Acne presents in a wide variety of clinical forms depending on the type, number and severity of the predominant lesion. In most patients, acne is a spectrum of disease. At one end lies the invisible microcomedone – the development of which is the first essential step in acne lesion formation – and at the other end is the deep scarring inflammatory nodule. Acne principally affects the face (99% of sufferers), the back (60%), and the chest (15%).

Who gets acne?
Acne affects almost everyone at some point in their life, up to 14% of people will consult their GP, and about 0.3% will require referral to a dermatologist. Peak incidence is seen in females aged 14-17 years and males aged 16-19 years. Acne varies greatly in severity, and the person’s perception of the problem will influence whether they seek medical help for it. Acne is the presenting problem in 3% of GP consultations in the 13-25 age group.

Acne can also occur later in life. Approximately 5% of women and 1% of men aged 25-40 years either continue to get acne lesions or develop acne (late-onset acne) after adolescence. Patients with persistent acne often have a family history of persistent acne. This is a more demanding, articulate group of patients with high expectations for improvement. Without treatment, acne persists in most sufferers for an average of 8-12 years. Currently, the understanding of acne has been refined toward a “chronic disease”, overcoming the misconception of acne as a simple, self-limiting affliction of adolescents.
What causes acne?

There are 4 primary pathogenic factors, which interact in a complex manner to produce acne lesions:

1. Androgen-induced sebum production by the sebaceous gland
2. Abnormal keratinisation resulting in the formation of comedones
3. Colonisation of the pilosebaceous duct with Propionibacterium acne. P. acne is an anaerobic bacterium that forms part of the normal cutaneous flora in adults. Colonisation by P. acne leads to visible inflammation with swelling, redness, pain and release of inflammatory mediators into surrounding skin
4. Inflammation, resulting from an interaction between biological changes in the duct, P. acne colonisation, and the production of pro-inflammatory cytokines in response

The formation of an acne lesion is thought to begin with the microscopic lesion known as the “microcomedo” or “microcomedone”. This lesion, which is not yet clinically visible, forms when excess sebum collects in the follicle and normal epithelial desquamation occurs along with proliferation of P. acne. The microcomedo is the precursor to all acne lesions.

What are the complications of acne?

Although acne is a common, non-life threatening disease, untreated it can have serious, lifelong physical and psychological consequences and health professionals should aim to treat it effectively.

**Physical complications**

Acne can cause extensive and permanent scarring. Scarring is usually mild and only visible under bright lights. However, significant scarring (socially noticeable) is estimated to occur in 22% of people with acne and has been implicated as a risk factor for suicide, particularly in men. The development of post-acne scarring often represents the failure of adequate and timely medical therapy; thus early and effective treatment of acne is the most appropriate way to prevent scarring.

**Psychological complications**

Acne develops at the time when there is already a great deal of conflict and difficulty for the adolescent, and the presence of significant acne can make things worse. The social, psychological, and emotional impairment that can result from acne has been reported to be similar to that associated with epilepsy, asthma, diabetes, and arthritis. In particular, it is the psychosocial distress that acne produces that makes such a powerful argument for its timely and adequate treatment. Even patients with mild to moderate acne have a higher prevalence of suicidal ideation, comparable to that among patients with far more chronic and disfiguring dermatological problems. Other psychological consequences include lowered self-esteem and professional expectations, social inhibition, depression and anxiety. Furthermore, severe acne has been associated with decreased employability in adulthood.

**Myths and Frequently Asked Questions**

**What are the goals of acne treatment?**

The therapeutic goals in acne are to resolve existing lesions, prevent scarring and suppress the development of new lesions. Successful management of acne involves choosing the right medications and helping the patient to use the medications as directed. The treatment of acne is often hampered by misunderstandings about the condition (See Table TWO) and unrealistic expectations of treatment. Patients often abandon treatment early because of slowness of response, skin irritation caused by treatment or inconvenient regimens. It is important to recognise that patients want treatment that produces rapid results with minimum inconvenience. Successful treatment depends not merely on the provision of efficacious products but also on support and encouragement to carry on with treatment for months rather than just days or weeks.

**Are there any drugs that could cause or aggravate acne?**

Topical and oral corticosteroids, anabolic steroids, androgens, iodides, bromides, ciclosporin, lithium, halothane, progestogens and vitamin B12 can all cause or aggravate acne.

**Table TWO: Myths about acne and commonly asked questions**

<table>
<thead>
<tr>
<th>Question</th>
<th>Myth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients will often carry beliefs about the cause(s) of their acne, and will often blame themselves for the condition</td>
<td>dispelling popular myths can have a positive impact on a person’s motivation in coping with acne, improve adherence to treatment, and stop a person adopting unnecessary or potentially harmful behaviour.</td>
</tr>
<tr>
<td>Is acne caused by poor hygiene?</td>
<td>acne is not caused by poor hygiene and there is no evidence it is improved by cleaning. In fact, excessive washing can aggravate acne. The black tip of a comedone is deposited melanin and oxidised sebum, not dirt, and it cannot be removed by scrubbing. Vigorous washing or picking spots may actually make things worse.</td>
</tr>
<tr>
<td>Can I wear cosmetics?</td>
<td>Yes, especially if they are non-comedogenic but it is best to avoid heavy make-up.</td>
</tr>
<tr>
<td>Does diet influence acne?</td>
<td>diet has little or no effect on acne. No studies have shown a link between acne and diet. In particular, no effect has been established between chocolate, dairy products, shellfish, or fatty foods.</td>
</tr>
<tr>
<td>Does stress aggravate acne?</td>
<td>patients sometimes report that stress aggravates acne. This possibility is not unreasonable because stress, through its effect on the pituitary-adrenal axis, may slightly increase the levels of circulating androgens.</td>
</tr>
<tr>
<td>Does acne flare before a period?</td>
<td>a premenstrual acne flare occurs in about 60% of females with acne.</td>
</tr>
<tr>
<td>Does sunshine help?</td>
<td>many patients report benefit from sunshine, however, studies show sunlight probably has little benefit in acne.</td>
</tr>
<tr>
<td>Is acne infectious?</td>
<td>acne is not infectious and cannot be passed on to other people. P. acne is naturally present on skin but colonises follicles in acne.</td>
</tr>
</tbody>
</table>
How can compliance with acne treatments be improved?  
Non-compliance is primarily the result of patient dissatisfaction due to treatment-related side-effects and the inability of some patients to follow what can be complex, multi-product regimens. There are several ways in which healthcare professionals can work with a patient to motivate him/her to comply with prescribed regimens, thereby improving response to treatment:

- treatment may be associated with short-term adverse effects. These may improve with continued use.
- at the start of treatment, acne may appear to initially worsen. It should be explained that this is because medications may be working on lesions that were not previously visible.
- explain why a specific treatment was chosen. This emphasises the individualised benefits and therefore encourages compliance.
- suggesting how the recommended therapy can be incorporated into the patient’s skin care regimen is important because tailoring treatment recommendations to fit within the patient’s lifestyle will increase the likelihood of compliance.
- scheduling an initial follow-up visit between 4 and 8 weeks is important to assess response to treatment, as well as to give support to the patient.
- at each follow-up visit, ask about the patient’s impression of treatment effectiveness and assess any adverse effects related to the current treatment. Based on the observed response, the treatment plan is maintained, revised, or simplified according to the patient’s specific needs.
- patients should be aware that long-term treatment is likely to be necessary to control their acne.

