IMPROVING ADHERENCE IN GLAUCOMA

A MANUAL FOR PHARMACISTS

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**Introduction**

**One key to successful management of glaucoma is adherence and persistence to prescribed medication**[1, 2].

Medication can effectively prevent visual loss from occurring in glaucoma patients[1]. However, effective treatment of glaucoma and preservation of vision requires a high level of adherence. Like many chronic asymptomatic diseases glaucoma has poor patient adherence[2]. It is estimated that at least one third of glaucoma patients do not take their medication as prescribed[3].

In response to this, Glaucoma Australia in association with UTS: Pharmacy, part of the Graduate School of Health at The University of Technology Sydney has developed “Improving Adherence in Glaucoma - A Manual for Pharmacists”. This manual provides pharmacists with an understanding of glaucoma and raises awareness of the issues affecting patient adherence to glaucoma medications. Furthermore, it aims to help pharmacists develop strategies to identify and address adherence issues, in order to achieve optimal patient outcomes.

Pharmacists are well-positioned to play a primary role in improving adherence to glaucoma medications[4]. Moreover, literature supports the efficacy of pharmacist-led interventions in improving the detection and management of chronic conditions as well as improving patient adherence[5, 6].

This toolkit outlines the role of the pharmacist in improving patient adherence to glaucoma medications. Specifically, how pharmacists can detect and assess glaucoma medication non-adherence and implement patient adherence strategies into everyday practice.
Module 1: Understanding Glaucoma

What is Glaucoma?

One key to successful management of glaucoma is adherence and persistence to prescribed medication[1, 2].

Optic nerve damage progresses slowly and destroys vision gradually, initially affecting the peripheral vision (Figure 1)[1]. One eye compensates for the other, and the person remains unaware of any problem until a majority of nerve fibres have been damaged, and a large part of vision has been permanently destroyed[1]. Patients lose 35% and sometimes as much as 50% of their optic nerve fibres before their visual field shows the earliest pathological changes[9].

![Figure 1: 'Normal Vision' (above) and 'Glaucoma Vision' (below). Source: Dr A Hoste](image1)

In most people this damage is due to an increased ocular pressure (IOP) inside the eye resulting from aqueous fluid build-up within the eye[1]. The increase in pressure occurs when there is a blockage of the circulation of aqueous fluid around the eye, or drainage from the eye into the blood stream (Figure 2)[1]. The trapped fluid increases the pressure inside the eye, which in turn presses on the optic nerve, resulting in irreversible damage[1, 7].

Other causes of damage to the optic nerve can be attributed to poor blood supply to the vital optic nerve fibres, and/or an underlying pathology with the optic nerve or nerve fibres themselves[1].

![Figure 2: With increased resistance to outflow (due to physical obstruction or sub-optimal outflow function) the IOP rises until the rate of outflow equals the rate of inflow. Source: Glaucoma Australia](image2)
It is estimated that the probable time to progress to blindness from open angle glaucoma with treatment is 35 years\(^1,7,9,10\). In contrast, untreated or non-adherent patients can progress to blindness within 23 years\(^10\). A study investigating the prevalence of blindness in glaucoma patients found that 15% of patients with glaucoma were blind in both eyes and 26% were blind in one eye\(^10,11\).

Unlike other restorative cells in the body, nerve cells in the brain or the eye cannot be repaired or replaced once they are damaged\(^12\). As a result, vision lost from glaucoma is irreversible and no present treatment can restore it. Current treatment can prevent disease progression, therefore early detection and adherence to treatment is essential for all patients\(^1\).

**ONCE OPTIC NERVE DAMAGE OCCURS IT CANNOT BE REPAIRED:**
Explain sensitively to patients the risk of visual loss with glaucoma so that they understand the importance of treatment.

**TREATMENT IS PREVENTATIVE:**
Ensuring that patients understand the purpose of treatment will reinforce the benefits of using their medicine.

**ADHERENCE TO LIFELONG TREATMENT IS CRITICAL TO PREVENT VISUAL LOSS:**
Educate, encourage and support patients on the importance of remaining adherent to treatment.

**Glaucoma in Australia**

Glaucoma is the second leading cause of blindness globally\(^13\). It is estimated that over 300,000 Australians currently have glaucoma, with data suggesting that up to 50% of glaucoma cases are undetected\(^14\).

In Australia, glaucoma accounts for 3% of visual impairment, and 14% of blindness in people aged 40 and over\(^15\). Due to Australia’s ageing population, the prevalence of glaucoma will continue to rise, resulting in annual government glaucoma costs increasing from $1.9 billion in 2005, to $4.3 billion by 2025\(^16\).

**PHARMACISTS CAN PLAY A ROLE IN INCREASING DETECTION RATES:**
By increasing community awareness and recommending that all patients over the age of 50 undergo at least 2 yearly eye health checks; earlier if risk factors are identified e.g. those with a family history of glaucoma should begin these eye checks at the age of 35.
Risk Factors

There is a strong body of evidence that has established the risk factors for glaucoma development and progression\(^1\). Apart from raised IOP, advancing age, for example is a major risk factor for the development of glaucoma as it affects one in ten Australians over the age of 80 years. Current evidence strongly indicates that people over the age of 50 years should undertake regular ocular health checks\(^1\).

Family history of glaucoma puts an individual at greater risk of developing the disease\(^1^7\). The 22% lifetime risk of glaucoma is almost ten times greater in first-degree relatives, such brothers, sisters, fathers and mothers\(^1\). It is recommended that first-degree relatives undergo a full ocular examination five to ten years earlier than the age of onset of glaucoma in their relative\(^1\).

Comorbidities including type two diabetes mellitus and myopia (short-sightedness) are associated risk factors for the development of glaucoma \(^1\). In addition, migraine headache and peripheral vasospasm have been identified as risk factors for progressive glaucomatous optic nerve damage\(^1\).

ENCOURAGE FAMILY MEMBERS TO BE SCREENED EARLY:

First degree relatives should undergo ocular examination 5-10 years earlier than the age of diagnosis of their relative. If the age of diagnosis is unknown, begin these eye checks at the age of 35.

Long-term corticosteroid use is the main cause of drug-induced secondary glaucoma\(^1^8\). Corticosteroids administered by any route can cause an increase in IOP. The risk of developing glaucoma however increases with a higher dosage, route of administration (ocular drops/intraocular injection more than systemic use) and the susceptibility of the patient to corticosteroid-induced hypertension\(^1^8\). For patients exposed to these risk factors it is recommended that IOP measurement occurs at baseline, then routine pressure measurements taken every few weeks initially, then every few months\(^1^9\).

Medications with anticholinergic effects such as oxybutynin, tricyclic antidepressants and SSRI/SNRI have been reported to cause cases of bilateral acute angle closure which is an ophthalmic as well as a medical emergency\(^1\). These medications should be used with caution in patients with angle closure glaucoma however can be used safely in open-angle glaucoma\(^1\). See Angle Closure Glaucoma (pg.10) for more information about medication-induced angle closure.
Diagnosis

An authorised eye health professional can investigate and make a diagnosis of glaucoma. A collaborative approach to patient diagnosis and management between optometrists and ophthalmologists is the usual practice in Australia. Assessment includes a comprehensive medical history identifying potential risk factors, a full eye examination investigating IOP, visual field assessment, pupil reactivity, anterior chamber examination, gonioscopy (to determine the depth of the anterior chamber angle), optic disc assessment, optic and retinal nerve examination\(^1\). Diagnosis is usually determined by IOP, visual field loss and optic disc characteristics as outlined in Table 1.

Table 1: Characteristics that Determine Diagnosis

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>OPTIC DISC</th>
<th>FIELD VISION</th>
<th>IOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocular Hypertension</td>
<td>Normal</td>
<td>Normal</td>
<td>&gt;21mm Hg</td>
</tr>
<tr>
<td>Glaucoma Suspect</td>
<td>Suspicious</td>
<td>Suspicious</td>
<td>Any level of IOP</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>Cupped pathologically</td>
<td>Abnormal glaucoma pattern</td>
<td>Any level of IOP</td>
</tr>
</tbody>
</table>

UNDERSTANDING THE DIAGNOSIS

- Open angle glaucoma is the most common form of glaucoma in Australia.
- Raised IOP is not part of the definition, but an important risk for damage and its reduction is a vital aspect of management.
- You can have ocular hypertension but not glaucoma.

Classification of Glaucoma

Open Angle Glaucoma

Primary open-angle glaucoma (POAG) is the most common form of glaucoma accounting for approximately 80% of cases\(^1\). POAG is generally symptomless in its early stages and it is not until significant neuronal damage has occurred that characteristic visual loss is observed\(^1\).

An increased IOP is generally seen in patients with POAG, however one-third of patients will have an IOP within normal range\(^1\). POAG is generally bilateral and is associated with an anterior chamber angle that is open by gonioscopic appearance (Figure 3)\(^1\).

Figure 3: A slice through two eyes shows an open angle where the iris is not touching the trabecular meshwork and a closed angle where the iris is touching the trabecular meshwork. Source: Dr L Liu
**Angle Closure Glaucoma**

**Primary Angle Closure Suspect (PACS)** is the narrowing or partial closure of the anterior chamber angle without raised IOP nor signs of anterior eye damage (Figure 3)\(^1\). **Primary Angle Closure (PAC)** is the next progressive step where the patient shows signs of anterior eye damage (drainage angle scars and/or raised IOP)\(^1\). When optic nerve damage and visual field loss occurs, the eye is deemed to have progressed from primary angle closure to **Primary Angle Closure Glaucoma (PACG)**\(^1\).

**Acute Angle-Closure attacks** occur when the pressure inside the eye rapidly increases due to the iris blocking the drain\(^1\). Precipitants include physiological or pharmacological pupil dilatation\(^1\). Pupil dilation can result in pupillary block, where the iris and lens contact at the pupillary boarder – triggering an acute angle-closure attack\(^20\). Symptoms include pain, nausea, blurred vision and redness of the eye. If these symptoms should occur **immediate medical help** should be sought as delayed treatment can result in permanent visual damage that can occur rapidly\(^1\).

---

**COUNSELLING PATIENTS ON MEDICATION INDUCED ANGLE CLOSURE:**

- A large number of over-the-counter and prescription medications have been linked with acute angle closure crisis and/or raised intraocular pressure (Appendix 1).

- Both local (ocular drops, nasal and nebulised agents) and systemic drugs (e.g. atropine, adrenaline, ephedrine, some antidepressants and over- the- counter anti-cold medications which contain vasoconstrictives/adrenergics) can induce angle closure.

- Pharmacists should be aware of the potential of these medications causing acute angle closure and counsel individuals who are identified as being at risk of angle closure (hypermetropia, narrow angle, thick lens).

- At risk patients should be advised to avoid these medications and/or educate patients of the symptoms associated with angle closure (blurred vision, eye pain, nausea, red eyes).

- However many individuals are unaware that they have these risk factors.

- One distinguishable factor that could indicate high risk is those patients wearing thick hyperoptic glasses that magnify objects.

- The diagnosis of acute angle closure may be missed in patient requesting/using over the counter anti-cold medications which contain vasoconstrictives/adrenergics because symptoms like red eye, ocular pain, and headache may be mistaken as symptoms associated with upper respiratory tract infections.

- Onset of visual difficulty and the presence of a semi dilated pupil may be clues to an attack of acute angle closure.

- Any patient presenting with signs or symptoms of angle closure (blurred vision, eye pain, nausea, red eyes) should be referred immediately to an ophthalmologist.
Ocular Hypertension

Ocular hypertension (OHT) is consistently or recurrently elevated IOP (greater than 21 mmHg) in the absence of clinical evidence of optic nerve damage or visual field. Ten per cent of patients with ocular hypertension will progress to POAG within five years. The mean probability of progressing to POAG becomes greater with increasing IOP levels. Conversion time to POAG from ocular hypertension is significantly shorter for individuals not undergoing treatment.

Quality of Life

How a disease affects a person’s Quality of Life (QoL) is often an important aspect for patients. Consequently, it is vital to understand what aspects of QoL are affected by glaucoma. Currently it is not known at what stage of glaucoma QoL starts to deteriorate, although as glaucoma damage becomes more severe patients can experience increasing problems with their daily activities. Studies utilising the Glaucoma QoL-15 questionnaire (GQL-15) found that patients with glaucoma have a significantly poorer glaucoma-related quality of life when compared to controls. This depressed QoL was detected even in the earlier stages of the disease.

Many aspects of glaucoma can result in serious negative health outcomes. Research has found that visual field loss is the primary vision component that increases the risk of falls and hip fractures. Furthermore, patients with glaucoma are over three times more likely to have experienced a fall in the previous year than patients without glaucoma.

The loss of peripheral vision also affects a person’s ability to drive safely. Studies have found that patients with glaucoma who have moderate to severe visual field impairment are up to three times more likely to have a motor vehicle collisions and over four times more likely to have been at fault than were patients with no visual impairment.

Furthermore, depression is more common in patients with increasing glaucoma severity. Both patient age (70 to 79 years) and GQL-15 summary score were found to be independent risk factors for depression. Although depression is common in the geriatric population, detecting and referring patients experiencing depressive symptoms for appropriate treatment may improve QoL.

ASSESS PATIENTS FOR THEIR RISK OF FALLS:
In the context of other medical conditions, age, medications, living situation, and previous history of falls.

REMIND PATIENTS ABOUT SAFE DRIVING:
Patients must continue to have annual eye checks and consider safe driving techniques (e.g. driving in daylight only).

REFER PATIENTS WHO ARE EXPERIENCING SYMPTOMS OF DEPRESSION
If depression is suspected, ask patients or carers about general mood, sleeping patterns, appetite changes, anxiety and refer patients to their GP if symptoms are of concern.
Practice Points:

• Inform patients that glaucoma is progressive and can lead to irreversible blindness unless treated.

• Remember that people over 50 years of age are at moderate risk, and those over 80 years of age are at high risk of developing glaucoma. Pharmacists should encourage patients to undergo regular screening for glaucoma in patients over the age of 50 years at least every 2 years.

