

Patient information from the BMJ Group

Acne

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Acne

If you have acne it means you get spots. Lots of us have acne when we're teenagers. But it can affect older people, too. Acne may appear briefly or last for many years. Very severe acne sometimes causes scarring, but treatment can help prevent this.

We've brought together the best research about acne and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is acne?

Acne is just another word for spots. If you have severe acne you get lots of spots, or spots that are large, red, and sore.

Although acne is very common, especially for teenagers, it's hard to say what a "normal" amount of acne is. But you might want to think about treatment, or talk to your doctor, if:

- You seem to have a lot more acne than other people your age
- You are worried that your spots are leaving scars
- Your spots are making you so unhappy that you feel less able to enjoy life.

Most people don't like it when they get spots on their face. Acne can also affect other parts of your body. You can get it on your neck, chest, back, and arms.

Spots happen when you get a build-up of natural oil under your skin. Small glands in your skin make an oily substance called **sebum**. This stops your skin drying out.

Sebum comes out onto the surface of your skin through tiny holes called **pores**.

If a pore becomes blocked, sebum can build up. This can cause several kinds of swellings or spots on your skin.

- If sebum builds up just under your skin you get white bumps called whiteheads.

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- Blocked pores can get quite wide and open up. This causes small dark marks called blackheads. The black bit is a plug of oily sebum and protein from your skin. It's not dirt.
- Spots can turn red and become **inflamed**. These are called papules. They happen if **bacteria** start growing in the sebum that's built up.
- Some inflamed spots contain pus. These are called pustules.



Pustules

Spots can go deep in your skin and become painful.^[1] Very bad spots can cause scars as they heal.^[2]

You may hear spots called pimples or zits.

What causes acne?

We don't know exactly what causes acne.

The main reason teenagers get acne is probably the change in **hormones** that happens when they reach **puberty**.^[3] The change in hormones can cause your skin to make more sebum (oil). The extra sebum can make your skin greasy.

You're more likely to have acne if other people in your family have it.^[4] And some kinds of oily make-up may block your pores and trigger acne.^[4]

If you have acne there are things that can make it worse:^[4]

- Rubbing your skin
- Picking or squeezing your spots
- Tight clothes or bag straps that rub your skin
- Pollution and high humidity
- If you're female, the change in your hormones that happens when you have your periods, or when you start or stop taking the contraceptive pill.

Myths about acne

There are lots of myths about acne. Here are some common ones. ^[4] ^[5]

- You might hear people say that you get acne when you don't wash enough. But this isn't true. Blackheads aren't black because of dirt. Hard scrubbing can make acne worse.
- A lot of people say that greasy foods cause acne. But there's no good evidence that fatty foods or chocolate cause acne for most people. Some research does suggest that eating a lot of energy-rich, low-fibre foods could make acne worse. ^[6] That's probably because these foods release energy quickly, which could affect the balance of hormones in your body.
- Some people think that you can catch acne. Again, this isn't true. You can't catch acne or pass it on to someone else. Although acne is partly caused by bacteria, these live on your skin naturally and are usually harmless.

What are the symptoms of acne?

If you have acne you get spots on your skin. They usually appear on your face, neck, back, chest, or arms.

The main symptoms of acne are: ^[7] ^[8] ^[9]

- Blackheads (small black spots) or whiteheads (white bumps) on your skin
- Greasy skin
- Red, **inflamed** spots
- Spots with pus in them
- Painful spots that go deep into your skin. These may cause scars as they heal.

Spots themselves don't cause serious harm, although you may be worried about scars. Getting treatment early can prevent scarring. ^[10] ^[11]

Many people with acne don't like the way it looks. Some people find it embarrassing and even become very upset or depressed. ^[8] If you're concerned about your acne make sure your doctor understands how you feel. There may be stronger treatments that you can try.

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How common is acne?

Acne is the most common skin problem that affects young people. It's most common in teenagers but it's getting more common in adults.

