise program as determined by physiotherapist</td>
</tr>
<tr>
<td>Diet and nutrition</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td></td>
<td>Recommended - see the current edition of the Australian Immunisation Handbook for schedule</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Medication review</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Specialist review</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>HACC</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Falls risk assessment</td>
<td>✓</td>
<td>As determined by allied health</td>
</tr>
<tr>
<td>Balance and strength exercise program</td>
<td>✓</td>
<td>As determined by allied health</td>
</tr>
</tbody>
</table>

6. References


7. Resources


Osteoporosis

High risk groups\textsuperscript{1,2}

- Non modifiable
  - female gender (women develop thin bones sooner than men)
  - post menopause
  - over 70 years of age
  - certain medical conditions
  - a family history
- Modifiable
  - lack of weight-bearing exercise and immobilisation
  - poor calcium intake
  - vitamin D deficiency
  - low or high body weight
  - cigarette smoking
  - excessive alcohol use
  - long term use of corticosteroids
  - some chronic conditions like CKD and malabsorption syndromes

Urgent referral

- Any client who sustains a minimal trauma fracture should be investigated by a MO or NP for underlying osteoporosis or other pathology

Special considerations

- In managing osteoporosis the following needs to be addressed
  - cognitive impairment
  - Depression, page 172
  - Anxiety disorders, page 62
  - falls risk
  - medications (polypharmacy and potential drug interactions)

1. What is osteoporosis (OP)?

- Osteoporosis (OP) is defined as a disease characterised by low bone mass and deterioration of bone tissue, leading to bone fragility and an increase in fracture risk\textsuperscript{2,3}
- Osteoporotic fractures usually result from a combination of decreased bone strength and injurious falls
- Vertebral (spinal) fractures are the hallmark feature of OP and occur with a higher incidence and earlier in life than any other types of minimal trauma fracture\textsuperscript{3}
- Non-vertebral minimal trauma fractures include hip, distal forearm, humerus, shoulder, ankle, pelvis and tibia
- The lifetime risk of minimal trauma fracture is approximately 43% for women over 50
years of age and 56% among women over 60 years of age.\(^3\)

- Irrespective of fracture site, adults who sustain a fracture are at substantially greater risk (2 - 4 fold) of sustaining another fracture of a different type.\(^3\)

### 2. Diagnosis of osteoporosis\(^3\)

- Diagnosis of OP is based on:
  - medical history and identification of risk factors
  - clinical examination and
  - confirmation by a dual energy x-ray absorptiometry (DXA) bone density measurement on 2 sites, preferably anteroposterior spine and hip

- Part of this diagnostic process is ensuring that other causes of bone fragility such as metastatic cancers and endocrine disorders are excluded

- The result of DXA scans are expressed as a ‘T-score,’ and will be in the range of:
  - normal (-1 or higher)
  - osteopenia (low bone mineral density) (-1 to -2.5)
  - OP (-2.5 or lower)

- Applicable laboratory tests and radiographs of the thoracic and lumbar spine should also be considered

### 3. Management

**3.1 Factors complicating management**

- In managing OP the following needs to be addressed:
  - cognitive impairment
  - Depression, page 172
  - Anxiety disorders, page 62
  - falls risk
  - medications (especially polypharmacy and potential drug interactions)

**3.2 Support client self management**

- Provide the client with OP resources (see Resource 1)
- Maximise independent living using behaviour modification and exercise training
- Utilise community support services (e.g. Home and Community Care) to enhance safety, reduce risk and support the client to stay in their own home (see Resource 2)
- Ensure the home is safe from hazards such as trips, slips and burns
- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and develop goals to overcome those barriers based on their capacity and understanding

**3.3 Social emotional support**

- Be alert for signs and symptoms of depression and anxiety (see Resource 3)
- Acknowledge any client or carer concerns and reassure them that good adherence to
appropriate treatment can improve the symptoms and rate of progression of the condition

3.4 Adequate calcium intake

- Calcium can help prevent osteoporosis and fragility fractures\(^1\)
- An adequate calcium intake achieved through diet continues to be the best method, particularly in postmenopausal women and the elderly\(^1\)
- The recommended daily intake for women over 50, men over 70 and those with OP is 1300 mg (1000 mg daily for men between 50 and 70 years)\(^2,3,4\)
- Increase intake of dairy products by 3 - 4 servings of calcium containing foods each day (see Table 1)\(^2,3,4\)

<table>
<thead>
<tr>
<th>Table 1. Calcium content of key foods (per standard serve)(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food</strong></td>
</tr>
<tr>
<td>Milk and yoghurt (including low fat versions)</td>
</tr>
<tr>
<td>Cheese</td>
</tr>
<tr>
<td>Tinned fish</td>
</tr>
<tr>
<td>Selected green vegetables</td>
</tr>
<tr>
<td>Tofu (firm)</td>
</tr>
<tr>
<td>Selected nuts and tahini</td>
</tr>
<tr>
<td>Dried fruit</td>
</tr>
<tr>
<td>Fortified milk</td>
</tr>
<tr>
<td>Soy milk (including low fat versions)</td>
</tr>
</tbody>
</table>

For standard serve size see *Diet and nutrition, page 14*

3.5 Physical activity

- Regular weight bearing and resistance physical activity and exercise is recognised as one of the most effective lifestyle strategies to improve bone mass and density during ageing\(^3,4\)
- A 10% higher peak bone mass can delay the development of osteoporosis by 13 years and reduce the risk of fracture by 50%\(^3\)
- Non-weight bearing exercises (swimming, cycling) and leisure walking does not improve bone density\(^3,4\)
- Depending on the client’s capability, encourage 30 minutes of moderate to high intensity weight bearing and resistance exercise 3 - 5 times a week\(^5\)
- Weight bearing exercises include\(^1,3\)
  - running
  - impact aerobics
  - jump rope
  - dancing
Section 2: Management of diagnosed conditions

**Osteoporosis**

- Basketball
- Netball
- Tennis
- Stair climbing

- Resistance exercises include:
  - Hand weights
  - Ankle weights
  - Gym equipment

- Be active on most, preferably all, days every week
- Avoid long periods of sitting as often as possible
- Be mindful of the risk of falling during exercise, especially in combination with medications
- Do muscle strengthening activities on at least 2 days each week to maintain strength and prevent falls
- Exercise programs that combine high impact activity with high intensity resistance training appear most effective for pre-menopausal women
- Refer to a physiotherapist to initiate and reinforce an exercise regime such as a strength and balance group
- See Physical activity, page 26

3.6 Weight control

- The relative risk of a hip fracture is approximately doubled for both women and men with low body weight (BMI < 20)
- Achieve and maintain a healthy body weight to maintain muscle mass, particularly guarding against underweight
- See Overweight and obesity in adults, page 260

3.7 Adequate vitamin D levels

- Vitamin D deficiency is associated with low bone density and increased risk of falls
- Adequate vitamin D serum levels is critical for calcium absorption and is also important for bone growth and mineralisation and muscle function
- People at risk of osteoporosis should maintain a serum vitamin D concentration of 75 nmol/L or more
- It is important to measure vitamin D serum levels and provide supplements for those at risk of vitamin D deficiency, including those:
  - With limited sun exposure
  - With naturally occurring dark skin
  - Who cover their skin (cultural or habitual clothing)
  - Conditions affecting vitamin D metabolism
  - People in residential care or housebound, particularly the elderly
3.8 Alcohol reduction

- Excessive alcohol intake
  - is a cause of fracture, because of an increased propensity to fall
  - impairs bone formation

- If alcohol is consumed, it should be consumed in moderation; up to one standard drink per day for women and two standard drinks per day for men

3.9 Smoking cessation

- Smoking is associated with a reduction in bone structure and strength and is an independent moderate risk factor for vertebral fractures and nonvertebral (including hip) fractures

- Do not smoke

3.10 Falls prevention

- Reduced bone density and strength predisposes 50% of women and 25% of men to minimal trauma fractures, with a further 50% sustaining a re-fracture

- Screen for individual falls risk (see Resource 4)

- Review medications and minimise sedatives especially benzodiazepines

- Refer to a physiotherapist and a balance and strength or falls prevention group

- Refer to an occupational therapist to assess whether home modifications are required to minimise slip and fall hazards
4. Medications

4.1 Vitamin D

• For those at risk of developing osteoporosis, vitamin D supplements should continue at doses that will maintain serum 25(OH)D levels greater than 60 nmol/L to prevent the onset of the disease.

• Once this level has been achieved maintenance doses of vitamin D supplements should continue at daily doses of 800 IU.

• Higher doses of 2000 - 4000 IU (50 - 100 micrograms) per day may be required in some individuals e.g. obese.

• When starting vitamin D treatment for people who are already osteoporotic, it is important to measure the serum 25(OH)D level prior to initial dose of vitamin D, then 3 months after commencement of treatment (see Table 2).

<table>
<thead>
<tr>
<th>Table 2. Vitamin D regimen for osteoporosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance dose (serum 25(OH)D concentration &gt; 60 nmol/L)</td>
</tr>
<tr>
<td>Colecalciferol</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

4.2 Calcium supplements

• Only consider calcium supplements (maximum daily dose of 500 - 600 mg) if dietary intake is insufficient (see Table 3).

<table>
<thead>
<tr>
<th>Table 3. Calcium supplements for osteoporosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium carbonate</td>
</tr>
<tr>
<td>Calcium citrate</td>
</tr>
</tbody>
</table>

Note: Calcium supplements can reduce the absorption of some other drugs (e.g. thyroxine, tetracyclines, quinolones, bisphosphonates) and should be separated from these drugs by at least 2 hours.
4.3 Antiresorptive (AR) drugs

- Antiresorptive drugs (bisphosphonates and denosumab) slow bone loss by inhibiting osteoclast function, improving BMD and reducing the risk of fractures.

- AR drugs have very rarely been associated with osteonecrosis of the jaw in clients taking them orally for osteoporosis.

- However, a formal assessment of dental hygiene and examination by a dentist is recommended before starting treatment with an AR.

- It is recommended that dental treatment should be completed before starting bisphosphonate or denosumab therapy.

- Following commencement of these medicines, a dentist should monitor the client’s oral health regularly.

- Clients should ensure adequate intake of calcium and vitamin D while on these medications, however, calcium should be taken at a different time to ARs.

- ARs should be taken with caution in clients with renal disease.

- ARs are available on the PBS for men and women aged over 70 years where T-scores are ≤ -2.5 (Zoledronic acid ≤ -3.0).

- See Table 4. for a list of antiresorptive drugs.
Table 4. Antiresorptive drugs for osteoporosis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage Details</th>
<th>Administration Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alendronate</strong></td>
<td>70 mg orally weekly</td>
<td>• To minimise upper gastrointestinal adverse effects take first thing in the morning on an empty stomach remain upright for at least 30 minutes after taking</td>
</tr>
<tr>
<td><strong>Risedronate</strong></td>
<td>5 mg daily, 35 mg weekly or 150 mg monthly orally</td>
<td>• Dysphagia, achalasia or an inability to remain upright for 30 minutes are contraindications to their use</td>
</tr>
<tr>
<td><strong>Zoledronic acid</strong></td>
<td>5 mg IV once a year</td>
<td>• Due to poor oral absorption of bisphosphonates, food, drink (apart from water) and medication should be avoided before and after administration</td>
</tr>
<tr>
<td><strong>Strontium ranelate</strong></td>
<td>2 g daily at night</td>
<td>• Calcium salts, antacids, and iron and magnesium supplements inhibit absorption, and should not be taken within 2 hours</td>
</tr>
<tr>
<td><strong>Denosumab</strong></td>
<td>60 mg subcutaneously every 6 months</td>
<td>• Correct vitamin D deficiency before initiating therapy, as denosumab may exacerbate hypocalcaemia</td>
</tr>
<tr>
<td><strong>Raloxifene</strong></td>
<td>60 mg daily, orally</td>
<td>• Increases the incidence of hot flushes, deep venous thrombosis and causes a small increase in the risk of death after stroke</td>
</tr>
</tbody>
</table>

**For post-menopausal women with a minimal trauma fracture**

| **Teriparatide**            | 20 micrograms subcutaneously daily for a maximum of 18 months | • Can only be initiated by a specialist |

For those with a very high risk of fracture (T-score < -3.0, two or more minimal trauma fractures and at least one new fracture after 12 months on anti-resorptive therapy)
## 5. Care plan

