Section 1: Pharmaceutical care

P 4 – Glossary
The Terminology and Guidelines for Glaucoma EGS (European Glaucoma Society) 4th Edition, 2014 uses the term 'acute angle closure' rather than 'angle closure glaucoma.' The term glaucoma is added if glaucomatous optic neuropathy is present. Therefore, the definition for ‘iridectomy’ is a surgical incision into the iris, performed to treat acute angle closure. Likewise the definition for ‘iridotomy’ is laser treatment to treat angle closure, where usually two small holes are made in the iris using a laser.

P 13 – Pharmaceutical care
References have been provided, detailing supplementary and independent prescribing in the UK, in addition to Northern Ireland.
In England, Scotland, Wales and Northern Ireland pharmacist supplementary prescribing was initiated in 200311, 21, 22 with further expansion to independent prescribing in 200612, 22, 23. Therefore, the pharmacist’s role may now include prescribing.

P 14 – Prescribing
Data has been updated to reflect 2015 figures.
In November 2015, there were 351 optometrists on the independent prescribing register24.

P 17 – References
References 1, 10, 17, 18 & 20 updated

References 21, 22, 23 & 24 added
Section 2: Structure and function of the eye

Pg 22 – Structure of the eye
In the third sentence ‘aqueous’ should read ‘aqueous humour’.

Pg 34 – Tear Film
Figure 8, label should read ‘lacrimal puncta’ not ‘lacrimal punta’

Pg 37 – References
References 2, 4, 7, 12, 13 & 15 updated

P 39 – Exercise and case study reviews
The arrow for ‘Iris’ should be extended to meet the coloured part of the eye, in this case the brown part.

Section 3: Responding to eye symptoms

P 45 – Table 4 WWHAM questions
The statement that ‘many topical antihistamines are licensed for use in children’ is not the case. Only one topical ocular antihistamine is available OTC, i.e. antazoline as an ingredient of Otrivine Antistin®; this is licensed for adults and children over 12-years. Although ketotifen and olopatadine are licensed for use in children over-3, these are both POMs, and azelastine and epinastine are licensed for over-12s.

The statement that an ‘unusual appearance, e.g. cloudy cornea is also a sign of AACG’ has been amended to reflect a change in terminology. The term ‘glaucoma’ is added if glaucomatous optic neuropathy, i.e. damage is present. Otherwise it is known as acute angle closure (AAC). This change is relevant to each reference made to ‘glaucoma’ throughout the course.

P 50 – Signs and symptoms
‘Irritation caused by light (photophobia)’ should not be listed as a symptom associated with simple conjunctivitis. Photophobia is cited amongst symptoms, which require referral to the GP, as it may be indicative of adenoviral conjunctivitis, if severe.

P 51 – Guidance for the sale of chloramphenicol eye drops and ointment
The text currently states that ‘Pharmacists need to be satisfied when making a supply that it is not only in line with its marketing authorisation but it is clinically beneficial, given that acute bacterial conjunctivitis can be self-limiting and does not always require antibacterial therapy’13, 34.

Please note that since the RPS published their guidance (reference 13) based on the DTB (reference 34), a 2012 Cochrane review has stated that although acute bacterial conjunctivitis is frequently self-limiting, the use of antibiotic eye drops is associated with modestly improved rates of clinical and microbiological remission in comparison to the use of placebo38. Use of antibiotic eye drops should therefore be considered in order to speed the resolution of symptoms and infection. Therefore reference 13 has been updated to reflect the most recent information.

P 53 – Allergic conjunctivitis
The statement that preparations containing sodium cromoglicate ‘provide fast and effective relief’ has been amended, as relief occurs within a few days, it is not instant.

P 57 – Chalazia (Meibomian Cysts)
The first sentence has been changed from ‘A chalazion (see Figure 14) is a cyst of the Meibomian gland, which secretes fluid to stop the eyes sticking together’ to ‘A chalazion (see Figure 14) is a cyst of the meibomian gland, which secretes fluid to help the eyelid flow smoothly over the eyeball.’
P 59 – Eyelid hygiene
Cleansing the eyelids with baby shampoo is no longer recommended in practice, as baby shampoo is thought to be too harsh and possibly allergenic in some individuals. Alternative options now include sodium bicarbonate lotion and tea tree oil, as well as commercially available lid wipes.