• Educate patients on the genetic nature of glaucoma and encourage all first-degree relatives to undergo a full ocular examination and receive ongoing monitoring for the development of glaucoma. Screening should occur five to ten years earlier than the age of onset of glaucoma in their relative. If the age of diagnosis is not known, begin eye checks at the age of 35.

• Pharmacists should monitor patients that are long-term users of corticosteroids (particularly ocular steroids for > 4 weeks) and encourage baseline and monthly IOP checks while on therapy (especially if they have additional risk factors such as family history).

• Patients with glaucoma are over three times more likely to have experienced a fall - evaluate elderly glaucoma patients for their risk of falls by assessing current medications (antidepressants, antihypertensives, antipsychotics, sedatives, nitrates, etc.), medical history (hip replacement, Parkinson’s disease, stroke, COPD, previous falls etc.) and their degree of visual impairment.

• Acute Angle-Closure presents as a severe acute attack of pain, nausea, blurred vision, blurred cornea, unresponsive pupil and redness in the eye. If these symptoms should occur seek immediate medical help.

• Inform patients about Glaucoma Australia as a support service and the availability of free glaucoma information (in multiple languages) and any glaucoma support groups. Glaucoma Australia can be contacted on: 1800 500 880 or by visiting www.glaucoma.org.au

Learning Outcomes

• Describe the pathophysiology and the progressive nature of glaucoma

• Understand the risk factors for developing glaucoma

• Recognise the genetic nature of glaucoma

• Understand the different types of glaucoma

• Recognise the impact of glaucoma on the patients quality of life
Glaucoma Management

Management is often a challenge for glaucoma patients and healthcare professionals. In the same way as many other chronic diseases, glaucoma has poor patient adherence: it is estimated that at least one third of glaucoma patients do not take/use their medication as prescribed[3]. This is largely attributed to the chronic, asymptomatic nature of the condition which requires frequent use of multiple medications that may cause adverse effects[3]. As a result, pharmacists play a pivotal role in the management of patients with glaucoma. Evidence indicates that there are three components that have a positive effect on improving adherence when used in practice[3] and as a consequence, pharmacists are well-placed to implement these: (1) Information; about glaucoma, (2) Medication Advice; self-instillation techniques (Appendix 2), storage (Appendix 3) and managing adverse events (Appendix 7), (3) Ongoing Support; individualised behavioural strategies to improve adherence (Module 2).

The goal of managing patients with glaucoma is to lower intraocular pressure (IOP), which remains the major modifiable risk factor for progression[1]. Lowering IOP has been shown to reduce the risk of the progression of visual field loss and optic disc changes[28]. Long-term clinical trials completed in 2001 have provided strong evidence that lowering IOP prevents progression at both the early and late stages of the disease[7, 29]. Specifically lowering the IOP by 25% or more has been shown to inhibit progression of POAG[17, 28]. Studies have found that with each 1mmHg reduction in IOP there is a 10% risk reduction in progression[7]. Furthermore, treatment can reduce the relative proportion of the population converting from ocular hypertension to POAG by 50%(28).

Due to the established importance of lowering IOP it is recognised as the primary goal of treatment with the desired outcomes of preservation of visual function and maintenance of quality of life[28]. IOP can be lowered by three treatment options: pharmacologic therapy, laser therapy, and/or surgery. The choice of initial therapy depends on the diagnosis (Open Angle, Angle Closure, Ocular Hypertension), severity of disease (IOP level, visual field loss), prognosis, and should include discussion of the relative risks and benefits of each option with the patient[1].

PHARMACISTS CAN PROVIDE:

1. Information about glaucoma.
3. Ongoing Support: individualised behavioural strategies to improve adherence (Module 2).
Collaborative Care of Glaucoma Patients

A patient diagnosed with glaucoma is usually under the care of an ophthalmologist. Other health care professionals involved in the care of glaucoma patients include optometrists, general practitioners and pharmacists.

1. **Optometrist** usually makes a provisional diagnosis of glaucoma and refers the patient to an ophthalmologist (alternatively a GP referral). Authorised optometrists may make other arrangements, including independent diagnosis and management.

2. **Ophthalmologist** performs a definitive diagnosis and develops a management plan for the patient (follow-up and medication management).

3. **General Practitioner** assesses the patient for any potential cardiovascular or respiratory risks prior to initiating therapy.

4. **Pharmacists** provide (1) **Information**; about glaucoma, (2) **Medication Advice**; self-instillation techniques (Appendix 2), storage (Appendix 3) and managing adverse events (Appendix 7), (3) **Ongoing Support**; individualised behavioural strategies to improve adherence (Module 2).

There are multiple “links in the chain” at which patient understanding can be improved, and their overall management enhanced. Pharmacists are a critical link in the chain of glaucoma management.
Remind Patients to Have Regular Eye Check-Ups

It is critical to assess if IOP targets are being achieved and to monitor evidence of glaucoma progression in order to provide a basis for continuing or altering the glaucoma management plan[1]. The patient’s risk profile, disease state and capacity to self-manage dictate the frequency of review[1]. Even so, general eye check-ups are required for all patients; the following outlines the recommended review frequency[1]:

Newly Diagnosed and Patients Who Have Undergone Significant Changes in Treatment:
- Assess 2-3 times per year in the first two years[1]
- 1-2 times per year thereafter depending upon other risks signs and symptoms[1]

All Other Glaucoma Patients:
- Annually[1]

Glaucoma Medications

Topical medication is the first management choice for most patients with glaucoma[1]. Topical medications reduce IOP by enhancing aqueous outflow and/or reducing aqueous production[1]. There are five classes of glaucoma medications: Prostaglandin Analogues, Beta-Blockers, Alpha2-agonists, Carbonic Anhydrase Inhibitors and Cholinergic Agonists. These medication classes differ in their modes of action; the side effects and contraindications of which are outlined in Table 2.
## Current Medication Algorithm

Table 2: Medications Currently Available in Australia to Treat Glaucoma\(^1\)

<table>
<thead>
<tr>
<th>Preparation by Class and Generics (Brand)</th>
<th>Mechanism of Action</th>
<th>Efficacy</th>
<th>Daily Dosage</th>
<th>Wash-out period*</th>
<th>Order of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prostaglandin Analogues</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>latanoprost 0.005%</td>
<td>Increase aqueous outflow</td>
<td>25-30%</td>
<td>1x</td>
<td>4-6 weeks</td>
<td>FIRST</td>
</tr>
<tr>
<td>(Xalatan(^5), APO-Latanoprost(^6), Chem mart Latanoprost(^6), Latanoprost Actavis(^6), Latanoprost Pfizer(^6), Latanoprost Sandoz(^6), Terry White Chemists Latanoprost(^6))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>travoprost 0.004%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Travatan(^5))</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>bimatoprost 0.03%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Lumigan(^5), Lumigan(^5) PF(^x))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tafluprost 0.0015% 0.3 mL unit doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Saflutan(^5))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Beta-Blockers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Selective Agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>timolol 0.25%, 0.5%</td>
<td>Decrease aqueous production</td>
<td>20-25%</td>
<td>1x to 2x</td>
<td>2-5 weeks</td>
<td>FIRST</td>
</tr>
<tr>
<td>(Timoptic XE(^5), Tenopt(^6), Timoptic(^5))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>timolol 0.1% Eye Gel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Nyogel(^5))</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta 1 - Selective Agents</td>
<td></td>
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</tr>
<tr>
<td>betaxolol 0.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Betoptic(^5), BetoQuin(^5))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>betaxolol 0.25% Suspension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Betoptic S(^5))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proprietary-Fixed Combinations</td>
<td>As for individual components</td>
<td>25-30%</td>
<td>As for individual components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------</td>
<td>--------</td>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>brimonidine 0.2%/timolol 0.5%</td>
<td>2x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Combigan®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dorzolamide 2%/timolol 0.5%</td>
<td>2x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Cosopt®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>travoprost 0.004%/timolol 0.5%</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(DuoTrav®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>latanoprost 0.005%/timolol 0.5%</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Xalacom®, Latanocom®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brinzolamide 1%/timolol 0.5%</td>
<td>1x to 2x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Azarga®)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>bimatoprost 0.03%/timolol 0.5%</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(Ganfort®, Ganfort® PF)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Alpha2-Agonists</th>
<th>Increase aqueous outflow and decrease aqueous production</th>
<th>20-25%</th>
<th>2x to 3x</th>
<th>1-3 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>brimonidine 0.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(Alphagan®, Enidin®)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>brimonidine 0.15%</td>
<td></td>
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<tr>
<td>(Alphagan® P)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>apraclonidine 0.5%</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>(Iopidine®)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Carbonic Anhydrase Inhibitors</th>
<th>Decrease aqueous production</th>
<th>15-20%</th>
<th>2x to 3x</th>
<th>1 week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dorzolamide 2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Trusopt®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brinzolamide 1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Azopt®, BrinzoQuin®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systemic*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetazolamide 250mg</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cholinergics (Miotics)</th>
<th>Increase aqueous outflow</th>
<th>20-25%</th>
<th>3x to 4x</th>
<th>3 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilocarpine 1%, 2%, 4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Minims®, Pilop®)</td>
<td></td>
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</tr>
</tbody>
</table>

SECOND

SECOND

THIRD

THIRD
PHARMACIST ASSESSMENT OF GLAUCOMA MEDICATIONS:

1. Is this the patient’s first glaucoma treatment?
   - First line treatment is usually a Prostaglandin analogue or a Beta-Blocker.
   - If not, did previous treatment fail due to non-adherence?

2. Does this patient take more than one glaucoma medication?
   - Is a fixed-dose combination available?
   - If not, ensure the patient waits at least 5 minutes between each instillation.
   - If different ophthalmic formulations are being used, solutions should always be used before other formulations, such as gels and suspensions (to optimise absorption).

3. What other medications is this patient taking?
   - Monoamineoxidase Inhibitor therapy: Alpha-adrenergic agents are contraindicated (Module 3).
   - Is the patient currently on a complex regimen? Can the prescribed regimen be incorporated into the current regimen? (e.g. B.D dosing of eye drops should occur with B.D. dosing of other medication).

4. Current medical conditions
   - Asthma: timolol contraindicated (non-selective beta-blocker) (Module 3).
   - Chronic heart failure: Beta-blockers should be used with precaution (unless under specialist supervision) (Module 3).
   - Kidney Stones: Carbonic anhydrase inhibitors are contraindicated.

5. Does the patient have any allergies?
   - Sulfonamide allergy: Carbonic Anhydrase Inhibitors are contraindicated.

6. Ease of administration
   - Does the patient have arthritis, Parkinson’s Disease, or poor dexterity? Will they require a Dose Administration Aid (DAA) (Module 2).

7. Does the patient wear contact lenses?
   - Patients need to remove their contact lenses and wait 15 minutes after administering eye drops before replacing contact lenses.

8. Is the patient pregnant or breastfeeding? Or planning on becoming pregnant?
   - These medications are passed through the placenta as well as into the breast milk; women should inform their health care provider if they are pregnant, breastfeeding or are trying to conceive.
Initiation of Treatment

It is important for pharmacists to recognise that the “one eye control” trial may be recommended when treatment is initiated. If this is the case, pharmacists should advise patients that the initial topical medication management should commence in one eye only, using the other eye as a control to check for therapeutic response. Pharmacists should refer patients back to their eye health care professional within two to six weeks to check the response to lowering the IOP. In addition, pharmacists should also discuss with patients their adherence as well as checking instillation technique (See Module 2).

Recent evidence has found wide IOP variations between a patient's eyes, suggesting fewer benefits from the “one eye control” trial\[30\]. As a result, some eye health professionals may prefer a binocular drug trial where the change in IOP is compared to baseline measurements\[30\]. Nevertheless, pharmacists need to be aware that both methods are used in practice and clear instruction about initiation of treatment is always required.

Due to the efficacy and once daily dosing, there is general consensus\[1\] that prostaglandin analogues or topical beta-blockers are first line therapy for most glaucoma patients although prostaglandins are increasingly used as first choice treatment due to the IOP potency, lack of systemic effects, and fewer installations\[22\]. When patients cannot tolerate (e.g. adverse effects) or have contraindications (e.g. reversible airways disease) to either of these medications, they should be offered one of the other topical medications.

Combination Treatment

Monotherapy fails to achieve a satisfactory IOP reduction in 40-75% of glaucoma patients after two years of therapy\[22\]. If a drug fails to reduce IOP sufficiently despite good adherence to therapy, it can be replaced with an alternate agent. Combination therapy may be appropriate when a single medication is effective in lowering IOP but the target pressure is not reached\[1\]. Fixed-combinations (Table 2) improve patient adherence through convenience and can also have cost savings\[1\]. Currently all available fixed combination eye drops contain timolol with another IOP lowering agent (Table 2). At the present time no specific combination of medications has been identified as preferable to another.

1. **ENSURE SIMPLE DAILY REGIMEN:** Usually a prostaglandin analogue
2. **“ONE EYE CONTROL” TRIAL:** Commencing in one eye only for 2-6 weeks
3. **ASSESS ADHERENCE AND REFER WITHIN 6 MONTHS:** Visit their eye health professional to assess efficacy
4. **FIXED DOSE COMBINATION:** Indicated when target IOP is not reached despite good adherence
Adverse Effects

Hyperaemia (red, stinging eyes) is one of the most common adverse effects noted in ocular hypotensive therapy and although it is usually mild and of short duration, it can prove particularly troublesome if it becomes persistent\(^3\). In addition to local adverse effects, a substantial systemic absorption takes place through the highly vascularised nasal mucosa which can lead to systemic side effects\(^31\). Table 3 outlines the most common local and systemic adverse effects for each class of glaucoma medication. Further details about side effects related to glaucoma medications and strategies to overcome these adverse effects are explained in further detail in Module 2 (pg. 48).

