



A RESEARCH REVIEW™  
SPEAKER SERIES

# The management of acne vulgaris: Impact on quality of life and best practice

Making Education Easy

2022

## About the speaker



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Dr Peggy Chen works in New Plymouth as a vocationally registered Specialist Dermatologist and an American Mohs College certified Mohs Micrographic Surgeon.

Peggy completed her basic training in Dermatology in Waikato and Auckland and furthered her training in London at Chelsea and Westminster Hospital. Here she gained experiences in novel treatments for psoriasis and eczema and worked with world-renowned dermatologists in genital dermatology. Subsequently, she sub-specialised in Mohs Micrographic Surgery and undertook fellowship training in an American Mohs College accredited training facility in Perth, Australia. During her time in London and Perth, Peggy trained GPs and medical students, wrote book chapters and presented at national meetings and international conferences.

Dr Chen is also an associate editor of the Australasian Journal of Dermatology, a member of the Ministry of Health Melanoma Standards Working Group, and a member of the New Zealand Advanced Dermatology Training Committee.

### Abbreviations used in this review

**BPO** = benzoyl peroxide  
**COCP** = combined oral contraceptive pill  
**EGFR** = epidermal growth factor receptor  
**IL-1** = interleukin-1  
**LHA** = lipohydroxy acid  
**PCOS** = polycystic ovary syndrome

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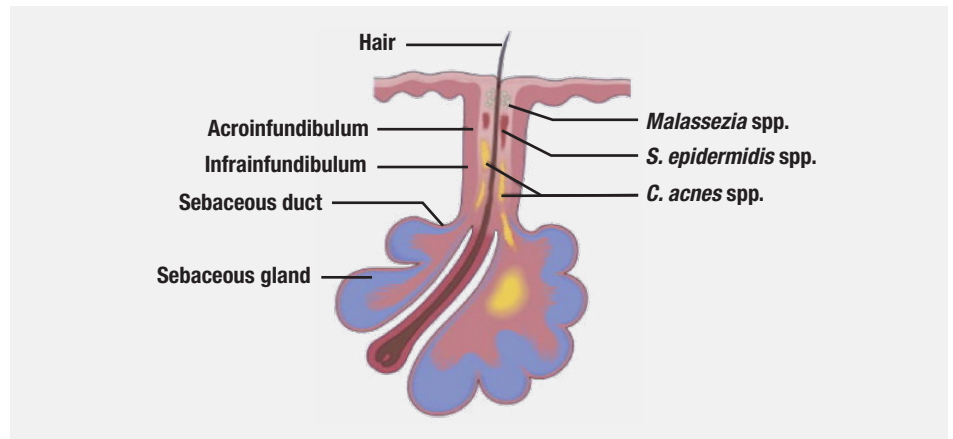


This review summarises a Goodfellow webinar on the management of acne vulgaris by dermatologist Dr Peggy Chen in December 2021. This Goodfellow session and write up was supported by unconditional funding from La Roche-Posay, L'Oréal New Zealand Limited. The full webinar can be accessed online [here](#).

## The prevalence and pathogenesis of acne

Acne vulgaris is a highly prevalent inflammatory skin condition affecting people of all ages. Acne can be easily and effectively managed, but untreated it may have a significant psychological and social impact on individuals.

Acne is characterised by inflammation of the pilosebaceous unit (**Figure 1**).



**Figure 1:** Inflammation of the pilosebaceous unit by resident microflora

Acne incidence peaks between the ages of 12 and 24 years and 85% of people of this age are affected. Acne often continues later in life, affecting 35% of women and 20% of men in their 30s and 26% of women and 12% of men in their 40s.

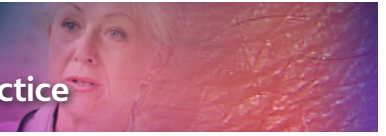
The risk factors for acne include the XXY karyotype, PCOS, hyperandrogenism and precocious puberty. There is no racial predilection for acne. Medicines associated with an increased risk of acne include anabolic steroids, corticosteroids, EGFR inhibitors, lithium, isoniazid and phenytoin.

