CHAPTER 11 EYE

<table>
<thead>
<tr>
<th>First line drugs</th>
<th>Second line drugs</th>
<th>Specialist drugs</th>
<th>Hospital only drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>– drugs which are recommended in both primary and secondary care</td>
<td>– alternatives (often in specific conditions) in both primary and secondary care</td>
<td>– Drugs where a specialist input is needed (see introduction for definition)</td>
<td>– prescribing within secondary care only.</td>
</tr>
</tbody>
</table>

11. 1 **Administration of drugs to the eye**

11. 2 **Control of microbial contamination**

11. 3 **Anti-infective eye preparations**

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<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Contributors</th>
</tr>
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<tbody>
<tr>
<td>09/12</td>
<td>Chapter Update</td>
<td>Mr M Wearne, K Ingram, G Ells</td>
</tr>
<tr>
<td>05/13</td>
<td>11.8 (NICE update)</td>
<td>G Ells</td>
</tr>
<tr>
<td>10/13</td>
<td>11.8 (NICE update)</td>
<td>G Ells</td>
</tr>
</tbody>
</table>
Non-proprietary medication ‘Specials’

Notes:
1. Wherever possible a proprietary brand of eye drops/ointment should be prescribed. If in doubt as to whether the product is commercially available (or to discuss a suitable alternative) please contact the medicines management team.
2. Where a special is required, Moorfields offer a wide range of ophthalmic products at comparatively cost effective prices. Moorfields Pharmaceuticals: Tel: 020 7684 9090 Email: pharmaceuticals@moorfields.nhs.uk

11.1 Administration of drugs to the eye

Notes:
1. Eye drops and eye ointments are instilled into the pocket formed by gently pulling down the lower eyelid then closing the eye for 30 seconds. For eye drops, one drop is all that is needed as long as instillation is successful. For eye ointments, a small amount is applied similarly; the ointment melts rapidly and blinking helps to spread it.
2. When two or more different drops are required at the same time of day, the patient should leave an interval of 5 minutes between drops to avoid dilution and overflow. Also use ointment preparations 5 minutes after drops.
3. Certain preparations included within this formulary are unlicensed. These products will be ordered specially and are not stocked; therefore a delay in obtaining stocks may be incurred. These ‘specials’ may be supplied for the individual patient’s clinical need, given no commercial alternative is available. Specials are often very costly.
4. Administration aids: eye drop dispensers are available to aid the instillation of eye drops especially for the elderly, visually impaired, arthritic, or otherwise physically limited patients. Eye drop dispensers are for use with plastic eye drop bottles, for repeated use by individual patients. They can be purchased from most community pharmacies or prescribed on a FP10 prescription. Please refer to the Drug Tariff for details – Appliances: Eye Drops Dispensers.
5. Preservatives and sensitisers: Long-term administration of preservative-containing eye drops may cause ocular irritation.
6. Recommendations for when to use preservative free treatments:
   - the patient has an allergy to the preservative
   - after a corneal transplant in selected cases, depending on indication, and in cases where the cornea is compromised, on specialist advice
   - ocular surface disease, including severe dry eye syndrome
   - if wearing soft contact lenses, including disposable lenses
   - sometimes when multiple topical preparations are being used, it may be desirable to have the most frequently instilled product in a preservative free formulation in order to reduce the preservative load.
7. All Minims® and other single use products are preservative free.

11.2 Control of microbial contamination

Notes:
1. Eye drops in multiple-application containers for domiciliary use should not be used for more than 4 weeks after first opening, unless otherwise stated.
2. Anti-microbial eye drops should not be used for more than 1 week after first opening if used in an inpatient setting.
3. If both eyes are infected and require treatment with an antimicrobial it is not necessary to supply two bottles to avoid cross-contamination, as it is usually the same infection. However, if a patient is using regular eye treatment, e.g. for glaucoma, and has an infection in one eye, it would be appropriate to supply 2 bottles of regular eye treatment (one for each eye) to avoid cross-contamination. NB. Can only be dispensed if prescription states “for left and right eye” and must be endorsed “2 bottles dispensed to avoid cross-contamination”.