### Table 5. Osteoporosis care plan

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>Once</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>BP</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Serum 25(OH)D levels</td>
<td>✓</td>
<td>3 mthly if being treated, otherwise annually</td>
</tr>
<tr>
<td>Carer education and support</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>✓</td>
<td>Ongoing support as required</td>
</tr>
<tr>
<td>Physical activity</td>
<td>✓</td>
<td>Exercise program as determined by physiotherapist</td>
</tr>
<tr>
<td>Diet and nutrition</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>Each visit</td>
</tr>
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<td>Pneumococcal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>Medication review</td>
<td>✓</td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Bone mass density testing</td>
<td>✓</td>
<td>Every 2 years</td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>✓</td>
<td>Referral as required</td>
</tr>
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<td>Specialist review</td>
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<td>HACC</td>
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<tr>
<td>Falls risk assessment</td>
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<tr>
<td>Balance and strength exercise program</td>
<td>✓</td>
<td>As determined by allied health</td>
</tr>
</tbody>
</table>
6. References


7. Resources

1. For an array of osteoporosis resources see Osteoporosis Australia at http://www.osteoporosis.org.au/


Overweight and obesity in adults

High risk groups
- Persons over 18 years of age with a BMI > 25
- Women with waist circumference ≥ 80 cm
- Men with waist circumference ≥ 94 cm
- Aboriginal and Torres Strait Islander and culturally and linguistically diverse peoples
- Those living in socioeconomic disadvantage
- Those living in rural and remote locations

Considerations for women of child-bearing age
- Small for gestational age babies with catch up growth are at risk of obesity
- Excess weight gain during pregnancy is associated with an increased risk of metabolic syndrome and obesity in the infant in later life
- Babies born to mothers who smoke during pregnancy have a higher risk of being overweight or obese as adolescents and adults
- Increase in antenatal miscarriage, gestational diabetes, stillbirth, pre-eclampsia, thromboembolism and maternal death
- Increase in intrapartum general anaesthesia use, instrumental delivery, caesarean section, postpartum haemorrhage and prolonged labour

1. What is overweight or obesity in adults?
- Overweight and obesity is defined as abnormal or excessive fat accumulation that may impair health
- The term, overweight, generally indicates that a person has more body fat than is considered healthy for the optimal functioning of the body
- Being overweight or obese is the second highest contributor to disease burden (after tobacco use) for all Australians, with approximately 60% of adults being overweight or obese
- Overweight and obesity is associated with an increased risk of
  - type 2 diabetes
  - cardiovascular disease
  - hypertension
  - metabolic syndrome
  - some cancers
  - musculoskeletal conditions
  - respiratory conditions
  - sleep apnoea
  - gall bladder disease
  - hernia
  - reproductive disorders
– urinary incontinence
– fatty liver disease and
– depression and other mental health disorders\(^3,4\)

• The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended i.e. a high fat, energy dense diet and a sedentary lifestyle\(^3,4\)

2. Diagnosis of overweight or obesity in adults

• Although not suitable for all population groups generally the diagnosis of overweight and obesity is determined by\(^1,4\)
  – body mass index (BMI) and
  – waist circumference

• It is recommended to use a combination of body mass and fat distribution measures when identifying ill health risk\(^1\)

2.1 Body Mass Index

• Body mass index (BMI) is calculated as weight (in kilograms) divided by height (in metres) squared (kg/m\(^2\))

• The association between a person’s weight and the risk of mortality or morbidity increases above a BMI in the normal range(18.5 to 24.9 kg/m\(^2\))

• BMI categories for adults are as follows
  – < 18.5 kg/m\(^2\) – underweight
  – 18.5 - 24.9 kg/m\(^2\) – healthy weight
  – 25.0 - 29.9 kg/m\(^2\) – overweight
  – ≥ 30.0 kg/m\(^2\) – obese

2.2 Waist circumference

• Increased abdominal obesity is associated with cardiovascular disease, type 2 diabetes and some cancers

• Risk is increased at ≥ 80 cm and high at ≥ 88 cm for women and increased at ≥ 94 cm and high at ≥ 102 cm for men\(^1\)

• Waist measurement is taken at the mid-point between the bottom of the person’s ribs and the top of the hipbone and during expiration

3. Management

• Managing overweight and obese clients primarily focuses on supporting the client to make sustainable lifestyle changes around diet and physical activity\(^4\)

3.1 Factors complicating management

• In managing overweight and obese clients the following co-morbidities and screening must be considered
  – Stroke and transient ischaemic attack, page 300
  – Dyslipidaemia, page 210
3.1 Overweight and obesity in adults

- Depression, page 172
- Anxiety disorders, page 62
- Moderate weight loss can prevent, delay or improve control of type 2 diabetes\(^4\) (see Diabetes type 2, page 196)
- A 5% weight loss is associated with improvements in chronic kidney disease and sleep apnoea\(^4\) (see Chronic kidney disease, page 112)
- A modest weight loss in overweight or obese people reduces cardiovascular risk factors\(^4\) (see Hypertension, page 228, Coronary heart disease, page 142, and Chronic heart failure, page 100)

- It is important to check for these complications along with calculation of absolute cardiovascular risk (see Appendix 1: Australian cardiovascular risk charts, page 494)

3.2 Support client self management

- Weight reduction can be achieved by reducing energy intake, increasing physical activity and supporting behavioural change\(^3,4\)
- Discuss overweight and obesity and its association with chronic diseases
- Provide resources (see Resource 1) and discuss the positive effects of lifestyle modification (see Lifestyle modification section) on weight with particular regard to diet and nutrition (Diet and nutrition, page 14) and physical activity (Physical activity, page 26)
- Encourage self monitoring of weight which is associated with greater weight loss and weight gain prevention\(^1,4\) (see Resource 2)
- Encourage the client to identify barriers to adequate lifestyle modification and clinical adherence and provide goals to overcome those barriers based on their capacity and understanding

3.3 Social emotional support

- Depressive disorders and eating disorders are associated with overweight and obesity. If suspected, refer to a psychologist for mental health assessment\(^1,4\)
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 3. for examples). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

3.4 Weight loss plan

- A weight loss plan is a documented set of client centred goals to lose weight in response to lifestyle modification information negotiated with the clinician
- For many overweight and obese adults, achieving a ‘healthy’ BMI is an unrealistic expectation. Discuss that a weight loss of 5% is achievable and will result in health benefits\(^4\)
- Encourage the client to set goals by identifying ways to modify their lifestyle (see Lifestyle modification section)
- For best results, self monitoring by using a food and activity diary is recommended
The plan should be reviewed every 2 weeks for the first 3 months to ensure client suitability and/or modification where necessary.

Review lifestyle behaviours if there is no weight loss (less than 1% body weight or no change in waist circumference) after 3 months of active management.

Encourage the client to take action (e.g. seeing a health professional) when small amounts of weight (approximately 3 kg) have been regained.

If there is weight gain reassess energy intake and physical activity, and reinforce weight loss strategies.

3.5 Physical activity

Being physically active reduces the risk of mortality and prevents and manages many chronic diseases, including:

- heart disease
- stroke
- hypertension
- type 2 diabetes and
- some cancers

Being physically active offers other health benefits, including:

- building and maintaining healthy bones, muscles and joints
- improving self-esteem, self-image and quality of life

When discussing physical activity approaches to weight loss consider:

- the influence of cultural values or family beliefs on health behaviours
- time or support for physical activity e.g. child care or walking tracks
- the client’s fitness level
- mobility or activity impairment due to age, disability, co-morbidity or size

Doing any physical activity is better than doing none.

Moving from no activity to low or higher levels of activity, provides the greatest health benefits.

Each week encourage:

- 150 - 300 minutes of moderate intensity physical activity or
- 75 - 150 minutes of vigorous intensity physical activity

Be active on most, preferably all, days every week.

Do muscle strengthening activities on at least 2 days each week to maintain strength, prevent falls, and to reduce risk factors for cardiovascular disease and type 2 diabetes.

Avoid long periods of sitting as often as possible which results in poorer health outcomes.

For adults who are overweight or obese, particularly those who are older than 40 years, there should be an individualised approach to increasing physical activity.

Women may start or continue exercise programs during pregnancy.
3.6 Diet and nutrition

When discussing dietary approaches to weight loss consider:

- the influence of cultural values or family beliefs on health behaviours
- the degree of overweight or obesity and the degree of program intensity
- dietary preferences of the individual and their family
- the availability, affordability and the ability to store healthy foods
- a sustainable eating plan to gradually change eating habits
- the presence of psychosocial pressures affecting the current eating pattern
- alcohol has a high kilojoule content and contributes to fat storage
- portion sizes and strategies for controlling or reducing them e.g. use smaller plates
- reducing rather than restricting intake of foods that are high in energy e.g. fats, sugar
- increasing intake of foods that are low in energy but rich in other nutrients e.g. vegetables, fruit
- starting with small changes and avoiding situations that encourage unhealthy behaviours
- providing examples of healthy foods that are affordable and familiar, or suitable alternatives
- identifying and managing triggers for emotional eating
- the importance of regular eating patterns and mindful eating

Provide the client with nutrition and diet related resources (see Resource 2)

Eat plenty of:

- any and all vegetables, including different types and colours
- fruit
- breads, cereals, rice, pasta, noodles, oats and barley
- lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes and beans
- reduced fat milk, yoghurt and cheese

Limit intake of all other foods including saturated fat, added salt, added sugars and alcohol

Drink plenty of water

Under recommendations by a dietitian a very low-energy diet may be a consideration in obese adults with:

- a BMI > 30 kg/m² or
- a BMI > 27 kg/m² and obesity related co-morbidities

Consider referring the client to a dietitian

For further details refer to the Diet and nutrition, page 14
3.7 Psychotherapy

- Psychological interventions have been shown to have a more beneficial weight loss effect when combined with other lifestyle approaches.\(^4\)
- Individual or group based psychological interventions may improve the success of weight management programs.\(^4\)
- The main form of psychotherapy is cognitive behaviour therapy (CBT).
- Psychotherapy\(^1,4\)
  - may provide skills which reduce risk of relapse
  - requires commitment by the person
  - requires referral to an appropriately trained expert therapist e.g. social worker, mental health worker or psychologist
- General principles of psychotherapy include
  - assisting the client to problem solve urges which adversely affect their weight
  - the client is encouraged to challenge urges and replace them with thoughts of rational consequences and to resist pessimism and self-criticism\(^1,4\)
  - an example might be: “I am hungry”
    - if I eat that bucket of chicken my hunger will be satisfied and I will gain weight
    - if I eat a sandwich and drink a glass of water my hunger will also be satisfied and I will not gain weight

3.8 Surgery

- Bariatric surgery may be considered for the following groups
  - people with a BMI > 40
  - people with a BMI > 35 and have co-morbidities that would improve with weight loss
  - people with a BMI > 30 and have poorly controlled type 2 diabetes and increased cardiovascular risk\(^4\)
- Bariatric surgery is associated with significant improvements in cardiovascular risk factors, improved glycaemic control in type 2 diabetes and mortality rate\(^4\)
- When indicated, bariatric surgery should be delivered by a multidisciplinary team (i.e. surgeons, dietitians, nurses, psychologists and MOs), including an overall clinical pathway for adult weight management\(^4\)
4. Medications

- Medications should not be necessary for individuals who are moderately overweight and should only be used in conjunction with lifestyle modification and counselling\(^1,4\)
- Lifestyle modification should be sufficient for weight loss
- There are several medications available for the purposes of weight reduction, however, they are not available on the Queensland Health List of Approved Medicines
- MO/NP may discuss medication options with their client

<table>
<thead>
<tr>
<th>Table 1. Medications for overweight or obesity in adults(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drug and dosage</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Orlistat 120 mg t.d.s. with food</td>
</tr>
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</table>

4.1 Medications that cause weight gain

- Be mindful of medications that may be a source of weight gain in a relatively short period of time\(^4\) (see Table 2)

<table>
<thead>
<tr>
<th>Table 2. Common medications associated with weight gain 12 weeks from commencement(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medications</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Atypical antipsychotics, including clozapine, olanzapine</td>
</tr>
<tr>
<td>Beta-adrenergic blockers, particularly propranolol</td>
</tr>
<tr>
<td>Insulin</td>
</tr>
<tr>
<td>Lithium</td>
</tr>
<tr>
<td>Pizotifen</td>
</tr>
<tr>
<td>Sodium valproate</td>
</tr>
<tr>
<td>Sulphonylureas, including chlorpropamide, glibenclamide, glimepiride and glipizide</td>
</tr>
<tr>
<td>Thiazolidinediones, including pioglitazone</td>
</tr>
<tr>
<td>Tricyclic antidepressants, including amitriptyline</td>
</tr>
<tr>
<td>Anabolic steroids</td>
</tr>
</tbody>
</table>
5. Care plan