<table>
<thead>
<tr>
<th>CLASS</th>
<th>COMMON ADVERSE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostaglandin Analogues</td>
<td>Changes in eye colour and eyelid skin colour, stinging, blurred vision, eye redness, itching, burning.</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>Low blood pressure, reduced pulse rate, fatigue, shortness of breath; rarely: reduced libido, depression.</td>
</tr>
<tr>
<td>Alpha2 Agonists</td>
<td>Burning or stinging, fatigue, headache, drowsiness, dry mouth and nose, relatively higher likelihood of allergic reaction.</td>
</tr>
<tr>
<td>Carbonic Anhydrase Inhibitors</td>
<td>Topical: stinging, burning, eye discomfort. Oral: tingling hands and feet, stomach upset, memory problems, depression, frequent urination.</td>
</tr>
</tbody>
</table>

Laser Therapy and Surgical Interventions

There is increasing interest in using laser techniques (laser trabeculoplasty) earlier in the glaucoma management hierarchy. Evidence supports the use of laser therapy as first choice intervention in angle closure and for specific patient groups with severe Primary Open Angle Glaucoma (POAG) or very high IOP\(^30\). Surgery (Trabeculectomy) remains the gold standard in successfully lowering IOP. The risks of surgery often outweigh the benefits resulting in medications as first line, followed by trabeculoplasty and trabeculectomy\(^30\).
Practice Points:

- Patients may be managed by numerous health care professionals. Remind patients about regular eye check-ups, including their optic nerves. Help patients manage their prescriptions if they are being written by multiple HCPs. Ensure that the patient is not taking duplicates of the same medication.

- Due to potential efficacy and once-daily usage, a topical prostaglandin analogue is usually the first choice, unless contraindicated. When more than one agent is required, fixed-dose combinations should be considered to encourage improved adherence.

- Always check for adherence when dose is increased and/or a new agent has been added and continue this strategy over time.

- Some patients may be initiated on the “one eye control” trial, where medications are initiated in one eye only, using the other eye as a “control”. In these cases, reassess IOP within 2-6 weeks before treating the other eye. If there is no apparent effect check for adherence.

- Be alert for interactions and side effects: local and/or systemic. Patients often consult pharmacies with a red eye ‘conjunctivitis’- a drug-induced allergic reaction can occur with many topical glaucoma agents.

- Provide ongoing tailored information to reinforce a patient’s understanding of glaucoma and realistic goals of treatment.

- If you are concerned about the patient’s current level of management, communicate with other health care professionals involved in the patient’s care in order to strengthen the links in the chain of glaucoma management.

Learning Outcomes:

- Discuss the goals of therapy
- Understand the shared care pathway in glaucoma management
- Recognise the importance of ongoing care and the role of pharmacists in glaucoma management
- Understand the medications used in therapy
References for Module 1


Module 2:

Strategies for Adherence - Glaucoma

Adherence - The Principles

Concepts and Terminology

Adherence, compliance, concordance and persistence are terms commonly encountered in the literature to describe medication-taking behaviours. Adherence is the preferred term and can be defined as “the extent to which a patient’s behaviour corresponds with agreed recommendations from a health care provider”[4].

The term compliance has come into disfavour as it suggests that a person is “passively following a doctor’s orders, rather than actively collaborating in the treatment process”[4]. Adherence, on the other hand, requires collaboration and patient agreement to the recommendations for therapy[4].

Concordance describes an “agreement reached after negotiation between a patient and a healthcare professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken”[4].

Persistence is defined as the “ability of a person to continue taking medications for the intended course of therapy”[4]. In the case of chronic diseases such as glaucoma, the appropriate course of therapy is usually the person’s lifetime.

Adherence is the single most important modifiable factor that compromises treatment outcome across all diseases[5]. The traditional belief that patients are solely responsible for taking their treatment is often misguided and reflects a lack of awareness into the numerous factors that can affect a person’s behaviour and capacity to adhere to their treatment[5]. Multiple factors affect an individual’s adherence and evidence suggests that it is a combination of these factors which determine adherence[5]. The World Health Organisation has outlined five dimensions/factors which affect adherence (Figure 1)[5]:

![Figure 1: The Five Dimensions of Adherence](image-url)

Reproduced with permission:
World Health Organisation
2003
Non-Adherence: When Does It Occur?

Non-adherence can occur at different stages of therapy (Figure 2), through non-initiation of the prescribed treatment, by sub-optimal implementation of the regimen and by early discontinuation of therapy\(^6\). It is important to note, that although adherence may not be achieved by the patient collecting all dispensed prescriptions, it does not necessarily follow that the medication will be taken or used as prescribed. Therefore discussing adherence regularly with your patient is encouraged throughout all stages of therapy.

Adherence in Glaucoma: How Often Does it Occur?

Medical therapy is a cost-effective strategy that can reduce the need for surgery; however effective treatment of glaucoma and preservation of vision, requires a high level of adherence to medication administration\(^7\). Poor adherence is known to be highly prevalent in chronic, asymptomatic disease such as glaucoma\(^8\). The literature reports similar rates of non-adherence in glaucoma as with other chronic diseases such as cardiovascular disease. It is found that patients are only taking 30% to 70% of prescribed medication doses\(^9\). Furthermore, approximately one-third of people who are prescribed topical anti-glaucoma medications for the first time fail to continue collecting prescriptions within the first year\(^8\).

BE AWARE:

- *Glaucoma Patients are only taking between 30% to 70% of doses.*
- *1/3 of patient’s discontinue therapy in the first year.*
Non-Adherence in Glaucoma: Why Does it Occur?

Reasons for non-adherence are multifactorial and vary from patient to patient. Non-adherence is usually related to the five factors previously discussed: therapy-related, patient-related, condition-related, health system and social/economic factors. Identifying individuals barrier/s related to each of these factors is of vital importance in order to improve patients adherence to therapies\[^5\]. Figure 3 graphically presents the results from a survey of glaucoma patients which identified the common barriers to adherence that glaucoma patients face\[^2\].

**Why are Glaucoma Patients Non-Adherent?**

![Reasons for Non-adherence in Glaucoma Patients](image)

*Patients had difficulty understanding information that was given by their HCP*

**Medication-Taking Behaviour: Glaucoma Patients**

In order to understand the behaviours which determine the level of adherence amongst glaucoma patients, studies have incorporated electronic monitoring devices which identified four different patterns of adherence\[^10\].

- **Fully Adherent**: Patient's take their glaucoma medication as prescribed.
- **Non-Persistent**: Patient's begin taking their medication as prescribed but discontinue treatment.
- **Dosing Holidays**: Patients who abruptly stop taking their medicine for a short time and then restart.
- **Erratic Doses**: Patients who take medicine whenever they remember.

Identifying the adherence pattern is important when trying to understand a patient's adherence behaviour, however it is critical to address the underlying barriers that the patient may face that can precipitate adherence patterns.
Non-Adherence in Glaucoma: The Impact

Non-adherence to glaucoma treatment results in poor patient outcomes and increased health care costs\(^7\). Inadequate adherence can adversely affect an individual’s response to therapy as erratic dosing intervals can diminish the effect of a drug or increase adverse effects\(^{11}\). Furthermore, patients with poor adherence to glaucoma medication have higher rates of glaucomatous damage and visual loss\(^7\). This results in a significant amount of treatment failure which often leads to increased healthcare expenditure due to the unwarranted need to prescribe more potent drugs, more complex therapy regimes and unnecessary dose increases\(^8\). Poor adherence also leads to increases in resource utilisation as treatment failure may necessitate more frequent hospital appointments, diagnostic tests, and an increased risk to the patient if subsequent surgical intervention is required\(^4\).

Typing Non-Adherence: Unintentional or Intentional

As well as identifying the reasons for non-adherence, understanding the patient’s role in non-adherence is a critical factor in developing appropriate pharmacist-led strategies. Non-adherence can be broadly divided into intentional and unintentional non-adherence\(^{12}\). Unintentional non-adherence is characterised by practical barriers, such as the inability to instil eye drops or memory impairment. Whereas intentional non-adherence occurs as a result of a patient’s perceptions and beliefs about a treatment\(^{12}\). For example, patient misbelief that ongoing treatment with eye drops will not help prevent further vision loss.

Figure 4: Patient and healthcare outcomes resulting from poor patient adherence
### Intentional Non-Adherence: Patient Beliefs and Motivations

<table>
<thead>
<tr>
<th>PERCEPTUAL BARRIERS</th>
<th>EXAMPLE</th>
</tr>
</thead>
</table>
| **Patient’s Health Beliefs** | Perceived risks and benefits of treatment – patient may believe the risks of therapy outweigh the benefits.  
E.g. the risks of the adverse effects – stinging eyes, red eyes outweigh the benefits of preventing visual loss. |
| **Lack of Concordance** | Not involving the patient in treatment decision, communication difficulties between patient and physician, poor patient-provider relationship. |

### Unintentional Non-Adherence: Patient’s Ability and Resources

<table>
<thead>
<tr>
<th>PRACTICAL BARRIERS</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complexity of Regimen</strong></td>
<td>The frequency of topical medication instillation, complex instructions.</td>
</tr>
<tr>
<td><strong>Cognitive Barriers</strong></td>
<td>Poor memory.</td>
</tr>
<tr>
<td><strong>Physical Barriers</strong></td>
<td>Poor dexterity - difficulty in administering topical eye drops.</td>
</tr>
<tr>
<td><strong>Patient Education</strong></td>
<td>Lack of knowledge about glaucoma and the importance of treatment in preventing vision loss.</td>
</tr>
<tr>
<td><strong>Patient Lifestyle</strong></td>
<td>Living alone and busy lifestyles have all been associated with a poorer adherence to glaucoma medication.</td>
</tr>
</tbody>
</table>
Non-Adherence: Theory and Practice

FLOWCHART: PUTTING THEORY INTO PRACTICE

This flow chart outlines the practical application of improving adherence in glaucoma patients, discussed in greater detail throughout this module. Through detection (1) and assessment (2) adherence is characterised into non-intentional (3) and intentional (4) non-adherence. Pharmacists must then develop individualised strategies which either increase patient capacity (3b) or address patient’s health beliefs (4b) through utilising the necessity-concerns framework (4c). The patient's readiness to change (3c/4d) directs appropriate intervention and motivational interviewing (5) is utilised throughout the entire practical application.
**Strategies to Improve Adherence**

*(1) Detecting Non-Adherence*

The first step to address patient's non-adherence to medicines is identifying it. There is no ‘gold standard’ for measuring patient adherence, and no single tool to detect all types of non-adherence. Unlike other conditions where adherence can be measured through physiological markers such as blood pressure or blood glucose levels, intraocular pressure measurements are not as accessible to the pharmacist or patient. For this reason relevant measurements for everyday practice include **assessing pharmacy repeat records, patient self-reporting and patient interview**. In combination, they can assist in achieving a reliable measure for assessing patient adherence. Table 1 outlines the pros and cons of the different methods of detecting non-adherence within the pharmacy setting.

**Table 1: The pros vs. cons of detecting non-adherence through pharmacy repeats and patient self-reporting**

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
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</thead>
<tbody>
<tr>
<td><strong>Pharmacy Repeat Records</strong></td>
<td>• An objective, unobtrusive and inexpensive source of information about medicines collecting behaviour.</td>
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**CUES TO INVESTIGATE ADHERENCE:**

- Have missed refilling prescriptions
- Elderly patient
- Patient who does not appear to have a support network
- Have difficulty communicating and/or do not speak English
- Are forgetful or absent minded
- Have cognitive impairment e.g. dementia
- Have a complex regimen
- Have been newly diagnosed with glaucoma
- Are on multiple medications
- Report missed doses/ interruption of use
- Lack knowledge about their glaucoma
(2) Assessing Non-Adherence

Intentional or Non-Intentional Non-Adherence?

In order to determine the type of non-adherence the pharmacist must assess the patient’s individual’s health beliefs about glaucoma and their medications as well as determining if there are practical barriers to adherence.

AN EXAMPLE OF ASSESSING CAPACITY:

Q: How are you going with your eye drops?
A: OK but I am finding it difficult to get the drop into my eye, it always takes me a couple of attempts – and even then I am not sure it is in.

Unintentional Non-Adherence > Dexterity

Q: Do you have any difficulty taking these every day?
A: I always forget to take my morning dose

Unintentional Non-Adherence > Memory

AN EXAMPLE OF ASSESSING BELIEFS:

Q: What do you understand about these eye drops?
A: I don’t think they are necessary- I don’t feel any different after I use them

Intentional Non-Adherence > Perceived Benefits

Q: Do you have any concerns about taking this medication?
A: I don’t like using them- they make my eyes red which disrupts my daily activities

Intentional Non-Adherence > Perceived Risks

Q: Do you feel that these eye drops will prevent vision loss?
A: I don’t think so, my dad had glaucoma and he didn’t lose his vision

Intentional Non-Adherence > Perceived Susceptibility

(3) Unintentional Non-Adherence

There is no evidence to date that indicates that there are any determinants, such as age, race or level of education that can accurately predict potential patients who will not adhere to glaucoma therapy[8]. However, studies have found numerous patient and treatment related barriers to adherence with anti-glaucoma medication, which pharmacists can target for intervention.
(3a) Practical Barriers

**Education**

Improving education is **vital in changing adherence behaviour** amongst glaucoma patients[^4^,^8^]. Studies have found certain factors such as previous knowledge of glaucoma and fulfilled information needs correlate with higher adherence to medication[^13^]. Patients who received an education session had an increased awareness of the consequences of glaucoma and believed that they had additional control over their treatment and course of their disease[^13^].

Studies have also found that patients with the highest adherence rates to glaucoma medications were ‘collaborative learners’, patients who learned most of what they know about glaucoma from their physicians, but also used additional sources of information[^9^]. Lower rates of adherence were seen in ‘doctor-dependent learners’ (learnt exclusively from their physician) and ‘independent learners’ (used other sources of information only[^9^]). These findings highlight the role of pharmacists in providing additional information to glaucoma patients, secondary to their primary physician (GP, ophthalmologist or optometrist) in order to increase confidence in their knowledge and adherence to glaucoma medications.

**PATIENTS LACK KNOWLEDGE ABOUT:**

1. The progression of glaucoma and the potentially blinding nature of the disease.
2. The role of anti-glaucoma medications in preventing disease progression.

**Complexity of Regimen**

Multiple studies have demonstrated that patients remain adherent to **simpler regimens** compared to patients on complex regimens[^8^]. An Australian study reports that of 200 patients with glaucoma, **32% could not state their prescribed therapeutic regimen** and those with three or more prescribed eye drops were five times more likely to be unaware of their medication regimen[^14^]. As a result, fixed-combination drops for patients requiring more than one preparation should preferentially be utilised.