11.3 Anti-infective eye preparations

Notes:
1. Most acute superficial eye infections can be treated topically.
2. Most cases of acute bacterial conjunctivitis are self-limiting. Where treatment is appropriate, antibacterial eye drops or an eye ointment are used. A poor response might indicate viral or allergic conjunctivitis.
11.3.1 Antibacterials

Administration:
- **Eye drops** (non-viscous) – Apply 1 drop every 2 hours then reduce frequency as infection is controlled and continue 48 hours after healing.
- **Eye ointment** – Apply either at night (if eye drops used during the day) or 3-4 times daily (if eye ointment used alone).

If there is no response to treatment it is advisable that a swab is taken before changing the antibiotic, ideally after stopping all treatment antibiotics for 24 hours.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Formulations</th>
</tr>
</thead>
</table>
| **Chloramphenicol** | Eye drops 0.5%  
|                  | ♦ Single use eye drop 0.5%  
|                  | ♦ Eye ointment 1%  
| **Gentamicin**   | ♦ Eye/ear drops 0.3%  
|                  | ♦ Minims® single use preservative free eye drops 0.3%  
| **Fusidic acid** | ♦ Viscous eye drops 1%  
| **Ofloxacin**    | ♦ Ophthalmic solution 0.3%  
| **Ciprofloxacin**| ♦ Ophthalmic solution 0.3%  
|                  | ♦ Eye ointment 0.3%  
|                  | ♦ Ophthalmic solution 5%  
| **Cefuroxime**   | Require storage in a freezer  

Excipients depend on manufacturer  
Contain benzalkonium chloride  
Contain benzalkonium chloride, disodium edetate  
Contain benzalkonium chloride  
Contain benzalkonium chloride  

Notes:
1. Chloramphenicol is the drug of choice for superficial eye infections. It has a broad spectrum of activity and is associated with a low level of resistance.
2. Concern has been expressed about a possible link between topical chloramphenicol and bone marrow suppression. The general consensus of opinion is that the link has not been proven but as a precaution courses should be limited to 5-7 days and topical chloramphenicol be avoided in those patients with a personal or family history of blood dyscrasia.
3. Gentamicin is a second line alternative when chloramphenicol is not indicated or inappropriate.
4. Ciprofloxacin eye drops should be reserved for treatment of corneal ulcers.
5. Cefuroxime eye drops are no longer commercially available and are very expensive. Usage should be reserved for initial management of microbial keratitis and supply should never be required in primary care.
6. Steroid-antibiotic ophthalmic combinations are not recommended for routine use.

11.3.2 Antifungals

Antifungal preparations for the eye are not generally available. Treatment will normally be carried out at specialist centres. Information can be obtained from Moorfields Eye Hospital 020 7253 3411

11.3.3 Antivirals

<table>
<thead>
<tr>
<th>Antivirus</th>
<th>Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aciclovir</strong></td>
<td>♦ Eye ointment 3%</td>
</tr>
</tbody>
</table>

Note:
1. Aciclovir may be used for dendritic corneal ulcers caused by herpes simplex. It may also be used in herpes zoster (shingles) as an adjunct to full dose oral therapy where there is ophthalmic involvement.
2. Aciclovir can cause corneal toxicity if used for more than 3 weeks at the full therapeutic dose so treatment should be stopped at this time.
3. Oral aciclovir may be required after corneal transplant to prevent herpes simplex keratitis / uveitis.
### 11. 4 Corticosteroids and other anti-inflammatory preparations

#### 11. 4. 1 Corticosteroids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Formulations</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Betamethasone | ♦ Eye drops 0.1%  
♦ Eye ointment 0.1% | Contain benzalkonium chloride, disodium edetate |
| Dexamethasone | ♦ Eye drops 0.1%  
♦ Single use eye drop 0.1% | Contain benzalkonium chloride, disodium edetate, polysorbate 80  
♦ Contain disodium edetate |
| Fluorometholone | ♦ Ophthalmic suspension 0.1% | Contain benzalkonium chloride, disodium edetate, polysorbate 80 |
| Prednisolone | ♦ Eye drops 0.5%  
♦ Eye drops 1%  
♦ Single use eye drops 0.5% | Contain benzalkonium chloride, disodium edetate, polysorbate 80  
♦ Contain disodium edetate |
| Loteprednol | ♦ Eye drops 0.5%  
♦ Eye drops 1% | Contain benzalkonium chloride, disodium edetate, polysorbate 80 |
| Rimexolone | ♦ Eye drops 1% | Contain benzalkonium chloride, disodium edetate, polysorbate 80 |