Assessing the severity of acne
When assessing the severity of acne, consider the distribution (face, back, chest, and upper arms), type and number of lesions (comedones, papules, pustules, nodules) and the presence or absence of scarring. Physically, acne can be categorised as mild, moderate or severe (see Table THREE).

<table>
<thead>
<tr>
<th>Table THREE: Grading of acne severity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild acne</strong></td>
<td><strong>Moderate acne</strong></td>
</tr>
<tr>
<td>Open and closed comedones (whiteheads and blackheads) a few papules and pustules</td>
<td>Comedones, more frequent papules and pustules, minimal scarring; can be subdivided into mainly comedonal or mainly inflammatory acne</td>
</tr>
</tbody>
</table>

Scarring often indicates previous episodes of severe acne (its presence may warrant more aggressive treatment to prevent further scarring).

The psychological impact of acne
It is important to recognise that acne can have a substantial impact on a person’s quality of life, affecting both self-esteem and psychosocial development. Psychological morbidity is not a trivial problem, and it is compounded by multiple factors.

- acne affects highly visible skin.
- popular culture and societal pressures dictate blemishless skin.
- acne can be dismissed by healthcare professionals as a trivial self-limiting condition.
- acne peaks in teenage years, a time crucial for building confidence and self-esteem.

Studies assessing the effect of acne on psychological health found a range of abnormalities including depression, suicidal ideation, anxiety, psychosomatic symptoms, shame, embarrassment, and social inhibition, which improve with effective treatment.

Many healthcare professionals and a significant proportion of the lay public dismiss acne as a natural part of growing up that has few real consequences. Yet considerable evidence shows that acne can be a psychologically damaging condition that lasts years.

Acne severity and degree of psychological impairment do not necessarily correspond – mild disease in one person can cause high degrees of psychological disability, whereas another with more severe disease can seem less bothered by their acne.

When is it appropriate to consider referring a person for specialist treatment?
Clinical Knowledge Summaries recommend the following referral advice for acne patients — see Table FOUR.

<table>
<thead>
<tr>
<th>Table FOUR: Referral to specialist services for acne vulgaris</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild acne</strong></td>
</tr>
<tr>
<td>Refer to psychiatry, people who have severe psychosocial problems, including a morbid fear of deformity (body dysmorphic disorder).</td>
</tr>
<tr>
<td>Refer to endocrinology or gynaecology, women suspected of having an underlying endocrinological cause of acne (e.g. polycystic ovary syndrome).</td>
</tr>
<tr>
<td><strong>Moderate acne</strong></td>
</tr>
<tr>
<td>Refer to psychiatry, people who have severe psychosocial problems, including a morbid fear of deformity.</td>
</tr>
<tr>
<td>Refer to dermatology:</td>
</tr>
<tr>
<td>- People who are developing scarring, or are at risk of developing it, despite primary care interventions.</td>
</tr>
<tr>
<td>- People who have moderate acne that has failed to respond adequately to treatment over a period of at least 6 months, and treatment failure should be judged on the person’s perception of their condition.</td>
</tr>
<tr>
<td>- People with features that make the diagnosis uncertain.</td>
</tr>
<tr>
<td>Refer routinely to endocrinology or gynaecology, women suspected of having an underlying endocrinological cause of acne.</td>
</tr>
<tr>
<td><strong>Severe acne</strong></td>
</tr>
<tr>
<td>Refer urgently to a dermatologist, if the person has a severe variant of acne with systemic symptoms (such as acne fulminans).</td>
</tr>
<tr>
<td>Refer (soon) to a dermatologist, all other people with severe acne, including people with painful, deep, nodules or cysts (nodulecystic acne).</td>
</tr>
<tr>
<td>Refer to psychiatry, people who have severe psychosocial problems, including a morbid fear of deformity.</td>
</tr>
</tbody>
</table>

When should treatment of acne be started?
Acne medications should be started soon after the appearance of acne lesions to minimise the potential for physical and emotional scarring. This is especially important because the clinical severity of acne does not correlate well with the impact on the patient; thus, the patient may feel significant embarrassment, anger, or other psychological disturbance even when disease is mild.

How is it decided which treatment(s) should be used?
Treatment for acne is largely determined by factors such as severity, extent and duration of the disease; predisposition to scarring; post-inflammatory erythema and pigmentation; and patient preference and cost considerations. Response to previous treatment also needs to be considered, bearing in mind that many people will have bought topical preparations over-the-counter before consulting a healthcare professional. Patients should be advised of the importance of adherence to treatment to minimise the potential for scarring.

The Global Alliance to Improve Outcomes in Acne has produced useful guidance – this is summarised in Table FIVE.
Patients often report tolerability problems with topical acne treatments, for example, patients using benzoyl peroxide preparations may complain that the product causes skin dryness or irritation. This is particularly problematic early in the course of treatment. To improve tolerability of topical agents, gradual dosing can be considered. For example, the use of a topical agent twice a week or every other day for the first few weeks of the regimen may be helpful; after this time, daily use can be instituted. Moisturisers can also be used to decrease irritation.

For how long should topical treatments be used?
In general, topical treatment should be used for a period of six weeks before response is assessed. Some improvement should become apparent during this time period, although maximal response may occur later. Once a satisfactory response has been achieved, it is uncertain how long treatment should be continued for. The decision should be made on a case by case basis. Factors to consider include the original severity of the acne, the psychological disability caused by the acne, and the adverse effects of treatment.

- benzoyl peroxide and topical retinoids can be used indefinitely as long as adverse effects do not occur. It may be possible to reduce application to alternate days or less during maintenance.
- topical antibacterials should not usually be used long-term due to fears of resistance occurring (see later).
- azelaic acid should be used continuously over a period of several months. There is clinical experience for a continuous application time period of up to one year.

Most physicians probably prescribe topical therapies indefinitely provided the patient is responding. Indeed it would be wise to tell the patient that some form of topical therapy will probably be required for much of the patient’s acne-life. This could be anything from a few years up to 10 years or more. A small number of patients (up to 7%) have nodular acne which may require therapy for up to 10 years or more.