- Most people get some acne. About 80 in 100 teenagers have spots at some point. ^[12]
- In one study about half the teenagers aged 14 to 16 had acne. ^[13]
- About 30 in 100 teenagers have acne that's bad enough to need treatment. ^[14]
- More people over 25 have acne now than in the past. ^[15] We don't know why.

What treatments work for acne?

There are several treatments that can help to clear up your acne. The treatment you have will depend on how severe your acne is.

- Treatment can make your acne much better. But it can take about eight weeks to work. ^[20]
- You can buy a treatment called benzoyl peroxide from a pharmacy. It comes as a gel or cream that you put on your skin.
- Other treatments can be prescribed by your doctor. They come as gels, creams, or tablets.
- You may need to keep using your treatment for several months.
- If one treatment doesn't help, your doctor will be able to suggest something else.
- Getting treatment early can stop you getting scars. ^[21] ^[22]

You can buy lots of different acne products from pharmacies. They work in different ways. It's worth looking at the label to see what the active ingredient is. This is the chemical that helps to get rid of your spots. The main over-the-counter treatment we've looked at is benzoyl peroxide. The research shows that it can help get rid of acne.

Some of the products you can buy say they are 'fast-acting'. You might find a product that helps you quickly, but most acne treatments take several weeks or months to work. ^[22] If you've used a treatment for a couple of months and it hasn't helped, your doctor can prescribe treatments that you can't buy over the counter.

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Lots of the treatments for acne come as creams or gels. These can stop new spots forming, so it's important to apply them to the whole area where you have acne (perhaps your face and chest, or your upper arms). Don't just put them on the spots you have at the time. ^[23]

Whether you prefer a cream or gel can depend on your skin type. Creams help moisturise your skin, so these may be better if you get dry skin. Gels can help with greasy skin.

The treatment you have will depend on how severe your acne is. Your doctor will probably suggest a gel or cream first. ^[22] You can also get treatments for acne that you take as tablets. These can be helpful if you have spots that you can't reach to put cream on. Your doctor may also suggest them if gels and creams haven't worked for you, but tablets can cause more severe side effects. ^{[24] [25] [26] [27] [28] [29]}

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

Treatment Group 1

Treatments for acne

Treatments that work

- [Benzoyl peroxide gel, cream, or face wash](#)
- [Retinoid gels or creams](#)
- [Antibiotic gels and creams](#)

Treatments that are likely to work

- [Azelaic acid cream](#)
- [Antibiotic tablets](#)
- [Hormone treatments](#)

Treatments that work, but whose harms may outweigh benefits

- [Isotretinoin tablets](#)

What will happen to me?

Acne usually affects teenagers. It often goes away as you get older but this can sometimes take years.

Acne

For most people acne lasts about five years.^[16] But some people have acne for longer than this. About 3 in 100 men and 12 in 100 women still have acne when they're 25.^[17] And about 1 in 100 men and 5 in 100 women have it into their 40s.^[15] It's also possible for acne to start for the first time when you're older.

Treatments can help get rid of acne. But it can take two months before you can tell if your treatment is working.^[18] You might need to keep using your treatment for six months or longer. Getting treatment early can prevent scarring.^{[16] [18]}

If one treatment doesn't help you it's worth going back to see your doctor. There may be another treatment that works better for you.

You'll probably be treated by your usual doctor. He or she may suggest you see a doctor who specialises in skin conditions (a dermatologist) if:^[16]

- Your acne is severe
- You're at risk of getting scars
- You've tried several treatments without finding one that works
- An allergy or other problem could be causing your acne.

There are some things you can try yourself to keep your skin healthy. You may want to:^{[16] [19]}

- Clean your skin gently. Some people try to get rid of grease and spots by scrubbing their skin but this can make acne worse
- Avoid touching your spots. Squeezing or picking your spots can cause scars
- Avoid sunburn. Some treatments for acne can make you more likely to get burnt if you go out in the sun
- If you shave, shave carefully. You could try electric shavers or safety razors, whichever is more comfortable
- Use oil-free make-up. Some types of make-up can block pores and cause spots.