**Notes:**
1. Topical corticosteroids should normally only be used under expert supervision.
2. Topical ophthalmic steroids placed in descending order of potency:
   - prednisolone acetate 1% (most potent)
   - dexamethasone 0.1%
   - betamethasone 0.1%
   - prednisolone sodium phosphate 0.5%
   - fluorometholone 0.1% (least potent)
   The severity of the inflammation determines the choice of steroid.
3. **Topical steroids should not be used for undiagnosed red eye.** If red eye is due to herpes simplex, corticosteroids will aggravate this condition possibly leading to loss of vision or even loss of the eye.
4. Steroid eye drops can raise intra-ocular pressure (IOP) and therefore precipitate glaucoma in patients pre-disposed to chronic simple glaucoma. Evidence suggests that fluorometholone is less likely to raise IOP though this may be due to reduced penetration of the cornea.
5. Loteprednol and rimexolone are known to be less likely to raise IOP in steroid responders.
6. A steroid cataract may follow prolonged use with topical steroids.
7. Other side effects include thinning of the cornea and sclera.
8. Prescribing of non-proprietary corticosteroid eye drops e.g. low concentration prednisolone eye drops is very expensive. Whilst it is sometimes necessary to use these products in the management of conditions such as herpetic keratitis or corneal grafts, it is usually possible to manage these conditions by undertaking a very slow tail off of less potent commercially available corticosteroids with reduced frequency of administration.

### Corticosteroids with antibacterials

#### Betamethasone with neomycin

- ♦ Eye drops: betamethasone sodium phosphate 0.1%, neomycin sulphate 0.5%  
  Excipients depend on manufacturer

#### Maxitrol®

- ♦ Eye drops: dexamethasone 0.1%, hypromellose 0.5%, neomycin 0.35%, polymixin B sulphate 6000 units/ml  
  Contains: benzalkonium chloride, polysorbate 20  
- ♦ Eye ointment: dexamethasone 0.1%, neomycin 0.35%, polymixin B sulphate 6000 units/ml  
  Contains: hydroxybenzoates (parabens), wool fat

**Note:**
Steroid/antibiotic combinations are routinely prescribed as a defined treatment course following some eye surgery procedures e.g. cataract removal. Steroid-antibiotic ophthalmic combinations are not recommended for routine use without a definite diagnosis and are not generally suitable as items to be included on repeat prescriptions.
### Intravitreal Corticosteroids

**Dexamethasone ▼**  
Intravitreal implant 700 microgram

**Notes:**
1. Dexamethasone intravitreal implant is recommended as an option for the treatment of macular oedema following central retinal vein occlusion. It is also recommended as an option for the treatment of macular oedema following branch retinal vein occlusion when treatment with laser photocoagulation has not been beneficial OR treatment with laser photocoagulation is not considered suitable due to the extent of macular haemorrhage. NICE TA229 July 2011
2. Dexamethasone intravitreal implants should only be administered by specialists experienced in the use of intravitreal implants.
3. Concurrent administration to both eyes is not recommended.

#### 11.4.2 Other Anti-inflammatory Preparations

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Cromoglicate</td>
<td>Eye drops 2%</td>
<td>Available OTC</td>
</tr>
<tr>
<td></td>
<td>Preservative free 2% UDV 0.3ml (Catacrom®)</td>
<td>Excipients depend on manufacturer</td>
</tr>
<tr>
<td>Nedocromil Sodium</td>
<td>Eye drops 2%</td>
<td>Exipients include benzalkonium chloride, disodium edetate</td>
</tr>
<tr>
<td>Olopatadine</td>
<td>Eye drops 1mg/ml</td>
<td>Exipients include benzalkonium chloride</td>
</tr>
<tr>
<td></td>
<td>For short term use only</td>
<td></td>
</tr>
<tr>
<td>Lodoxamide</td>
<td>Eye drops 0.1%</td>
<td>Available OTC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exipients include benzalkonium chloride, disodium edetate</td>
</tr>
</tbody>
</table>

**Notes:**
1. Sodium cromoglicate and nedocromil are cost-effective mast cell stabilisers that prevent the release of histamine and can be used prophylactically or for treatment of allergic and seasonal conjunctivitis. They should be instilled four times a day and patients should be counselled that, as they work to stabilise mast cells, it may take up to a week for them to reach maximal effect.
2. Preservative free sodium cromoglycate (Catacrom®) should be reserved for true preservative allergy.
3. Olopatadine and lodoxamide are antihistamines and may be useful for very itchy eyes requiring immediate symptom relief.
4. Iatrogenic allergy should be discounted for any allergic conjunctivitis. Common offenders are neomycin, framycetin, atropine, chloramphenicol, fusidic acid and benzalkonium chloride (preservative).