<table>
<thead>
<tr>
<th>Table FIVE: Global Alliance Acne Treatment Algorithm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild acne</td>
</tr>
<tr>
<td>Comedonal</td>
</tr>
<tr>
<td>First choice</td>
</tr>
<tr>
<td>Topical retinoid</td>
</tr>
<tr>
<td>Alternatives</td>
</tr>
<tr>
<td>Different topical retinoid</td>
</tr>
<tr>
<td>Or Azelaic acid</td>
</tr>
<tr>
<td>Or Salicylic acid</td>
</tr>
<tr>
<td>Alternatives (females only)</td>
</tr>
<tr>
<td>Oral anti-androgen + topical retinoid/azelaic acid</td>
</tr>
<tr>
<td>Oral anti-androgen + topical retinoid +/- topical antibacterial</td>
</tr>
<tr>
<td>Maintenance therapy</td>
</tr>
<tr>
<td>Topical retinoid</td>
</tr>
<tr>
<td>Topical retinoid +/- benzoyl peroxide</td>
</tr>
<tr>
<td>Moderate acne</td>
</tr>
<tr>
<td>Mixed and papular/pustular</td>
</tr>
<tr>
<td>Oral antibacterial + topical retinoid +/- benzoyl peroxide</td>
</tr>
<tr>
<td>Nodular</td>
</tr>
<tr>
<td>Oral antibacterial + topical retinoid + benzoyl peroxide</td>
</tr>
<tr>
<td>Nodular/conglobate</td>
</tr>
<tr>
<td>Oral isotretinoin</td>
</tr>
<tr>
<td>High dose oral antibacterial + topical retinoid +/- benzoyl peroxide</td>
</tr>
</tbody>
</table>

* Refer all people with severe acne for specialist assessment and treatment (for example with oral isotretinoin), and consider prescribing an oral antibiotic in combination with a topical drug whilst waiting for an appointment.
How do topical retinoids work?
Topical retinoids normalise follicular keratinisation, promote drainage of comedones, and inhibit new comedone formation. They have been used historically mainly to treat comedones, but they are also effective at treating inflammatory lesions (if used in the longer term) by inhibiting microcomedone formation. This is supported by good evidence fromplacebo-controlled trials. Topical retinoids decrease the number of comedones and inflammatory lesions by 40-70%.

How should a topical retinoid be used?
Patients should apply a thin layer of the agent to any area affected by acne and continue until lesions clear. Without instruction many patients will apply only to inflamed spots. Application should be at bedtime because retinoids are inactivated by light, If irritation is particularly troublesome, consider advising the person to wash the product off their skin after a certain period (such as 20 minutes or more); most people can tolerate topical retinoids applied in this way. Several months of treatment with a topical retinoid may be needed to achieve an optimal response, and treatment should be continued until no new lesions develop.

When are topical retinoids contra-indicated?
Topical retinoids should be avoided in:
- pregnancy.
- women of child-bearing age must use effective contraception (oral progesterone-only contraceptives not considered effective).
- people with very sensitive skin (such as people with eczema).
- Consider using adapalene in preference to tretinoin if sensitivity is a problem.
- personal or familial history of cutaneous epithelioma.

What are the side-effects of using a topical retinoid?
The most common adverse effect associated with topical retinoid preparations is local irritation. Symptoms include erythema, scaling, dryness, itching, and burning. These effects often resolve after about 3 weeks usage, but in the meantime, if symptoms are troublesome, consider the following measures:
- advise the person to persist with treatment, as irritation usually subsides over time.
- apply the agent on alternate days to begin with, and increase to daily application once tolerance has developed, or increase the product strength gradually as tolerance improves.
- switch to an alternative topical retinoid. More recently developed retinoids, such as adapalene, cause less irritation than tretinoin.
- advise the person to wash off the product after about 20 minutes; most people can tolerate topical retinoids applied in this way.
- consider changing the formulation of the drug (it may be the vehicle that is causing the irritation).

Topical retinoids increase the skin’s sensitivity to ultraviolet light. This is especially important if they are also taking a tetracycline. Night usage of the product and the use of a suncreen usually avoids this problem.

Approximately 3 weeks after starting topical retinoid therapy, many patients report a flare-up of their acne. There is then a further delay of 2 months before the retinoids exert their maximal effect.

Maintenance treatment with topical retinoids
The nature of acne as a “chronic disease” requires the definition of maintenance regimens to preserve the initial treatment success and prevent frequent relapses. Topical retinoids are suitable for maintenance treatment due to their multifactorial anti-acne efficacy without inducing bacterial resistance during long term treatment and their ability to prevent microcomedone formation. It has been shown that, after cessation of retinoid treatment, the number of microcomedones increases again, which might explain the occurrence of frequent relapses when treatment is withdrawn following successful initial therapy.

Cautions with the use of topical retinoids
- Topical retinoids should be avoided in pregnancy.
- Topical retinoids should be avoided in severe acne involving large areas.
- Contact with eyes, nostrils, mouth and mucous membranes, eczematous, broken or sunburned skin should be avoided.
- Use with caution in sensitive areas such as the neck, and accumulation in angles of the nose should be avoided.
- Exposure to UV light (including sunlight, solariums) should be avoided; if sun exposure is unavoidable an appropriate sunscreen or protective clothing should be used.
- Use of retinoids with abrasive cleansers, comedogenic or astringent cosmetics should also be avoided.
- Allow peeling (e.g. resulting from the use of other irritant treatments) to subside before using a topical retinoid.

Topical benzoyl peroxide
(Acnicide®, Brevlox®, PanOxyl®)
Benzoyl peroxide has been a widely used topical treatment for acne since the 1960s. Although a powerful oxidising agent, benzoyl peroxide is non-toxic to humans and is used in food processing to bleach flour and oils and in various industrial applications. For the treatment of acne, benzoyl peroxide is available in a variety of strengths and formulations, both on prescription and over-the-counter from pharmacies. There is no evidence from trials that any one product is superior to another.

How does benzoyl peroxide act?
Topical benzoyl peroxide has numerous modes of activity. It has been shown to possess antimicrobial, anti-inflammatory, keratolytic, and wound-healing activity. It has been shown that P. acnes is capable of secreting protective biofilm polysaccharides, which may explain some of the difficulty of delivering effective levels of antimicrobials within the skin. Benzoyl peroxide, with its oxidative properties, appears to have a role in destroying this biofilm. This model helps to illustrate the use of benzoyl peroxide in facilitating the delivery of topical antibacterials and other agents to the targeted bacteria. It also explains why benzoyl peroxide has the ability to prevent or eliminate the development of P. acnes resistance.