<table>
<thead>
<tr>
<th>Table 3. Care plan for overweight or obese adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Height</td>
</tr>
<tr>
<td>Weight</td>
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<tr>
<td>BMI</td>
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<tr>
<td>Waist circumference</td>
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<tr>
<td>Blood pressure</td>
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<tr>
<td>Fasting lipids</td>
</tr>
<tr>
<td>Fasting blood sugar</td>
</tr>
<tr>
<td>Weight loss plans</td>
</tr>
<tr>
<td>Behavioural change</td>
</tr>
<tr>
<td>Client self management support</td>
</tr>
<tr>
<td>Lifestyle modifications</td>
</tr>
<tr>
<td>Diet modifications</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
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<tr>
<td>Influenza vaccine</td>
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<tr>
<td>Pneumococcal vaccine</td>
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<tr>
<td>Dietitian</td>
</tr>
<tr>
<td>RN/HW R/V</td>
</tr>
<tr>
<td>MO/NP R/V</td>
</tr>
</tbody>
</table>
6. References


2. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (2013) Management of Obesity in Pregnancy; C-Obs 49


7. Resources


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Overweight and obesity in adults

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OVERWEIGHT AND OBESITY IN ADULTS
Overweight and obesity in children

High risk groups

• Children born to mothers with poor nutritional habits or with greater than the recommended weight gain during pregnancy
• Low birth weight infants
• Children who were not breastfed
• Children born into socioeconomic disadvantage and/or living in rural and remote regions
• Children of mothers who smoked during pregnancy¹,²
• Children whose diets are high in fats and sugars

Considerations for women of child-bearing age

• Parental influence on child’s food choices
• Diabetes in pregnancy increases the risk of macrosomia (oversize baby), early onset obesity and type 2 diabetes in the child
• Excess weight gain during pregnancy is associated with an increased risk of babies developing metabolic syndrome and obesity in later life²
• Babies born to mothers who smoke during pregnancy have a higher risk of being overweight or obese as adolescents and adults²

Referral

• Refer the child to paediatric services if they¹
  — are aged 2 - 18 years and have a BMI well above the 95th percentile on US-CDC growth charts or the 97th percentile on WHO charts
  — are under 2 years of age, above the 97th percentile on WHO growth charts and gaining weight rapidly
  — have a suspected co-morbidity that requires urgent weight management e.g. sleep apnoea, orthopaedic problems, risk factors for cardiovascular disease or type 2 diabetes, psychological distress
  — have a suspected underlying medical or endocrine cause or there are concerns about height and development

1. What is overweight or obesity in children?

• Overweight and obesity is defined as abnormal or excessive fat accumulation that may impair health³

• The term, overweight, generally indicates that a person has more body fat than is considered healthy for the optimal functioning of the body

• The fundamental cause of overweight and obesity is an energy imbalance between calories consumed and calories expended i.e. a high-fat, energy-dense diet combined with a sedentary lifestyle e.g. screen based activities and a reduction in physical activity¹⁻³

• An elevated BMI in childhood is associated with a high risk of obesity in adulthood and associated co-morbidities including type 2 diabetes, hypertension, stroke and
Aboriginal and/or Torres Strait Islander children and adolescents have a high incidence of obesity.

2. Diagnosis of overweight or obesity in children

- Taking a history, a clinical assessment and a body mass index (BMI) for age is the widely accepted practice to define overweight or obesity in children over the age of 2 years.
- Growth monitoring of Australian children aged 0-2 years is based on age, length and weight using the WHO growth charts.
- Growth monitoring of Australian children 2-18 years of age is done using either the US-CDC or WHO growth charts (see Resource 1).
- BMI is measured the same way in children as it is in adults; weight (in kilograms) divided by height (in metres) squared (kg/m²).
- Measuring waist circumference alone to identify overweight and obesity in children is not recommended.
- Waist to height ratio of > 0.5 may be used to consider further assessment of cardiovascular risk in children.

3. Management

- Focusing on family health behaviours with frequent health professional contact produce better outcomes than child focused dietary and physical activities alone.
- Management should focus on weight maintenance rather than weight loss for most children and adolescents.
- Early weight management gives children and adolescents the opportunity to learn positive lifestyle behaviours, and reduce their risk of obesity, diabetes and cardiovascular diseases in adulthood.

3.1 Support child self management

- Managing overweight and obesity in children involves building a therapeutic partnership with parents or caregivers to support children to live healthy lives by:
  - helping the child choose nutritious healthy foods
  - encouraging the child to improve activity levels
  - setting an example by improving family lifestyle behaviours
- Encourage family based goal setting toward lifestyle modification and behavioural change.
- Provide resources (see Resource 2) and discuss the positive effects of lifestyle modification (see Lifestyle modification section) on weight with particular regard to diet and nutrition (Diet and nutrition, page 14) and physical activity (Physical activity, page 26).
- Weight reduction can be achieved by reducing energy intake, increasing physical activity and supporting behavioural change.
- Discuss with adolescents and carers, overweight and obesity and the risks associated with...
with developing chronic diseases in adulthood

3.2 Social emotional support

- Be mindful that weight may be a sensitive topic for children, particularly if they have experienced teasing or bullying
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 3. for examples). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Refer children and adolescents to a suitably qualified mental health clinician, psychologist or social worker for help with disordered (dysfunctional) eating, poor body image, depression and anxiety and weight-related bullying if present
- Acknowledge child or carer concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of the condition

3.3 Weight management program

- Weight management in children and adolescents focuses on lifestyle interventions
- Weight loss is not recommended for most children and should be limited to postpubertal adolescents who are assessed as obese
- The aim of maintaining weight is for the child to grow toward normal BMI without losing weight
- Involving the parent or carer and child to develop a weight management program will improve weight management
- Encourage the child and carer to make goals to change lifestyle behaviours and identify ways to manage hunger
- Set and review goals around sustainable family lifestyle changes
- Encourage regular weight monitoring (see Resource 4)
- Consider age appropriate incentives for overweight or obese children to improve weight management in the short term e.g. consider activity based incentives such as swimming, fishing or trips to the park, over food rewards or gift cards which encourage sedentary behaviour
- Encourage the child and carer to take action (e.g. seeing a health professional) when no progress toward goals has been achieved
- Encourage frequent review of progress by health professional in the short term as this improves the outcome of weight management interventions
- Review should include
  - changes in weight by doing the child’s BMI (3 monthly minimum)
  - child and family eating and physical activity habits and behaviours
  - psychosocial factors around weight control behaviours (dietary restrictions, exercise, weight loss products etc.), body image, family functioning and relationships
- Referral for specialist intervention should be considered when
  - lifestyle changes have been unsuccessful in reducing child’s BMI
— development of social and emotional issues
— inability to implement lifestyle changes due to complex family problems
— parents feel unable to influence the child’s sedentary time or change eating habits or food choices

• Ensure ongoing management by single health professional as an adolescent transitions from paediatric to adult health services

3.4 Physical activity

• See Physical activity, page 26

• Children should accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day

• Physical activity should include a variety of aerobic activities, including some vigorous intensity activity

• Explain that being active is good for overall health as well as being fun

• Encourage parents and family to
  — be active with children
  — get involved in local activities
  — make use of local opportunities for physical activity like pools and walking tracks
  — be good role models by being physically active themselves
  — support children to include physical activity in routine daily activities like walking to school
  — encourage children to be involved in team sports

• To reduce health risks children should minimise the time they spend being sedentary every day

• Limit electronic media for entertainment (screen based activities) to less than 2 hours a day

• Break up long periods of sitting as often as possible

3.5 Diet and nutrition

• See Diet and nutrition, page 14

• Infants, children and adolescents need sufficient nutritious food to grow and develop normally to maintain a rate of growth consistent with the norms for age, sex and stage of physiological maturity

• Breastfeeding provides health benefits to infants including protection against obesity, reduced risk of infection, asthma, hypertension and other chronic diseases in later life

• When discussing dietary approaches for weight management consider
  — the degree of overweight or obesity
  — dietary preferences of the individual and their family
  — the availability, affordability and the ability to store healthy foods
  — a sustainable eating plan to gradually change eating habits
  — the presence of psychosocial pressures affecting the current eating pattern
Overweight and obesity in children

- a family approach to improving nutrition and role modelling
- regular meals, including breakfast and snacks in a social family environment
- separating mealtimes from watching television or other screen-based activities
- encouraging children to listen to internal hunger cues and to eat to appetite
- having healthy foods readily available
- avoiding being restrictive or controlling of the child’s food intake
- explaining the concept of ‘often’ or ‘sometimes’ foods
- some school canteens base available foods on a traffic light system of (see Resource 2)
  - green foods always on the menu
  - amber foods to select carefully and
  - red foods which are not recommended
- avoiding using foods as treats or rewards
- comforting children with attention, listening and affection instead of food
- encouraging children to develop ways of regulating emotions that don’t involve food

Provide the child and carer with nutrition and diet-related resources (see Resource 2)

Eat plenty of
- vegetables, including different types and colours and legumes/bean
- fruit
- breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans
- reduced fat milk, yoghurt and cheese from 2 years of age onwards (full-fat dairy options are appropriate for children under 2 years of age)

Limit intake of all other foods including saturated fat, added salt and sugars

Only drink water

Refer child to a dietitian if they have specific dietary restrictions or needs

Under recommendations of a specialist team a very low-energy diet may be considered in obese post-pubertal adolescents

3.6 Surgery

For post-pubertal adolescents with a BMI > 40 kg/m² (or > 35 kg/m² with obesity-related complications), bariatric surgery may be considered if other interventions have been unsuccessful in producing weight loss

When indicated, bariatric surgery should be delivered by a multidisciplinary team (i.e. surgeons, dietitians, nurses, psychologists and MOs), including an overall clinical pathway for weight management.
4. Medications

- Medications should only be considered in cases where there is severe obesity and the presence of associated co-morbidities. These should be delivered through specialist clinics and as an adjunct where lifestyle interventions alone have failed\(^1\).\(^2\)\(^7\)

- Lifestyle modification should be sufficient for weight loss

- Weight loss medications have shown only slight improvements in weight loss compared with lifestyle modification\(^7\)

- MO/NP will discuss medication options and the need for specialist referral with the family and child

5. Care plan

Table 1. Care plan for overweight or obese children

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Ongoing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>✓</td>
<td>With BMI until stops growing</td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>Mthly for 3 mths then 3 mthly</td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>As the clinical presentation dictates otherwise 12 mthly</td>
</tr>
<tr>
<td>Fasting lipids</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fasting blood sugar</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Weight loss plan</td>
<td>✓</td>
<td>Review every 2 wks for 3 mths then mthly for 12 mths. Continue review until weight loss achieved</td>
</tr>
<tr>
<td>Behavioural change</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Client self management support</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Diet modification</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td></td>
<td>Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
<tr>
<td>Pneumococccal vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietitian</td>
<td>✓</td>
<td>1 wk</td>
</tr>
<tr>
<td>RN/HW R/V</td>
<td>✓</td>
<td>Each visit</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>3 mthly</td>
</tr>
</tbody>
</table>

**OVERWEIGHT AND OBESITY IN CHILDREN**
6. References

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Section 2: Management of diagnosed conditions  
overweight and obesity in children

[electricity_guidelines]
Poor growth in children

High risk groups
• Low birth weight infants
• Infants born prematurely
• Children transitioning from breastfeeding to solids (6 - 18 months)
• Children with birth defects
• Children with organic pathology (physical illness)
• Children from low income and socially disadvantaged backgrounds including Aboriginal and/or Torres Strait Islander children
• Children from homes where there is family dysfunction

Considerations for women of child-bearing age
• Prevention of poor growth and micronutrient deficiencies through healthy food and fluid intake, plus multi-micronutrient supplements
• Avoid alcohol and cigarettes pre and postnatally
• Promote continued breastfeeding complemented by nutritious foods after 6 months of age

Urgent referral
• Refer to the MO/NP if the child has any of the following
  – a weight that has crossed 2 or more centile lines downwards on their growth chart
  – has acute poor growth (see Figure 1)
  – has chronic poor growth or stunting (see Figure 1)
  – is severely anaemic (Hb < 80 g/L)
  – has no identified carer able to offer adequate nutrition to the child
  – suspected child abuse or neglect

Child safety reporting
• Child abuse or neglect can contribute to poor growth in children
• Make a child safety report if the child has no identified carer able or willing to offer adequate nutrition to the child
• See Appendix 2: Child safety reporting, page 498

1. What is poor growth in children?
• Poor growth is an imbalance between nutrient requirements and dietary intake, negatively affecting growth and development
• As a result, over an extended period of time children fail to physically grow or gain weight as expected. This is also known as failure to thrive (FTT)
• The causes of poor growth are multi-factorial and should be viewed as a causal framework rather than independent factors resulting in poor growth. These include direct or immediate causes, underlying causes and peripheral causes (see Table 1)
• Children with poor early nutrition are at increased risk
- poor growth
- poor or delayed cognitive, motor and socioemotional development
- developing chronic disease and obesity as adults
- decreased learning capacity and school performance
- decreased work capacity and economic productivity
- intergenerational consequences