You may find that acne makes you feel embarrassed or depressed. Talking to your doctor might help. He or she will be able to help you find the best treatment for you. He or she may also be able to give you advice about looking after your skin.^[16]

Treatments:

Benzoyl peroxide gel, cream, or face wash

In this section

You can buy benzoyl peroxide over the counter from a pharmacy. Its brand names are Brevoxyl and PanOxyl. It comes as a gel, cream, or face wash.

Benzoyl peroxide is probably the best treatment to try first. You can get different strength products, with 2.5 percent being the lowest and 10 percent the highest. It's a good idea to start with a lower strength. You can always switch to a stronger version if the weaker one doesn't work for you.

Benzoyl peroxide helps to kill **bacteria**, unblock pores, and make your skin less oily. It can be used for different types of acne: blackheads; whiteheads; and red, **inflamed spots**.^[22] You use the cream or gel once or twice a day, usually after you wash.

We found one summary of the research (called a **systematic review**) that looked at the research on benzoyl peroxide.^[20] People who used it had fewer spots after four weeks to 12 weeks.

Side effects of benzoyl peroxide include dry, red, or peeling skin, and a burning or tingling feeling. About 1 in 3 people get these side effects.^[30] ^[31]

Benzoyl peroxide is a kind of bleach, so it's best to avoid getting it on your hair, clothes, or sheets. You should also avoid getting too much sun.^[22]

You can also get benzoyl peroxide gel combined with an **antibiotic** called clindamycin. The brand name is Duac Once Daily. You can only get it on prescription from your doctor.

One study found that a combination of benzoyl peroxide and clindamycin worked better than either treatment individually.^[32]

Retinoid gels or creams

In this section

Retinoid gels or creams can help get rid of acne. They work by unblocking your pores. You usually need to use these creams or gels once or twice a day.

Some retinoids that come as creams or gels are:

- Adapalene (brand name Differin)
- Isotretinoin (Isotrex)
- Tretinoin (Retin-A).

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You can also get retinoids combined with an antibiotic called erythromycin. Brand names for the combination treatments are Isotrexin and Aknemycin Plus.

There's some good research to show that retinoid creams or gels can help get rid of acne.^[20] ^[33] ^[34] People who use them have fewer spots after about eight weeks to 12 weeks.

In one study the researchers asked people using tretinoin cream if they thought their acne had improved.^[35] People who used tretinoin were more likely to say their acne had improved than people who used a dummy treatment (a placebo). A study on adapalene found similar results, with 60 in 100 people using the gel saying they were mostly satisfied with the results compared with 42 in 100 using a placebo.^[34] But, in another study, people who used adapalene didn't notice much of an improvement.^[20]

The side effects of retinoid creams or gels are similar to sunburn, so you may get red or peeling skin.^[20] ^[36] ^[37] ^[38] But this will probably settle down after a few weeks.

You need to be quite careful with retinoid gels or creams. Try not to get them in your eyes, nose, or mouth. And don't let the cream or gel build up on your skin, for instance at the sides of your nose or under your chin. The cream can make your skin feel itchy or sore.

Using a retinoid cream or gel can make your skin burn more easily in the sun. Try to cover up or use sunscreen when you're outside.

You shouldn't use retinoids if you're pregnant. It may cause birth defects. If you're going to have sex, make sure you use contraception.^[22]

You can get a cream that combines adapalene with [benzoyl peroxide](#). The brand name is Epiduo.

One large study found that people who used this combination of treatment said their acne had improved after just one week. But we don't know whether it's any better than using either of these treatments alone.^[39]

Antibiotic gels and creams

In this section

Antibiotics are drugs that kill germs called bacteria. Using an antibiotic gel or cream helps get rid of the bacteria that make your spots red and inflamed.

You can get antibiotic gels or creams from your doctor. You'll need to use your treatment once or twice a day.