In many years of use in acne management, bacterial resistance to benzoyl peroxide has not developed.

How should benzoyl peroxide products be applied?
Similar to other topical agents, benzoyl peroxide should be applied to the whole of the affected area, not just the spots. What are the adverse effects of benzoyl peroxide?
Benzoyl peroxide can cause skin irritation, erythema, dryness, and skin peeling. Although irritation tends to diminish as tolerance develops, it can be severe enough to limit use. Minimise local adverse effects by considering the following:
- use a low strength of benzoyl peroxide. Evidence suggests that 2.5% preparations are as effective as 5% or 10% preparations, and they are less likely to cause irritation. Thus, 2.5% is the concentration of choice.
- wash off the application of benzoyl peroxide after 15 minutes initially, and increase exposure in increments of 15 minutes until the drug can be tolerated for 2 hours.
- use water-based products instead of alcohol-based products.

Allergic contact dermatitis is a more serious adverse effect associated with benzoyl peroxide. It has been reported in approximately 1% to 3% of patients and its occurrence necessitates discontinuing the treatment. It usually resolves when treatment is withdrawn.

For how long should benzoyl peroxide be used?
The response to benzoyl peroxide is usually rapid, with improvement noted as early as five days after treatment has begun. Most clinical improvement with benzoyl peroxide occurs within the first 6 weeks, although the maximal response may take up to 3 months. Once a satisfactory response has occurred, the decision to continue treatment should be made on an individual basis. Factors to consider include the original severity of the acne, the psychological disability caused by the acne, and adverse effects of treatment. Benzoyl peroxide may be used indefinitely (either alone or in combination with a topical retinoid) provided adverse effects do not occur. It may be possible to reduce application to alternate days or less frequently during maintenance.
**Prescribing points – Benzoyl peroxide**

- Avoid contact with eyes, mouth and mucus membranes.  
- Benzoyl peroxide may cause bleaching of hair, clothing, towels, and bed-linen.  
- Avoid excessive exposure to sunlight.  
- Available as cream, gel, aquagel, and wash formulations.  
- For people with sensitive skin, weaker, aqueous products may be preferred.  
- Benzoyl peroxide inactivates retinoid when used concurrently. Therefore apply individual products 12 hours apart. A combined proprietary product (Epiduo®) is also available. 

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**Topical azelaic acid**  
(Finacea® and Skinoren®)

Azelaic acid is a naturally occuring decarboxylic acid that has been shown to be effective in reducing both inflammatory and non-inflammatory acne lesions. Azelaic acid has moderate antibacterial and keratolytic activity as well as weak anti-inflammatory effects. Clinical studies have shown it to be as effective as benzoyl peroxide or tretinoin in the treatment of mild to moderate acne and some patients prefer it because it is less likely to cause local irritation than benzoyl peroxide. Because it is less irritant than other topical treatments, it can be a useful alternative if benzoyl peroxide or topical retinoids are not tolerated.

**What are the adverse effects of topical azelaic acid?**

Mild transient erythema and skin irritation are the most frequently reported adverse events and these tend to subside after 3-4 weeks of continued use. No alteration in regimen is usually necessary. Azelaic acid can lighten the colour of the skin, but this is rarely problematic in practice. Similarly, photosensitivity can occur but is rare and usually mild.

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**Topical antibacterials**  
(Dalacin T®, Stiemycin®, Trecelin®, Zindecilin® and Zinery®)

**Action**

Topical antibacterials, such as clindamycin and erythromycin, are bacteriostatic for *P. acnes* and have also been demonstrated to have anti-inflammatory activities through inhibition of lipase production by *P. acnes* or inhibition of leukocyte chemotaxis.

**Efficacy**

Topical antibacterials are generally well-tolerated and have been shown to reduce inflammatory lesions by 46-70% in several RCTs.

**Place in therapy**

Topical preparations of erythromycin and clindamycin are used in the treatment of mild to moderate inflammatory acne but appear to be no more effective than topical benzoyl peroxide or tretinoin. Topical antibacterials are probably best reserved for patients who wish to avoid oral antibacterials or who cannot tolerate them. Several topical antibacterial products are available and appear to be roughly equivalent in efficacy.

**Use**

Where topical antibacterials are indicated (such as in papulopustular acne), they must be used in combination with a topical agent that has anti-resistance properties (such as benzoyl peroxide), not as monotherapy, and limited to short-term treatment (i.e. reviewed at 6-12 weeks).

**What are the adverse effects of topical antibacterials?**

Mild skin irritation may occur with symptoms of erythema, peeling, dryness and burning, and may be due to the vehicle used. Topical antibacterials rarely cause significant skin irritation unless there is a hypersensitivity reaction to the antibacterial used, in which case treatment should be stopped. Although more commonly associated with systemic clindamycin, diarhoea, abdominal pain, bloody diarrhoea, and colitis (including pseudomembranous colitis) have also been associated with topical clindamycin, but this is likely to be very rare in practice.

**Is there a significant problem with resistance to topical antibacterials?**

Resistance of *P. acnes* to topical antibacterials has become more prevalent and may result in loss of product efficacy. In a large RCT in UK primary care, levels of resistance in *P. acnes* was found to be 47% with erythromycin and 41% with clindamycin.

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**Other topical preparations**

**Abrasive agents** and vigorous scrubbing are not beneficial in acne and should be avoided, as they can aggravate acne by promoting the development of inflammatory lesions.

**Peeling agents** such as sulphur-containing preparations and salicylic acid are generally considered inferior to the more modern topical treatments for acne.

**Salicylic acid** is available in various preparations for sale direct to the public for the treatment of mild acne. Salicylic acid may be an option for someone who cannot tolerate retinoids. Nicotinamide (Nicam®) has potent anti-inflammatory activity in vitro, but there is little data to support its efficacy.

**Using combinations of topical agents**

Given the multiple factors as well as the complex inter-relationship of these factors contributing to acne development, combination therapy targeted towards simultaneous processes has been increasingly favoured in practice. This can be done by alternating separate products or using proprietary combination products (see Table SIX). The choice should be made according to patient’s preference bearing in mind that combined proprietary products:

- do not allow for individual titration of component agents.
- are usually formulated with an alcoholic base, which may irritate sensitive skin.
- may be more convenient for people to use as they reduce the numbers of products and applications required and thus may increase compliance.
- are generally more expensive than single products.

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**Prescribing point – topical antibacterials**

Monotherapy with topical antibacterials should not be used routinely because *P. acnes* may become resistant within one month after daily treatment has begun. Resistance can be avoided if a topical antibacterial is combined with benzoyl peroxide.