### Table 1. Causes and processes of poor growth

<table>
<thead>
<tr>
<th>Causes</th>
<th>Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immediate</strong></td>
<td></td>
</tr>
<tr>
<td>Inadequate intake</td>
<td>• Poor breastfeeding practise</td>
</tr>
<tr>
<td></td>
<td>• Receives formula feeds which have been incorrectly prepared</td>
</tr>
<tr>
<td></td>
<td>• Not provided enough food or fed often enough</td>
</tr>
<tr>
<td></td>
<td>• Delayed introduction of solids (around 6 months)</td>
</tr>
<tr>
<td></td>
<td>• Poor chewing or swallowing ability</td>
</tr>
<tr>
<td></td>
<td>• Decreased appetite due to micronutrient deficiencies</td>
</tr>
<tr>
<td>Disease/medical</td>
<td>• Cannot feed well due to neurological, cardiovascular or respiratory problems</td>
</tr>
<tr>
<td></td>
<td>• Persistent vomiting</td>
</tr>
<tr>
<td></td>
<td>• Poor absorption of nutrients caused by intestinal parasites, chronic diarrhoea or malabsorption syndromes</td>
</tr>
<tr>
<td></td>
<td>• Syndromes such as fetal alcohol syndrome, other genetic disorders or intra-uterine growth restriction</td>
</tr>
<tr>
<td></td>
<td>• Low birth weight</td>
</tr>
<tr>
<td></td>
<td>• Chronic diseases with infections</td>
</tr>
<tr>
<td>Household food insecurity</td>
<td>• Competition for food with others in the home</td>
</tr>
<tr>
<td></td>
<td>• Mother/carers lack adequate resources to provide the food needed</td>
</tr>
<tr>
<td></td>
<td>• Poor financial control</td>
</tr>
<tr>
<td></td>
<td>• Low education level</td>
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<tr>
<td></td>
<td>• Poor family planning practises</td>
</tr>
<tr>
<td></td>
<td>• Family violence</td>
</tr>
<tr>
<td></td>
<td>• Psycho-social issues including depression, behavioural disorders and addictions (gambling, alcohol and other drugs)</td>
</tr>
<tr>
<td>Inadequate care and feeding practices</td>
<td>• Infections from poor hygiene practises including when preparing food and using bottles</td>
</tr>
<tr>
<td></td>
<td>• Provision of food and drinks of poor nutritional value</td>
</tr>
<tr>
<td></td>
<td>• Decreased appetite due to psychosocial neglect</td>
</tr>
<tr>
<td></td>
<td>• Food refusal due to coercive feeding practises</td>
</tr>
<tr>
<td></td>
<td>• Distractions at meal times</td>
</tr>
<tr>
<td>Overcrowding, unhealthy household environment and inadequate health services</td>
<td>• Unhealthy/unsafe living environment</td>
</tr>
<tr>
<td></td>
<td>• Lack of access to safe water, sanitation and basic hygiene practises</td>
</tr>
<tr>
<td></td>
<td>• Poor access to maternal and child health services</td>
</tr>
<tr>
<td><strong>Underlying</strong></td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>• Poverty</td>
</tr>
<tr>
<td>Social and economic inequity</td>
<td>• Social and economic inequity</td>
</tr>
<tr>
<td><strong>Peripheral</strong></td>
<td></td>
</tr>
</tbody>
</table>
2. Diagnosis of poor growth

- If suspected during a routine child health check, diagnosis of poor growth is made following a comprehensive general and nutritional assessment of
  - a detailed maternal history including: pregnancy, mother’s health, birth parameters, gestational age, general medical and family/sibling history, use of medications and allergies
  - diet history including: a feeding history, breastfeeding, use of formula and other milks, introduction of solids, type and quantity of food and appetite
  - sociocultural practices of the family including: child caregiver relationships, daily schedules, cultural practices/beliefs, shopping, food preparation, household stressors, family networks and social support
  - the child’s general physical examination including: anthropometric measurements to ensure normal growth trends by plotting corresponding weight for age, height/length for age, weight for height percentiles and head circumference where appropriate using the WHO and CDC growth charts for children aged 0 - 2 years and 2 - 18 years

- A suspicion of poor growth is made when
  - there are underlying causes of poor growth (see Table 1)
  - the child’s weight for age centile tracks in a flat line, crosses 2 centiles or is below the 10th centile at first presentation (see Figure 1)

- How a child’s growth differs from the median and their level of poor growth is determined by plotting the child’s ‘z’ scores (weight for length and age for length) on the appropriate WHO z-score growth chart

- See Resource 1. for further details and use of the WHO z-score charts

3. Management

- Managing children with moderate acute poor growth involves building a therapeutic partnership with family or carers and collaborating with the multidisciplinary health care team to support the child to maintain healthy growth

- In managing poor growth in children the following issues must be considered
  - determining the severity of poor growth
  - assessing and addressing any underlying causes of the child’s poor growth (see Table 1)
  - past or current medical history
  - pathology results

- The primary steps to re-establishing a child’s weight are to
  - support continued breastfeeding in infants
  - use therapeutic supplements until appetite is restored
  - once appetite is restored reintroduce nutritious foods
3.1 Support carer management of condition

- Work with family to identify a carer who is willing and able to provide for child’s needs and support goals for change
- Provide information about the child’s poor growth, causes and management
- Provide weekly follow up until initial target weight is achieved
- Provide relevant nutrition resources (see Diet and nutrition, page 14)
- Encourage the family or carers to identify barriers to adequate lifestyle modification and clinical adherence and to develop goals to overcome those barriers based on their capacity and understanding
- If appropriate, engage the school for support to ensure the child is being fed
3.2 Social emotional support

- Acknowledge any child and parent concerns and reassure them that provision of adequate nutritional intake will improve the condition.

3.3 Breastfeeding

- Up to the age of 6 months the aim is to encourage exclusive breastfeeding.
- If a child is breastfeeding, continue to support the mother to maintain this practice (see Resource 2).
- A baby is getting enough breastmilk if they gain weight and length and have 5 - 7 wet nappies per day.
- See Diet and nutrition, page 14.

3.4 Supplementary feeding

- Supplementary feeding is not suitable for all children. Consult a dietitian for children who are:
  - younger than 2 years of age
  - weigh less than 8 kg
  - lactose intolerant
  - allergic to peanuts or other foods
  - deficient in particular micronutrients
- Supplementary feeds help to restore normal appetite by providing micronutrients as well as energy to re-establish normal healthy growth.
- The child may require coaxing to take supplementary feeds at first but once appetite is re-established, they will consume more and be interested in eating again.
- Most undernourished children need to take supplementary feeds as high energy fluids at first, then increasing amounts of food.
- Ways of encouraging children to take supplementary feeds include:
  - add flavouring to the made-up supplement
  - freeze the made-up supplement as an icy pole
  - add the supplement powder to porridge or cereals

3.5 Supplement amount

- The dietitian will determine the amount of supplement required for the child to grow in weight and length.
- Encourage the family or carer to give as much of the recommended supplementary amount as the child will take.
- Give the supplement slowly over ½ - 1 hr from a cup. Too quickly may cause diarrhoea.

3.6 Formula

- Infant formula should be used up to 12 months of age if baby is not being breastfed.

3.7 Solids introduction

- Introduction of first foods should begin around 6 months, starting with iron fortified...
infant cereal and/or iron rich foods such as puréed meat or tofu, followed by other foods from the five food groups (see Diet and nutrition, page 14)

- Introduce different tastes and textures as the baby grows
- By 12 months of age, infants should be consuming a wide variety of nutritious foods enjoyed by the rest of the family

### 3.8 Food

- Small frequent serves of nutrient rich foods and/or snacks will restore appetite in the undernourished child (see Table 2)
- Continue to provide supplements until sufficient weight and length have been achieved
- Sometimes provide extra nutrition to the child by adding grated cheese, avocado, margarine or a teaspoon of smooth peanut butter to foods
- Supplements can be substituted for cow’s milk to mix with cereals
- Encourage fruit and vegetables
- See Diet and nutrition, page 14

> **High energy intake (fats and sugars) without adequate macronutrients and micronutrients (fruits, vegetables and lean meats) will result in excess fat deposits and predisposes the undernourished child to chronic diseases in later life**

### 3.9 Drinks

- To grow, the undernourished child is required to drink nutritional supplements
- Provide milk or water if child is thirsty when not drinking supplements
- Unmodified milk from animal sources including cow’s milk should not be given as a main drink to infants under 12 months of age
- For older children consider flavoured full cream milk, either alone or mixed with the supplement
- Follow on formulas are not recommended
- Fruit juice is not recommended
- Avoid cordial, soft drink, tea, herbal teas, coffee, fruit juice, sports drinks or any sugar sweetened drinks as they lack nutrition and will displace nutritious supplements
- See Diet and nutrition, page 14

> **Soy (except soy infant formula) and other nutritionally incomplete plant-based milks (e.g. rice, oat, coconut or almond milk) are inappropriate alternatives to breast milk or formula in the first 12 months**
### Table 2. Foods for the child with poor growth

<table>
<thead>
<tr>
<th><strong>Meat and meat alternatives (high protein)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Includes meat, chicken, fish or bush tucker meats</td>
</tr>
<tr>
<td>• Meat alternatives include baked beans, lentils, kidney beans and tofu</td>
</tr>
<tr>
<td>• Include at each main meal and snacks as appropriate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Cheese (high protein)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Serve on crackers/sandwiches</td>
</tr>
<tr>
<td>• Grate onto vegetables</td>
</tr>
<tr>
<td>• Add to rice or pasta</td>
</tr>
<tr>
<td>• Cut into small blocks as a snack</td>
</tr>
<tr>
<td>• Make cheese sauce to add to meals/vegetables</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Eggs (high protein)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cook hardboiled eggs for snacks or add to a salad plate</td>
</tr>
<tr>
<td>• Mash egg with mayonnaise as a sandwich filler or stir through potato salad</td>
</tr>
<tr>
<td>• Make an omelette or quiche with chopped meat, vegetables and cheese</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Nuts and seeds (high protein)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole nuts are a choking hazard for children under 3 years of age</strong></td>
</tr>
<tr>
<td>• Use smooth peanut butter or other nut pastes in preference to jam or yeast spreads</td>
</tr>
<tr>
<td>• Use hummus or tahini as a dip or spread</td>
</tr>
<tr>
<td>• Serve whole roasted nuts as a snack if age appropriate</td>
</tr>
<tr>
<td>• Use in baking e.g. almond meal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Avocado</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Spread on crackers, toast or sandwiches</td>
</tr>
<tr>
<td>• Blend into vegetable mixtures</td>
</tr>
<tr>
<td>• Add in salads</td>
</tr>
<tr>
<td>• Guacamole dip</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Supplements (consider before milk) (high protein)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Blend supplements with frozen fruit (e.g. berries, bananas), ice cream or yoghurt. Add honey or other flavourings</td>
</tr>
<tr>
<td>• Make soups, puddings, custards, desserts or packet mixes with milk instead of water</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Small amounts of margarine and oil (essential fatty acids)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add to vegetables</td>
</tr>
<tr>
<td>• Add to rice or pasta after cooling</td>
</tr>
<tr>
<td>• Spread on bread and on savoury biscuits</td>
</tr>
<tr>
<td>• Add to soups</td>
</tr>
</tbody>
</table>

Encourage fruit and vegetables every day. Avoid ‘junk’ food which replaces nutrient rich foods the child requires to grow healthily. Provide 3 meals and 3 snacks a day as well as ongoing supplements.