Some antibiotics that come as gels or creams are:

- Clindamycin (brand names include Dalacin T and Zindaclin)

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- Erythromycin (Stiemycin).

There's good research to show that antibiotic gels and creams get rid of spots.^[20] But they're better at getting rid of red or inflamed spots. They don't help as much with whiteheads and blackheads.

It may be several weeks before your treatment starts working. In studies, it took between four weeks and 12 weeks for people to have fewer spots.

In some studies researchers asked people if they thought their acne was getting better. People who used an antibiotic cream or gel were more likely to say their acne had improved.^{[40] [41] [42]}

You can get a gel that combines clindamycin with [benzoyl peroxide](#). The brand name is Duac Once Daily. One large study found that people who used this combination of treatment said their acne had improved after two weeks. It seemed to work better than using either treatment on its own.^[32]

You can also get erythromycin gel combined with zinc. The brand name is Zineryt. The idea is that zinc helps your skin absorb the antibiotic. But there's no research to say whether it's any better than an antibiotic on its own.

The research on antibiotic creams doesn't give much information about side effects.^[20] A few people who used clindamycin got a burning feeling in their skin, and others got diarrhoea. But we don't know how common this is. Erythromycin doesn't seem to cause any more problems than a dummy treatment (a [placebo](#)).

Azelaic acid cream

In this section

Azelaic acid comes as a cream. It's a bit like [benzoyl peroxide](#), but you can only get it on prescription from your doctor. Brand names are Finacea and Skinoren.

Research shows that azelaic acid seems to reduce the number of spots people have, but some of the studies have had problems.^[20] For example, lots of people dropped out of one study, and another looked at people with different degrees of acne.^{[43] [44]}

Side effects of azelaic acid include itching or stinging, a burning feeling, and red or scaly skin.^{[43] [44] [45]}

You may be less likely to get side effects from azelaic acid than you are with benzoyl peroxide.^[22]

Antibiotic tablets

In this section

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Antibiotics are drugs that kill germs called bacteria. If you've tried [antibiotic gels or creams](#) and they haven't worked, your doctor may suggest antibiotic tablets. You'll need to keep taking them for several months.

Antibiotic tablets used for acne include:

- Doxycycline
- Erythromycin
- Lymecycline (brand name Tetralysal 300)
- Minocycline
- Oxytetracycline
- Tetracycline.

Antibiotic tablets can reduce the number of red and inflamed spots you have. ^[20] ^[46] ^[47] They may not help as much with whiteheads or blackheads.

In one study, between 30 and 40 in 100 people who took antibiotic tablets found that their acne cleared up completely after six months. ^[25]

Antibiotic tablets can cause side effects. The most common are diarrhoea, an upset stomach, nausea, and vomiting. ^[25] ^[24] ^[26] In one study, 14 in 100 people had these problems. ^[24]

In a study of minocycline, about 2 in 100 people had changes in their skin colour. ^[48] This can be permanent. Some studies also found that minocycline can cause liver damage or a problem where your immune system attacks your body. ^[27] ^[29] ^[49] These problems are rare but your doctor may want to keep a check on you just in case.

You can't take some types of antibiotics if you're pregnant.

Isotretinoin tablets

In this section

If you have very severe acne or have tried other treatments that haven't helped, your doctor may prescribe isotretinoin tablets. Isotretinoin tablets stop your skin making as much oil (sebum). They can reduce the number of spots you have or even cure your acne completely. ^[50] ^[51]

One small study found that isotretinoin tablets worked better than [antibiotic tablets](#) but caused more side effects. ^[52]

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You should only have this treatment prescribed by a doctor who specialises in skin problems. This type of doctor is called a consultant dermatologist. ^[22]

The brand name for isotretinoin tablets is Roaccutane.