**Steps to combat bacterial resistance:**

- Do not use topical antibacterials where other topical acne treatments can be expected to bring the same benefit.
- Do not use a topical antibacterial alone, rather use combined therapy with retinoids or benzoyl peroxide.
- Stop topical antibacterials when there is no further improvement or the improvement is only slight.
- 6-8 weeks into treatment might be an appropriate time point at which to assess response to a topical antibacterial.
- Where possible, treatment with topical antibiotic should be limited to 12 weeks duration.
- Do not combine topical and systemic antibacterials.
- Check the patient’s compliance with treatment.
Table SIX: Practical considerations when combining topical treatments for acne

<table>
<thead>
<tr>
<th>Combination</th>
<th>Proprietary combinations available</th>
<th>When combining separate products</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzoyl peroxide + topical antibacterial</td>
<td>Benzoyl peroxide + clindamycin (Duac® Once Daily)</td>
<td>Apply 12 hours apart (e.g. benzoyl peroxide at night and topical antibacterial in the morning).</td>
<td>Concomitant use of benzoyl peroxide and topical clindamycin or erythromycin is more effective than either component alone (87,88,89) and decreases the risk of resistance. Duac® gel needs to be refrigerated until it is dispensed. After dispensing, it then needs to be stored below 25°C. Shelf life after dispensing = 2 months.</td>
</tr>
<tr>
<td>Benzoyl peroxide + topical retinoid</td>
<td>Benzoyl peroxide + adapalene (Epiduo®)</td>
<td>Apply 12 hours apart (e.g. topical retinoid at night and benzoyl peroxide in the morning). Both products may irritate the skin; switch to an alternative combination if this is a problem.</td>
<td>The combination of a topical retinoid plus benzoyl peroxide is a logical formulation, because it targets 3 of 4 pathophysiologic factors and the antibacterial portion (benzoyl peroxide) is rapidly bactericidal without evidence of bacterial resistance. Benzoyl peroxide may oxidize a retinoid if they are applied as separate products. (77)</td>
</tr>
<tr>
<td>Topical retinoid + topical antibacterial</td>
<td>Tretinoin + erythromycin (Akneemycin® Plus)</td>
<td>Apply 12 hours apart (e.g. topical retinoid at night and topical antibacterial in the morning).</td>
<td>A combination of topical retinoid and topical antibacterial is more effective than either agent used alone. (73,87-92) However, the agents should be applied at separate times, unless they are known to be compatible. Patients on combination therapy show faster signs of improvement. (82-83) This is believed to lead to greater patient adherence and reduce the risk of P. acnes resistance.</td>
</tr>
</tbody>
</table>

Notes: 58,96
- Topical retinoids improve the penetration of other topical medications.
- Topical retinoids may help to improve the hyperpigmentation that is left in darker skin types after the resolution of inflammatory lesions.

Oral preparations for the management of acne

**Oral antibacterials**

When topical agents are insufficient or not tolerated, or in cases of moderate to severe acne, especially when the chest, back and shoulders are involved, systemic antibacterials are often considered the next line of treatment. (99,105)

Oral antibacterials are usually reserved for: 59,70,101
- moderate inflammatory acne
- patients who have not responded adequately to topical therapy or who cannot tolerate it
- those at greatest risk of scarring
- where lesions are predominantly on the chest, back, shoulders making topical therapy impractical,

Anti-comedonal treatment (e.g. with topical benzoyl peroxide) may also be required. 42

Oral antibacterials reduce P. acnes within follicles, thereby inhibiting production of bacteria-induced inflammatory cytokines. (102) Compared to topical antibacterials, oral antibacterials are more effective and have a faster onset of action. Unfortunately, the risk of antibacterial resistance is significant. (109)

**Which oral antibacterials are suitable for the treatment of acne?**

Of the oral antibacterials, **oxytetracycline, tetracycline and lymecycline** are considered first-line (see Table SEVEN for doses). Alternatives to tetracyclines include erythromycin, and doxycycline.

**Minocycline** is no longer considered suitable as a first-line acne treatment (see later).

Erythromycin should only be used as a first-line agent when tetracyclines are contraindicated. 46 There is a lack of evidence from placebo-controlled trials to verify the efficacy of erythromycin, although evidence from comparative trials indicates it is probably as effective as tetracyclines. However, there is evidence from observational and controlled studies that there are particular problems with the development of bacterial resistance to erythromycin. Erythromycin can be used as second-line choice following therapeutic failure of a tetracycline.

No oral antibacterial has been shown to be more effective than any other, 104 but clinical experience indicates that some people respond better to one antibacterial than another. There is no evidence that higher doses are more effective than lower doses or that controlled-release preparations are necessary. 105,106

Table SEVEN: Oral antibacterial therapy for acne vulgaris 42,107

<table>
<thead>
<tr>
<th>Antibacterial and dose</th>
<th>Cost of 28 days treatment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doxycycline</strong> 100mg daily</td>
<td>£2.68</td>
<td>Contraindicated in pregnant women or in children under 12 years of age. Can be taken with food. Adverse reactions: GI upset, phototoxicity.</td>
</tr>
<tr>
<td><strong>Erythromycin TABLETS</strong> 500mg twice daily</td>
<td>£6*</td>
<td>Safe in pregnant women and children. May cause GI upset. 42% of patients may show resistance. (11)</td>
</tr>
<tr>
<td><strong>Lymecycline</strong> 408mg daily</td>
<td>£6.95</td>
<td>Contraindicated in pregnant women or in children under 12 years of age. Can be taken with food.</td>
</tr>
<tr>
<td><strong>Oxytetracycline</strong> 500mg twice daily</td>
<td>£3.60</td>
<td>Contraindicated in pregnant women or in children under 12 years of age. Needs to be taken on an empty stomach.</td>
</tr>
<tr>
<td><strong>Tetracycline</strong> 500mg twice daily</td>
<td>£7.92</td>
<td>Contraindicated in pregnant women or in children under 12 years of age. Needs to be taken on an empty stomach.</td>
</tr>
</tbody>
</table>

*Prescribe erythromycin as tablets; they cost considerably less than the capsules. 42
Why is minocycline not considered to be a first-line acne treatment?

Minocycline is NOT a first-line acne treatment based on the following:

- Evidence that minocycline might be more effective than other tetracyclines is, at best, weak, being limited to a few, poor quality trials with questionable results. 106,107
- Minocycline seems to be almost unique within tetracyclines in causing potentially irreversible slate-grey hyperpigmentation of the skin. Pigmentation of other tissues (e.g. the sclera, conjunctiva) has also been reported. 111,112
- Minocycline is associated with a higher risk of inducing lupus-like syndrome. 109 The overall hazard ratio for the association of minocycline to lupus erythematosus was 2.64 (95% confidence interval = 1.51 to 4.66). 113
- Minocycline has been associated with autoimmune hepatitis or other types of hepatotoxicity.