### 3.10 Encouraging eating

- Young children with poor appetites need persistent encouragement to take enough supplement

- What and how much?
  - small regular amounts of nutritious food
– the same foods the family are eating
– finger foods
– avoid drinks and snacks before meals

• Mealtime environment
  – model behaviour by eating together as a family
  – avoid negative comments about food
  – keep calm and relaxed, avoid nagging and punishment
  – allow independence
  – avoid distractions e.g. television

• Mealtime routines
  – provide consistent time and location for meals
  – 20 to 30 minutes for main meals, 10 to 20 minutes for snacks

• Food exploration
  – make food look appealing e.g. favourite foods in the shape of a face
  – serve foods or drinks in colourful cups, bowls or plates
  – try different foods and often
  – involve children in choosing the ingredients
  – encourage children to cook, mix and prepare food

• Praising good behaviour, ignoring poor behaviour
  – encourage good eating behaviours by cuddles, smiling and telling children how well they are eating
  – ignore poor eating behaviours such as not eating, eating slowly or spitting food out
  – avoid nagging or berating
  – praise regularly

• Avoid unhealthy food bribes
  – unhealthy food bribes reinforces that they are preferable to healthy foods e.g. offering ice cream if the child eats their vegetables
  – avoid substituting favourite foods (e.g. chips) for uneaten healthy foods. Children learn they will be rewarded for refusing foods
  – offer non food rewards for eating well, such as a game, book or trip to the park

• It may take 1 - 2 months and a lot of perseverance to restore a child’s healthy appetite

3.11 Growth monitoring

• A child’s weight will naturally fluctuate over time
• Continue to monitor the child’s weight and length trend over time according to routine child health check schedule
• To protect against future chronic conditions the child should grow well in height while continuing to be a healthy weight
• Follow up daily to monitor supplement intake
• The MO/NP should review a child who still has poor appetite or is not consuming enough supplement after 1 - 2 weeks

4. Medications
• See local policies and guidelines for eligibility, supply and costing of enteral products (see Resource 3)

4.1 Nutritional supplements
• Nutritional supplements (e.g. Pediasure) is available in powder or tetrapaks and are suitable for children who are more than 8 kg or over 1 year of age
• Ensure family or carer understand mixing powdered supplement as per product directions prior to leaving the clinic
• For tube/enteral feeding follow MO/NP instructions for flow rate, volume, dilution and need for additional fluid

<table>
<thead>
<tr>
<th>Table 3. Medications for the child with poor growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>-------</td>
</tr>
</tbody>
</table>
| Giardia treatment | • Tinidazole 50 mg/kg/dose stat (max 2 gm)  
• Metronidazole 30 mg/kg once daily for 3 days (max 2 g) | • Routinely at diagnosis or if giardia confirmed from stool OCP |
| Antihelmintics | • Albendazole  
• Child > 6 months and < 10 kg dose 200 mg stat  
• Child > 10 kg dose 400 mg stat | • The taste is poorly tolerated  
• For roundworm and threadworm  
• Routinely at diagnosis or if stool positive  
• Repeat every 6 months |
| | • Albendazole  
• Daily 3 days | • For hookworms, strongyloides, cutaneous larva migrans and whipworm |
| Iron supplement | • Ferrous sulphate  
• 3 - 6 mg/kg/day up to max 100 - 210 mg of elemental iron daily | • Routine supplementation for 3 months to meet increased iron requirements of catch up growth  
• Delay until any infections are treated in the undernourished or acutely unwell child due to the risk of triggering further infections  
• May cause nausea, bloating, constipation, diarrhoea. Warn parents that this medication causes black stools |
### 5. Care plan

<table>
<thead>
<tr>
<th>Table 4. Care plan for undernourished children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Head circumference</td>
</tr>
<tr>
<td>History and exam</td>
</tr>
<tr>
<td>Social emotional well being of carer</td>
</tr>
<tr>
<td>Check diet history/food security</td>
</tr>
<tr>
<td>Check Hb, urine and stool MCS and stool OCP</td>
</tr>
<tr>
<td>Carer education</td>
</tr>
<tr>
<td>Nutrition supplement</td>
</tr>
<tr>
<td>Food prescription</td>
</tr>
<tr>
<td>HW/CHN R/V</td>
</tr>
<tr>
<td>Dietitian</td>
</tr>
<tr>
<td>MO/NP R/V</td>
</tr>
<tr>
<td>Social worker</td>
</tr>
<tr>
<td>Paediatrician</td>
</tr>
<tr>
<td>Multidisciplinary team</td>
</tr>
<tr>
<td>Immunisations</td>
</tr>
</tbody>
</table>
6. References


10. NACCHO/RACGP. National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. 2nd edn. South Melbourne: The RACGP, 2012


7. Resources


Rheumatic heart disease

High risk groups
- People with a history of acute rheumatic fever (ARF) and a diagnosis of rheumatic heart disease (RHD)
- Aboriginal and Torres Strait Islander people (children aged between 5 and 14 are most at risk) and immigrants from developing countries

Considerations for women of child-bearing age
- Increased cardiac load during pregnancy will exacerbate pre-existing rheumatic valvular heart disease
- Importance of early diagnosis and regular secondary prophylaxis will help prevent deterioration of disease to a point where pregnancy is a risk
- Secondary prophylaxis is safe and should be continued during pregnancy
- Antibiotic prophylaxis to prevent endocarditis if prolonged labour and/or ruptured membranes
- Pre-conception counselling and assessment for all women with known rheumatic valvular disease

Urgent referral
- Cardiologist, MO/NP or paediatrician if suspicion of a diagnosis exists or there are signs of heart failure
- 2 kg weight gain or loss over 48 hours

Acute rheumatic fever (ARF)
- For diagnosis and management of ARF refer to the current edition of the PCCM or see *The Australian guideline for the prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease* (2nd edition) (see Resource 1)

Notifiable disease

1. What is rheumatic heart disease (RHD)?
- When a person becomes infected by Group A *Streptococcus* bacterium ( GAS), the immune response can cause acute generalised inflammation that affects the heart, joints, brain and skin. This is called acute rheumatic fever (ARF)
- Recurrent ARF can cause permanent damage to the heart valves - most commonly the mitral and aortic valves
- This damage is known as rheumatic heart disease (RHD)
- RHD can be classified as mild, moderate or severe
- In a mild case there will be no clinical evidence of heart failure
- In severe cases there are signs of valvular disease, oedema, angina and syncope
2. Diagnosis of RHD

- All people with suspected or definite ARF should undergo echocardiography to identify evidence and severity of carditis.
- Diagnosis of RHD is based on the degree of damage to the heart (see Table 1).
- Many people with established RHD do not have a documented history of ARF however previous ARF is assumed and recurrences must be prevented.
- All suspected cases of ARF require discussion with, or review by, a medical specialist.

### Table 1. Classification of rheumatic heart disease

<table>
<thead>
<tr>
<th>Class</th>
<th>Definition of category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hx ARF or no RHD</td>
<td>No pathological mitral or aortic regurgitation, but may have minor morphological changes to mitral or aortic valves on echocardiography</td>
</tr>
<tr>
<td>Priority 4.</td>
<td></td>
</tr>
<tr>
<td>Mild RHD</td>
<td>Mild mitral or aortic regurgitation clinically and on echocardiography, with no clinical evidence of heart failure, and no evidence of cardiac chamber enlargement on echocardiography</td>
</tr>
<tr>
<td>Priority 3.</td>
<td></td>
</tr>
<tr>
<td>Moderate RHD</td>
<td>Any valve lesion of moderate severity clinically (e.g. mild to moderate cardiomegaly and/or mild to moderate heart failure) or on echocardiography</td>
</tr>
<tr>
<td>Priority 2.</td>
<td>Mild mitral regurgitation together with mild aortic regurgitation clinically or on echocardiography</td>
</tr>
<tr>
<td></td>
<td>Mild or moderate mitral or aortic stenosis</td>
</tr>
<tr>
<td></td>
<td>Any pulmonary or tricuspid valve lesion co-existing with a left-sided valve lesion</td>
</tr>
<tr>
<td>Severe RHD</td>
<td>Any clinically severe valve lesion (e.g. moderate to severe cardiomegaly or heart failure) on echocardiography</td>
</tr>
<tr>
<td>Priority 1.</td>
<td>Any impending or previous cardiac valve surgery</td>
</tr>
</tbody>
</table>

3. Management

- The fundamental long term goal to manage RHD is to prevent ARF recurrences and therefore prevent the progression of valve disease.
- This is achieved by regular delivery of secondary prophylaxis with intramuscular LA Bicillin (see Table 2).
- Where adherence to secondary prevention is poor there is greater need for surgical intervention and long term surgical outcomes are poor.

3.1 Client education and health promotion

- See Lifestyle modification section.
- Discuss what RHD is, how it progresses and its association with throat and skin infections.
- Recognising the signs and symptoms of recurrent ARF and of RHD.
- The need for timely access to health services and follow up.
- Encourage the client to identify barriers to adequate lifestyle modification and medical.
adherence and to set goals to overcome those barriers based on their capacity and understanding

- Provide relevant service and educational resources (see Resource 1)

### 3.2 Social emotional support

- A self- or clinician-rated mood scale can be used to assess for altered mood (for examples see Resource 2). Rating scales should be supplemented by a clinical assessment by suitably qualified mental health clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition

### 3.3 Secondary prophylaxis (antibiotics)

- All clients with evidence of RHD and a history of ARF should have secondary antibiotic prophylaxis to control streptococcal infections (see Table 2)
- Discuss the effectiveness of Bicillin regimes to prevent recurrence of ARF and minimise RHD
- Consider adverse reactions to medications
- See 4.1 Secondary prophylaxis and 4.2 Bicillin administration technique for further details

### 3.4 Regular physical health and specialist review

- Follow the care plan for RHD
- Access to timely specialist physician, paediatric and/or cardiologist services for examination of heart and lungs
- Echocardiography
- Examination of throat, teeth and skin every presentation
- Assessment for shortness of breath, ankle swelling, palpitations or dizziness and chest pain

### 3.5 Dental care

- The risk of infective endocarditis and further heart valve damage increases with poor dental hygiene and oral infections
- 6 - 12 monthly dental care (depending on classification level) is essential for clients with a history of ARF and RHD
- Discuss dental hygiene and oral health at each visit
- Where appropriate, antibiotic prophylaxis are given prior to dental procedures
- A dental assessment and any treatment is required prior to valvular surgery

### 3.6 Recall and review

- Place client on a facility ARF/RHD recall system
- Provide client with the date of the next scheduled Bicillin injection
- Recall client from 21 days after the last injection to ensure that injections are given no
more than 28 days apart

- Provide the client and other health services with Bicillin prophylaxis details when client is travelling to different communities
- Contact the RHD Register and Control Program (ArfRhdRegister@health.qld.gov.au – 1300 135854) to
  - request educational resources
  - share follow up and Bicillin administration details
  - ensure your ARF/RHD clients correctly appear on the Bicillin and echocardiogram reminder lists sent out to your service monthly

3.7 Surgery

- Surgery is determined by the severity of damage to the heart valves (severe RHD)
- Early referral to a cardiologist is required to identify heart failure and consideration for valve repair
- Repair or replacement of damaged heart valves prevents left ventricular dysfunction and severe pulmonary hypertension
- Heart valve replacement risks include stroke and infective endocarditis
- Repair is the preferred option for young people for this reason

3.8 Special management considerations

- A boarding school child needs to have consent and access to Bicillin injections to continue treatment
- A documented Bicillin management regime needs to be developed in consultation with the child, family and the school
- If a client relocates, provide the respective health service with RHD health records to provide continuation of care

4. Medications

- Primary prophylaxis involves prompt treatment with antibiotics for treatment of streptococcal infection
- Secondary prophylaxis involves regular administration of Bicillin to prevent recurrent ARF (see Table 2)

4.1 Secondary prophylaxis

- Decisions to cease secondary prophylaxis should be based on clinical and echocardiographic assessment by a specialist ARF/RHD physician
- All persons with
  - ARF or RHD should have prophylaxis for a minimum of 10 years after most recent episode of ARF or until age 21 years (whichever is longer). Clients > 25 years of age who are diagnosed with RHD, without any documented history of prior ARF, should receive prophylaxis until the age of 35 years and then
  - no RHD or mild RHD, if clinically assessed by echocardiography can discontinue prophylaxis at this time
- moderate RHD continue prophylaxis until 35 years of age
- severe RHD continue prophylaxis until 40 years of age. Although the risk of recurrence is extremely low in people aged > 40 years, in some cases prophylaxis may be continued beyond the age of 40 years, or even for life e.g. when a client decides they want to reduce even a minimal risk of recurrence.