The pathogenesis of acne is multifactorial. The role of genetics is unclear, however, the size of an individual's sebaceous glands is genetically determined and the prevalence and severity of acne in identical twins is highly concordant. The onset of acne is accompanied by androgen elevations leading to an increase in the size of the sebaceous glands and of sebum production. The resulting follicular keratinization and subsequent follicular plugging causes comedones to form that are characterised by the retention and accumulation of corneocytes. The formation of comedones stimulates an inflammatory response involving increases in CD4+ cells, IL-1 and neutrophils that underly the papules and pustules in patients with acne (see below).

### The microbiome

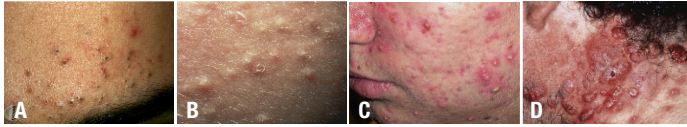
The role of the microbiome in the aetiology of acne has become clearer in the last decade. *Cutibacterium acnes* (previously known as *Propionibacterium acnes*) is present in low numbers on the skin's surface but it is the dominant bacteria in the pilosebaceous unit, along with *Staphylococcus epidermidis*. Previously, it was thought that *C. acnes* was a driver of acne inflammation. More recently, it has been demonstrated that *C. acnes* numbers are similar in the sebaceous glands of individuals with and without acne and that those with acne have fewer *C. acnes* phylotypes in their sebaceous glands compared to individuals without acne. It is speculated that this dysbiosis leads to further inflammation in people with acne.

The gut microbiome also plays a role in the aetiology of acne. A decrease in gut flora diversity leads to an increase in intestinal permeability resulting in the release of additional inflammatory mediators. This may explain the role of diet in acne pathogenesis that has been controversial due to a lack of convincing evidence. The "Western diet" with high levels of refined carbohydrates is associated with a decrease in gut floral diversity and an increase in inflammatory acne.



## Clinical presentation

Acne generally occurs on the face, upper chest and back, where the sebaceous glands are densest. Non-inflammatory acne is caused by open comedones (blackheads – **Figure 2**) and closed comedones (whiteheads). If the sebaceous gland inflammation increases, lesions are formed, e.g. papules, pustules and inflamed nodules and cysts. Secondary lesions may form from inflammatory acne including excoriations, erythematous macules (more common in skin phototypes IV and V), pigmented macules and scarring.



**Figure 2:** Open comedones (A), closed comedones (B), papules and pustules (C) and inflamed nodules and cysts (D)

**Comedones as well as pustules and papules are required for a diagnosis of acne;** pustules or papules without comedones mean acne is unlikely. Acne can be confused with other skin conditions, e.g. rosacea, folliculitis, keratosis pilaris and milia.

Acne can be arbitrarily graded as mild, moderate or severe based on lesion count:

- Mild = < 20 comedones or < 15 inflammatory lesions or < 30 total lesions
- Moderate = 20-100 comedones or 15-50 inflammatory lesions or 30-125 total lesions
- Severe = 5 cysts or > 100 comedones or > 50 inflammatory lesions or > 125 total lesions

## Assessing the psychosocial impact of acne

Globally, acne is the second most disabling skin disease, after eczema. People with acne often experience significant reductions in their quality of life (QoL) and self-esteem.<sup>1,2</sup> The reduction in QoL is comparable to chronic conditions such as arthritis, diabetes and asthma. Historically, the impact of acne on patients has been overlooked and poorly managed. A systematic review of the experiences of patients treated for acne and of health professional attitudes toward treatment, found that health professionals often perceived acne as a short-term problem and patients often felt their symptoms were trivialised by health professionals.<sup>3</sup> These attitudes often lead to delays in diagnosis and treatment or under-treatment of acne.

A validated questionnaire is available [here \(https://onlinelibrary.wiley.com/doi/full/10.1111/jdv.17134\)](https://onlinelibrary.wiley.com/doi/full/10.1111/jdv.17134) for assessing the impact of acne on adult patients.<sup>4</sup> Dr Chen recommends that practitioners use this questionnaire from diagnosis to track the progress of treatment.