Isotretinoin causes birth defects, even if it's taken for only a few days during pregnancy. ^[53] It's very important that you're not pregnant when you start taking it. And you have to make sure you don't get pregnant while you're taking it. Your doctor will ask you to take a pregnancy test before you start treatment. If you're going to have sex, you need to make sure that you use contraception. You need to use contraception for one month before you start taking isotretinoin, all the time you're taking it, and for one month afterwards. ^[22] You need to have a pregnancy test every month during treatment, and five weeks after you stop treatment.

You also shouldn't take isotretinoin while breastfeeding. ^[53]

Isotretinoin tablets can also cause other side effects, including: ^[22]

- Very dry skin
- Dry eyes, lips, nose, and throat
- Nosebleeds
- Headaches
- Muscle or joint aches
- Blood in your urine
- Anaemia (when you don't have enough iron in your blood, which makes you feel tired).

Isotretinoin can also cause skin problems and hair loss. Very rarely, it can cause diarrhoea, drowsiness, and problems with your bones and vision. ^[22] Isotretinoin can also affect your liver and your cholesterol level. You'll need blood tests to check on your cholesterol and to see how well your liver is working.

Isotretinoin may make you more sensitive to sunlight, so you should use sunscreen while taking it. If you usually wax your skin to remove hair, you should stop. Waxing can damage your skin if you do it while taking this drug. ^[22]

Doctors are also worried that isotretinoin could cause very severe mood changes. These could include depression, aggressive behaviour, or suicidal thoughts. ^[22] It's not clear from the research how common these problems are or even whether isotretinoin really causes them. ^[54] But your doctor will monitor you to see if you have any feelings of

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depression, thoughts of harming yourself, or any change in your mood. If you have any of these symptoms contact your doctor straight away.

Isotretinoin tablets have also been linked to serious skin conditions called erythema multiforme, Stevens Johnson syndrome, and toxic epidermal necrolysis. Researchers don't yet know for certain that isotretinoin caused these problems. But if you notice any worrying skin reactions, be sure to promptly tell your doctor. ^[55]

Hormone treatments

In this section

Women with acne can take a hormone treatment called co-cyprindiol. It's a type of contraceptive pill that's also designed to help clear up spots. It contains the hormone oestrogen along with a drug that reduces the effect of testosterone in women's bodies. The brand name is Dianette.

Co-cyprindiol doesn't work any better than [antibiotic tablets](#) , but, if you have acne and want to take the contraceptive pill anyway, it's a possible choice. ^[56] Co-cyprindiol is only recommended for women with severe acne and if antibiotic tablets haven't helped.

There's also been research on ordinary contraceptive pills to see whether they help with acne. ^[57] The studies looked at combined contraceptive pills, which contain two hormones, oestrogen and progestogen. Women taking these pills had fewer spots and said their acne noticeably improved.

As a side effect, co-cyprindiol and combined contraceptive pills can increase your risk of getting a blood clot inside a vein in your leg. ^[56] This is called a [deep vein thrombosis](#) (or DVT for short). Although DVTs aren't common they can be serious. A clot that travels in your blood to your lungs can be life threatening.

If you have a blood clot in your leg you usually get pain, swelling, warmth, and redness. See a doctor straight away if you have any of these symptoms.

Further informations:

Glossary:

inflammation

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

bacteria

Bacteria are tiny organisms. There are lots of different types. Some are harmful and can cause disease. But some bacteria live in your body without causing any harm.

hormones

Hormones are chemicals that are made in certain parts of the body. They travel through the bloodstream and have an effect on other parts of the body. For example, the female sex hormone oestrogen is made in a woman's ovaries. Oestrogen has many different effects on a woman's body. It makes the breasts grow at puberty and helps control periods. It is also needed to get pregnant.