Table 2. Antibiotic regimens for secondary prevention

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dose</th>
<th>Route</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>First line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzathine penicillin G (Bicillin)</td>
<td>≥ 20 kg 900 mg (1,200,000 U)</td>
<td>Deep IM injection</td>
<td>28 days</td>
</tr>
<tr>
<td></td>
<td>&lt; 20 kg 450 mg (600,000 U)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Second line | | |
| If IM route is not possible or refused
| Adherence should be carefully monitored
| Oral secondary prophylaxis is nowhere near as effective as Bicillin |
| Phenoxymethylpenicillin (Penicillin V) | 250 mg | Oral | Twice daily |

Following documented penicillin allergy

| Erythromycin | 250 mg | Oral | Twice daily |

Adapted with permission from Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease (2nd edition). © 2014 National Heart Foundation of Australia

4.2 Bicillin administration technique

- Initial Bicillin administration will determine success or failure of the client to adhere to the regimen, especially children
- Administer Bicillin in conjunction with procedural interventions involving
  - distraction techniques for children
  - application of pain relief such as EMLA cream (30 - 60 minutes prior), cold spray (15 seconds prior), ice pack (for 5 minutes) or pressure (for 15 seconds) to the injection site if required
  - ensure Bicillin solution is warmed to room temperature by rolling between the hands
  - inject slowly over 2 minutes to avoid pain from solution under pressure
  - apply ice pack afterwards and encourage normal ambulation
- It is not recommended to mix lignocaine with Bicillin

4.3 Anticoagulation therapy

- Used for clients who have had heart valve surgery
- Clients will be discharged from hospital and commenced on anticoagulation therapy. With reference to therapy duration and INR therapeutic range see Table 3.
- Monitor INR levels using a recall system and RHD care plan
- Contact the MO/NP if the INR result is outside the acceptable range (determined by the MO) (see Table 4)
Table 3. Indications for warfarin therapy duration and target INR\(^4\)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Minimum recommended duration</th>
<th>Target INR range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk heart valves (includes bio prosthetic)</td>
<td>3 months</td>
<td>2 - 3</td>
</tr>
<tr>
<td>High risk mechanical heart valve</td>
<td>Life long</td>
<td>2.5 - 3.5</td>
</tr>
</tbody>
</table>

Table 4. Warfarin dosing regime for INR target range of 2 - 3\(^\star\)

<table>
<thead>
<tr>
<th>INR</th>
<th>Dosage adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR &lt; 1.5</td>
<td>• Increase weekly dose by 20%</td>
</tr>
<tr>
<td>1.5 - 1.9</td>
<td>• Increase weekly dose by 10%</td>
</tr>
<tr>
<td>2 - 3</td>
<td>• No change</td>
</tr>
<tr>
<td>3.1 - 3.9</td>
<td>• No change&lt;br&gt;• Recheck in one week&lt;br&gt;• If persistent, decrease weekly dose by 10% - 20%</td>
</tr>
<tr>
<td>4 - 4.9</td>
<td>• Omit one dose&lt;br&gt;• Decrease weekly dose by 10% - 20%&lt;br&gt;• Recheck INR in 2 to 5 days</td>
</tr>
<tr>
<td>INR 5 - 9 and no bleeding</td>
<td>• Cease warfarin&lt;br&gt;• If bleeding risk high give vitamin K 1 - 2 mg orally or 0.5 - 1 mg IV&lt;br&gt;• Check INR in 6 - 12 hours&lt;br&gt;• Resume lower dose of warfarin once INR &lt; 5</td>
</tr>
<tr>
<td>INR &gt; 9</td>
<td>• Cease warfarin&lt;br&gt;• Seek senior medical advice&lt;br&gt;• Refer to the Guidelines for Warfarin Management in the Community(^4) (see Resource 5)</td>
</tr>
</tbody>
</table>

\(^\star\)Dose modification is required for clients with mechanical heart valves as the target INR range is higher (2.5 - 3.5).

4.4 Client anticoagulation education\(^4\)

- Always take the same brand of warfarin tablets
- Take warfarin tablets at about the same time every day
- Inform a doctor if a painful, purplish, bruise-like rash develops
- Use a booklet to tick the days after taking a dose so that any missed doses can easily be identified
- Warfarin is affected by vitamin K which is found in certain foods e.g. green leafy vegetables. Eat a normal, balanced diet without dramatic changes, to keep intake of vitamin K stable
- Avoid excessive alcohol consumption (see Alcohol reduction, page 4)
- Avoid drinking large amounts of cranberry juice as this may increase the effects of warfarin
• Inform any health care professional including dentists that a client is taking warfarin
• Ensure clients have appointments for regular blood tests in case the dose of warfarin needs adjusting and ensure they have been advised of the next dose to take when the test result is known
• Refer client to the MO/NP if they feel unwell for any reason including
  – unexplained bruising
  – bleeding
  – pink, red or dark brown urine
  – red or black faeces
  – bleeding from gums or nose
  – dizziness
  – trouble breathing or chest pain
  – severe headache
  – unusual pain or weakness
  – dark, purplish or mottled fingers or toes
  – vomiting or coughing up blood
  – excessive menstrual bleeding

Many medications interact with warfarin. The MO/NP or pharmacist should review every client on warfarin before starting or stopping other medications, vitamin supplements, herbal or over-the-counter products.
## 5. Care plan

### Table 5. Care plan for people with rheumatic heart disease

<table>
<thead>
<tr>
<th>Action</th>
<th>Dx</th>
<th>Inactive Priority 4</th>
<th>Mild ARF/RHD Priority 3</th>
<th>Moderate RHD Priority 2</th>
<th>Severe RHD Priority 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicillin</td>
<td>✓</td>
<td>Nil</td>
<td>No more than 28 days apart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>4 wkly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>✓</td>
<td>12 mthly then once only when client stops growing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>✓</td>
<td>12 mthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>✓</td>
<td>12 mthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waist circumference</td>
<td>✓</td>
<td>12 mthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
<td></td>
</tr>
<tr>
<td>Anticoagulation therapy</td>
<td>✓</td>
<td>Nil</td>
<td>As recommended by MO/NP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>✓</td>
<td>Nil</td>
<td>As recommended by MO/NP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECG</td>
<td>✓</td>
<td>Nil</td>
<td>12 mthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echocardiogram</td>
<td>✓</td>
<td>Within 2 mths</td>
<td>As requested by MO/NP</td>
<td>Child 2 yrl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adult 2 - 3 yrl</td>
<td>12 mthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 - 6 mthly</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>✓</td>
<td>12 mthly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self manage education</td>
<td>✓</td>
<td>12 mthly</td>
<td>4 wkly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin and throat</td>
<td>✓</td>
<td></td>
<td>At each presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral care</td>
<td>✓</td>
<td></td>
<td>At each presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 - 6 mthly</td>
<td></td>
</tr>
<tr>
<td>Dentist</td>
<td>✓</td>
<td>12 mthly</td>
<td>Within 3 mths of Dx then 6 mthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication R/V</td>
<td>✓</td>
<td></td>
<td>12 mthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotic cover</td>
<td>✓</td>
<td></td>
<td>For any <em>Streptococcal</em> infection or as per MO, dentist or specialist prior to invasive procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>✓</td>
<td></td>
<td>Recommended. See the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>✓</td>
<td>12 mthly</td>
<td>6 mthly</td>
<td>3 mthly</td>
<td></td>
</tr>
<tr>
<td>Care plan</td>
<td>✓</td>
<td></td>
<td>12 mthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist MO</td>
<td>✓</td>
<td>As referred with new symptoms</td>
<td>12 mthly</td>
<td>3 - 6 mthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>And with any new symptoms/suspected disease progression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac rehab</td>
<td>✓</td>
<td></td>
<td>Post surgery</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. References

1. RHDAustralia (ARF/RHD writing group), National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand. Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease (2nd edition). 2012


7. Resources

1. RHDAustralia website for client support and resources available at http://www.rhdaustralia.org.au/


4. The RHD Register and Control Program (ArfRhdRegister@health.qld.gov.au) Ph. 1300 135 854

Stroke and transient ischaemic attack

High risk groups
- Previous history of stroke or transient ischaemic attack (TIA)
- Over 60 years of age
- Those with hypertension, diabetes or dyslipidaemia
- Those with atrial fibrillation (AF)
- Smokers and those who drink excessive amounts of alcohol

Considerations for women of child-bearing age
- Stroke in women aged 15 - 44 years is uncommon
- Pregnant women with a past history of stroke or TIA or who are at risk of thromboembolic conditions should be referred to an obstetrician
- Warfarin is contraindicated in pregnancy
- Oestrogen-containing contraceptive pill is contraindicated in women who have had a stroke or TIA

Urgent referral
- Refer to the current edition of the Primary Clinical Care Manual (PCCM) and the MO/NP for acute diagnosis or management of a stroke or TIA
- Use the acronym FAST to identify any warning signs or symptoms of a stroke or TIA
  - F - Facial weakness
  - A - Arm and/or leg weakness
  - S - Speech difficulty
  - T - Time to act fast

Special considerations
- In managing a stroke or TIA the following co-morbidities and screening must be considered
  - Diabetes type 2, page 196
  - Chronic kidney disease, page 112
  - Hypertension, page 228
  - Coronary heart disease, page 142
  - Chronic heart failure, page 100
  - Overweight and obesity in adults, page 287
  - Dyslipidaemia, page 210
  - Atrial fibrillation
1. What is a stroke and transient ischaemic attack (TIA)?

- The symptoms for a stroke and TIA are the same, however stroke symptoms last longer than 24 hours and result in infarction (death) of neurological (brain) tissue

- Symptoms include
  - unilateral weakness, clumsiness or numbness (note: isolated sensory symptoms are unlikely to be due to TIA/stroke)
  - speech disturbance (trouble talking or understanding speech)
  - difficulty recognising or naming things
  - double vision or sudden loss of vision in one or both eyes
  - sudden loss of balance

1.1 Transient ischaemic attack (TIA)

- TIA is a transient episode of neurological dysfunction caused by focal brain ischaemia without infarction

- Most episodes last less than an hour and symptoms resolve within 24 hours

- TIAs are a warning sign of impending stroke with significant risk within the first 48 hours

- Urgent identification of TIAs and commencement of preventative behaviours and treatment can prevent client from having a stroke

1.2 Stroke

- A stroke (also known as a cerebrovascular accident or CVA) is the result of disrupted arterial blood supply to the brain due to a
  - blockage (ischaemic stroke/cerebral infarction) or
  - rupture (haemorrhagic stroke)

- This results in death of brain tissue and focal (specific) neurological deficits

2. Diagnosis of a stroke or TIA

- Diagnosis of stroke/TIA is made by
  - history and clinical presentation of neurological symptoms
  - a CT or MRI scan of the brain to detect infarct or haemorrhage and exclude other pathologies
  - an ECG to exclude atrial fibrillation (AF), a major source of thrombi which cause cerebral blockages
  - a carotid doppler to exclude atherosclerotic plaque and vessel occlusion
  - an echocardiogram to assess heart function and exclude micro thrombi
3. Management

- Managing the stroke or TIA client includes building a therapeutic partnership with caregivers in order to support the client to rehabilitate and maintain an active productive life.

3.1 Factors complicating management

- In managing a stroke or TIA the following co-morbidities and screening must be considered:
  - Hypertension is the major risk factor for both first and subsequent stroke (see Hypertension, page 228).
  - Diabetes and impaired glucose tolerance are risk factors for subsequent strokes (see Diabetes type 2, page 196).
  - Chronic kidney disease, page 112.
  - Coronary heart disease, page 142.
  - Chronic heart failure, page 100.
  - High cholesterol levels are associated with stroke while cholesterol reduction reduces stroke risk within 12 months of commencing therapy (see Dyslipidaemia, page 210).
  - Overweight and obesity in adults, page 260.
  - Smoking cessation, page 44.
  - Alcohol reduction, page 4.
  - Atrial fibrillation which is associated with high risk of recurrent stroke and treatment with anticoagulant medications substantially reduces this.

- It is important to check for these complications along with calculation of absolute cardiovascular risk using the CVD risk tool (see Appendix 2: Australian cardiovascular risk charts, page 494).

- Reducing cardiovascular risk requires regular assessment and control of blood pressure and lipids.