#### 11.5 Mydriatics and Cycloplegics

**CAUTION:**
1. Darkly pigmented iris is more resistant to pupillary dilatation and caution should be exercised to avoid over dosage.
2. Patients should be advised not to drive for at least two hours after mydriasis.

**Antimuscarinics**

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atropine Sulphate</td>
<td>Eye drops 0.5%, 1%</td>
<td>Contain benzalkonium chloride</td>
</tr>
<tr>
<td></td>
<td>Single use eye drops 1% (Minims®)</td>
<td>Contain wool fat</td>
</tr>
<tr>
<td></td>
<td>Eye ointment 1%</td>
<td></td>
</tr>
<tr>
<td>Cyclopentolate Hydrochloride</td>
<td>Eye drops 0.5%, 1%</td>
<td>Contain benzalkonium chloride</td>
</tr>
<tr>
<td></td>
<td>Single use eye drops 0.5%, 1% (Minims®)</td>
<td></td>
</tr>
<tr>
<td>Tropicamide</td>
<td>Single use eye drops 0.5%, 1% (Minims®)</td>
<td></td>
</tr>
</tbody>
</table>
Notes:
1. Antimuscarinics dilate the pupil and relax the ciliary muscle resulting in mydriasis and cycloplegia. They can raise Intra Ocular Pressure (IOP) and should be used with caution in those patients susceptible to angle closure.
2. Atropine has the longest activity, sometimes up to a week. It is used to treat anterior uveitis to prevent posterior synechiae. Atropine has a tendency to cause hypersensitivity.
3. Atropine ointment 1% is sometimes preferred for children aged under 5 years to produce cycloplegia prior to refraction, because the ointment formulation reduces systemic absorption.
4. Tropicamide has a fast onset and relatively short duration of activity (<4 hours) which makes it ideal for mydriasis prior to ophthalmological examination.

Sympathomimetics

Phenylephrine hydrochloride
- Single use eye drops 2.5%, 10%

Note: Phenylephrine hydrochloride is used for mydriasis in diagnostic procedures and pre-operative use. Use with caution in cardiovascular disease and only use the lower 2.5% strength.

11.6 Treatment of glaucoma

Prostaglandin analogues

Latanoprost (1st line choice)
Administration once a day (evening)
- Eye drops 0.05%. Contains: benzalkonium chloride.
  - Eye drops: latanoprost 0.05% and timolol 0.5% (use in the morning)

Travoprost (2nd line choice)
Apply once a day, preferably in the evening
- Eye drops 40 microg/ml
  - Duotrav® eye drops: travoprost 40mcg/ml and timolol 5mg/ml (use in the morning)

Tafluprost▼
Apply once a day, preferably in the evening
- Unit dose vial eye drops 15 microg/ml
  - Reserved for patients with preservative allergy where travoprost has already been tried as an alternative to latanoprost
  - Preservative free

Notes:
1. Prostaglandin analogues are now regarded as first line treatment for open-angle glaucoma and ocular hypertension (NICE clinical guideline 85 April 2009)
2. Patients should be counselled regarding possible changes to eye colour since an increase in the brown pigment in the iris and eye lash growth may occur. This is particularly relevant in those with mixed coloured irides and those receiving treatment to one eye only.
3. Prostaglandin analogues should be prescribed generically to maximise cost effectiveness.
4. Where a combination product containing a prostaglandin analogue and a beta-blocker is used, it should be administered in the morning.
5. Latanoprost currently has a comparatively low incidence of reported side effects though uveitis and macular oedema have been reported.
6. A transient asymptomatic hyperaemia (“pink eye”) is common for a few months. This does not necessarily signify intolerance to the eye drop or an allergy or preservative problem.
7. Travoprost contains a different preservative to other agents in this class and may be an alternative for patients with intolerance to latanoprost eye drops.
8. Due to the low eye drop burden associated with this class of drug, eye drop intolerance due to preservative load is rare and usage of tafluprost should only be necessary for true preservative allergy.
Beta-blockers