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puberty

Puberty is the time when boys and girls develop secondary sexual characteristics. For boys, the major changes include pubic hair, a deeper voice, and growth of their penis and testicles. For girls, major changes include pubic hair, breasts and starting to have periods. After puberty, girls are able to become pregnant and boys are able to father children.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

antibiotics

These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

Placebo effect

People who are ill sometimes improve even though they've been given an inactive treatment. This is called the placebo effect. We don't know exactly why it happens. It might be that expectations about treatment help you feel better, or even lead to physical changes in the body. It's also possible that seeing a doctor or other kind of therapist is reassuring, even if the treatment itself is inactive.

liver

Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

immune system

Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

anaemia

Anaemia is when you have too few red blood cells. Anaemia can make you get tired and breathless easily. It can also make you look pale. Anaemia can be caused by a number of different things, including problems with your diet, blood loss and some diseases.

deep vein thrombosis

A deep vein thrombosis is a blood clot that has formed in the deep veins of your arms or legs. These clots can form if a person doesn't move their limbs often enough. This is because blood is pushed through your veins by the contraction of muscles that occurs when a limb is moved. Blood tends to clot when it is not kept flowing, so clots can form if a person is not moving. Deep vein thrombosis is also called deep venous thrombosis or DVT.

Sources for the information on this leaflet:

1. Healy E, Simpson N. Acne vulgaris. *BMJ*. 1994; 308: 831-833.
2. Mallon E, Newton JN, Klassen A, et al. The quality of life in acne: a comparison with general medical conditions using generic questionnaires. *British Journal of Dermatology*. 1999; 140: 672-676.
3. Brown SK, Shalita AR. Acne vulgaris. *Lancet*. 1998; 351: 1871-1876.
4. National Institute of Arthritis and Musculoskeletal and Skin Diseases. Questions and answers about acne. Available at <http://www.niams.nih.gov/hi/topics/acne/acne.htm> (accessed on 6 November 2014).
5. Webster GF. Acne vulgaris. *BMJ*. 2002; 325: 475-479.

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6. Smith RN, Mann NJ, Braue A, et al. The effect of a high-protein, low glycemic-load diet versus a conventional, high glycemic-load diet on biochemical parameters associated with acne vulgaris: a randomized, investigator-masked, controlled trial. *Journal of the American Academy of Dermatology*. 2007; 57: 247-256.
7. Healy E, Simpson N. Acne vulgaris. *BMJ*. 1994; 308: 831-833.
8. Mallon E, Newton JN, Klassen A, et al. The quality of life in acne: a comparison with general medical conditions using generic questionnaires. *British Journal of Dermatology*. 1999; 140: 672-676.
9. Brown SK, Shalita AR. Acne vulgaris. *Lancet*. 1998; 351: 1871-1876.
10. National Institute for Health and Care Excellence. Referral practice: a guide to appropriate referral from general to specialist services. May 2000. Available at http://www.gserve.nice.org.uk/niceMedia/pdf/NICE_GP_Referral_cues_4.pdf (accessed on 6 November 2014).
11. British National Formulary. Acne and rosacea. Section 13.6. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 6 November 2014).
12. Chu TC. Acne and other facial eruptions. *Medicine*. 1997; 25: 30-33.
13. Smithard A, Glazebrook C, Williams HC. Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study. *British Journal of Dermatology*. 2001; 145: 274-279.
14. Garner S. Acne vulgaris. In: Williams H. Evidence-based dermatology. BMJ Publishing Group, London, UK; 2003.
15. Cunliffe WJ. Management of adult acne and acne variants. *Journal of Cutaneous Medicine and Surgery*. 1998; 2: 7-13.
16. National Institute for Health and Care Excellence. Referral advice: a guide to appropriate referral from general to specialist services. May 2000. Available at http://www.gserve.nice.org.uk/niceMedia/pdf/NICE_GP_Referral_cues_4.pdf (accessed on 6 November 2014).
17. Goulden V, Stables G, Cunliffe W. Prevalence of facial acne in adults. *Journal of the American Academy of Dermatology*. 1999; 578: 577-580.
18. British National Formulary. Acne and rosacea. Section 13.6. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 6 November 2014).
19. National Institute of Arthritis and Musculoskeletal and Skin Diseases. Questions and answers about acne. Available at <http://www.niams.nih.gov/hi/topics/acne/acne.htm> (accessed on 6 November 2014).
20. Haider A, Shaw JC. Treatment of acne vulgaris. *Journal of the American Medical Association*. 2004; 292: 726-735.
21. National Institute for Health and Care Excellence. Referral advice: a guide to appropriate referral from general to specialist services. May 2000. Available at http://www.gserve.nice.org.uk/niceMedia/pdf/NICE_GP_Referral_cues_4.pdf (accessed on 6 November 2014).
22. British National Formulary. Acne and rosacea. Section 13.6. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 6 November 2014).
23. Webster GF. Acne vulgaris. *BMJ*. 2002; 325: 475-479.
24. Brandt H, Attila P, Ahokas T, et al. Erythromycin acistrate: an alternative treatment for acne. *Journal of Dermatologic Treatment*. 1994; 5: 3-5.
25. Gammon WR, Meyer C, Lantis S, et al. Comparative efficacy of oral erythromycin versus oral tetracycline in the treatment of acne vulgaris: a double-blind study. *Journal of the American Academy of Dermatology*. 1986; 14: 183-186.
26. Al-Mishari MA. Clinical and bacteriological evaluation of tetracycline and erythromycin in acne vulgaris. *Clinical Therapy*. 1987; 9: 273-280.