- Table 1. provides target values for those with co-morbidities.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
</table>
| Lipids            | • LDL-C < 2.0 mmol/L  
                    | • TC < 4.0 mmol/L  
                    | • HDL > 1.0 mmol/L  |
| Blood pressure    | • < 140/90  
                    | • < 130/80 for those with diabetes and renal disease  |
| BMI               | • 18.5 - 24.9  |
| Random BGL        | • < 5.5 mmol/L  
                    | • HbA1c < 7%  |
| Waist circumference| • Men < 94 cm  
                    | • Women < 80 cm  |
3.2 Support client self management

- Discuss the importance of how to prevent further strokes and TIAs by way of lifestyle modification (see Lifestyle modification section)
- Provide relevant stroke and TIA resources (see Resources 1)
- Discuss early warning signs for immediate medical attention (and phoning 000) by using the acronym FAST
  - F - Facial weakness
  - A - Arm and/or leg weakness
  - S - Speech difficulty
  - T - Time to act fast
- Discuss the need for blood pressure and blood glucose monitoring and control
- Discuss the risk factors for stroke and TIA such as: history or family history of vascular disease, hypertension, obesity, dyslipidaemia, physical inactivity, atrial fibrillation, excessive alcohol and smoking
- Encourage the client to identify barriers to adequate lifestyle modification and medical adherence and create goals to overcome those barriers based on their individual capacity and understanding

3.3 Social emotional support

- Depression is the most common mood disorder after a stroke and often resolves within a few months without antidepressants or active management
- Generalised anxiety and agoraphobia are the most common anxiety disorders following a stroke
- Depression and anxiety can be screened for by using a self- or clinician-rated mood scale (see Resource 2. for examples). Rating scales should be supplemented by a clinical assessment by a suitably qualified clinician to make a diagnosis
- Acknowledge any client concerns and reassure them that good adherence to appropriate treatment can improve the symptoms of their condition
- The client should be encouraged and supported to
  - be as independent as is feasible and safe
  - participate in leisure and productive activities
  - re-engage in family and community roles
  - seek medical approval to return to driving (if appropriate)
  - access the wider community
  - maintain quality relationships with family and friends, including sexual relationships
- The Rural Stroke Outreach Service can provide an appropriate tool to guide this process as needed (see Resource 3)
3.4 Carer support
• Caring for a stroke client is a source of carer stress and burden
• Provide the carer with resources to assist with their own needs (see Resources 4)
• Ensure carer is supported and engaged in service coordination
• Refer carers in remote areas to available carer support services
• Carers may experience isolation and abuse if client has become violent or agitated
• Referral to respite allows carers to have a break and enables clients to stay in their home longer (see Resource 5)

3.5 Smoking cessation
• Smoking increases the risk of stroke due to narrowing of blood vessels and changes in blood dynamics
• The risk of stroke from smoking disappears 5 years after giving up cigarettes
• Refer to the MO/NP and the Quitline for smoking cessation support (see Resource 6)
• See Smoking cessation, page 44

3.6 Diet and nutrition
• Dehydration and malnutrition are common after a stroke due to swallowing impairment, immobility and communication difficulty, leading to increased complications and mortality
• Encourage the carer to make preferred fluids and foods available and provide supervision during meals
• A diet high in fruit, vegetables and oily fish reduces the risk of further strokes
• Refer to a speech therapist to assess for any swallowing impairment
• Refer to a dietitian to assist with malnourished clients
• See Diet and nutrition, page 14

3.7 Alcohol reduction
• Excessive alcohol consumption increases the risk of subsequent strokes
• Limit alcohol intake to 1 - 2 standard drinks per day
• Refer to Alcohol, Tobacco and Other Drugs (ATODs) to support alcohol reduction (see Resource 7)
• See Alcohol reduction, page 4

3.8 Physical activity
• Physical activity has a protective effect against stroke
• Cardiovascular deconditioning occurs as a result of immobility after a stroke
• Fitness training for stroke clients can lead to improved blood pressure and reduction in cardiovascular risk
• 40 minutes of moderate physical activity on most days of the week should begin once sufficient strength returns\(^3\)

• See Physical activity, page 26

3.9 Falls prevention

• 79% of all clients are at risk of a fall after a stroke with 7% of all stroke clients having had a documented incident\(^3\)

• Screen for individual falls risk (see Resource 8)

• Review medications and minimise sedatives especially benzodiazepines

• Refer to a physiotherapist and a balance and strength group

• Refer to an occupational therapist to assess whether home modifications are required to minimise slip and fall hazards

3.10 Rehabilitation

• Stroke rehabilitation involves multidisciplinary tailored interventions, usually including an occupational therapist, starting the first day after a stroke to maximise a person’s functionality in their community\(^3\)

• All clients will be screened and assessed for cognitive, sensorimotor, physical and communication deficits shortly after the acute incident and tailored interventions will be documented and implemented in consultation with the client and carer\(^3\)

• Amount and intensity of rehabilitation should be at least 1 hour of active practise per day, 5 days per week, within the first 6 months after the stroke event\(^3\)

• Encourage clients, carers and/or family to continue rehabilitative interventions while the client is at home

• Some practical rehabilitation interventions are shown in Table 2.\(^3\)

<table>
<thead>
<tr>
<th>Table 2. Stroke rehabilitation prompts for client, carer and/or family(^4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weakness</strong></td>
</tr>
<tr>
<td>• 70% present with arm or leg weakness</td>
</tr>
<tr>
<td>• Referral to physiotherapist who will facilitate therapeutic strategies</td>
</tr>
<tr>
<td>• Repetitive resistance exercises, muscle contractions and strength training</td>
</tr>
<tr>
<td><strong>Loss of sensation</strong></td>
</tr>
<tr>
<td>• 50% have some sort of sensory deficit</td>
</tr>
<tr>
<td>• Sensory specific training for focused tasks e.g. training to recognise hot or cold water in the context of testing tap water temperature</td>
</tr>
<tr>
<td>• Touching of various materials to parts of the body including water, sand, play dough and various textured objects</td>
</tr>
<tr>
<td>• Lifting small weights, bouncing balls, pushing and skipping</td>
</tr>
<tr>
<td>• Rocking chairs, swings, spinning, rolling</td>
</tr>
<tr>
<td>• Swimming, tying shoelaces, building blocks, transferring</td>
</tr>
</tbody>
</table>

(continued)
Table 2. Stroke rehabilitation prompts for client, carer and/or family (continued)\textsuperscript{1,3}

<table>
<thead>
<tr>
<th>Activities of daily living</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occupational therapy referral</td>
</tr>
<tr>
<td>• Task specific training</td>
</tr>
<tr>
<td>• Assistance of aids e.g. eating utensils, walkers, alarms, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Upper limb activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Repetitive practise to use upper limbs</td>
</tr>
<tr>
<td>• Practise in front of a mirror</td>
</tr>
<tr>
<td>• Mechanical assistance e.g. upper limb strengthening devices and exercises</td>
</tr>
<tr>
<td>• Mental practise</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standing up from sitting and remaining standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Repetitive practise with or without assistance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Repetitive practise</td>
</tr>
<tr>
<td>• Use of a treadmill</td>
</tr>
<tr>
<td>• Physically positioning client’s feet</td>
</tr>
<tr>
<td>• Use of foot-ankle orthotics for those with persistent foot drop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Practising to sit and reaching beyond arm’s length with assistance or supervision</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unilateral spatial neglect (failure to respond to stimuli or move towards one side)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Modification of client’s environment to favour dominant side</td>
</tr>
<tr>
<td>• Training to visually scan an environment</td>
</tr>
<tr>
<td>• Drawing attention to and activating the affected limb</td>
</tr>
<tr>
<td>• Touching the limb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apraxia (impaired planning and sequencing of movement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Physically guide limbs through particular movements</td>
</tr>
<tr>
<td>• Break tasks into smaller steps</td>
</tr>
<tr>
<td>• Verbalising the actions</td>
</tr>
<tr>
<td>• Touch and apply weight to the limbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dysarthria (difficulty speaking due to poor mouth muscle strength) and dyspraxia (impai</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Referral to a speech pathologist who will facilitate therapeutic strategies</td>
</tr>
<tr>
<td>• Oral muscle exercises</td>
</tr>
<tr>
<td>• Repetitive practise speaking</td>
</tr>
<tr>
<td>• Prompting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aphasia (inability to speak) and dysphasia (impaired ability to speak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Referral to a speech pathologist who will facilitate therapeutic strategies</td>
</tr>
<tr>
<td>• Encourage other forms of communication e.g. writing or via electronic medium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dysphagia (difficulty swallowing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Referral to a speech pathologist who will facilitate therapeutic strategies</td>
</tr>
<tr>
<td>• Support safe swallowing by positioning and altering food and fluids</td>
</tr>
<tr>
<td>• Monitor eating, diet intake and tolerance</td>
</tr>
<tr>
<td>• Weight loss and recurrent chest infections need urgent referral to MO/NP</td>
</tr>
</tbody>
</table>
Table 2. Stroke rehabilitation prompts for client, carer and/or family (continued)\(^1,3\)

<table>
<thead>
<tr>
<th>Hemianopia (visual field loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Affects 33% of stroke victims</td>
</tr>
<tr>
<td>• Referral to an ophthalmologist who will facilitate therapeutic strategies</td>
</tr>
<tr>
<td>• Therapy may include vision restoration therapy, attentional cueing, Fresnel Prism glasses and computer based visual restitution training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agnosia (inability to recognise sounds, smells, body parts or objects)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Help client to use their intact senses</td>
</tr>
<tr>
<td>• Use labels, shapes, distinct features and verbal reasoning</td>
</tr>
<tr>
<td>• This is particularly important for dangerous household items e.g. stove</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory and executive functioning (initiation of behaviour, planning and problem solving)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Memory games and tasks</td>
</tr>
<tr>
<td>• Repetition of behaviours or activities</td>
</tr>
<tr>
<td>• Use of notebooks, digital organisers and alarms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory, attention and concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Repetitive attention tasks e.g. games (cards, match, fish), cooking</td>
</tr>
<tr>
<td>• Memory training using alerts, calendars or diaries</td>
</tr>
</tbody>
</table>

3.11 Oral hygiene
- Physical weakness, dysphasia, lack of coordination and cognitive problems can lead to poor oral hygiene\(^3\)
- All clients should have education to maintain good oral hygiene or carers should be trained to assess and manage oral hygiene (see Dental caries and periodontal disease, page 162)

3.12 Contracture prevention
- Contracture is a shortening of soft tissues that results in poor range of motion (ROM) of the affected limb and impaired movement\(^3\)
- People with severe weakness are at most risk because the joint or muscle is not moved or lengthened regularly
- Early tailored rehabilitation intervention should be provided for clients at risk of contractures

3.13 Pain management
- Shoulder pain commonly develops after a stroke and is usually managed with shoulder strapping and education to prevent trauma\(^3\)
- Central post stroke pain (CPSP) is a burning pricking sensation made worse by touch, water or movement and can be managed with tricyclic antidepressants or anticonvulsants prescribed by the MO/NP or a specialist pain management team\(^3\)
3.14 Oedema
- Immobile clients are at risk of developing swelling of the feet or hands due to weakness and an inability to move.
- Management to prevent or reduce swelling include: pressure garments, electrical stimulation, continuous passive movement and elevation of limbs when resting.

3.15 Fatigue
- Fatigue that is unrelated to exertion levels and not relieved by rest, occurs in most clients after a stroke.
- The client and carer should be supported to improve sleep patterns and to avoid sedatives and excessive alcohol.
- Any therapy should be arranged for periods of the day when the client is most alert.

3.16 Urinary and faecal incontinence
- Urinary and faecal incontinence is common after a stroke due to weakness and cognitive or perceptual impairments.
- Refer all incontinent clients to a continence advisor or continence nurse for specialist review.
- For confirmed urinary incontinence:
  - a continence management plan should be developed, documented, implemented and monitored with the client and carer.
  - indwelling catheters should be avoided except with acute urinary retention.
  - use of anticholinergic drugs can be trialled for urge incontinence.
  - use of a voiding regime to assist with bladder retraining should be trialled.
  - use of continence aids e.g. urinary pads, pants, uridomes, etc.
  - For confirmed faecal incontinence:
    - a bowel habit retraining regime should be employed using the type and timing of a client’s diet to exploit the gastro-colic reflex i.e. the urge to defecate after food.
  - use of continence aids.
- If continence is not achievable then refer eligible clients to Medical Aids Subsidy Scheme (MASS) to access continence aids (see Resource 9).

3.17 Behavioural change
- Personality and behavioural changes are common after a stroke e.g. irritability, aggression, apathy, disinhibition, impulsivity, lack of insight and rapid mood changes (sudden switch between crying and laughing) (see Resource 10).
- These changes can contribute to significant carer burden and stress.
- Provide client and carer access to personality and behavioural change programs to support management of challenging behaviour e.g. anger management or cognitive behaviour therapy (CBT).
3.18 Deep vein thrombosis (DVT) and pulmonary embolism (PE)

- Reduced mobility, stroke severity, age, dehydration and delayed stroke prevention activities are associated with DVT and PE which account for nearly a third of all deaths after a stroke.
- Mobilisation and adequate hydration should be encouraged
- Antiplatelet therapy is used to prevent DVT and PE (see 4. Medications)
- Antithrombotic therapy and antithrombotic stockings are not recommended for the prevention of DVT and PE.

3.19 Pressure area care

- Age, stroke severity, immobility, incontinence, nutritional status and diabetes are contributing factors to localised tissue damage due to pressure, shearing or friction.
- Clients should be assessed for the risk of developing pressure ulcers using The Waterlow Pressure Ulcer Risk Assessment Tool (see Resource 11)
- Management of pressure ulcers involves
  - addressing contributing factors above
  - wound care
  - use of pressure beds, mattresses or cushions
  - regular mobilisation and repositioning.

3.20 Obstructive sleep apnoea (OSA)

- OSA occurs in 32% - 80% of clients following a stroke.
- Measure the client’s daytime sleepiness by performing the Epworth Sleepiness Scale (see Resource 12)
- If they score highly refer to a sleep specialist to exclude OSA
- Weight reduction and continuous positive airway pressure (CPAP) therapy are the accepted effective treatments for OSA.