Dr Chen recommends the following 4-step process when assessing patients with acne:

1. Confirm the diagnosis is correct and classify the acne as mild, moderate or severe, in order to determine the appropriate treatment
2. Consider whether the symptoms may be due to hormonal changes. Most women with acne do not have a hormonal imbalance, however, acne may be a sign of androgenisation and if hirsutism, obesity or menstrual irregularity is present PCOS should be considered.
3. Consider the emotional and social impact on the patient as this does not necessarily equate with objective severity and may influence treatment decisions
4. Consider if there are contributing occupational or recreational factors, e.g. mask wearing or exposure to comedogenic substances such as chlorine, industrial oils, grease from food or hot and humid environments.

## Acne treatment

Treating acne requires a multifactorial approach targeting multiple pathogenic factors including sebum production, alteration of the keratinisation process, *C. acnes*, and inflammation. The therapeutic goals are resolution of existing lesions, prevention of scarring and providing patients with tools to cope with the psychological stress of acne.

Management begins with the avoidance of oily cosmetics and occlusive skincare products. Topical products should be light, non-occlusive and water-based. Patients should not excessively wash or exfoliate as this can promote inflammation.

A balanced diet is recommended and patients with acne should avoid a dietary pattern that is high in refined carbohydrates or with a high glycaemic load. Dr Chen recommends dietary pro- and prebiotics to preserve the floral diversity of the patient's gut microbiome. A regular sleep pattern should also be encouraged, which may be difficult for teenagers.

Pharmacological treatment options for acne may be comedolytic, antibacterial or anti-androgenic (**Table 1**).

Group	Example	Action
Comedolytic	Keratolytic Salicylic acid Lipohydroxy acid (LHA)	Unblock pores by removing keratin plugs
	Retinoids Topical adapalene Topical tretinoin	Promotes removal of keratin plugs, prevents re-blocking of pores and suppresses inflammation
	Retinoids Oral isotretinoin	Reduce incidence of blocked pores, markedly reduce sebum and indirectly decrease <i>C. acnes</i> inflammation
Antibacterial	Topical benzoyl peroxide (BPO) Topical clindamycin	Anti-inflammatory and suppress bacteria (acne is not an infection)
	Oral tetracyclines Oral erythromycin	Used for anti-inflammatory effect rather than as treatment for infection (acne is not an infection)
Anti-androgens Female patients only	Combined oral contraceptive containing cyproterone acetate	Reduce androgen-mediated sebum production

**Table 1:** Treatment options for acne<sup>5</sup>

## Treatment options for mild acne

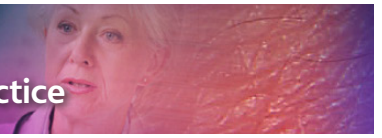
Topical 5% benzoyl peroxide (BPO) is considered the standard of care for mild to moderate acne, although it may cause irritant dermatitis for some patients, e.g. erythema, scaling, burning and itching. BPO is metabolised in the epidermis to benzoic acid which lowers the skin pH and causes oxygen free radicals to disrupt microbial cells. BPO is bactericidal for *C. acnes* and has a mild anti-inflammatory and comedolytic activity that may be used alone or in combination with other topical treatments, e.g. antibiotics, retinoids, salicylic acid or zinc. Products containing BPO include Benzac<sup>®</sup>, Brevoxyl<sup>®</sup> and Clearasil Ultra Acne<sup>®</sup>. Patients using BPO should be informed that it can cause fabric or hair to bleach.

An alternative first-line treatment for mild acne is salicylic acid or its derivative lipohydroxy acid (LHA). Salicylic acid breaks down follicular keratotic plugs and promotes desquamation of the follicular epithelium, making it an effective treatment for comedonal acne. Salicylic acid also has anti-inflammatory properties. Products containing salicylic acid include Neutrogena Oil-Free Acne<sup>®</sup>, Effaclar Duo (+)<sup>®</sup> and Clean and Clear<sup>®</sup>.