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27. Sturkenboom MC, Meier CR, Jick H, et al. Minocycline and lupuslike syndrome in acne patients. *Archives of Internal Medicine*. 1999; 159: 493-497.
28. Cunliffe WJ. Doctors should not change the way they prescribe for acne. *BMJ*. 1996; 312: 1101.
29. Lawrenson RA, Seaman HE, Sundstrom A, et al. Liver damage associated with minocycline use in acne: a systematic review of the published literature and pharmacovigilance data. *Drug Safety*. 2000; 23: 333-349.
30. Lookingbill DP, Chalker DK, Lindholm JS, et al. Treatment of acne with a combination clindamycin/benzoyl peroxide gel compared with clindamycin gel, benzoyl peroxide gel and vehicle gel: combined results of two double-blind investigations. *Journal of the American Academy of Dermatology*. 1997; 37: 590-595.
31. Hunt MJ, Barnetson RS. A comparative study of gluconolactone versus benzoyl peroxide in the treatment of acne. *Australasian Journal of Dermatology*. 1992; 33: 131-134.
32. Thiboutot D, Zaenglein A, Weiss J, et al. An aqueous gel fixed combination of clindamycin phosphate 1.2% and benzoyl peroxide 2.5% for the once-daily treatment of moderate to severe acne vulgaris: assessment of efficacy and safety in 2813 patients. *Journal of the American Academy of Dermatology*. 2008; 59: 792-800.
33. Thiboutot D, Pariser DM, Egan N, et al. Adapalene gel 0.3% for the treatment of acne vulgaris: a multicenter, randomized double-blind, controlled, phase III trial. *Journal of the American Academy of Dermatology*. 2006; 54: 242-250.
34. Kawashima M, Harada S, Loesche C, et al. Adapalene gel 0.1% is effective and safe for Japanese patients with acne vulgaris: a randomized, multicenter, investigator-blinded, controlled study. *Journal of Dermatological Science*. 2008; 49: 241-248.
35. Krishnan G. Comparison of two concentrations of tretinoin solution in the topical treatment of acne vulgaris. *Practitioner*. 1976; 216: 106-109.
36. Hughes BR, Norris JF, Cunliffe WJ. A double-blind evaluation of topical isotretinoin 0.05%, benzoyl peroxide gel 5% and placebo in patients with acne. *Clinical and Experimental Dermatology*. 1992; 17: 165-168.
37. Chalker DK, Leshner JL Jr, Smith JG Jr, et al. Efficacy of topical isotretinoin 0.05% gel in acne vulgaris: results of a multicenter, double-blind investigation. *Journal of the American Academy of Dermatology*. 1987; 17: 251-254.
38. Langner A, Boorman GC, Stapor V, et al. Isotretinoin cream 0.05% and 0.1% in the treatment of acne vulgaris. *Journal of Dermatological Treatment*. 1994; 5: 177-180.
39. Thiboutot DM, Weiss J, Bucko A, et al. Adapalene-benzoyl peroxide, a fixed-dose combination for the treatment of acne vulgaris: results of a multicenter, randomized double-blind, controlled study. *Journal of the American Academy of Dermatology*. 2007; 57: 791-799.
40. Braathen LR. Topical clindamycin versus oral tetracycline and placebo in acne vulgaris. *Scandinavian Journal of Infectious Diseases*. 1984; 43: 71-75.
41. Becker LE, Bergstresser PR, Whiting DA, et al. Topical clindamycin therapy for acne vulgaris: a cooperative clinical study. *Archives of Dermatology*. 1981; 117: 482-485.
42. Gratton D, Raymond GP, Guertin-Larochelle S, et al. Topical clindamycin versus systemic tetracycline in the treatment of acne: results of a multiclinic trial. *Journal of the American Academy of Dermatology*. 1982; 7: 50-53.
43. Cunliffe WJ, Holland KT. Clinical and laboratory studies on treatment with 20% azelaic acid cream for acne. *Acta Dermato-Venereologica*. 1989; 143: 31-34.
44. Katsambas A, Graupe K, Stratigos J. Clinical studies of 20% azelaic acid cream in the treatment of acne vulgaris: comparison with vehicle and topical tretinoin. *Acta Dermato-Venereologica. Supplementum*. 1989; 143: 35-39.
45. Graupe K, Cunliffe WJ, Gollnick HP, et al. Efficacy and safety of topical azelaic acid (20% cream): an overview of results from European clinical trials and experimental reports. *Cutis*. 1996; 57: 20-35.