**Betaxolol hydrochloride**
Administered twice a day

- Ophthalmic suspension 0.25%
- Unit dose eye drop suspension 0.25%

**Timolol maleate**
Administered twice a day

- Eye drops 0.25%, 0.5%
- Single use eye drops 0.25%, 0.5%

**Timolol maleate** *(Timoptol LA®)*
Administered ONCE A DAY

- Eye gel (drops) 0.1% *(Nyogel®)*
- Ophthalmic gel-forming solution 0.25%, 0.5% *(Timoptol LA®)*
- Unit dose eye gel (drops) 0.1% *(Tiopex®)*

Notes:
1. There is no evidence to show that 0.5% timolol is any more effective than 0.25%. The lower dose may also minimise the risk of systemic side effects. Timolol 0.1% eye gel is available for patients unable to tolerate higher strength preparations.
2. Eye gels should be prescribed in preference to standard drops only where there is intolerance or for ease of administration. Eye gels are generally more expensive than standard drops.
3. Systemic absorption may follow topical application; therefore eye drops containing a beta-blocker are contra-indicated in patients with bradycardia, heart block or uncontrolled heart failure.
4. CSM advice: The CSM has advised that beta-blockers, even those with apparent cardioselectivity, should not be used in patients with asthma or obstructive airways disease, unless no alternative treatment is available. In such cases the risk of inducing bronchospasm should be appreciated and appropriate precautions taken.
5. Beta-blocker eye drops should be avoided in patients receiving oral verapamil.

**Sympathomimetics**

**Brimonidine tartrate**
Administered twice a day

- Eye drops 0.2%
- Combigan® Eye drops: brimonidine 0.2%, timolol 0.5%.

Notes:
1. Brimonidine is a selective alpha₂-adrenoceptor stimulant which can be used in those patients who are unresponsive to beta-blockers or if beta-blockers are contra-indicated.
2. Brimonidine should be prescribed generically to maximise cost effectiveness of treatment.
3. Ocular reactions, for example sore itchy red eyes, are quite common with long term use of brimonidine but they rarely manifest before 9 months on treatment.
4. Combined brimonidine/timolol drops *(combigan®)* can be used in open angle glaucoma or ocular hypertension when a beta-blocker alone is not adequate.
5. Adrenaline and dipivefrine *(Propine®)* are not included in this formulary. Their use has reduced due to associated systemic and ocular side effects.

**Carbonic anhydrase inhibitors and systemic drugs**

**Acetazolamide**

- Tablets 250mg
- Diamox SR® m/r capsules 250mg
- Injection 500mg

**Dorzolamide** *(1st choice)*

Usual administration:
- three times a day *(mono therapy)*
- twice a day *(dual therapy with topical beta-blocker)*

- Ophthalmic solution 2%
- Ophthalmic solution: dorzolamide 2%, timolol 0.5%
**Brinzolamide**  
*(2nd choice)*  
Administration twice a day

**Notes:**  
1. Carbonic anhydrase inhibitors are sulphonamide related drugs and may give rise to associated side effects especially with systemic treatment e.g. blood disorders.  
2. Topical carbonic anhydrase inhibitors are another alternative in patients resistant to beta-blockers or those in whom beta-blockers are contra-indicated. They can be used alone or as an adjunct to a topical beta-blocker.  
3. Dorzolamide is the first choice carbonic anhydrase inhibitor. There is no evidence that one carbonic anhydrase inhibitor is more effective then another and dorzolamide costs significantly less. Brinzolamide should only be considered where there is intolerance to dorzolamide or it has not been effective.  
4. Carbonic anhydrase inhibitors should be prescribed generically to maximise cost effectiveness of treatment.  
5. Acetazolamide is used as parenteral or oral therapy for acute glaucoma. Its side effects include paraesthesia, general malaise/fatigue, dizziness, electrolyte imbalance, and depression.  
6. Combination treatment (dorzolamide/timolol) has been included to aid compliance for those patients requiring both a carbonic anhydrase inhibitor and beta-blocker. A newly licensed combination brinzolamide/timolol product *(Azarga▼)* offers no clinical advantage over dorzolamide/timolol combination treatment and is significantly more expensive.