The SmPC for minocycline products recommends that if the drug is continued for over 6 months, patients should be monitored at least 3-monthly for features of hepatitis, systemic lupus erythematosus or unusual pigmentation.

Considering the non-superiority of its effects in acne, its specific adverse effects, its price and the alternatives, the benefits of minocycline are significantly lower than the potential risks. 114

Minocycline may be an effective treatment for some patients with acne but there is a lack of evidence that it is any better than other options. 104,105

Consequently, the number of prescriptions for minocycline in NI has fallen steadily over the last ten years, as Graph ONE below shows. 169

Graph ONE: Number of items of Minocycline prescribed in NI

<table>
<thead>
<tr>
<th>Year</th>
<th>0/2/17</th>
<th>0/3/17</th>
<th>0/4/17</th>
<th>0/5/17</th>
<th>0/6/17</th>
<th>0/7/17</th>
<th>0/8/17</th>
<th>0/9/17</th>
<th>0/10/17</th>
<th>0/11/17</th>
<th>0/12/17</th>
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<tr>
<td>Items</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>

Actions for prescribers: Minocycline

The potential for serious adverse reactions with minocycline has led manufacturers to recommend "periodic" monitoring of blood, renal, and liver function. The BNF recommends monitoring for hepatotoxicity, pigmentation and systemic lupus erythematosus every 3 months, if the drug is taken for 6 months or more. 42

After what time should efficacy of an oral antibacterial be assessed and for how long should treatment be continued?

Oral antibacterials usually cause a rapid and sustained improvement in acne; data from a large RCT indicated that 6-8 weeks is an appropriate time to assess response. 106 However, maximal improvement may only be apparent after 3-4 months, and it has been recommended that treatment should be continued for a minimum of 3 months before it is assumed to be ineffective. 105

If an individual does not respond to oral antibacterials or stops responding, there is no evidence that increasing the frequency or dose is helpful. Such strategies increase the risk of resistance developing without increasing efficacy. The oral antibacterial should be stopped if no further improvement is evident; 44 a different oral antibacterial can be tried. 52,53

If patients respond well, the oral antibacterial should be continued for 6-8 months in total and then the patient maintained on an appropriate topical regimen. 42 Oral antibacterials should NOT be routinely used for maintenance because alternatives exist with similar efficacy and preventative action. 96

What happens when the course of oral antibacterial finishes?

An oral antibacterial can be very helpful in bringing moderate to severe acne under control. However, once adequate control is achieved, the oral antibacterial may be discontinued. Many patients do well with subsequent use of a topical regimen with a combination topical retinoid plus topical antibiotic or retinoid plus benzoyl peroxide combination. Maintenance therapy with topical retinoids or retinoid combinations may obviate the need for long-term systemic antibiotics. 116

What are the adverse effects of the oral antibacterials used to treat acne?

The incidence of significant adverse effects with oral antibacterial use is low. However, adverse effect profiles may be helpful for each oral antibacterial used in the treatment of acne.

Tetracyclines

- Gastrointestinal disturbances are the most common adverse effects associated with use of tetracyclines orally. Nausea, vomiting and diarrhea are the most common adverse effects. Tetracycline and oxytetracycline should be taken on an empty stomach, which may increase nausea. Doxycycline, lymecycline, and minocycline may be taken with food, which may help the person tolerate the drug. 115
- Vulvovaginal candidiasis may occur as a result of the broad spectrum nature of tetracyclines. 45
- Tetracyclines can cause severe opsonophagitis, presenting as burning pain in the lower chest. To counteract this, it is recommended that tetracyclines are taken in an upright position with plenty of water, without chewing or breaking the tablets or capsules. 45
- Photosensitivity may also occur with tetracycline use, especially doxycycline. As a precaution, people taking the drug should be advised to limit their exposure to sunlight (cover up with clothes and use sunblock), and avoid sun-lamps. Doxycycline has been reported to cause photosensitivity in 13 per 1 million prescriptions written. 117
- Lymecycline is much less phototoxic than doxycycline. 116
- Benign intracranial hypertension is a rare but important adverse effect of tetracycline-like drugs. 45 If a person taking a tetracycline develops headache and visual disturbances, the drug should be stopped immediately and advice sought.
- Tetracyclines as a class should not be used in pregnant women or in patients younger than 12 years to avoid the risks of tooth discoloration and bone growth retardation in the foetus or child. 51 When administered to children, all tetracyclines induce grey (63%), yellow (28%), or brown (10%) discoloration of teeth. 119 In adults, only minocycline induces tooth discoloration.

Minocycline

Minocycline shares most of the adverse effects that occur with other tetracyclines, but it is also associated with several adverse effects that are rarer but more severe:

- Drug-induced hepatitis is the most severe adverse effect associated with minocycline use, and this can be life-threatening. All tetracyclines have the potential to cause hepatic inflammation; however, it seems to be more common with minocycline. 104,110 This has led some physicians to suggest that minocycline should only be offered as a second-line treatment, after other antibacterials have failed to have a satisfactory effect. 120
- Minocycline can cause vestibular disturbances. Typically, these present as headache, dizziness, ataxia, and drowsiness. 51 These adverse symptoms are usually reversible, and may be decreased by starting with a low dose of minocycline and increasing gradually. 45
- Skin discoloration is a possible adverse reaction to minocycline, and presents as a grey or blue discolouration, particularly in areas that have been inflamed by acne. 45 This effect may be related to the cumulative dose of minocycline taken and may be irreversible. 104,111

Erythromycin

Gastrointestinal adverse effects are common with prolonged erythromycin use, and these may be severe enough to limit its use. 35 However, erythromycin can be taken with food, which may help reduce nausea.

How significant a problem is resistance to oral antibacterials in the management of acne?

A major problem affecting oral antibacterial use in acne is bacterial resistance, which has been increasing. 86,121 Resistance has been seen with all antibacterials used to treat acne, but is most common with erythromycin. 122
How can the chances of developing antibacterial resistance be lowered?
In an attempt to counteract the development of antibacterial resistance, consider the following:12,13
- stress the importance of adherence to treatment.
- prescribe adequate doses of an oral antibacterial.
- use antibacterials only when there is no other option.
- avoid concomitant use of oral and topical antibacterials.42,71,82
- use antibacterials for the minimum time possible.

If an oral antibacterial has failed and resistance is suspected, it is probably justified to try another antibacterial from a different class. However, avoid routinely switching or rotating antibacterials, as this practice promotes resistance.12,13
- If acne relapses after an antibacterial is stopped, restart the regimen if this was originally effective.