LHA is more lipophilic than salicylic acid and is therefore retained to a larger extent in the stratum corneum, causing a reservoir effect. Treatment with LHA causes exfoliation of individual corneosomes, which is thought to more closely mimic physiological desquamation resulting in better tolerance, compared with salicylic acid. Effaclar Duo (+)<sup>®</sup> contains LHA to minimise the concentration of salicylic acid used in the formula.

## Second-line treatments for mild acne

Topical retinoids (derivatives of vitamin A) are a second-line treatment option for acne. In New Zealand, adapalene (Differin<sup>®</sup>) and tretinoin (Retriev<sup>®</sup>) are available. Topical retinoids reduce keratinocyte proliferation and promote epithelial differentiation, thereby normalising desquamation. This mechanism makes topical retinoids an effective treatment for comedonal acne. Topical retinoids also block several inflammatory pathways that are activated in patients with acne. Topical retinoids can also be prescribed, as required, for use if comedones reappear. As they are teratogenic, topical retinoids should not be prescribed to women who are planning to become pregnant or are pregnant or breastfeeding. To minimise skin irritation, topical retinoids should be introduced gradually, e.g. every second night after washing for the first 2 weeks, then nightly. An improvement in the patient's skin should be evident after 6 weeks, with ongoing improvement for up to 6 months. If the response is not adequate after 6 weeks, the patient should be switched to a topical combination as determined by the acne characteristics (**Figure 3**).



For mild acne that is mainly comedonal apply a topical combination of:

**BPO (Benzac®) + LHA (Effaclar Duo (+)®)**

OR

**BPO + Adapalene (Epiduo®)**

For mild acne that is comedonal and inflammatory, apply a topical combination of:

**Clindamycin + BPO (Duac®)**

#### Treatment Advise

- Stop a combined preparation containing a topical antibiotic when inflammation has resolved, and change to a single-ingredient preparation containing LHA, a topical retinoid or BPO for maintenance.
- If the inflammation recurs, resume the topical combination containing an antibiotic.

Figure 3: Combining topical treatments for mild acne

## Treating moderate to severe acne

Antibiotics are prescribed to patients with moderate to severe acne due to their anti-inflammatory effects, rather than antibacterial properties, and are therefore taken at a low dose. Tetracyclines are more effective than macrolides for treating acne and oral doxycycline and minocycline (50-100 mg, once daily) are generally the first choice, although erythromycin can be prescribed to patients who are pregnant or children as young as 8 years old. Dr Chen, however, generally avoids macrolides in patients aged under 10 years. Oral antibiotics should be initiated in combination with a topical product or topical combination as shown in **Figure 3**.

Patients taking oral antibiotics should be reviewed regularly with six-monthly blood tests for those taking doxycycline. There are no guidelines for the treatment duration of antibiotics for acne, but in general Dr Chen does not allow patients to remain on an oral antibiotic for longer than 12-18 months due to concerns about the gut microbiome and antimicrobial resistance. Oral isotretinoin (see below) should be considered if oral antibiotics are not tolerated or are ineffective after 6-8 weeks.

A combined oral contraceptive pill (COCP) is an alternative to oral antibiotics for teenage girls and women with moderate to severe acne. Treatment with a COCP often takes 3 months to produce a visible benefit, therefore a 6-month trial is recommended. COCPs can be used long-term and a formulation containing cyproterone is more likely to effectively control acne. The funded treatment option in New Zealand is Ginet® (ethinylloestradiol + cyproterone).

Spironolactone is an anti-androgen and a diuretic that may be appropriate for female patients with hyperandrogenism or when a COCP is not appropriate or insufficient in monotherapy. Spironolactone is contraindicated during pregnancy. The dosing of spironolactone for acne is generally 50-100 mg per day and treatment may take 3-6 months before any benefits are noticed. The sodium, potassium levels and renal function of patients taking spironolactone should be monitored every six months, although there is evidence that the risk of potassium changes and renal adverse effects is low.

## Oral isotretinoin

Oral isotretinoin is the treatment of choice for severe acne or acne that is scarring or having a negative emotional and social effect on the patient. Treatment with oral isotretinoin may also be appropriate for acne that is resistant to other treatments or is persistently relapsing.