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**Miotics**  
**Pilocarpine**  
Administered TDS - QDS

**Notes:**  
1. A darkly pigmented iris may require a higher concentration of pilocarpine or more frequent administration. Care should be taken to avoid overdosage.  
2. Fundus examination is advised before starting treatment with a miotic.  
3. Miotics should be used with caution in cardiac disease, hypertension, asthma, peptic ulceration, urinary-tract obstruction and Parkinson’s Disease.  
4. Miotics are contra-indicated in conditions where pupillary constriction is undesirable such as acute iritis, anterior uveitis and some forms of secondary glaucoma.  
5. Blurred vision may affect performance of skilled tasks (eg driving) particularly at night or in reduced lighting.

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**11.7 Local anaesthetics**  
**Proxymetacaine**  
**Proxymetacaine with fluorescein**

**Notes:**  
1. Proxymetacaine causes less initial stinging and is useful in children. It has a short duration of action.  
2. Local anaesthetics should never be used for the management of ocular symptoms.

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**11.8 Miscellaneous ophthalmic preparations**  
**Sodium chloride 5%**  
**Ciclosporin**

Unlicensed product for management of very dry eyes. Prescribing should be undertaken only on the recommendation of a consultant ophthalmologist or a corneal specialist.
11. 8. 1  Tear deficiency, ocular lubricants and astringents

Notes on the diagnosis and treatment of dry eyes

- Instillation of fluorescein can be useful for assessing severity of dry eyes. Moderate to marked staining of the conjunctiva and/or cornea may signify a significantly dry ocular surface.
- Patients assessed as having moderate to severe dry eye or patients who are requiring frequent daily use of ocular lubricant (e.g. ≥ 6 times a day) may require referral for consideration for punctal occlusion to reduce tear drainage (outflow).

<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Hypromellose</th>
<th>Eye drops 0.3%</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Unit dose vials 0.5ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydromoor® Preservative Free Tear Drops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Polyvinyl alcohol ophthalmic solution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Polyvinyl alcohol single use ophthalmic solution</td>
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<tr>
<td></td>
<td></td>
<td>Excipients depend on manufacturer</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Liquifilm Tears®</th>
<th>Polyvinyl alcohol ophthalmic solution</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Polyvinyl alcohol single use ophthalmic solution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contains benzalkonium chloride, disodium edetate</td>
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<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Carmellose</th>
<th>Unit dose eye drop 0.5% (Celluvisc®)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Preservative free</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Systane®</th>
<th>Hydroxypropyl guar eye drops</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Hydroxypropyl guar 0.8ml single use vials</td>
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<tr>
<td></td>
<td></td>
<td>Contains polyquaternium-1 (POLYQUAD)</td>
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<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Sodium hyaluronate</th>
<th>Sodium hyaluronate 0.1% (Hylo-Tear®)</th>
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<tbody>
<tr>
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<td></td>
<td>Sodium hyaluronate 0.2% (Hylo-Forte®)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acetylcysteine Eye drops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preservative free</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each bottle of Hylo-Tear® and Hylo-Forte® can be used for up to 6 months from opening</td>
</tr>
<tr>
<td></td>
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<td>Contains benzalkonium chloride, disodium edetate</td>
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<table>
<thead>
<tr>
<th>Eye Drops</th>
<th>Ilube®</th>
<th>Liquid paraffin eye ointment</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Clinitas Gel® 980 liquid gel</td>
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<td></td>
<td></td>
<td>Contains cetrimide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recommended dosage 3 times daily</td>
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<table>
<thead>
<tr>
<th>Eye Ointment</th>
<th>Lacri-Lube®</th>
<th>Clinitas Gel® 980 liquid gel</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Contains cetrimide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recommended dosage 3 times daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye Gel</th>
<th>Carbomer 980</th>
<th>Single-dose carbomer 980 liquid gel (Viscotears®)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Contains cetrimide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recommended dosage 3 times daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Irrigation solution</th>
<th>Sodium chloride</th>
<th>Single use eye drops, sodium chloride 0.9% (Minims®)</th>
</tr>
</thead>
</table>

Notes:

1. Most ocular lubricants may be purchased over the counter from a Pharmacy at a cost under the current prescription charge.
2. Hypromellose is the traditional choice of treatment for tear deficiency. It may be instilled frequently for adequate relief.
3. Lacri-Lube® may be used to lubricate the eye surface, especially in cases of recurrent corneal epithelial erosion. It may cause temporary visual disturbance and is best suited for application before sleep. Lacri-Lube® contains lanolin- wool fat derivatives.
4. The ability of carbomers to cling to the eye surface may help to reduce frequency of application.
5. Carmellose, hydroxypropyl guar and sodium hyaluronate eye drops are significantly more expensive and should not be used as first or second line choices.
6. Hylo-Tear® and Hylo-Forte® drops have a unique one way valve system incorporated into the bottle which maintains the sterility of the product so that it can be used for up to 6 months after opening. Patients should be counselled about the increased “shelf-life” of these products in order to ensure they are used cost-effectively.
7. Only in exceptional circumstances would a patient require more than one type of ocular lubricant drop.
8. Long-term administration of preservative-containing eye drops may cause ocular irritation.
9. Recommendations for when to use preservative free treatments:
   - the patient has an allergy to the preservative
   - after a corneal transplant in selected cases, depending on indication, and in cases where the cornea is compromised, on specialist advice
   - ocular surface disease, including severe dry eye syndrome
   - if wearing soft contact lenses, including disposable lenses
   - sometimes when multiple topical preparations are being used, it may be desirable to have the most frequently instilled product in a preservative free formulation in order to reduce the preservative load
10. Ointments should not be used during contact lens wear.
11. Sodium chloride is included for a variety of irrigation procedures.

11. 8. 2  Ocular diagnostic and peri-operative preparations and photodynamic treatment

Ocular diagnostic preparations

Fluorescein sodium
- Single use eye drops 1%, 2%
- Fluorets®

Notes:
Fluorescein sodium is the standard preparation to detect ocular lesions and foreign bodies. It is used in diagnostic procedures in both primary and secondary care and should not be prescribed.

Ocular peri-operative drugs

Diclofenac sodium
- Voltarol Optha® Single use eye drops 0.1%
- Acular® Eye drops 0.5%

Notes:
Preservative free

Ketorolac
(1st Line)

Apraclonidine
- Ophthalmic solution 0.5%
- Single use ophthalmic solution 1%

Notes:
Contain benzalkonium chloride, disodium edentate

Subfoveal choroidal neovascularisation

Afibercept▼
- Eylea® Solution for intravitreal injection 40mg/ml
- Lucentis® Solution for intravitreal injection 10mg/ml

Ranibizumab▼
- Solution for intravenous infusion 6mg/m²

Notes:
Ranibizumab (NICE TA155 2008) and afibercept (NICE TA 294 July 2013) are recommended for the treatment of wet-related macular degeneration if all the following apply:
- The best corrected visual acuity is between 6/12 and 6/96
- There is no permanent structural damage to the central fovea
- The lesion size is less than or equal to 12 disc areas in greatest linear dimension
- There is evidence of recent disease progression
They should only be continued in patients who maintain adequate response to therapy

Ranibizumab is also approved by NICE to treat diabetic macular oedema (DMO) in some patients (NICE TA 274 Feb 2013) and for the treatment of retinal vein occlusion (NICE TA 283 May 2013)

Verteporfin

Notes:
Verteporfin is recommended for wet age-related macular degeneration with a defined diagnosis of classic (no occult) subfoveal choroidal neovascularisation and best corrected visual acuity of 6/60 or better (NICE TA68 2003)

Health supplements for eye conditions such as age-related macular degeneration (e.g. ICaps, Ocuvite) are not recommended for prescribing on the NHS and are not supported.
11.9 **Contact lenses**

**Notes:**

1. **Contact lens solutions are not allowed on FP10 prescription.**
2. Acanthamoeba keratitis, a sight-threatening condition, is associated with ineffective lens cleaning and disinfection or the use of contaminated lens cases. The condition is especially associated with the use of soft lenses and can be characterised by intense pain sometimes in the absence of any other signs.
3. Special care is required in prescribing eye preparations for contact lens users.
4. Some drugs and preservatives in eye preparations can accumulate in hydrogel lenses and may induce toxic reactions. Therefore, unless medically indicated, the lenses should be removed before instillation and not worn during the period of treatment.
5. Ointment preparations and oily eye drops should only be used in conjunction with contact lens wear following specialist advice.
6. Many drugs given systemically can also have adverse effects on contact lens wear – refer to BNF for details.