**MEDICATION REGIMEN’S THAT ARE SUBJECT TO POOR ADHERENCE:**

1. Patients taking multiple medications, specifically > 3 eye drops may be unaware of their medication regimen.
2. Medication-naive patients are at risk of discontinuation within the first 30 days of therapy.
Conversely, even the simplest regimes are subject to poor persistence rates. Studies have found that it is medication-naive patients that are prescribed non-oral medicines who were most at risk of discontinuation in the first 30 days of therapy compared with those who were more experienced with medicines. This supports the early pharmacist provision of patient education and support in an attempt to prevent early discontinuation.

**Cognitive Barriers**

Although patients of any age may forget to take their medication, for some older patient’s memory difficulties may be exacerbated by other medications or cognitive dysfunction such as dementia. These patients warrant particular attention in managing adherence.

**Medication Label Legibility**

Approximately 1 in 7 glaucoma patients are unable to read the instructions provided on the pharmacy label. Label illegibility and reduced visual acuity is also correlated with a reduced ability for patients to remember their treatment regimen.

**Dexterity**

Physical barriers such as dexterity play a significant role in non-adherence particularly elderly patients, who suffer comorbidities such as rheumatoid arthritis or tremor. These diseases make eye-drop instillation difficult. In one survey, 27% of glaucoma patients failed to place the drop into the conjunctival sac, and of these, 25% were unaware that they had missed the eye.

**(3b) Increasing Capacity**

**Interactive Educational Training Session**

“I didn’t know that blindness caused by glaucoma was irreversible”

**Provide Verbal Information**

- About glaucoma and their medication (Module 1)
  - Glaucoma can lead to irreversible blindness
  - Treatment is preventative
  - Adherence to treatment is critical to prevent visual loss
- Instillation technique (Appendix 2)
- Storage information (Appendix 3)

**Suggest Online Video’s for Visual Learners**

What is Glaucoma: [http://www.youtube.com/watch?v=wb4tnJZj25E](http://www.youtube.com/watch?v=wb4tnJZj25E)
Instillation Technique: [http://www.youtube.com/watch?v=uY5HLrXo6HE](http://www.youtube.com/watch?v=uY5HLrXo6HE)
Glaucoma Medication Advice: [http://www.youtube.com/watch?v=0f6mbGiWEhw](http://www.youtube.com/watch?v=0f6mbGiWEhw)
Provide Written Information

- Educational brochures, pamphlets, newsletters and glaucoma fact sheets are available from Glaucoma Australia
- Print off the appropriate Consumer Medicines Information for your patient
- Write an Individualised Patient MediList in collaboration with your patient

Individualising Regimen

“I tend to only take my eye drops once a day instead of twice a day”

Fixed Dose Combination

- The benefits of using a fixed dose combination are simplicity, convenience, adherence and potential savings in cost.

Linking Drops To A Daily Activity

- Before bedtime (Once a day)
- After brushing teeth (Twice a day)
- Before/after eating a meal (Three times a day)

PATIENT-TAILORED INTERVENTIONS ARE REQUIRED

The most effective long-term strategies for effective glaucoma management.

Over the long term patients must rely on unassisted effort and self-management to maintain their behaviour.

Reminder Programs

“I can’t keep up with all of these medicines; I have diabetes and hypertension medicines as well!”

Medicines List

- Medilists are very useful for patients on multiple medications or who have cognitive/memory impairment - listing their prescription, OTC and complementary medicines (Appendix 4)

MedicineList+ Smart Phone Application

- The NPS MedicineWise smartphone application is a free, user friendly application to assist patients with their medication adherence.
- The application allows individualised medication lists to be constructed as well a user friendly medication reminder system. Alarms are set according to the medication regimen which allows the application to record patient adherence (Appendix 4).

Eye Pressure Tracker

- This paper based reminder system has a calendar to help patients keep track of doses. It also has a section to record eye pressure and appointment check-up dates (Appendix 4).
Labelling

“I can’t read the label - I am not sure how many drops I am supposed to use”

Simplifying Labels

Reducing the complexity and simplifying the content and layout of prescribed medication labels is improving adherence for patients with visual barriers that could impair the correct administration.\(^4\)
- Pharmacists can offer enlarged print labels to patients who describe difficulty in reading labels (Appendix 5).

“I have to take three different eye drops and I always get confused about which one I am supposed to take”

The Colour Coding System

- Patients who have more than one eye condition often use several drops every day and may become confused about which drops to instil.

The American Academy of Ophthalmology (AAO) working in conjunction with the FDA developed a colour-coding system to overcome patient confusion and medication misuse. http://www.glaucomaassociates.com/medications.html

REMEMINDER:

Leave a five minute gap between instillation of different eye drops to ensure no wash out of the previous eye drop occurs.

After each instillation ensure patients replace the bottle cap on the correct bottle to avoid confusion.
**Dose Administration Aids**

“I find it very difficult to use that tiny bottle, I have arthritis!”

**Dose Administration Aids (DAA) Can Help Patients Who Complain Of:**

- Missing the eye with the drop
- Blinking as the drop is delivered
- Difficulty in squeezing the bottle to deliver the drop

Table 2 outlines the medications that can be used in the three different DAAs available in Australia. For more information about DAAs and counselling tips see Appendix 6.

<table>
<thead>
<tr>
<th>DAA</th>
<th>MEDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xal-Ease™</td>
<td>Xalacom®</td>
</tr>
<tr>
<td></td>
<td>Xalatan®</td>
</tr>
<tr>
<td>Alcon Eyot™ 5ml</td>
<td>Betoptic®</td>
</tr>
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**Alternate Strategies for Administration Difficulties**

Shaky Hands:
- Attempt approaching the eye from the side by resting your hand on your face which will help steady your hand.

Trouble Getting the Drop into Your Eye:
- Either turn your head to the side or lay on your side and close the eye you want to put a drop into. Place a drop in the inner corner of your eyelid (the side closest to the bridge of your nose). By opening your eyes slowly, the drop should fall right into your eye.
- If you aren’t sure that you are getting the drop into your eye, try placing the bottle in the fridge before use. You will be able to tell where the drop ended up since it will be cool.
Trouble Holding Onto the Bottle

- If the eye drop bottle feels too small to hold, try wrapping something (like a paper towel) around the bottle. This may be helpful in some mild cases of arthritis.

(3c) Readiness to Change

Behaviour change is rarely a discrete, single event, it is better described as a process of identifiable stages through which people pass\(^{[16]}\). The Stages of Change model describes five stages of readiness (Figure 6)\(^{[17]}\) – pre-contemplation, contemplation, preparation, action, and maintenance. The Stage of Change model provides a useful framework for understanding how ready a patient is to change their behaviour. By identifying a patient’s readiness to change, interventions can then be individualised to effectively implement behaviour change (Table 3)\(^{[16]}\).

For most people behaviour change occurs gradually over time, with the person progressing from being uninterested, unaware, or unwilling to make a change (pre-contemplation), to considering a change (contemplation), to deciding and preparing to make a change (preparation)\(^{[18]}\). People can move in both directions in the stages of change process. Most people will “recycle” through the stages of change several times before the change becomes fully established\(^{[16]}\). Anything that moves a person along the continuum towards making a positive change should be viewed as a success\(^{[18]}\).

TWO MAJOR FACTORS THAT AFFECT A PERSON’S READINESS TO CHANGE:

1. “Importance”
   What value a person places on making the change.
   For example: A person who is newly diagnosed with glaucoma may be confident that they can instil eye drops every day but are not convinced of the importance of this action.

2. “Self-efficacy”
   A person’s belief or confidence in their ability to succeed at making the change.

   For example: A glaucoma patient may be convinced of the importance of taking their eye drops but have a low level of confidence based on previous failure to take medicine regularly.

Figure 6: The Five Stages of Change.
Assessing Readiness to Change

Questions that can elicit a patient's readiness to change

“Are you willing to take these eye drops to prevent vision loss?”

“How do you feel about making these changes in your daily routine?”

“Do you feel comfortable taking your medication at work?”

“Do you think that a Dose Administration Aid will make things easier for you?”

These answers not only identify a patient’s readiness to make changes in their behaviour, they also promote identification and discussion of perceived barriers to change. With this information pharmacists can individualise strategies according to a patient's readiness to change (Table 3, below).

Readiness to change can be evaluated using the “The Readiness-to-Change Ruler”

The Readiness-to-Change Ruler can be used as a quick assessment of a person’s present motivational state relative to changing a specific behaviour, and can serve as the basis for motivation-based interventions to elicit behaviour change, such as motivational interviewing.

THE READINESS TO CHANGE RULER:

“How ready are you on a scale from 1 to 10 to take your glaucoma medication regularly?”

“How important is it for you on a scale of 1 to 10 to take your eye drops every day”

0 1 2 3 4 5 6 7 8 9 10
NOT READY THINKING ABOUT IT READY

I don’t want to take eye drops every day.
I don’t think I need to take these drops.
I have a terrible memory I don’t think it would work anyway.
I know that this medication would benefit my health.
I am interested about learning more about glaucoma.
I don’t take my eye drops enough and I know I need to change this.
What can I do to help me remember to take my eye drops?
### Individualising Strategies For Patients Readiness To Change

Table 5: Strategies should be implemented according to the patient’s readiness to change

<table>
<thead>
<tr>
<th>STAGES</th>
<th>CHARACTERISTICS</th>
<th>STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-contemplation</strong></td>
<td>The person is not even considering changing.</td>
<td>Educate on positive outcomes related to becoming more adherent to glaucoma medication.</td>
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<td></td>
<td>They may be &quot;in denial&quot; about potential vision loss.</td>
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<td></td>
<td>They may have tried unsuccessfully to change so many times that they have given up.</td>
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<tr>
<td><strong>Contemplation</strong></td>
<td>The person is ambivalent about changing.</td>
<td>Identify patient barriers and misconceptions.</td>
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<td></td>
<td>During this stage, the person weighs benefits versus barriers (e.g., time, expense, adverse effects).</td>
<td>Address concerns by suggesting ways to overcome patient barriers (managing ADR, simplifying regimen).</td>
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<td>Identify Glaucoma Australia as a patient support network.</td>
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<tr>
<td><strong>Preparation</strong></td>
<td>The person is prepared to experiment with small changes.</td>
<td>Develop realistic goals and timeline for change.</td>
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<td></td>
<td>Provide positive reinforcement.</td>
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<tr>
<td></td>
<td></td>
<td>Ensure regular follow-up.</td>
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<tr>
<td><strong>Action</strong></td>
<td>The person takes definitive action to change behaviour.</td>
<td>Provide positive reinforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure regular follow-up.</td>
</tr>
<tr>
<td><strong>Maintenance and Relapse Prevention</strong></td>
<td>The person strives to maintain the new behaviour over the long term.</td>
<td>Provide encouragement and support.</td>
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</table>
Practice Points:

• At least one third of patients are non-adherent to their glaucoma medication— which accounts for over 10% of the visual loss caused by glaucoma.

• Ask patients if they are having difficulty reading their medication label - 1 in 7 glaucoma patients are unable to read the instructions on the drop bottle.

• Always enquire about adverse effects - hyperaemia (red eyes) is responsible for stopping or switching medication in 63% of patients experiencing an adverse effect.

• Ask the patient to demonstrate their instillation technique - 27% of glaucoma patients fail to place the drop into the conjunctival sac, and of these, 25% are unaware that they had missed the eye.

Non-Intentional Adherence Strategies

• Clearly and correctly label medication with intended dosing in as large a print font size as possible.

• Point out the colour of the cap or the shape and size of the bottles if they are taking more than one eye drop medication.

• If they are having problems aiming or squeezing the bottle, suggest they try a dose administration aid (Appendix 6).

• If remembering is the issue, and the patient has a smart phone, enrol the patient into the NPS medicine wise smartphone application and also suggest they keep their medication somewhere visible such as next to their toothbrush as a reminder.

• Combined medications offer both convenience of using one eye drop bottle instead of two, as well as a financial advantage for some patients.

Learning Outcomes:

• Understand the concept of adherence and the impact of non-adherence

• Understand that adherence to glaucoma medicines in poor

• Recognise the different mechanisms of detecting and assessing patient non-adherence

• Recognise the difference between intentional and unintentional non-adherence

• Understand and recognise the different practical barriers to non-intentional adherence

• Understand that there are multiple strategies that can be implemented to reduce practical barriers to adherence
(3c) Readiness to Change

Behaviour change is rarely a discrete, single event, it is better described as a process of identifiable stages through which people pass\textsuperscript{[16]}. The Stages of Change model describes five stages of readiness (Figure 6)\textsuperscript{[17]} – pre-contemplation, contemplation, preparation, action, and maintenance. The Stage of Change model provides a useful framework for understanding how ready a patient is to change their behaviour. By identifying a patient’s readiness to change, interventions can then be individualised to effectively implement behaviour change (Table 3)\textsuperscript{[16]}.

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(4) Intentional Non-Adherence

Adherence to medicine is largely influenced by patient beliefs and attitudes about their condition\textsuperscript{[4]}. It has been found that patient beliefs concerning their medicines can predict their adherence to a greater extent than socio-demographic or clinical factors\textsuperscript{[4]}. It is therefore critical for pharmacists to understand the principles and models of behavioural change in order to improve adherence\textsuperscript{[5]}. Theoretical constructs of adherence propose that patient behaviour is determined by the balance between beliefs about the threat of the disease and the benefits and burdens of treatments\textsuperscript{[9]}. The health belief model suggests that five key elements determine a patient’s adherence to medicines;

(4a) Perceptual Barriers

**Threat of Illness**
- Patient’s perception of the severity of glaucoma.
- Patient’s perception of how susceptible they are to vision loss.

**Positive Outcome Expectancy**
- Perceived benefits of life long topical therapy.

**Barriers to Using Treatment**
- How the patient judges and balances the expected disadvantages of the treatment (financial, adverse effects, complexity of regimen).

**Intent**
- Patient’s intention to adhere to treatment.

**Self-Efficacy**
- Patient’s belief in their own ability to be adherent to the treatment regimen.
The effectiveness of adherence interventions based on behavioural principles has been demonstrated in many therapeutic areas, including hypertension, headaches, AIDS, cancer and chronic asthma. While patient beliefs about illnesses and medicines have been widely researched in these chronic diseases, only recently have they been assessed in regards to glaucoma.