A total cumulative isotretinoin dose of 120-150 mg/kg is recommended internationally, however, in New Zealand and Australia treatment is usually at a lower daily dose and guided by the patient's response. For example, continue for 3 months after clearance of active acne before tapering from 20 mg daily oral isotretinoin to 10 mg daily for 3 months. Using the patient's response to guide treatment generally prevents relapses. Oral isotretinoin, 10-20 mg, 2-3 times a week may be prescribed as maintenance treatment for patients with relapsing acne.

Females must avoid pregnancy while taking oral isotretinoin and for one reproductive cycle after treatment has finished. Before beginning oral isotretinoin, all females must test negative for pregnancy and use 2 forms of contraception during treatment.

Oral isotretinoin may cause an initial acne flare, particularly in patients with multiple nodules or microcomedones. It may be necessary to initiate isotretinoin with prednisolone or a macrolide to prevent flares, but it should not be co-prescribed with doxycycline due to the risk of increased intracranial pressure.

The adverse effects of oral isotretinoin are dose-dependent, diminish during treatment and resolve within weeks of stopping treatment. Most patients will develop dryness of the lips, eyes and mucosal lining of the nose and any eczema may be exacerbated. An increase in sensitivity to the sun is also common and patients should be informed their night vision may be affected which may affect their driving.<sup>6</sup> Some patients may experience myalgia, lethargy or facial erythema, while dyslipidaemia is less common.

Depression or anxiety are not an absolute contraindication to oral isotretinoin, however, other health professionals treating patients with mood disorders should be informed that isotretinoin has been initiated. In Dr Chen's experience, some patients with acne and depression experience an improved mood after initiating isotretinoin. Oral treatment options containing isotretinoin are Roaccutane® and Oratane®.

## Surgical and physical treatments for acne

Treatment options for acne for patients who cannot tolerate medicines, include:

- Chemical peels for mild acne
- Comedone extraction
- Photodynamic therapy for moderate acne
- Laser therapy for scars and inflammatory lesions
- Intralesional corticosteroid injections for large cysts and nodules

## The role of adjunctive therapy

Adjunctive skincare is an important and complimentary aspect of acne treatment that is often overlooked. The potential benefits of adjunctive treatment include:

- Targeting multiple drivers of acne, e.g. antibiotics for inflammation and keratolytic skincare for blocked pores
- Improved skincare can enhance the skin's barrier function and reduce the impact of inflammatory triggers
- Sunscreen reduces ultraviolet (UV) inflammation
- Moisturisers reduce the dryness associated with retinoid treatment
- Improved self-esteem for the patient

Dr Chen recommends Anthelios Invisible Fluid® SPF 50+ sunscreen because it is water-based, is not occlusive or comedogenic, and patients generally are not aware they are wearing the product. Dr Chen also recommends Effaclar H® moisturiser or Cetaphil PRO Acne Prone® oil to patients who are beginning oral isotretinoin.

## Topical niacinamide

Topical niacinamide (vitamin B3) has anti-inflammatory properties that are mediated by inhibiting mast cell histamine release and neutrophil chemotaxis and by reducing the secretion of inflammatory mediators. In the treatment of acne, topical niacinamide reduces inflammation and sebum production. Topical niacinamide (4%) has been shown to be equally as effective as 1% clindamycin gel in the treatment of acne.<sup>7</sup>

The evidence supporting the use of vitamin B3 in acne management is for topical formulations. Oral vitamin B3 has a protective effect against squamous cell carcinoma and Dr Chen prescribes this (500 mg, twice daily) to patients with skin cancer.

## Zinc-based actives

Topical zinc in both its elemental and salt forms is widely used in dermatology. Zinc oxide provides UV protection and has antiacne properties thought to be mediated by sebum control and antibacterial pathways.<sup>8</sup> Dr Chen does not routinely recommend oral zinc to patients with acne.

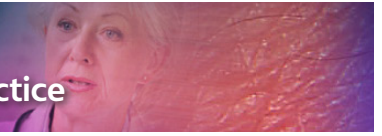
### When to refer to a dermatologist?