P 62 – Treatment
‘Vismed® Multi, Hyabak® and the Hylo® range’ are examples of sodium hyaluronate preservative-free eye drops. Other preservative-free products include: carbomers (Viscotears® single-use eye drops) carmellose sodium (Cellulisc® single-use eye drops), hypromellose (Lumecare®) and macrogols (Systane® Ultra) etc.

Liposic® has been discontinued as a medicine and has been replaced by Artelac® Night-time gel as a device. For a full list of carbomers available on prescription access the Drug Tariff (England & Wales) part IXA Appliances - Eye products, part III of the NI Drug Tariff and part 3 of the Scotland Drug Tariff.

P 68 – Summary points
The text states that ‘Full guidance is available from the Royal Pharmaceutical Society (www.rpharms.com) for the sale of chloramphenicol 0.5% eye drops’. In addition guidance is also available in relation to the sale of chloramphenicol eye 1% ointment. The information on The Royal Pharmaceutical Society is available to members only.

P 69 & P 70 – References
References 1, 3, 13, 14, 16, 26, 28, 30, 31, 32, 33 & 37 updated. Reference 38 added.

Reference 33 is no longer required as the detail is present in reference 21.


P 71 – Exercise and case study reviews
Voltarol® eye drops are no longer called Volarol® ophtha eye drops.

Section 4: Common diseases of the eye

P 81 – Angle-closure glaucoma (Acute glaucoma)
This section should include the use of the term ‘angle closure glaucoma’ only where glaucomatous damage occurs in line with the Terminology and Guidelines for Glaucoma EGS (European Glaucoma Society) 4th Edition, 2014.
Pharmaceutical Care of the Eye (2013)

P 83 – Treatment
The text states that ‘The goal of treatment is to reduce intraocular pressure by 20 to 40% and to prevent further optic nerve and visual field damage’; it is worth noting that target pressure is identified on an individual basis.

P 84 – Table 7: Common pharmacological intervention treatments for glaucoma
Please note prostaglandin analogues and prostamides are first-line, beta-blockers are second-line, carbonic anhydrase inhibitors and sympathomimetics are third-line and miotics are used very rarely in the treatment of glaucoma.

Sympathomimetic drops
In addition the sympathomimetic, apraclonidine may be used short-term to control intraocular pressure prior to surgery.

Prostaglandin analogues and prostamides
Prostaglandin analogues and prostamides can cause eyelash growth and may darken the skin around the eyes.

Screening
The text states that ‘first degree relatives of glaucoma patients are eligible for free eye tests’; this should read ‘first degree relatives of glaucoma patients are eligible for free eye tests when they are aged over 40-years.’

P 89 – Treatment
The text states that ‘Diabetic macular oedema is now included in the NICE approved indication for ranibizumab’ (Lucentis®). This is also a NICE improved indication for aflibercept (Eylea®).

In addition intravitreal corticosteroid is used when other treatments have not worked. Fluocinolone acetonide intravitreal implants are recommended as a possible treatment for people with chronic diabetic macular oedema if:

- the implant is used in the eye with the artificial lens and
- their diabetic macular oedema has not got better with other treatments

P 90 – Age-related macular degeneration
The text states that ‘According to the World Health Organisation, 8 million people have severe blindness due to age-related macular degeneration (ARMD), excluding the countries where data are scarce.’ This statistic is from 2003. The Lancet reported in 2014 that the projected number of people with ARMD in 2020 is 196 million, increasing to 288 million in 2040

The text states that ‘In a systematic review it was estimated that somewhere between 182, 000 and 300, 000 people in the United Kingdom are blind or partially sighted as a result of ARMD.’ This data was reported in 2003 and the reference can no longer be found – it has been replaced with information from NHS Choices. NHS Choices (updated in August 2015) has detailed that ARMD affects more than 600,000 people in the UK and is the leading cause of vision loss. By 2020, it’s predicted almost 700,000 will have late-stage ARMD in the UK

P 91 – Treatment
In addition, in the field of ARMD there are surgical trials of implants (bionic eyes) underway.