Hormonal treatment

Co-cyprindiol (2mg cyproterone acetate with 35micrograms ethinylestradiol)
Co-cyprindiol is licensed for the treatment of moderate to severe acne related to androgen-sensitivity (with or without seborrhoea) and / or hirsutism, in women of reproductive age. Co-cyprindiol should only be used after topical therapy or systemic antibiotic treatments have failed.12,13 Co-cyprindiol is also an effective combined oral contraceptive (COC), but is not licensed for the sole purpose of oral contraception. Brands include Diane17, Acnocin9, Cifacem9, Clairette9.

What are the adverse effects of co-cyprindiol?
Co-cyprindiol has been found to be associated with an increased risk of venous thromboembolism (VTE). The risk of VTE is considered to be 1.5 to 2 times higher compared with levonorgestrel-containing pills. Other adverse effects associated with co-cyprindiol are similar to those of other COCs and include breast tenderness, mood changes, and body weight changes.

For how long should co-cyprindiol be given?
A response to hormonal intervention may be seen after one menstrual cycle, but 3-6 months are usually needed to judge the full effect.33,36
Co-cyprindiol should be continued for only 3-4 menstrual cycles after the woman’s acne has resolved, due to the risk of serious adverse effects such as VTE.12,13 If contraceptive cover is still required after the course of co-cyprindiol is finished, the patient should change to another oral contraceptive. Note: other COCs can be effective in acne management (although unlicensed) and may be continued indefinitely.

If acne recurs after co-cyprindiol has been stopped can it be restarted?
If, on withdrawal of co-cyprindiol, the patient’s acne relapses, then a repeat course of co-cyprindiol is indicated. No set interval between courses is suggested, but in order to maintain the menstrual cycle, it is suggested leaving a minimum of one month before restarting another course.12,13

Combined oral contraceptives
There is good evidence from placebo-controlled trials that COCs are effective in reducing lesion count, acne severity, and the woman’s perception of the condition.34,121-123 Clinical observation indicates that women with deep-seated nodules of the lower face and neck are a group in whom hormonal treatment may be especially useful.82
In general, after 6 to 9 months of use of a COC, there is a reduction in inflammatory lesions by 30-60%, an improvement of acne in 50-90% of patients, and non-inflammatory facial acne lesions are also reduced.33,34
Of note, hormonal therapies seem to work best in women who report acne flare-up premenstrually.12,13

How do COCs work in the treatment of acne?
The beneficial effects of COCs on acne have been noted for many years.97 COCs are useful in acne because oestrogen inhibits sebaceous gland activity and suppresses ovarian and adrenal androgen production. Androgens are one of the main factors in acne pathogenesis because they enhance follicular keratinosis and influence sebum production.12,13 There is no acne without sebum, which serves as a nutrient source for P. acnes, and androgens are the major sebotropic hormones. The increased sebum production in acne patients may be due to increased circulating androgens or a hyperresponsiveness of the target organ (the pilosebaceous unit) to androgens, or both.1,12,13

Oral retinoids

Oral isotretinoin is a synthetic form of vitamin A. Oral isotretinoin is indicated for severe acne such as nodulocystic and conglobate acne, but it is commonly used for severe acne that has failed to respond to adequate courses of standard oral and topical therapies.99 It is also particularly useful in women who develop acne in the third or fourth decades of life, since late onset acne is frequently unresponsive to antibacterials.82
When the use of this agent is being considered, an assessment of the severity of disease should include the effect of the acne on the person, such as the potential for scarring.82
Isotretinoin is a toxic drug that should be prescribed only by, or under the supervision of, a consultant dermatologist. In Northern Ireland, isotretinoin is on the RED list for specialist medicines. This means that the responsibility for prescribing it remains with the consultant or specialist clinician. Supply of isotretinoin is via the relevant hospital pharmacy. (See www.ipnsm.hscni.net).

How effective is oral isotretinoin in the treatment of acne?
Oral isotretinoin is the most effective drug available for the treatment of acne. However, despite its undeniable effectiveness, isotretinoin is not a curative drug.124 After one course of oral isotretinoin:
- 40% of patients will be free of acne.
- 40% of patients will have recurrence of acne of low severity that responds to medications to which the acne had been previously resistant.
- 20% will need repeated treatment with oral isotretinoin at a future time;124 factors linked with relapse are younger age, female gender, pre-pubertal acne or truncal acne and a high number of inflammatory lesions at the end of treatment.141

How does oral isotretinoin work in the treatment of acne?
Oral isotretinoin is thought to treat all the primary aetiologic factors of acne pathogenesis by:50,142-151
- decreasing sebum production (by 70%) normalising follicular keratinisation reducing follicular colonisation with P. acnes reducing inflammation
The combination of these actions explains the efficacy of oral isotretinoin.50,132

What are the side-effects of oral isotretinoin?
Isotretinoin has a significant pattern of adverse effects. The pattern is similar to that seen in hypervitaminosis A. Adverse effects associated with isotretinoin range from mild, temporary effects which resolve after the drug is discontinued, to rarer potentially fatal conditions.133
Milder side-effects
Most patients receiving isotretinoin experience variable dryness of skin and mucous membranes including nose, eyes and lips. These symptoms are dose-related, and may lead to active inflammation, e.g. cheilitis. This can usually be managed with the regular use of emollients, eye drops and lip balms. Because of these issues concurrent administration of isotretinoin with topical keratolytic or exfoliative anti-acne agents should be avoided as local irritation may increase. Drying of the nasal mucosa may lead to colonisation with *Staphylococcus aureus*, the potential complications of which include abscesses, conjunctivitis, impetigo, cellulitis, and folliculitis.

Rarer side-effects
Rarer side-effects include: isotretinoin embryopathy are craniofacial, central nervous system, cardiovascular and thymic. In addition, foetal exposure to isotretinoin is associated with a higher risk of adverse outcome with respect to mental functioning. The UK National Teratology Information Service estimates that in foetal exposure to isotretinoin 30% of infants with no gross malformations have mental retardation, and up to 60% have impaired neuropsychological function. The MHRA has issued formal prescribing guidance for isotretinoin that is designed to reduce the risk of pregnancy during treatment. The regulations require that women are carefully counselled regarding the risks of pregnancy and should use effective contraception for one month before therapy, during therapy and for one month afterwards. Two simultaneous forms of contraception, including a barrier method, should preferably be used. Pregnancy tests are now required before treatment, every four weeks during treatment and five weeks afterwards. MHRA guidance can be found at the following link: https://www.gov.uk/drug-safety-update/oral-retinoids-pregnancy-prevention-reminder-of-measures-to-minimise-teratogenic-risk