(4b) Health Beliefs

Beliefs about Illness

Studies have found that adherence is significantly lower in patients who were not concerned about vision loss. These patients did not believe that non-adherence would put them at increased risk for optic nerve damage, increased intraocular pressure, or complete vision loss. Unconcerned patients were less likely to report that someone close to them had lost vision because of eye disease and were more than twice as likely to have missed appointments. Furthermore, patients that believe that glaucoma management is not a priority or that their condition does not warrant assistance have been found to have a fairly poor knowledge of glaucoma.

On the other hand, patients who were exposed to a personalised intervention targeting individual patient beliefs felt that they had more personal control over managing and influencing their glaucoma, and that their own actions could determine the course of their condition.

Beliefs about Medicines

Recent studies have found that patients with poor adherence had more concerns and less belief in the necessity of IOP lowering eye drops. Gray et al found that patients that were exposed to a health belief education intervention had a significantly stronger belief in the necessity of eye drops and significantly less concern about long-term effects, resulting in increased adherence. Whereas the control arm were significantly more concerned about harm and overuse of medicines, resulting in poorer adherence.

Barriers to treatment - Adverse Events

Adverse effects can often be barriers to treatment, especially if patients believe these risks outweigh the benefits of therapy. Hyperaemia is one of the most common adverse effects noted in ocular hypotensive therapy and although it is usually mild and of short duration, it can prove particularly troublesome if it becomes persistent. Hyperaemia is responsible for 63% of adverse effects that require cessation of treatment.

Lack of Concordance:

Lack of concordance has been found to negatively impact the level of adherence to therapy due to poor prescriber communication. Working in concordance and improving patient-doctor relationships is vital in encouraging patient adherence as well as understanding patient’s non-adherence.
These health related beliefs are of particular interest because they are a key component of pharmacist driven adherence interventions and are amenable to be changed\(^5\). Studies have identified the importance of specific beliefs about glaucoma and its treatment and the influence of healthcare provider communication on those beliefs and adherence behaviour\(^5\). There are some useful techniques in assessing and improving intentional non-adherence:

- **Health Beliefs**: Identifies what the patient believes about glaucoma and their medications.
- **Necessity-Concerns**: Identifies how the patient perceives the benefits vs. risks of medication.
- **Readiness to Change**: Identifies how ready the patient is to make a behavioural change.
- **Motivational Interviewing**: Encourages patients to make behavioural changes.

**Health Beliefs - Education Combined With Behavioural Change**

After pharmacists have assessed a patient’s beliefs and their perceived necessity and concerns about glaucoma and its treatment, pharmacists must then educate the patient by **rectifying any misbeliefs**. The **most successful** interventions for providing a positive impact on patient adherence to glaucoma medication combined education and incorporated behavioural change interventions\(^8\). Adherence rates at one year follow-up were 70% in patients who received **individually tailored behavioural and education interventions** compared to 43% in the control group\(^13\). There were three key steps in achieving these improved adherence rates:

1. **Assessment of the individual beliefs and understanding about illness and medications**,  
2. **Addressing patient barriers and beliefs by personalizing therapy and introducing self-management**,  
3. **Interactive educational training session**.

## Assessing Individual Beliefs About Illness

“What do you understand about glaucoma?”

“Do you feel that you are at risk of vision loss?”

## Assessing Individual Beliefs About Medication

“What do you understand about your medication?”

“Do you feel that when you miss your dose you are at increased risk for vision loss?”
**(4c) Necessity-Concerns Framework**

Adherence is influenced by an individual’s perceptions of the necessity and the concerns about their medications and disease\(^2\). Pharmacists must assess the balance between patient’s beliefs about the necessity of pharmacotherapy, as well as their concerns about their glaucoma and their glaucoma-medication. Pharmacists can then help patients make informed treatment decisions based on a clear understanding of likely benefits and risks of treatment rather than by inaccurate beliefs about their illness and the treatment\(^2\). Pharmacist-led strategies should be individualised depending on the patient’s perceived benefits (necessity) and risks (concerns) of treatment with the goal of creating an attitude of “high necessity” and “low concern” about taking their glaucoma medication.

**Primary Concerns for Glaucoma Patients:**

- **Side-effects:** hyperaemia, breathlessness.
- **Disruption of daily activities:** eye drop instillation interrupts the home or work schedule.
- **Not effective:** patients do not have better vision after use.
- **Glaucoma is asymptomatic:** patients often have no symptoms therefore don’t see value in treatment.

---

1. **PATIENT**
   
   **HIGH CONCERN**
   “I am worried about the eye drops- they make my eyes red, I don’t think I should be using these long term”

   **LOW NECESSITY**
   “I don’t think they will improve my vision”

2. **PHARMACIST**
   
   “By taking your medication regularly you are preventing irreversible vision loss from occurring. I understand the redness can be troublesome, but I have some tips and techniques that may help with the redness”

3. **PATIENT**
   
   **HIGH NECESSITY**
   “This medication will prevent vision loss from occurring later in life”

   **LOW CONCERN**
   “After my pharmacist gave me some tips on why and how to administer my eye drops the redness is more tolerable”

---

\(^2\) Clatworthy et al. 2008
Managing Concerns about Adverse Effects

“I don’t think it’s worth it- the drops sting my eyes and delay my morning activities”

Local Adverse Effects

Hyperaemia is one of the most common adverse effects noted in ocular hypotensive therapy and although it is usually mild and of short duration, it can prove particularly troublesome if it becomes persistent[8]. Hyperaemia is responsible for 63% of adverse effects that require cessation of treatment[8]. Benzalkonium chloride (BAK) is the most commonly used preservative in anti-glaucoma medications. However, BAK is toxic to ocular tissue and has the potential to cause adverse effects[20]. Most IOP-lowering medications contain preservatives which can result in hyperaemia (two exceptions- Salfutan and Lumigan PF are preservative free preparations). Prostaglandin analogues are associated with the highest incidence of hyperaemia[8]. Management strategies include:

Switching to an Alternative Agent

Prostaglandin inhibitors display less hyperaemia when switched to another drug in the class[21]

- latanoprost: 5-15%
- travoprost: 25-40%
- bimatoprost: 45%
- tafluprost: 4.1%[22]
- BAK toxicity is mainly dose-dependent, reducing the number of instillations can improve ocular tolerance[23] e.g. prostaglandins and long-acting preparations of timolol are given once rather than twice a day, thus reducing the amount of BAK administered by 50%[23].

Finding the Best Time of Day to Take the Medication

- Changing the administration time may be useful in reducing the severity of this adverse effect.
- Taking eye drops at night before bed may be a more appropriate time and cause less interruption of daily activities.

Switching to a Gentle Preservative Alternative

- The use of less toxic preservatives or preservative-free medications has the potential to improve the management of glaucoma.

Gentler preservative alternatives:

- Travatan® and DuoTrav® – polyquad® preservative
- Travatan Z™ - sofzia™ preservative (available on SAS)
- Alphagan® P - purite® preservative

Preservative free alternative that is available in single-dose units

- Timolol Minims® (available on SAS)
- Saflutan® (tafluprost)
- Lumigan® PF (bimatoprost)
- Ganfort® PF (bimatoprost/timolol) will soon be available in a preservative-free single-dose formulation
Non-Pharmacological

- If applied to the skin of the eyelids before instilling drops, Vaseline can sometimes relieve irritation around the eyes from those drops.
- Cotton tips or a damp tissue can be used, cautiously, to clean around your eyes each morning and evening.

See Appendix 7 for strategies to overcome common adverse effects.

Systemic Adverse Effects

“I feel dizzy after using my eye drops - so I don’t use them in the morning”

A substantial systemic absorption takes place through the highly vascularised nasal mucosa which can lead to systemic side effects\(^{[24]}\). Absorption of drugs directly into the general circulation is rapid and significant - particularly since such absorption gives drugs access to systemic receptors without first-pass hepatic metabolism\(^{[24]}\). Beta-blockers are a generally safe class but can result in serious adverse effects if absorbed systemically responsible\(^{[24]}\). For example: the instillation of one drop of timolol 0.5% may lead to a serum concentration of timolol that equals the intake of a 10 mg tablet\(^{[25]}\). This can result in serious adverse effects such bronchospasm, worsen heart block, decompensate congestive heart failure, or create central nervous system effects in some patients\(^{[24]}\).

Systemic absorption can be reduced by about two-thirds if the patients use appropriate instillation technique (see the “double DOT”: Don’t Open eyes Technique and Digital Occlusion of the Tear ducts). This technique generates higher tear concentrations of instilled drug, enhancing ocular absorption and reducing systemic adverse effects.

If the correct administration technique is being utilised, other alternatives to reducing systemic adverse effects include:

- **Switching to an alternative** agent with lower systemic adverse effects (betaxolol has 4x less absorption than timolol)\(^{[24]}\).
- **Converting to a suspension** (Betoptic S\(^{®}\)) reduces local stinging of betaxolol (Betoptic\(^{®}\)).
- **Gel formulations** significantly reduce systemic absorption (Nyogel\(^{®}\)).

See **Appendix 7** for strategies to overcome common adverse effects.
Instillation Technique

“I am concerned that the medication isn’t working - It’s always running down my cheek”

Inform patients on the appropriate instillation technique, demonstrate this technique and ask patients to recall the technique. Ensure that patients understand that the volume of an eye drop is 50 microlitres and the eye can only hold 30 microlitres therefore much of the dose will be lost from the eye by overflow[26]. Once a drop has been instilled into the eye, only 20% manages to enter the eye[27]. The rest is drained through the nasolacrimal duct or will run down the chin[27], reassure patients that it is normal for medication to run down their face, just as long as they are practising the correct technique.

“DOUBLE DOT” TECHNIQUE

- Advise patients to practice simple eyelid closure (do not blink) AND digital occlusion of the tear duct.
- Post-instillation gently close your eye just once, place the pad of your most sensitive finger at the inside corner of the eyelid by the nose and press gently. Leave the eyelids closed and the finger pressing gently for 2 full minutes.
- Demonstrate instillation techniques, observe patient or carer instilling drops and repeat education till ability to instil has been proven.

Figure 7: The Double DOT Technique: the photo shows both techniques on the same eye. Source: Glaucoma Australia
**TIPS ABOUT TECHNIQUE:**

- **Ask** patients if they can taste their eye drops after they use them. If so the patient is not blocking their tear duct properly. Demonstrate the correct occlusion technique.
- **Ensure** patients are only administering one drop at a time, the volume of an eye drop is 50 microL whereas the eye can only hold 30 microL.
- **Reassure** patients that it is OK if their medication runs down their chin. Only 20% of medication enters the eye, the rest is drained through the nasolacrimal duct or will run down the chin.

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**Motivational Interviewing**

Motivational interviewing is an evidenced-based counselling approach that helps patients to resolve ambivalence and to encourage change in the direction for improved health. It seeks to build the patient’s own intrinsic motivation. Motivational interviewing should be incorporated into the counselling and education session of both **intentional and non-intentional non-adherence**. The READS criteria addresses the five principles of motivational interviewing. In order to carry out the READS criteria described following, there are four basic therapeutic skills or methods used in motivational interviewing:

1. Reflective listening
2. Asking open questions
3. Affirming
4. Summarising
**R.E.A.D.S CRITERIA**

**Roll With Resistance:**
- Do not argue but try to clarify your understanding of their position. If you are not making progress and the client is resisting change, it may be time to take a different approach.
- Perhaps they perceive the situation differently than you do, go back to try and understand how they are viewing the situation.

**Express Empathy**
- Identify with their perceptions and feelings.
- Create a climate of change by building trust.
- “I understand that it is difficult to take eye drops twice a day”.

**Avoid Argumentation:**
- Causes people to reinforce their position and resist change.
- Keep on the patient’s side.
- Power struggles are not helpful. It has to be the patient who expresses reason to change.

**Develop Discrepancy:**
- Help the patient see that there’s a problem in their behaviour.
- How does their current behaviour compare to their ideal?
- Acknowledged the positives and negatives in changing the behaviour, but create some dissonance in their mind.
- Focus on perceived discrepancy between behaviour and their values.
- “I know they are difficult to administer but if we use the eye drop administration aid, you will be using these eye drops more effectively- most importantly- preventing you from losing your vision”.

**Support Self-Efficacy**
- Encourage their perception of themselves as a capable person.
- Affirm their position statements.
- Reinforce the patient’s role as a problem solver.
- Remind them of past success.
- “You have done really well – you are taking your eye drops five times a week, which is a great improvement – what can WE do to improve this further?”
- Encourage their perception of themselves as a capable person.
- Affirm their position statements.

**Adherence Needs To Be Followed Up**

Improving adherence requires a continuous and dynamic process. Strong evidence supports that the key components of adherence interventions were providing reinforcement for patients’ efforts to change, providing feedback and continual follow-up[^5]. Health care providers should be able to assess the patient’s readiness to adhere, provide individualised strategies, and follow up the patient’s progress at every contact[^5].
**Practice Points:**

- Remember that patient beliefs about their medicines predict their adherence more strongly than socio-demographic or clinical factors.

**Intentional Non-Adherence Strategies**

- Discuss with the patient, their Health Beliefs about glaucoma and their medication.
- Use the Necessity Concerns Framework to identify the patients concerns and barriers to safely and effectively taking their medications.
- Have a goal of increasing patient’s necessity and decreasing patients concerns about treatment.
- Develop strategies according to the patient’s “Readiness to Change”.
- Provide Motivational Interviewing according to the READS Criteria.
- Always provide education combined with behavioural change. Patients who receive glaucoma education are more aware of the consequences of glaucoma and believe that they have more control over their treatment and course of their disease.
- Always follow up your patients progress, adherence is ongoing, therefore pharmacists education and interventions must also be consistent.
- If a patient is starting on a prostaglandin inhibitor educate them about the common occurrence of hyperaemia (red eyes), ensure they are aware that it is usually mild and of short duration.
- If the hyperaemia (red eyes) remains consider switching to another prostaglandin inhibitor. It has been found that prostaglandin inhibitors display less hyperaemia when switched to another drug in the class, Latanoprost and Tafluprost (preservative free single dose formulation) have been shown to have the lowest incidence of hyperaemia within the class.
- To minimise the drainage into the nose and throat and systemic side effects patients should be advised on appropriate instillation technique; “double DOT” for 2-3 minutes.