3.21 Palliation support

- Palliative care should be considered in all clients where the possibility of significant deterioration is high
- In conjunction with the client and the multidisciplinary team arrange for a visiting physiotherapist and/or occupational therapist for home assessment and other supports such as wheelchairs and bedding
- Assess impact of the client’s function on employment, finances, family routines and emotions
- Feelings of grief and loss need to be anticipated from the time of diagnosis to death. Grief and bereavement counselling should be available to clients, family and carers.
- A conference with involved clinicians and the family can provide an opportunity to discuss end-of-life issues.
- The use of advance care planning (i.e. enduring powers of attorney and/or advanced...
health directives) will assist the client retain some control over their care and personal lives.

- Refer eligible clients to Home and Community Care (HACC) services and Medical Aid Subsidy Scheme (MASS) (see Resource 13)

4. Medications

4.1 Acute stroke

- For initial therapy for acute TIA or stroke refer to the current edition of the *Primary Clinical Care Manual (PCCM)*

4.2 Secondary prevention of further TIA or stroke

- Antihypertensives
  - recommended for the prevention of recurrent stroke and other vascular events in persons who have had an ischaemic stroke
  - this benefit extends to persons with or without a history of hypertension
  - ACE inhibitors are most effective
  - alternatives include calcium channel blockers and low dose thiazide diuretics
  - beta blockers appear ineffective in preventing stroke

- Antiplatelet agents
  - recommended for clients with non-cardioembolic ischaemic stroke or TIA to reduce the risk of recurrent strokes and TIAs
  - there are 3 antiplatelet drugs commonly used; aspirin, clopidogrel and combination aspirin and dipyridamole (Asasantin®)
  - Aspirin or combination low dose aspirin and extended-release dipyridamole (200 mg twice a day) are recommended for secondary prevention of stroke, regardless of absolute risk of recurrent stroke
  - Aspirin and dipyridamole combination should be considered in clients with recurrent stroke events despite aspirin therapy
  - Clopidogrel is equally effective for clients where aspirin is contraindicated or not tolerated

4.3 Anticoagulation

- For ischaemic stroke or TIA clients with persistent or paroxysmal (intermittent) atrial fibrillation, anticoagulation with adjusted dose warfarin (target INR range 2.0 - 3.0) or a novel oral anticoagulant medication (e.g. rivaroxaban) is recommended to prevent cardioembolic clots

- Monitor INR levels (2.0 - 3.0) using Table 3. as a guide

- For those with AF who have had a TIA or stroke, reassess annually whether they should be anticoagulated weighing the benefits and risks using the Cotswold Heritage and Detecting Society (CHADS²) score for risk of further thromboembolus and HAS-BLED score to assess risk of bleeding (see Resource 14)
Table 3. Warfarin dosing regime for INR target range of 2.0 - 3.0\(^*\)

<table>
<thead>
<tr>
<th>INR</th>
<th>Dosage adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.5</td>
<td>• Increase weekly dose by 20%</td>
</tr>
<tr>
<td>1.5 - 1.9</td>
<td>• Increase weekly dose by 10%</td>
</tr>
<tr>
<td>2 - 3</td>
<td>• No change</td>
</tr>
<tr>
<td>3.1 - 3.9</td>
<td>• No change</td>
</tr>
<tr>
<td></td>
<td>• Recheck in one week</td>
</tr>
<tr>
<td></td>
<td>• If persistent, decrease weekly dose by 10 - 20%</td>
</tr>
<tr>
<td>4 - 4.9</td>
<td>• Omit one dose</td>
</tr>
<tr>
<td></td>
<td>• Decrease weekly dose by 10% - 20%</td>
</tr>
<tr>
<td></td>
<td>• Recheck INR in 2 - 5 days</td>
</tr>
<tr>
<td>INR 5 - 9 and no bleeding</td>
<td>• Cease warfarin</td>
</tr>
<tr>
<td></td>
<td>• If bleeding risk high give vitamin K 1 - 2 mg orally or 0.5 - 1 mg IV</td>
</tr>
<tr>
<td></td>
<td>• Check INR in 6 - 12 hours</td>
</tr>
<tr>
<td></td>
<td>• Resume lower dose of warfarin once INR &lt; 5</td>
</tr>
<tr>
<td>INR &gt; 9</td>
<td>• Cease warfarin</td>
</tr>
<tr>
<td></td>
<td>• Seek senior medical advice</td>
</tr>
<tr>
<td></td>
<td>• Refer to the Guidelines for Warfarin Management in the Community (see Resource 15)</td>
</tr>
</tbody>
</table>

\(^*\)Dose modification is required for clients with mechanical heart valves as the target INR range is higher (2.5 - 3.5)

4.4 Client warfarin education

• Many medications interact with warfarin. The MO/NP or pharmacist should review every client on warfarin before starting or stopping other medications, vitamin supplements, herbal or over-the-counter products

• Always take the same brand of warfarin tablets

• Take warfarin tablets at about the same time every day

• Inform a doctor if a painful, purplish, bruise-like rash develops

• Use a booklet to tick the days after taking a dose so that any missed doses can easily be identified

• Warfarin is affected by vitamin K which is found in certain foods e.g. green leafy vegetables. Eat a normal, balanced diet without dramatic changes, to keep intake of vitamin K stable

• Avoid drinking large amounts of cranberry juice as this may increase the effects of warfarin

• Ensure clients have appointments for regular blood tests in case the dose of warfarin needs adjusting and ensure they have been advised of the next dose to take when the test result is known
4.5 Generic client anticoagulation education

- Avoid excessive alcohol consumption
- Client or carer to inform other health care professionals they are taking warfarin
- Refer client to the MO/NP if they feel unwell for
  - unexplained bruising or bleeding
  - pink, red or dark brown urine
  - red or black faeces
  - bleeding from gums or nose
  - dizziness
  - trouble breathing or chest pain
  - severe headache
  - unusual pain or weakness
  - dark, purplish or mottled fingers or toes
  - vomiting or coughing up blood or
  - excessive menstrual bleeding

Many medications interact with warfarin. The MO/NP or pharmacist should review every client on warfarin before starting or stopping other medications, vitamin supplements, herbal or over-the-counter products.
Table 4. Medications for stroke and TIA\textsuperscript{1,6,8,9}

<table>
<thead>
<tr>
<th>Class</th>
<th>Suggested drug and dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For the prevention of a stroke or TIA in high risk people</strong></td>
<td></td>
</tr>
<tr>
<td>Antiplatelet</td>
<td>- Aspirin 75 - 150 mg daily</td>
</tr>
<tr>
<td></td>
<td>- Aspirin is cheap and effective</td>
</tr>
<tr>
<td></td>
<td>- Clopidogrel 75 mg daily</td>
</tr>
<tr>
<td></td>
<td>- For use when aspirin is not tolerated or is contraindicated</td>
</tr>
<tr>
<td>Anticoagulant</td>
<td>- Recommended for clients with atrial fibrillation, cardioembolic stroke from valvular heart disease or recent myocardial infarction, unless contraindicated</td>
</tr>
<tr>
<td></td>
<td>- The new oral anticoagulants (NOACs) are alternatives to warfarin in clients without a prosthetic heart valve or significant valvular disease</td>
</tr>
<tr>
<td></td>
<td>- Warfarin 5 mg daily for 2 days then titrated to INR 2 - 3</td>
</tr>
<tr>
<td></td>
<td>- Rivaroxaban 20 mg once daily (15 mg once daily if CrCl 30 - 49 mL/min, don’t use if &lt; 30 mL/min)</td>
</tr>
<tr>
<td></td>
<td>- Apixaban 5 mg twice daily (2.5 mg twice daily if at least 2 of: weight &lt; 60 kg, age &gt; 80 years or serum cr &gt; 133 umol/l. Don’t use if &lt; 25 ml/min)</td>
</tr>
<tr>
<td></td>
<td>- Dabigatran 150 mg twice daily (110 mg twice daily if age &gt; 75 or CrCl 30 - 50 mL/min, don’t use if &lt; 30 ml/min)</td>
</tr>
<tr>
<td><strong>For those who have had an ischaemic stroke or TIA - as above as well as the following</strong></td>
<td></td>
</tr>
<tr>
<td>Antiplatelet (preferred)</td>
<td>- Combined dipyridamole/aspirin 200/25 mg b.d.</td>
</tr>
<tr>
<td></td>
<td>- Recommended as secondary prevention</td>
</tr>
<tr>
<td></td>
<td>- Use clopidogrel 75 mg daily for clients intolerant of aspirin</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>- See Hypertension, page 228</td>
</tr>
<tr>
<td></td>
<td>- Recommended for all clients after stroke or TIA, regardless of hypertension history</td>
</tr>
<tr>
<td></td>
<td>- Beta blockers are not recommended</td>
</tr>
<tr>
<td>Statins</td>
<td>- See Dyslipidaemia, page 210</td>
</tr>
<tr>
<td></td>
<td>- Recommended for all clients after ischaemic stroke or TIA, regardless of lipid history</td>
</tr>
<tr>
<td><strong>For central post stroke pain (CPSP) - a trial of medications should be considered when CPSP interferes with functional tasks</strong></td>
<td></td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>Amitriptyline 10 - 25 mg at night, up to 75 - 100 mg at night</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>Gabapentin 100 - 300 mg daily, slowly increase up to 2400 mg daily</td>
</tr>
<tr>
<td></td>
<td>Pregabalin 75 mg daily, slowly increase up to 300 mg twice daily</td>
</tr>
<tr>
<td></td>
<td>Carbamazepine 50 mg daily, slowly increase up to 300 mg twice daily (Carbamazepine has many drug interactions)</td>
</tr>
<tr>
<td>SNRIs</td>
<td>Duloxetine 30 mg daily, up to 60 g daily</td>
</tr>
<tr>
<td></td>
<td>Venlafaxine 75 mg daily up to 150 mg daily</td>
</tr>
<tr>
<td><strong>For those who have had a haemorrhagic stroke or TIA, as above except antiplatelet (aspirin) and anticoagulants are contraindicated and lipid lowering therapy is not necessary</strong></td>
<td></td>
</tr>
</tbody>
</table>
5. Care plans

### Table 5. Care plan for clients at high risk of stroke or TIA

<table>
<thead>
<tr>
<th>Action</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse</td>
<td>3 mth then 12 mthly</td>
</tr>
<tr>
<td>TIA screen</td>
<td>3 mthly or as indicated by condition</td>
</tr>
<tr>
<td>Stroke prevention education</td>
<td>3 mthly (or as indicated by condition) then 12 mthly</td>
</tr>
<tr>
<td>CHADS² score</td>
<td>If AF present then annually</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>Each visit</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>Recommended. See the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>3 mthly (or as indicated by condition) then 12 mthly</td>
</tr>
</tbody>
</table>

### Table 6. Care plan for post stroke or TIA clients

<table>
<thead>
<tr>
<th>Action</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure</td>
<td>Within 1 mth of discharge or first presentation post stroke then 3 mthly or as condition indicates</td>
</tr>
<tr>
<td>BMI</td>
<td>12 mthly or as condition indicates</td>
</tr>
<tr>
<td>Weight</td>
<td>12 mthly or as condition indicates</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>12 mthly or as condition indicates</td>
</tr>
<tr>
<td>Fasting blood lipids</td>
<td>12 mthly or as condition indicates</td>
</tr>
<tr>
<td>Fasting blood glucose</td>
<td>12 mthly or as condition indicates</td>
</tr>
<tr>
<td>INR</td>
<td>Wkly until stable then as per MO</td>
</tr>
<tr>
<td>Assess falls risk</td>
<td>As client situation changes</td>
</tr>
<tr>
<td>Client education</td>
<td>Within 1 mth of discharge or first presentation post stroke then 3 mthly</td>
</tr>
<tr>
<td>Carer support</td>
<td>Each visit</td>
</tr>
<tr>
<td>Lifestyle modification</td>
<td>Each visit</td>
</tr>
<tr>
<td>Social emotional wellbeing</td>
<td>Each visit</td>
</tr>
<tr>
<td>Influenza vaccine</td>
<td>Recommended - see the current edition of the <em>Australian Immunisation Handbook</em> for schedule</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
</tr>
<tr>
<td>Dentist</td>
<td>12 mthly</td>
</tr>
<tr>
<td>HW/RN R/V</td>
<td>3 mthly</td>
</tr>
<tr>
<td>MO/NP R/V</td>
<td>6 mthly</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>At the discretion of the physiotherapist</td>
</tr>
<tr>
<td>Speech pathologist</td>
<td>At the discretion of the speech pathologist</td>
</tr>
<tr>
<td>Dietitian</td>
<td>At the discretion of the dietitian</td>
</tr>
</tbody>
</table>
6. References


7. Resources