Furthermore, aflibercept, pegaptanib and ranibizumab are vascular endothelial growth factor inhibitors licensed for the treatment of neovascular (wet) age-related macular degeneration (ARMD). Aflibercept is also licensed for the treatment of macular oedema secondary to central retinal vein occlusion and diabetic macular oedema; ranibizumab is licensed for the treatment of visual impairment due to diabetic macular oedema, macular oedema secondary to branch or central retinal vein occlusion and choroidal neovascularisation secondary to pathologic myopia. Bevacizumab has many indications now in combination with other agents, e.g. metastatic carcinoma of the colon or rectum, metastatic breast cancer, metastatic or recurrent non-small cell lung cancer etc. but it is not licensed for ARMD. In the latest guidance in 2012 NICE stated that pegaptanib is not recommended for people with wet AMD.
References


Pharmaceutical Care of the Eye (2013)


Reference 2 is no longer required

P 99 – Exercise 5 review (b)
For clarity the following has been added ‘All people over 60 years of age are entitled to free sight tests.’

Exercise 6 review
In addition, a pharmacist should check when a patient's condition was last monitored by a specialist and refer to monitoring intervals (at least every 12 months for glaucoma, at least every two years for ocular hypertension etc.).

P 100 - Case study 4 review (d)
A useful website summarising the supplements similar in formulation to that used in AREDS 2 is http://www.areds2.org.uk/supplements. This site not only compares ingredients but lists total monthly costs.

The website 'http://www.maculardisease.org/page.asp?section=189&sectionTitle=Information+Sheets' at the end of this section is no longer active and has been replaced with The National Eye Institute’s summary of results from the Age-Related Eye Disease Study, found at https://nei.nih.gov/amd.

Section 5: Drug and disease related eye problems

P 102 – Introduction
The text states that ‘a topical steroid may be necessary post-operatively to reduce inflammation.’ The use of topical steroids post-operatively should be short-term, i.e. 1 month to 6 weeks is normal. This is less likely to give rise to steroid-induced side-effects. Pharmacists should query prolonged use of topical corticosteroids to ensure use is appropriately monitored.

P 103 – P 106 – Drug-induced eye problems

Amiodarone
In comparison to amiodarone, dronedarone has not been reported to cause ocular side-effects (http://www.ncbi.nlm.nih.gov/pubmed/12919771).

Antimuscarinics
Furthermore, oxybutynin is another example of an older antimuscarinic treatment. Oxybutynin is more likely (very common) to cause side-effects than solifenacin (common).

Antiparkinsonian agents
Levodopa is contra-indicated in patients with occludable angles. Levodopa can cause both miosis and mydriasis. There has only been one report of glaucoma with a multi-constituent product of levodopa in 52 years. There have been a few reports of blurred vision (5), visual impairment (9), diplopia (2), and miosis (2) from 1963 to 2015 (https://www.medicinescomplete.com).
Levodopa can cause oculogyric crisis. The BNF states that side-effects of levodopa include nausea and vomiting; rare side-effects include abdominal pain, blurred vision, blepharospasm, diplopia, activation of Horner's syndrome, pupil dilatation, oculogyric crisis, flushing; and very rarely angle-closure glaucoma (http://www.evidence.nhs.uk/formulary/bnf/current).
The SPC for procyclidine states that it is contra-indicated in individuals with known hypersensitivity to any component of the preparation, untreated urinary retention, closed angle glaucoma and gastro-intestinal obstruction (http://www.medicines.org.uk/EMC/medicine/2171/SPC/Kemadrin+Tablets+5+mg/).
The BNF now states that antimuscarinics should be used with caution in gastro-oesophageal reflux disease, diarrhoea, ulcerative colitis, autonomic neuropathy, acute myocardial infarction, hypertension, conditions characterised by tachycardia (including hyperthyroidism, cardiac insufficiency, cardiac surgery), pyrexia and in individuals susceptible to angle-closure glaucoma. They should also be used with caution in Down’s syndrome, in children and in the elderly.
Antimuscarinics should be avoided in gastro-intestinal obstruction and myasthenia gravis.