**Learning Outcomes:**

- Recognise that different health beliefs held by glaucoma patients impact their adherence.
- Discuss the different strategies to improve intentional adherence with glaucoma medicines.
- Understand that interventions tailored to patient beliefs are the most effective.
- Address patient beliefs by incorporating behavioural change and motivational interviewing.
References for Module 2


Module 3: 
Implementing Adherence

Mapping Adherence

Pharmacists are well-positioned to play a primary role in improving adherence to glaucoma medications. Managing and maintaining adherence is a dynamic process that needs regular follow-up with patients. A combination of five main factors can influence a person’s adherence to medication - therapy, disease, patient, socio-economic and health care system. These factors may alter over time and therefore it is important to assess a person’s adherence continually throughout the course of therapy. As it is usually a combination of factors that affect medication non-adherence, there can be no “one size fits all” approach to improve adherence: strategies must be individualised for each patient.

Pharmacists may improve outcomes through informing and educating patients about glaucoma, describing proper use of prescribed medications, identifying barriers to treatment adherence and developing strategies to help each patient overcome obstacles to optimise management.

This flow chart describes the cyclic approach to successful glaucoma medication management.
NON-ADHERENCE: Theory & Practice

FLOWCHART: PUTTING THEORY INTO PRACTICE

Firstly through detection (1) and assessment (2) adherence may be non-intentional (3) and/or intentional (4) non-adherence. Pharmacists should develop individualised strategies which either increase patient capacity (3b) or address patient’s health beliefs (4b) through use of necessity-concerns framework (4c). The patient’s readiness to change (3c/4d) directs appropriate intervention; motivational interviewing (5) is used throughout the entire practical application. Practical applications to improve adherence in glaucoma patients are discussed in greater detail throughout Module 2.
Pharmacist’s Role: Glaucoma Management

ASSESSING MEDICATION – INDIVIDUALISING REGIMEN

1. **Simple daily dosing** – Prostaglandin Analogues of Beta-Blockers can be given once a day and are usually first line.
2. **Incorporate dosing** – Use patient’s current regimen or activities (e.g. BD dosing with other oral medications).
3. **Identify drug-drug or drug-disease interactions** – Asthma, COPD, CHF, MAOI, etc.
4. **Identify difficulties with self-administering eye drops** – arthritis, tremor or poor dexterity.

DETECTING NON-ADHERENCE – 1/3 OF GLAUCOMA PATIENTS

- **Who’s at risk:** Everyone, but especially the elderly, cognitively impaired, complex regimen, newly diagnosed patients
- **How to detect:** Patient self-reporting (report missed doses/ interruption of use), patient interview (lack knowledge about their medication/condition; lack realistic expectations from treatment) and repeat records (missed refilling/’MedsIndex’ < 85).

ASSESSING ADHERENCE – UNINTENTIONAL OR INTENTIONAL NON-ADHERENCE

1. **Unintentional:** Practical barriers- dexterity, memory, education, complexity of regimen.
2. **Intentional:** Perceptual barriers- patient beliefs about treatment/glaucoma.

INCREASING CAPACITY – IDENTIFY AND OVERCOME PRACTICAL BARRIERS

1. **Instillation technique** - Including “Double DOT” for 2-3 minutes.
2. **Simplify regimen** - Fixed dose combination, incorporate into daily activities (e.g. brushing teeth.)
4. **Simplify label** - Large font size, clear instructions.
5. **Dose Administration Aid** - If patient has difficulty self-administering eye drops.
6. **Colour code system** - If patient is taking more than one eye drop medication.

MODIFYING HEALTH BELIEFS – BALANCING NECESSITY CONCERNS

1. Help patients make informed treatment decisions.
2. Create an attitude of “high necessity” and “low concern”.

EDUCATION & BEHAVIOURAL CHANGE – MOTIVATIONAL INTERVIEWING & FOLLOW-UP

1. Help patients to understand glaucoma.
2. Educate on the purpose, effects and side-effects of their medication.
3. Prompt attendance to regular eye checks in order to monitor glaucoma progression.
4. Recommend patients contact Glaucoma Australia for information and support.
Management

Detection and Assessment:

Tools to Measure Adherence

An accurate measure of adherence behaviour is necessary to monitor and promote adherence to glaucoma therapy. There are different approaches that can be utilised when measuring adherence:

- **Computerised Measurement**: Pharmacists may use online measurement tools or dispensing programs to measure patient refill adherence.
- **Formal Measurement**: Pharmacists might provide a formal questionnaire to patients outside of the consultation time.
- **Informal Measurement**: Pharmacists may incorporate the measurement tools casually into patient discussions/interviews.

Pharmacists are encouraged to integrate multiple approaches when measuring adherence to gain a more accurate measure of adherence behaviour. The following are examples of tools available to measure adherence and evaluate the impact of adherence interventions:

1. **GuildCare – ‘MedsIndex’ (Medication Possession Ratio)**

   - ‘MedsIndex’ is a component of the GuildCare dispensing program which provides an adherence monitoring system based on patients’ refill intervals, compared with the expected refill intervals (Medication Possession Ratio)\(^4\).
   - The ‘MedsIndex’ score prompts pharmacists to initiate a conversation with the patient about their adherence. If the conversation validates the score, and poor adherence is confirmed, this is a call to action to the pharmacist to explore strategies to address non-adherence\(^4\).
   - ‘MedsIndex’ gives patients an adherence score out of 100 for each of their medicines for chronic conditions.
   - A score of <80 indicates the need for a MedsCheck, dose administration aid or a Home Medicine Review (HMR).

**UNDERSTANDING THE MEDSINDEX?\(^1\)**

*For example – Medicine (30 doses) 1 dose a day:*

- Pack size = 30 doses divided by 1 dose a day = 30 days of medicine
- If the patient’s actual number of days between repeats = 45 days
- THEN the MedsIndex = 30/45 = 67% = MedsIndex 67
2. Adherence Questionnaires

Adherence questionnaires enable pharmacists to measure patient adherence as well as assess the impact of clinical interventions[4].

Morisky Scale[3]

• The Morisky Scale[3] measures beliefs and behavioural factors that underlie non-adherence to medicines.
• The questionnaire is brief and requires only a ‘yes’ or ‘no’ response from the patient[4].
• Patients are considered non-adherent if they answer ‘yes’ to one or more of the four questions[3]

The Morisky Scale[3]

1. Do you ever forget to take your medicine?
2. Are you careless at times about taking your medicine?
3. When you feel better, do you sometimes stop taking your medicine?
4. Sometimes, if you feel worse when you take your medicine, do you stop taking your medicine?

Medication Adherence Report Scale (MARS)[6]

• The MARS is a five-item scale which asks the respondents to rate the frequency with which they engage in each of the five types of non-adherent behaviour.
• All items are rated on a 5-point scale (1 = always and 5 =never).
• The total points are then calculated to show an indication of the patient’s adherence to their medicines.
• Higher scores on the MARS suggest better adherence than lower scores (a score of 25 indicates perfect adherence).

Five MARS Non-Adherent Behaviours[4]

• I forget to take these medicines sometimes.
• I alter the dose of these medicines sometimes.
• I stopped taking these medicines for a while.
• I decided to miss out a dose.
• I take less than instructed sometimes.
Pharmacist-Led Interventions:

Clinical Interventions

A Clinical Intervention (CI) is the process whereby a pharmacist identifies and recommends in an attempt to prevent or resolve a drug-related problem[1]. By participating actively in your patient’s medication management, specifically by improving adherence to glaucoma medications, pharmacists may be eligible to claim for clinical interventions[7]. Clinical interventions include:

1. **Medication-Taking Behaviour** e.g. Improve a patient’s adherence through an education counselling session

2. **Means of Administration** e.g. Provide a dose administration aid to a patient having difficulty administering eye drops. If a DAA is not adequate: inform the patient’s prescriber.

3. **Recommendation for a Change in the Patient’s Medication Therapy** e.g. Make a recommendation to the prescriber: a fixed dose combination or an alternative preservative or a preservative free formulation

**EXAMPLES OF CLINICAL INTERVENTIONS[1]**

- The pharmacist identifies potential over-use or duplication of medicines: e.g. patient is taking generic and branded latanoprost

- The pharmacist identifies a medical condition which may require enhanced therapy or improved medication adherence: e.g. pharmacist identifies patient is only taking their latanoprost three times a week OR the patient has difficulty administering eye drops

- The pharmacist identifies a medication induced adverse effect that requires change to therapy e.g. a consumer requests something to relieve red eye subsequent to the use of a prostaglandin agonist; the pharmacist recommends an alternative agent to the ophthalmologist
**Recording Clinical Intervention: Making It Easier**

GuildCare software is a platform for delivering professional health services such as clinical interventions. Guildcare is integrated with pharmacy dispensing software (FRED Dispense, LOTS Dispense) allowing pharmacists to identify, record and report clinical interventions (paper-based recording is also available).

**Step 1. Select Intervention: “Compliance”**

- Under use: C1
- Over use: C2
- Erratic use: C3
- Intentional drug misuse: C4

**Step 2. Select Recommendations:**

- Drug change: R3
- Dose Schedule/frequency change: R6
- Referral to prescriber: R9
- Education and counselling session: R13
- Written summary of medications: R14
- Dose administration aid: R15

Under the 5th Community Pharmacy Agreement (5CPA) funding requires pharmacists to record CIs in accordance with the D.O.C.U.M.E.N.T. classification system[1]. For more information about eligibility view the guidelines at:


For information about claiming a clinical intervention view the guidelines at:


Alternatively enrol in the Pharmaceutical Society of Australia’s 5CPA Clinical Intervention online learning module:

**Conducting Clinical Interventions:**

**Managing Glaucoma with Comorbid Conditions**

When conducting Clinical Interventions pharmacists should assess glaucoma medications within the context of the patient’s overall list of chronic diseases and medications. For clinical information about *medication-condition related problems* in glaucoma management see Table 1 and for information about *medication-related problems* in glaucoma management see Table 2.

**MedsCheck:**

MedsCheck provides an In-Pharmacy review of consumers medication management, aiming to enhance the quality use of medicines and reduce the number of adverse drug events experienced by consumers[2]. If a patient presents with poor adherence to their glaucoma medications, pharmacists should assess their eligibility for a MedsCheck service.

---

**ELIGIBILITY CRITERIA[2]:**

**IS YOUR PATIENT:**

Newly diagnosed with glaucoma or another condition?

**AND/OR**

Had a recent medical event that has the potential to affect their adherence?

**AND/OR**

Taking 5 or more prescription medications?

---

**Additional Eligibility Criteria[2]:** (current at time of printing)

- Is a Medicare and/or DVA cardholder.
- Has not received a MedsCheck, Diabetes MedsCheck, HMR or Residential Medication Management Review (RMMR) in the last 12 months and is living at home in a community setting.
Carrying Out a MedsCheck for your Glaucoma Patient[2]

1. **Identify** - An eligible consumer (see above criteria).
2. **Discuss** - The service with the consumer and gain informed consent.
3. **Schedule and Prepare** - Request the patient to bring all medicines and devices to the consultation.
4. **Conduct the consultation** - In a screened area or separate room that is distinct from the general public area of the pharmacy.
5. **Claim** - For payment including having the consumer sign and confirm informed consent using the MedsCheck Program Payment Application form and MedsCheck Program Claim Coversheet; and Filing the consultation documentation (www.5cpa.com.au/medscheck > Claiming).

**Conducting MedsCheck: Managing Glaucoma with Comorbid Conditions**

When conducting MedsCheck pharmacists should assess glaucoma medications within the context of the patient's overall chronic diseases and medications. For clinical information about medication-condition related problems in glaucoma management see Table 1 and for information about medication-related problems in glaucoma management see Table 2.

**Home Medication Review:**

Home Medication Review (HMR) is a comprehensive medication review conducted by an accredited pharmacist after referral from the patient's General Practitioner[1]. HMR's are conducted within the patient's home providing a comfortable environment for patients to discuss their concerns and beliefs about their medications. This also allows the assessment of their level of adherence. In addition, the pharmacist can evaluate medication storage and medication duplicates.

Most patients with glaucoma are managed by an ophthalmologist and/or optometrist; unfortunately HMRs cannot be ordered by either of these professionals. Therefore it is critical for pharmacists to incorporate glaucoma medication management into their HMR session. HMR referral can also occur through the MedsCheck route - If a clinical issue cannot be resolved during the MedsCheck, the pharmacist may refer the consumer to their General Practitioner and/or recommend a HMR.

**Carrying Out a HMR with a Glaucoma Patient**

Pharmacists must remember to include the assessment of glaucoma medications and medication non-adherence when completing a HMR. Below are the 5 key actions to undertake when completing a HMR with a patient who suffers glaucoma.
**HMR- 5 KEY ACTIONS**

1. **Asses medication in context of patient’s comorbid conditions (Table 1) and medications (Table 2):**
   - Respiratory disease (asthma, COPD)
   - Cardiovascular disease (e.g. bradycardia, heart failure, hypertension/hypotension).
2. **Assess Storage:**
   - Cool constant temperature, away from direct sunlight.
   - Do not require refrigeration (Appendix 3).
3. **Assess Duplicates**
   - Check remaining repeats/ scripts, current bottles.
   - Check use-by date.
4. **Assess Adherence:**
   - Detect, assess strategy.
   - Map adherence (Module 2).
5. **Education & Behavioural change**
   - According to the patient’s readiness to change.
   - Motivational interviewing.
   - Help patients to understand glaucoma.
   - Educate on the purpose, effects and side-effects of their medication.

**Pharmacist-Led Interventions: In the Context of the Patient’s Overall Health**

When conducting a pharmacist-led intervention (Clinical Intervention, MedsCheck, HMR) pharmacists should acquire comprehensive knowledge about the patient’s current medical conditions, medications and new or existing symptoms. By doing this pharmacists can identify both medication-condition related (Table 1) and medication-related problems (Table 2).