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46. Fleischer AB Jr, Dinehart S, Stough D. Safety and efficacy of a new extended-release formulation of minocycline. *Cutis*. 2006; 78: 21-31.
47. Bleeker J, Hellgren L, Vincent J. Effect of systemic erythromycin stearate on the inflammatory lesions and skin surface fatty acids in acne vulgaris. *Dermatologica*. 1981; 162: 342-349.
48. Goulden V, Glass D, Cunliffe WJ. Safety of long-term high-dose minocycline in the treatment of acne. *British Journal of Dermatology*. 1996; 134: 693-695.
49. Garner SE, Eady EA, Popescu C, et al. Minocycline for acne vulgaris: efficacy and safety (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
50. Peck GL, Olsen TG, Butkus D. Isotretinoin versus placebo in the treatment of cystic acne. *Journal of the American Academy of Dermatology*. 1982; 6: 735-745.
51. Chivot M. Retinoid therapy for acne: a comparative review. *American Journal of Clinical Dermatology*. 2005; 6: 13-19.
52. Lester RS, Schachter GD, Light MJ. Isotretinoin and tetracycline in the management of severe nodulocystic acne. *International Journal of Dermatology*. 1985; 24: 252-257.
53. Goodfield MJD, Cox NH, Bowser A, et al. Advice on the safe introduction and continued use of isotretinoin in acne in the UK. *British Journal of Dermatology*. 2010; 162: 1172-1179.
54. Strahan JE, Raimer A. Isotretinoin and the controversy of psychiatric adverse effects. *International Journal of Dermatology*. 2006; 45: 789-799.
55. Medicines and Healthcare product Regulatory Agency. Isotretinoin: risk of serious skin reactions. September 2010. Available at <http://www.mhra.gov.uk/Safetyinformation/DrugSafetyUpdate/CON093855> (accessed on 6 November 2014).
56. British National Formulary. Oral preparations for acne: hormone treatment for acne. Section 13.6.2. British Medical Association and Royal Pharmaceutical Society of Great Britain. Also available at <http://bnf.org> (accessed on 6 November 2014).
57. Arowojolu AO, Gallo MF, Lopez LM, et al. Combined oral contraceptive pills for treatment of acne (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.

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