Side-effects of antimuscarinics include constipation, transient bradycardia (followed by tachycardia, palpitation and arrhythmias), reduced bronchial secretions, urinary urgency and retention, dilatation of the pupils with loss of accommodation, photophobia, dry mouth, flushing and dryness of the skin. Side-effects that occur occasionally include confusion (particularly in the elderly), nausea, vomiting and giddiness; and very rarely, angle-closure glaucoma may occur (http://www.evidence.nhs.uk/formulary/bnf/current).

**Chloroquine**

Ocular toxicity is unlikely if the dose of chloroquine phosphate does not exceed 4 mg/kg daily (equivalent to chloroquine base approximately 2.5 mg/kg daily).

**Ethambutol**

Because this drug has a unique effect on the eye, it is recommended that patients undergo a full ophthalmic examination before starting treatment. This should include visual acuity, colour vision, perimetry and ophthalmoscopy. Many physicians consider that routine ophthalmological examination for adults is not thereafter necessary, but patients should be informed of the importance of reporting any change in vision. Routine ophthalmological examinations may be considered desirable when treating young children.

**Tamsulosin**

Intraoperative floppy iris syndrome (IFIS) was first described in 2005 and is characterised by a flaccid and billowing iris, iris prolapse through a surgical incision and progressive pupil constriction. This may lead to increased procedural complications during cataract and other intraocular surgery. IFIS is frequently seen in patients taking alpha blockers, particularly tamsulosin, which is a highly selective alpha-1a blocker. The alpha-1a receptor, as well as being the predominant receptor in the bladder neck and prostate, is the most abundant receptor in the iris, mediating pupil dilation.

An article in the Pharmaceutical Journal has stated that although IFIS is referred to in tamsulosin’s patient information leaflet as a very rare side-effect, affecting less than 1 in 10,000 people, this is far from what is seen in clinical practice (http://www.pharmaceutical-journal.com/news-and-analysis/news/tamsulosin-reclassification/11007901.article). The occurrence of IFIS in patients exposed to tamsulosin has been reported to be between 57 and 100%, compared with 0 to 5% in those not exposed to the drug.

The age-group of men suffering from benign prostatic hypertrophy (BPH) is similar to those undergoing cataract surgery; therefore, it is expected that a substantial number of patients treated with tamsulosin would also present for cataract surgery. Pharmacists recommending OTC tamsulosin to men who present with symptoms of BPH need to emphasise the importance of avoiding starting tamsulosin when cataract surgery is likely to be scheduled in the near future.

Ophthalmologists must be made aware that a patient is taking or has taken tamsulosin so that cataract surgery can be assigned to a surgeon experienced in dealing with IFIS.

**Vigabatrin**

A third of patients taking the antiepileptic drug vigabatrin will have visual field defects (http://patient.info/medicine/vigabatrin-for-epilepsy-sabril). The onset is usually after months to years of vigabatrin therapy. The degree of visual field restriction may be severe and this may have practical consequences for the patient. Most of the patients with perimetry-confirmed defects are asymptomatic. Hence, this undesirable effect can only be reliably detected by systematic perimetry, which is usually possible only in patients with a developmental age of more than 9 years. A developed method based on field specific Visual Evoked Potentials (VEP) is available from the manufacturer on request to test the presence of peripheral vision in children aged 3-years and above. At present this method has not been validated in the detection of vigabatrin attributed visual field defects. Electroretinography may be useful but should be used only in adults who are unable to cooperate with perimetry testing or in the very young.

Available data suggests that visual field defects are irreversible even after discontinuation of vigabatrin. Deterioration after the treatment is discontinued cannot be excluded. Therefore, vigabatrin should only be used after a careful assessment of the balance of benefits and risks, compared with alternatives.

Vigabatrin is not recommended for use in patients with any pre-existing clinically significant visual field defect. Patients should undergo systematic screening examination when starting vigabatrin and at regular intervals for detection of visual field defects. Visual field testing should continue at 6 monthly intervals for the whole duration of treatment.
P 111 – Eye conditions associated with systemic disease

Gonorrhoea
Conjunctivitis associated with gonorrhoea is usually a vertical transmission from mother to child during birth and it also applies to chlamydia. There is also sexually transmitted conjunctivitis. With increased resistance to fluoroquinolones, this is extremely worrying.

P 113 - Summary points
Nasal steroids do not appear to be linked with cataract formation.