**Medication - Condition Related Problems[^8]**

Glaucoma is an age related disease; as a result elderly patients will often present with comorbidities requiring multiple medications[^8]. Optimising drug therapy is an essential part of caring for an older person and the possibility of an adverse drug event should always be borne in mind when evaluating an older adult individual. Although most medications used to treat glaucoma are in topical formulation, a substantial systemic absorption takes place through the highly vascularised nasal mucosa which can lead to systemic side effects which can have implications with numerous comorbid conditions and medications[^9].
**Table 6 Medication - Condition Related Problems in Glaucoma Management[^8]**

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>POTENTIAL OUTCOME</th>
<th>PATIENT SYMPTOMS</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pulmonary Disease</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Topical Beta-Blockers                    | Bronchospasm      | Dizziness, fatigue, severe asthma attacks, weakness, decreased exercise tolerance | REFER:  
  • Patients on non-selective beta-blockers for consideration of an alternative agent  
  • Patients on selective beta-blockers (e.g. betaxolol) that present with respiratory symptoms for a dose decrease or an alternate agent |
| COPD                                     |                   |                  | PATIENT ADVICE:  
  • Correct instillation technique to decrease systemic absorption (Double DOT, Appendix 2)  
  • May warrant an additional bronchodilator use |
| Asthma                                   |                   |                  |        |
| Topical Beta-Blockers                    |                   |                  | REFER:  
  • Patients who are at risk of hypoglycaemia (insulin-controlled diabetes)  
  • Patients who have a history of hypoglycaemia |

| Diabetes                                 |                    |                  | REFER:  
  • Patients who present with active depressive symptoms for an alternative agent  
  • Seek specialist advice (mental health care professional, GP, ophthalmologist) |
| Topical Beta-Blockers                    | May mask signs and symptoms of impending hypoglycaemia and prolong recovery from low blood sugars[^8] | Low blood sugar levels/readings with no symptoms of hypoglycaemia (e.g. no tachycardia or tremor) | PATIENT ADVICE:  
  • Correct instillation technique to decrease systemic absorption (Double DOT, Appendix 2)  
  • Discuss diabetic control and adherence to both diabetic and glaucoma medication |
| Should be used cautiously in patients with insulin-dependent diabetes[^9] |                   |                  |        |

| Depression                               |                    |                  | REFER:  
  • Patients who present with active depressive symptoms for an alternative agent  
  • Seek specialist advice (mental health care professional, GP, ophthalmologist) |
| Topical alpha2-agonists and Beta-blockers[^8] | Aggravate existing depressive symptoms | Low mood, sleeping difficulties, appetite changes, anxiety | PATIENT ADVICE:  
  • Correct instillation technique to decrease systemic absorption (Double DOT, Appendix 2)  
  • Inform the patient the reason you are enquiring about their depression and advise patients who are experiencing active depressive symptoms to seek specialist advice  
  • Consult patients prior to commencing medications for depression, and periodically during treatment for depression. |

[^8]: Refer to the original source for detailed information and precautions.
[^9]: Additional notes on potential side effects and recommendations for management are provided in the original source.
**Medication Related Problems**[8]

Topical ophthalmic medications may interact with systemic medications specifically within the elderly population where poly-pharmacy and systemic adverse effects are more common e.g. hypotension[8].

### Table 7 Medication Related Problems in Glaucoma Management

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>MEDICATION</th>
<th>POTENTIAL OUTCOME</th>
<th>PATIENT SYMPTOMS</th>
<th>ACTION</th>
<th>PATIENT ADVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topical Beta-Blockers</strong></td>
<td>Hypotensive medications (particularly calcium-channel blockers e.g. verapamil and systemic beta-blockers)[9]</td>
<td>• Combination can reduce BP, cardiac contractility and conduction[10] • Increasing the risk of hypotension, heart failure and/or significant bradycardia[10] • Avoid treatment with verapamil due to potential for profound bradycardia.</td>
<td>Dizziness, fatigue, weakness, decreased exercise tolerance, hypotension</td>
<td>REFER: • May be more significant in elderly patients as hypotension can increase the risk of falls.</td>
<td>• Correct installation technique to decrease systemic absorption (Double DOT, Appendix) • Ensure patients rise slowly from sitting or lying position.</td>
</tr>
<tr>
<td>Timolol</td>
<td>Betaxolol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Alpha-2-agonists** | Monoamine Oxidase Inhibitors are contraindicated[8, 9] Used with caution in patients taking tricyclic antidepressants[9] | • May inhibit the IOP-lowering effect of brimonidine[10] • May result in hypertensive crisis (selegiline)[11] | N/A | REFER: • Prescriber should be contacted and informed about the contraindication, patient should be switched to an alternate glaucoma medication OR antidepressant. • Patients should be referred to their prescriber. | • Inform patient that their doctor may change one of their medications, as the combination is not optimal • Advise patient to see their GP/mental health care professional |
| Brimonidine | Apraclonidine | | | | |

### Pregnancy and Breastfeeding [8, 12]

**Category C:**

"Drugs which, owing to their pharmacological effects, have caused or may be suspected of causing, harmful effects on the human foetus or neonate without causing malformations. These effects may be reversible."[9]

- timolol, betaxolol,

- Pregnancy: Suitable if necessary, may cause fetal bradycardia[12].
- Breastfeeding: Unlikely to cause adverse effects at usual doses.
- timolol gel-forming solution has less systemic absorption than the aqueous solution[12].

**Category B1:**

"Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an observed increase in the frequency of malformation or other direct or indirect harmful effects in the human foetus. Studies in animals have not shown evidence of an increased occurrence of foetal damage.[13]

- brimonidine

- Suitable if necessary [14]
- No breastfeeding data available; unlikely to be a concern.

**Category B3:**

"Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects in the human foetus, having been observed. Studies in animals have shown evidence of an increased occurrence of foetal damage the significance of which is considered uncertain in humans."[11]

- apraclonidine, latanoprost, bimatoprost, travoprost, tafluprost, brinzolamide, dorzolamide, acetazolamide

- Avoid use; no human data available.
- Category B3 medications would only be used after consideration of the risks and benefits of treatment[9].

---

**GENERAL ADVICE**

- No glaucoma medications are known to be human teratogens, however none have been proven to be completely risk-free[8].
- Avoid the use of medication, or use a minimum number of drugs, especially during the first trimester[13].
- Category C, B1 and B2 medications would be the preferred medications during pregnancy[9].
- Health care providers should contact a specialist pregnancy drug information centre to discuss the risks of glaucoma medication[9].
- IOP is lower during pregnancy, so control of IOP may well be achieved with fewer medications[13] or even with laser trabeculoplasty.
- During breastfeeding, if medication is required dosing should be done immediately after breastfeeding to minimize the concentration in breast.
Case Studies
Case Study 1: Mary, 73 years old

1. Gather Adequate Information: Ask open ended questions

Mary has only been taking her eye drops “every now and then” because she does not feel any different after she uses them (perceived benefit). She knows her doctor would not be happy that she is not taking her medicine so she has not seen her ophthalmologist for 8 months and has not told her GP about her missing doses. Mary also reveals she has difficulty using the eye drops as the bottle is too small.

Medications:
1. Aspirin enteric coated 75 mg daily
2. Perindopril 5 mg daily
3. Pantoprazole 40 mg daily
4. Rosuvastatin 10 mg daily
5. Betaxolol 0.5% eye drops 1 drop in both eyes twice a day

2. Identify Clinical Intervention:

Mary is non-adherent (medication under use - C1) to her medication, this issue can be resolved through education and counseling (R3) and/or a dose administration aid (R15). Mary is taking 5 or more medications and therefore may be eligible for a MedsCheck. The pharmacist offers Mary the opportunity to participate in a MedsCheck. Mary accepts.

3. Identify Adherence Issue: Assess Non-Adherence

a) Intentional Non-Adherence
   • Health beliefs: Mary’s perceived benefits of taking her medication.
   • Necessity-Concerns: Low necessity, Low concern.
b) Non-Intentional Non-Adherence
   • Practical barriers: Mary has difficulty instilling her Betoptic® (betaxolol) 0.5% twice a day.
   • She always misses her eye.
4. Make Appropriate Recommendations:

Incorporate Motivational Interviewing and assess Mary’s Readiness To Change:

a) Addressing Intentional Non-Adherence:
   - Increase Mary’s perceived necessity
   - Education: Explain that Betoptic is betaxolol, a Beta-blocker that reduces IOP. In order to prevent vision loss this medication requires regular and consistent dosing.

   For example: “Glaucoma is an asymptomatic disease- which means that patients are often unaware that they are losing their vision. Unfortunately this vision loss is irreversible. Your medication prevents this vision loss from occurring – so even though you don’t feel any different after you use your eye drops it is really important to take this medication regularly”.

a) Addressing Unintentional Non-Adherence:
   - Increase Mary’s capacity to instil her eye drops

   Behaviour Change:
   - Demonstrate correct technique for eye drop application (Appendix 1)
   - Including “Double-DOT” technique (pressure on the tear duct for 2 minutes)
   - Recommended DAA: refer Mary to Glaucoma Australia who can help Mary gain access to the Alcon Eyot™ 5 mL which fits Betoptic® (Appendix 5)

   • Individualised Action Plan
   • Medication List, MedicineList+ Smart phone app.
     - Generic, brand names and purpose (keep list with Mary’s tablets)
     - Storage of eye drops (Appendix 2)
     - Prompt Mary to book an eye check-up with her ophthalmologist

5. Document and Follow-up Medscheck

1. Develop a Written Action Plan
   - Include agreed consumer goals, actions and follow-ups with the GP and/or eye health care professional(s).
   - Provide Mary with a copy of the Consumer Report and arrange agreed follow-up actions

2. Claim Payment for the Medscheck
   - Using the MedsCheck Claim Coversheet and MedsCheck Program Payment Application forms available from the Department of Human Services (Medicare) website: www.humanservices.gov.au/5cpa > MedsCheck program
   - File all consultation documentation including the Consumer Report (Medicines List and Action Plan) and Claim form.

3. Record Adherence Issue in Dispensing Program
   - To prompt the pharmacist to monitor Mary’s adherence at her following visits
Case Study 2: Tim, 66 years old

1. Gather Adequate Information

Tim has recently been in hospital following a stroke; he has had no lasting disability. Tim’s medication was changed on discharge and Tim’s GP wants the pharmacist to check that Tim understands and is adherent to his medicines.

Medications:
- Clopidogrel 75 mg daily
- Olmetec Plus 40/12.5 mg daily
- Lercanidipine 10 mg daily
- Xalacom eye drops Use 1 drop into both eyes daily
- Rosuvastatin 20 mg daily

At the HMR you discuss

1. The changes to Tim’s Tablets
   - You remove discontinued oral medicines.
2. Discuss lifestyle factors
   - To prevent future stroke/complications.
3. Assess Tim’s Glaucoma Management
   a) Ask open ended questions about Tim’s glaucoma management
      - Tim doesn’t feel the drops ‘do anything’.
      - Tim sometimes forgets to use his eye drops because he leaves them in the fridge.
      - Tim says the tiny bottle is fiddly & difficult to use.
   b) Ask Tim to retrieve medication, scripts and referrals
      - Tim has an open bottle of Xalatan®, plus an opened bottle of Xalacom®.
      - Tim has a script for Xalatan written 8 months ago with 2 repeats left.
      - Unused script for Xalatan written 2 months ago.
      - Tim has used 4 bottles of Xalatan drops in 8 months.
      - 2 months ago Tim’s specialist said his pressures weren’t ideal - Gave him a new prescription for Xalacom:
      - Tim did not realise it was for a combination drop.
      - Tim thought Xalacom would be the same as Xalatan.

2. Identify Clinical Intervention:

Tim is non-adherent to his medication and is taking duplicates of the same medication. The pharmacist can provide education to address Tim’s beliefs about his medication as well as to reduce confusion about his medication (duplication). The pharmacist can also combine this with behavioral change in order to increase Tim’s capacity and ability to instill his eye drops.

Reason for HMR
Referral:
Recent stroke potentially as a result of non-adherence to medications
3. Identify Adherence Issue: Assess Non-Adherence

a) **Intentional Non-Adherence**
   - Health beliefs: Tim’s perceived benefits of taking his medication.
   - Necessity-Concerns: Low necessity, Low concern.

b) **Non-Intentional Non-Adherence**

   **Practical barriers:**
   - Memory: Tim forgets to use his eye drops because he leaves them in the fridge.
   - Dexterity: Tim says the tiny bottle is fiddly & difficult to use.

4. Make Appropriate Recommendations: Incorporate Motivational Interviewing and assess Tim’s Readiness To Change:

a) **Addressing Intentional Non-Adherence:**
   - **Balance Necessity-Concerns:**
   - **Help Tim understand glaucoma**
     - Glaucoma is a progressive disease.
     - Glaucoma can lead to irreversible blindness.
   - **Educate Tim on the purpose of his medication**
     - Explain the long term issues of raised pressure.
     - Medication can prevent visual loss from occurring.
     - Explain importance of regular administration of eye drops to control pressure

   **Further Education:**
   - **Explain to Tim that the two eye drops prescribed are different**
     - Xalatan contains latanoprost
     - Xalacom contains latanoprost plus timolol
   - **Explain to Tim the reason he was prescribed another medication is because his eye pressure has worsened.**
     - Reinforce the progressive, irreversible nature of glaucoma.
     - Prompt attendance to regular eye checks in order to monitor glaucoma progression.
     - Recommend patients contact Glaucoma Australia for information and support.

b) **Addressing Unintentional Non-Adherence:**
   - **Increase Tim’s capacity to instil his eye drops:**
   - **Behaviour Change**
     - Demonstrate correct technique for eye drop application (Appendix 2).
     - Including “Double-DOT” technique (pressure on the tear duct with closed eyelids for 2 minutes).
5. Document and Follow-Up HMR

- **Produce an Individualised Action Plan**
  - Medication List, MedicineList+ Smart phone app.
  - Generic, brand names and purpose (keep list with Tim’s tablets.)
  - Storage of eye drops (Appendix 3)
  - Prompt Tim to book an eye check-up with his healthcare professional(s).