Referral to a dermatologist may be appropriate for patients with acne who have:

- Acne that is not responding to simple topical treatment
- Resistant forms of acne, e.g. back or buttock acne or adult female hormonal acne (often with nodules or cysts on their jawline)
- Nodules
- Darker skin types
- Evidence of scarring

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Education and myth busting

Myth busting	General advice
<i>Sexual activity does not influence acne</i> - acne is related to androgen metabolism at the sebaceous gland. There is no link between acne and sexual activity.	<i>Do not squeeze acne lesions</i> – this may increase inflammation and the risk of scarring.
<i>Blackheads are not due to dirt</i> – excessive washing can be counterproductive. Functional blockage of pores by sebum is too deep to be removed by washing.	<i>Use a mild skin cleansing regimen</i> – apply a low irritant, pH balanced, soap-free cleanser twice a day.
<i>Chocolate and fatty food do not cause acne</i> – however a healthy diet should be recommended.	<i>Eat a healthy diet</i> – a poor diet may not directly cause acne, but foods with a high glycaemic index, foods high in refined sugar or fatty food should be avoided if possible.
<i>Infrequent shampooing does not predispose to acne</i> – having long or greasy hair or wearing hair over the face does not influence acne.	<i>Avoid overexposure to the sun</i> – UV light is not a treatment for acne. Many acne treatments make the skin more prone to sunburn. Use a noncomedogenic, SPF 30+ broad spectrum sunscreen.
<i>Most cosmetics are noncomedogenic</i> – avoid cosmetics containing isopropyl myristate. Use water-based or oil-free products.	<i>Stress plays a role in acne</i> – stress can cause acne exacerbations.
<i>All teenagers have acne so it doesn't matter</i> – acne can cause shyness and depression – it does matter!	<i>Acne can be controlled with the right regimen</i> – use your treatment daily. Apply creams to all affected areas, not just the spots.

Question and answers

1. How long can BPO or LHA be used as maintenance treatment for acne?

LHA is safe and can be used long-term. BPO can cause irritation for some patients and where possible, Dr Chen prefers LHA or a topical retinoid for maintenance after finishing a course of oral medicines.

2. Can topical and oral retinoids be taken at the same time?

This is not a common practice. Combination treatment can cause skin peeling and other adverse effects. LHA may be considered if a topical treatment is needed with oral isotretinoin or topical clindamycin if there is marked inflammation.

3. What treatments are recommended for scarring due to acne?

Active acne should be treated before treating any scarring. Derma needling or a mild chemical peel can be effective for mild scarring. Laser resurfacing may be required for more severe scarring. Consultation with a dermatologist is recommended.

4. How is acne managed in patients who are required to take steroids?

Dr Chen generally prescribes oral isotretinoin to these patients, particularly if the acne is on the back which is often hard to treat.

5. How should acne caused by mask wearing be managed?

It is important to select a mask made of the appropriate material as occlusive masks may exacerbate acne. If possible, frequent mask removal and gently dabbing the covered portion of the face dry may be beneficial. Masks should be washed frequently.

6. How should acne associated with pregnancy and acne in infants be managed?

Dr Chen recommends an oral macrolide with topical clindamycin during pregnancy, although many patients will avoid medicines during pregnancy. Infant acne usually self resolves. Oral medicines are avoided in infants and good facial washing with a light moisturiser is recommended.

Tips for best outcomes in acne management

- Start treatment early to minimise the potential for physical and emotional scarring
- Select treatments according to the severity of the acne and the impact on the patient
- Treatment should be convenient (once daily improves adherence), tailored to the patient's lifestyle and tolerable
- Education improves patient adherence and treatment success; tell patients not to pick or squeeze the spots as this will cause scabs
- Treatment should be applied every day to the entire affected area, not just the spots
- Use water-based or oil-free cosmetics and sunscreen
- Use a light moisturiser
- Be patient as most treatments take 6-12 weeks to work

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<b>NIACINAMIDE</b> Reduces inflammation	<b>ZINC PCA</b> Reduces sebum secretion

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<sup>1</sup> Instrumental test results from 12h, 43 subjects. <sup>2</sup> Compilation of 13 studies conducted by La Roche-Posay.

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