P 114 - References
References 2, 8, 9, 22, 24, 27, 28, 29, 36, 37, 39, 43, 44, 46, 48 & 53 updated

Reference 6 removed as Broflex syrup/Trihexyphenidyl hydrochloride was discontinued in 2013.

3 additional references to complement reference 58 have been included:
Section 6: Keeping eyes healthy

P 122 - Eye drop dispensers
Patients should be informed of the relevant information:
- the timing of the drop, e.g. prostaglandin analogues and bimatoprost are applied in the evening, and once daily timolol is used in the morning
- the interval between eye drops, e.g. twice daily = 12-hourly rather than morning and night.

P124 - Frequency of eye examinations
The College of Optometrists has updated information on ‘The routine eye examination.’

In Scotland SIGN has published guidance on ‘Glaucoma referral and safe discharge.’ This has information on the frequency of eye examinations for glaucoma.
http://www.sign.ac.uk/pdf/SIGN144.pdf

P 125 - Clinical reasons for earlier recall
New guidance states that clinical circumstances may justify recalling a patient earlier than the intervals detailed in the text. This includes patients:
- of any age with refractive error which is changing rapidly or who are at risk of such changes, e.g. patients newly diagnosed with diabetes whose condition is being managed in primary care, for example suspected visual field defects on one visit which is not confirmed on repeat, with no other significant signs of glaucoma
- who are identified in protocols as needing to be seen more frequently because of risk factors, for example of developing glaucoma
- with pathology likely to worsen, for example AMD, cataract, corneal dystrophy or congenital anomalies.

P 125 - Contact lens care
The statistic ‘According to the Association of Contact Lens Manufacturers (ACLM), approximately 3.7 million in the UK wear contact lenses’ has been updated and the latest report (2015) stated that more than 3 million people in the UK wear contact lenses. This may have decreased due to the uptake of refractive surgery.

P 126 - Soft contact lenses
In 2014 the proportions of contact lens wearers were:
- daily disposables – 43%
- frequent replacement – 47%
- traditional soft – 1%
- rigid – 9%

Silicone hydrogel is a material (unlike the other categories), which was reported separately when first introduced. This no longer makes sense as it is increasingly spanning the modalities, so it is not reported separately any more. Data from Simon Rodwell, Secretary General of The Association of Contact Lens Manufacturers Ltd.

P 135 - Additional supply optometrists

P 135 - Supplementary prescribing optometrists
Supplementary prescribing courses are no longer offered alone, they are part of independent prescribing courses. Optometrists train under the additional supply specialty or independent prescribing optometrists specialty, which includes supplementary prescribing. See the following websites for more information:

In addition dispensing opticians may obtain certain medicines by signed order for use by optometrists or doctors in the optician’s practice (wholesale dealing). They may also obtain lidocaine hydrochloride,
oxybuprocaine hydrochloride and proxymetacaine hydrochloride from pharmacies when they practice as contact lens specialists. http://www.rpharms.com/support-resources-a-z/medicines-that-optometrists-can-order.asp (Accessed by members only).

P 135 - Independent prescribing optometrists

P 137 – P 138 - References
References 2, 10, 15, 17 & 27 updated. Reference 29 added.

P 138 Professional organisations
Detail updated
British & Irish Orthoptic Society
Salisbury House, Station Road, Cambridge CB1 2LA
Tel: +44 (0) 13 5366 5541
bios@orthoptics.org.uk

General Optical Council, 10 Old Bailey, London, EC4M 7NG
Tel: +44 (0) 20 7580 3898 Fax: +44 (0) 7436 3525
goc@optical.org

UK Ophthalmic Pharmacy Group. Contact through NHS networks
https://www.networks.nhs.uk/

The Royal College of Ophthalmologists
18 Stephenson Way, London, NW1 2HD
Tel: +44 (0) 20 7935 0702 Fax: +44 (0) 20 7383 5258
contact@ocophth.ac.uk

P 139 - Self-help organisations
Detail updated
Association of Blind Asians, Room 16, 210 Church Rd, London E10 7JQ
Tel: +44 (0) 20 8185 6085

The Macular Society. PO Box 1870, Andover SP10 9AD
Helpline: +44 (0) 300 3030 111 Office: +44 (0) 1264 350 551Email: info@macularsociety.org http://www.maculardisease.org.