- **Complete HMR and Report to GP**
  - Tim’s confusion over names.
  - Issues with adherence.
  - Education session and DAA recommendation to combat non-adherence.
  - Storage of eye drops.

---

Disclaimer: The pharmacist recommendations used in this module are only examples of information to provide to glaucoma patients. Each patient requires individualised advice and recommendations depending on their presenting case.
References for Module 3


## Appendix 1: Topical Medicines that can Precipitate Acute Angle Closure[15] [16]

<table>
<thead>
<tr>
<th>Administration route</th>
<th>Mode of action</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye drops</td>
<td>Mydriatics</td>
<td>Phenylephrine, tropicamide, atropine, homatropine, cyclopentolate</td>
</tr>
<tr>
<td>Local drugs</td>
<td>Intranasal</td>
<td>Ephedrine, naphazoline, cocaine</td>
</tr>
<tr>
<td></td>
<td>Periocular</td>
<td>Botulinum toxin</td>
</tr>
<tr>
<td></td>
<td>Aerosolized drugs</td>
<td>Salbutamol, terbutaline, ipratropium bromide, atropine</td>
</tr>
<tr>
<td></td>
<td>Vegetative nerve system drugs</td>
<td>Salbutamol and adrenaline</td>
</tr>
</tbody>
</table>

N.B: These medications are safe to use in patients with open-angle glaucoma
Appendix 2: Instilling Eye Drops

http://www.youtube.com/watch?v=uY5HLrXo6HE

HOW TO INSTILL EYE DROPS

1. Wash your hands thoroughly.

2. You can choose to carry out the next steps standing up, sitting down or lying down.

3. Carefully remove the cap of the eye drop bottle; ensuring the tip of the bottle doesn’t touch anything.

4. Tilt your head back (not required if lying down) and look up.

5. Gently pull the lower eyelid away from the eye to form a pocket (or pouch).

6. Position the tip of the bottle directly over this region. Hold the bottle as vertically as possible.

7. Gently squeeze the bottle. Try to allow only one drop to fall onto the inside of the lower eyelid. If you’re not sure the drop entered the eye, instil another.

8. Look down, then release the eyelid and close your eye without blinking or squeezing the eyelid or rolling the eye around.

9. Press the tip of your index finger against the inside corner of the closed eye, applying gentle pressure over the drainage canal opening and hold gently for at least two minutes.

10. Gently wipe off any excess medication that may have spilt onto your face with a clean disposable tissue or cotton make up pad.

11. Repeat step 4-10 if you need to instil an eye drop in the opposite eye.

12. If you have a number of different eye drops to administer, leave at least 5 minutes between each different drop.

Appendix 3: Storage for Eye Drops

- **Drops Do Not Require Refrigeration:** However they must be stored in a cool constant temperature and away from direct sunlight.

- Refrigeration is often useful for patients who find it difficult to instil eye drops as it may be easier to determine whether a cold eye drop has actually entered your eye or not compared with an eye drop which is at room temperature.

- **How Long Can You Store Eye Drops For:** Unopened bottles will have an expiry date. Once opened, drops will last for four weeks, after this time bottles should be discarded.
For Travellers: Glaucoma Australia sells the FRIO® Eye Drop Wallets.

- These wallets are easy to use, lightweight, compact and reusable.
- They come in two sizes. The larger holds 3 - 4 bottles and the smaller 1 bottle only.
- The wallet will maintain your drops at a constant temperature for up to 45 hours.
- The inside wallet is activated with water and does not require refrigeration

Appendix 4: Reminder Systems

Medicines List (paper) and Medicines eList (Electronic)

- Medilists are very useful for patients on multiple medications or who have cognitive/memory impairment.
- Listing the prescription, OTC and complementary medicines being taken.
- NPS MedicineList+ offers two forms of MediLists a paper form, which you can print off and fill out or an electronic version which can be created using your computer’s internet browser. You can print it out, save it as a PDF and email it.

**MedicineList+ Smart Phone Application:**

- The NPS MedicineWise MedicinesList+ smartphone application is a free, user friendly application to assist patients with their medication.
- The application contains the following useful tools
  - **Information bar** - Which has easy to follow instructions on how to use the application with links to relevant YouTube videos.
  - **User friendly alarm system** – When daily regimens are put into the application, alarms are automatically set up.
  - **Measuring adherence** - The system records if the patient ignores the reminder, or if they unlock the phone. Patients can also tick a checkbox icon which records if that have taken their dose.
- Help the patient fill in the information in the app, such as “active ingredient” and “dosing” and help set alarms if they are not confident using smart phone applications.
Eye Pressure Tracker:

• This helpful tracker has a calendar to help patients keep track of doses. It also has a section to record eye pressure and appointment dates.
• Print one for your patient today: http://www.xalatan.com/content/EyePressureandUsageTracker.pdf
Appendix 5: Simplifying Labels

Given the majority of the patients being treated for glaucoma are over 65 years old, it is no surprise that one in 7 are unable to read pharmacy labels\(^5\). Reducing complexity by simplifying content and layout of prescribed medication labels improves adherence for patients with visual barriers that could impair correct administration\(^5\).

Pharmacists can offer enlarged print labels to patients who describe difficulty reading labels\(^5\) (Figure 1). A dispensed label must fulfill legal requirements as specified in relevant state legislation however it should also be provided so that it is easy to read\(^5\). An enlarged pharmacy label can offer simple language, maximal spacing and logical organization on a standard label size (80 mm by 38 mm) designed to improve medication label readability and comprehension\(^5\).

Figure 1: Simplifying the content and layout of pharmacy labels. Used with permission: O’Hare et al, 2009\(^5\).

‘MY PILL TALKS’ Smartphone Application - Release Date Unknown

- This application is designed to assist visually-impaired patients with their medication.
- Pharmacists will be able to dispense QR barcode stickers which can be attached to the patient’s medication.
- The patient then scans the barcode with their smartphone app; the app converts Text-To-Speech, speaking out the medication details, including doctor’s instructions, patient’s details, script no., date dispensed, and number of repeats remaining.
- The barcode can be printed out to direct the patient to the audio version of their CMI.
Appendix 6: Dose Administration Aids

If your patient presents with difficulty administering their medication, refer the patient to Glaucoma Australia (1800 500 880 or www.glaucoma.org.au), who can help patients gain access to DAAs. Ensure you advise the patient on the appropriate DAA for their medication. The table below outlines the DAA’s available in Australia and the glaucoma medications that fit within the devices.

<table>
<thead>
<tr>
<th>DAA</th>
<th>Medications</th>
<th>Tips and Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xal- Ease™</td>
<td>Xalacom®</td>
<td>• Helps patients who find it difficult to administer drop into the eye</td>
</tr>
<tr>
<td></td>
<td>Xalatan®</td>
<td>• A bottle cap opener is provided – allows removal of the eye drop cap after the bottle is placed in the delivery aid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Eye drops have two caps: a winged over cap and a white bottle cap</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>How to Use:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Remove ONLY the clear winged over cap by twisting it gently with hands (discard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Insert bottle in the back of the delivery aid (back of the eyecup)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Remove the cap on the bottle by unscrewing using the bottle cap opener (or fingers)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Tilt head back, place forefinger of free hand at the top of cheek and pull down eyelid, use other hand to place eyecup over the eye area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Position the eyecup over the eye</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Press the green button until one drop is released</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Replace the bottle cap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Bottle may be left in the delivery aid for future use (or removed)</td>
</tr>
</tbody>
</table>
### Alcon 5mL Eyot™

- Helps patients to administer eye drop
- DAA has a mirror which allows patients to line their eye up correctly
- The pack also provides a bottle opener for patients who may have problems with gripping the bottle cap.

**How to Use:**

1. Firmly seat the bottle into the large opening (eye cup) of the device (bottle tip is facing outwards)
2. Hold the Eyot over eye with the mirror on the lower side
3. Using the Eyot gently push the eyelid downwards until there is a “pocket” between the eyelid and your eye. At the same time place the upper part of the Eyot near eyebrow
4. Look for your eye in the Eyot mirror (the bottle is now in the correct position)
5. Now look up through the hole in the upper part of the device
6. Tilt head backwards until you can see the ceiling through the hole
7. Squeeze device carefully
8. Bottles can be left in Eyot (replace cap)

**Video instructions:**

http://www.eyot.nl/uk/?id=instructional_movies

### Alcon 2.5mL Eyot™

- Duotrav®
- Travatan®

**Tips:**

- Helps patients who find it difficult to squeeze bottle (e.g. arthritis), however it does not aid in administering eye drops into the eye (unlike the above DAA’s)
- Fits most 5ml bottles
- N.B: Xalatan/Xalacom fit more securely in Xal-Ease

**How to Use:**

1. Remove bottle cap
2. Locate the keyhole slot around the base of the bottle neck
3. Position the bottle nozzle over the eye and gently squeeze
4. Replace cap

### AutoSqueeze™

- Lumigan®
- Ganfort®
- Alphagan® P
- Combigan®

**Tips:**

- Helps patients who find it difficult to squeeze bottle (e.g. arthritis), however it does not aid in administering eye drops into the eye (unlike the above DAA’s)
- Fits most 5ml bottles
- N.B: Xalatan/Xalacom fit more securely in Xal-Ease

**How to Use:**

1. Remove bottle cap
2. Locate the keyhole slot around the base of the bottle neck
3. Position the bottle nozzle over the eye and gently squeeze
4. Replace cap
Products that Do Not Fit DAA:
- Medications produced by MSD such as **Timoptol**, **Timoptol XE**, **Trusopt** and **Cosopt**.
- These products are contained in rigid plastic containers which do not fit a compliance aid device.

For Trusopt and Cosopt, inform these patients:
1. One side of the container is ‘softer’ than the other rigid side
2. This has a raised area intended for pressing with a thumb, which allows one drop to be dispensed (Figure 2).
3. The area may not be soft enough for some patients and this design cannot help patients who have difficulty administering eye drops

![Figure 2: Some MSD bottles have a raised side which can be pushed to dispense one drop of medication. Source: Merck Sharp and Dohme](image)
# Appendix 7: Strategies to Overcome Common Adverse Events [17]

<table>
<thead>
<tr>
<th><strong>Prostaglandin analogues</strong></th>
<th><strong>Precautions</strong></th>
<th><strong>Counselling Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Iris hyperpigmentation</td>
<td>- Active iritis or hepatic keratitis, torn lens or capsule</td>
<td>- Always single daily dose</td>
</tr>
<tr>
<td>- Eyelash darkening, lengthening and thickening</td>
<td></td>
<td>- Iris hyper-pigmentation is Irreversible, but not progressive if drops are stopped</td>
</tr>
<tr>
<td>- Skin pigmentation</td>
<td></td>
<td>- Skin pigmentation fades with non-use over time.</td>
</tr>
<tr>
<td>- Bitter taste</td>
<td></td>
<td>- Eyelash thickening is reversible when stopped</td>
</tr>
<tr>
<td>- Peri orbital rash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Conjunctiva</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hyperaemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Eye irritation (itching, stinging)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Headache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Allergic conjunctivitis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Beta-Blockers</strong></th>
<th><strong>Precautions</strong></th>
<th><strong>Counselling Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Airway obstruction affects 40% &gt;75</td>
<td>- COPD (nonselective)</td>
<td>- Elderly patients are at higher risk of systemic adverse effects e.g. hypotension</td>
</tr>
<tr>
<td>- Corneal toxicity</td>
<td>- Asthma (nonselective)</td>
<td>- Use of the suspension reduces local stinging of betaxolol may help compliance</td>
</tr>
<tr>
<td>- Allergic reactions</td>
<td>- CHF (check with cardiologist)</td>
<td>- Gel formulations significantly reduce systemic absorption (Nyogel®)</td>
</tr>
<tr>
<td>- CHF (classic teaching, although cardiologists use beta-blockers as first line treatment in CHF)</td>
<td>- Bradycardia</td>
<td>- Betaxolol has less systemic side effects (4x less absorption)</td>
</tr>
<tr>
<td>- Bronchospasm (seen with nonselective)</td>
<td>- Hypotension</td>
<td></td>
</tr>
<tr>
<td>- Bradycardia</td>
<td>- Second or third degree heart block</td>
<td></td>
</tr>
<tr>
<td>- Depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Impotence</td>
<td>- Avoid treatment with verapamil due to potential for profound bradycardia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Alpha-adrenergic agents</strong></th>
<th><strong>Precautions</strong></th>
<th><strong>Counselling Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Tachyphylaxis and allergy main limitations (apraclonidine &gt; brimonidine)</td>
<td>- Monoamine oxidase inhibitor therapy</td>
<td>- Brimonidine is effective and well tolerated when used long term</td>
</tr>
<tr>
<td>- Brimonidine crosses BBB and can cause hypotension, depression and lethargy</td>
<td>- Infants and children younger than 2 years</td>
<td>- Apraclonidine should be used only short term for acute pressure lowering as it is associated with a high incidence of allergic blepharoconjunctivitis with chronic use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Miotics</strong></th>
<th><strong>Precautions</strong></th>
<th><strong>Counselling Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increased myopia</td>
<td>- Neovascular, uveitic, or malignant glaucoma</td>
<td>- If patients are using more than one type of eye drop, use pilocarpine drops last</td>
</tr>
<tr>
<td>- Eye or brow ache/pain</td>
<td>- Need to regularly assess fundus</td>
<td>- These eye drops may cause blurred vision. Do not drive or operate machinery if you are affected. Take particular care in poor light</td>
</tr>
<tr>
<td>- Decreased vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cataract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Peri ocular contact dermatitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Corneal toxicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Paradoxical angle closure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Carbonic anhydrase inhibitors</strong></th>
<th><strong>Precautions</strong></th>
<th><strong>Counselling Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Topical route:</td>
<td>- Sulfonamide allergy</td>
<td>- Your eye may feel uncomfortable for a little while after you have put in the drop</td>
</tr>
<tr>
<td>- Metallic taste</td>
<td></td>
<td>- If you have blurred vision, avoid driving or operating machinery until your sight improves</td>
</tr>
<tr>
<td>- Allergic dermatitis/ conjunctivitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Corneal oedema</td>
<td></td>
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</tr>
</tbody>
</table>
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