Teratogenicity
The most severe safety issue concerning oral isotretinoin is teratogenicity and the consequences of taking isotretinoin while pregnant are well described. The main abnormalities found in isotretinoin embryopathy are craniofacial, central nervous system, cardiovascular and thymic. In addition, foetal exposure to isotretinoin is associated with a higher risk of adverse outcome with respect to mental functioning. The UK National Teratology Information Service estimates that in foetal exposure to isotretinoin 30% of infants with no gross malformations have mental retardation, and up to 60% have impaired neuropsychological function. The regulations require that women are carefully counselled regarding the risks of pregnancy and should use effective contraception for one month before therapy, during therapy and for one month afterwards. Two simultaneous forms of contraception, including a barrier method, should preferably be used. Pregnancy tests are now required before treatment, every four weeks during treatment and five weeks afterwards. MHRA guidance can be found at the following link: https://www.gov.uk/drug-safety-update/oral-retinoids-pregnancy-prevention-reminder-of-measures-to-minimise-teratogenic-risk

What about reports linking oral isotretinoin with depression or suicidal ideation?
Beginning in 1983, there were a number of case reports as well as small case studies suggesting that mood change, and particularly depression, can occur in association with treatment with oral isotretinoin. The clinical data supporting a relationship between isotretinoin and depression are conflicting, with several small inconclusive studies, often with significant design faults. The current literature does not support nor disprove a causative link between isotretinoin and depression. In particular it has not been possible to distinguish accurately between mood change due to the drug and to the acne itself (depression and suicidal ideation occur with severe acne in the absence of isotretinoin treatment). Healthcare professionals should be alert to the potential psychiatric side-effects which are not restricted to depression. When symptoms have been described, they have most commonly been fatigue, irritability, poor concentration, sadness, crying spells, loss of motivation and forgetfulness. It is estimated that a physician would need to start 2000 patients on oral isotretinoin in a year to see one additional suicide attempt. The time course of onset of mood alteration is variable, but is often later in treatment, and in some cases depressive symptoms have occurred only in second or even third courses of therapy. Resolution of symptoms is usually rapid, within days to weeks of discontinuing the drug, although there are instances of prolonged illness requiring antidepressant therapy. Based on the available evidence, there is no need to discourage the use of isotretinoin in severe acne in patients who will benefit from treatment in terms of physical and psychological improvement. However, the following are recommended: 1. A direct enquiry about previous psychiatric health should be made for all patients who are being considered for isotretinoin and the facts recorded in the notes 2. All patients, and their families, should be made aware of the possible potential for mood change 3. Direct enquiry about psychological symptoms should be made at each clinic visit.

What are the clinically significant drug interactions of oral isotretinoin?
Patients should not take vitamin A concurrently due to the risk of developing hypervitaminosis A. Cases of benign intracranial hypertension have been reported with concomitant use of isotretinoin and tetracyclines. Therefore, concomitant treatment with tetracyclines should be avoided. Concurrent administration of isotretinoin with topical keratolytic or exfoliative anti-acne agents should be avoided as local irritation may increase. Oral isotretinoin can reduce the serum levels of carbamazepine, concurrent use requires close monitoring.

Prescribing points – oral retinoids
Although not prescribed in primary care, healthcare professionals in primary care should note: Referral of patients who would benefit from isotretinoin is the responsibility of the GP. GPs are in a position not only to make suggestions or recommendations to patients regarding referral for consideration of isotretinoin treatment, but also to ensure patient decisions are based on realistic understanding of the benefits and risks of therapy. Isotretinoin is an efficacious and widely-used therapy for severe acne but is recognised as having a wide range of side-effects. Doses of 0.5 to 1mg/kg per day are typical. It is given for at least 16 weeks; repeat courses are not normally required. Improvement may continue for up to 5 months after ending therapy. GPs may find themselves in the middle of the debate surrounding depression trying to allay their patient’s anxieties and doubts. Although a causal link between isotretinoin use and psychiatric changes (including suicidal ideation) has not been established, the possibility should be considered before initiating treatment; if psychiatric changes occur during treatment, isotretinoin should be stopped, the prescriber informed, and specialist psychiatric advice should be sought. A close partnership between dermatologist and GP is likely to be optimal in this situation.

Websites:
British Association of Dermatologists: (www.bad.org.uk) - Patient information leaflets, section for healthcare professional, specialist groups. British Skin Foundation: (www.britishskinfoundation.org.uk) - A charity for skin disease research. Patient information leaflets, newsletters. European Academy of Dermatology and Venereology: (www.eadv.org) - For healthcare professionals. European Society for Dermatologic Research: (www.esdr.org) - For healthcare professionals, supports investigational dermatology.


189. HSCB/BSO. Prescribing data, 2016.
COMPASS THERAPEUTIC NOTES ASSESSMENT
Management of Acne in Primary Care

COMPASS Therapeutic Notes are circulated to GPs, nurses, pharmacists and others in Northern Ireland. Each issue is compiled following the review of approximately 250 papers, journal articles, guidelines and standards documents. They are written in question and answer format, with summary points and recommendations on each topic. They reflect local, national and international guidelines and standards on current best clinical practice. Each issue is reviewed and updated every three years.

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Management of Acne in Primary Care

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- **Pharmacists** should submit their answers at: [www.nicpld.org](http://www.nicpld.org)

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<table>
<thead>
<tr>
<th>1</th>
<th>Topical retinoids:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Should be a foundation in acne therapy for virtually all patients except those with the most severe disease.</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>May cause a flare-up of acne about 3 weeks after initiation.</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>Are contraindicated in pregnancy.</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>Are not associated with skin irritation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Topical benzoyl peroxide:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Is unaffected by bacterial resistance.</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>Commonly causes skin irritation.</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>Can bleach hair, clothing, towels and bed-linen.</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>Should only be used for around 3 months.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Topical antibacterials:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Are more effective than benzoyl peroxide or topical tretinoin.</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>Commonly cause significant skin irritation.</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>Are best used as monotherapy.</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>Can be used indefinitely.</td>
</tr>
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</table>

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<tr>
<th>4</th>
<th>Oral antibacterials:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Show marked differences in efficacy in acne management.</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>Minocycline is an appropriate first-line oral antibacterial for acne management.</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>Should be used for a minimum of 3 months before being assumed to be ineffective.</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>Should be combined from the start of treatment with a topical retinoid or benzoyl peroxide.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>5</th>
<th>Hormonal treatment of acne:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>The progestogen-only pill will produce beneficial effects in acne.</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>Co-cyprindiol (e.g. Dianette®) is licensed as a contraceptive.</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>The full effectiveness of co-cyprindiol or other hormonal treatment for acne can be judged after 3-6 months use.</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>Venous thromboembolism occurs more frequently in women taking co-cyprindiol than those taking a low dose combined oral contraceptive.</td>
</tr>
</tbody>
</table>