Published in *99 & Counting Medical Myths Debunked*
in 2013 by Future Leaders (www.futureleaders.com.au)

PART FOUR

Preventative Health

35. Eating carrots will improve your eyesight

Harrison Weisinger
Deakin University

Getting enough vitamin A is important for healthy eyes. And carrots are a rich and natural source of this vitamin, which is basically a group of chemicals made up of retinal (the active form of vitamin A) and carotenes such as beta-carotene (which gives carrots their distinctive colour). But a diet overloaded with carrots — and vitamin A — won't leave you with healthier eyes.

To understand where vitamin A fits in, I'll first explain a little about the process of vision. When we look at something, light from that object enters the eye and is focused onto the inside back surface of the eyeball, which is lined by a thin layer of cells. This is called the retina.

The retina is responsible for catching light and turning this into a neural signal, which is then sent up to the brain for further processing. In order to perform this wondrous action, the retina has specialised cells, called photoreceptors, each of which is packed with light-catching pigments.

The predominant pigment in the retina is rhodopsin, a major part of which is retinal (vitamin A). When the retinal reacts with light, it induces a cascade of biochemical events and

shape changes in the rhodopsin molecule. In turn, this creates an electrical signal. This whole process is known as phototransduction, and this is really where vision begins.

Humans are unable to synthesise vitamin A afresh and, therefore, must take it in through their diet to maintain normal visual function. Vitamin A can be found in a range of meats and vegetables — the most notable being the carrot, though the best source is probably liver.

For most people living in developed countries, adequate vitamin A intake is not an issue, so eating more carrots will make no noticeable difference. This is because our diets contain enough vitamin A and we are able to store it, unlike other nutrients, such as vitamin B.

In fact, well-nourished pregnant women should avoid supplementing their diet with vitamin A when their total daily intake is around 3,000 IU because too much vitamin A (well above 10,000 IU per day) can cause birth defects. But vitamin A-rich foods are safe so you can still munch on a bag of carrots without doing any harm (provided you don't mind your skin turning orange from the carotenes!).

In the developing world, however, an estimated half a million children become blind each year as a consequence of dietary vitamin A deficiency. But carrots aren't the answer, as they are not easily grown and don't last long enough to be distributed. World food programs are instead trialling vitamin A-rich bananas and sweet potatoes as a source of nutrition to improve eye health.

While there is still much to be done to prevent vitamin A deficiency in the developing world, to those reading this article, carrots will make very little difference to your eyesight.

36. Fish oil is good for heart health

Michael Vagg
Deakin University

Did you hold your nose and take your daily dose of fish oil this morning? Or perhaps you opted for an odour-free capsule? Well, you're not alone. Around one in four take fish oil supplements to improve their health. After all, it's supposed to be good for the heart. Right?

The Heart Foundation even has a Fish Oil Program aimed at increasing awareness of the benefits of marine-derived omega 3 fatty acids on heart health. Its 2008 Position Statement on Fish Oil recommended adults consume at least 500 mg of omega-3 a day to lower the risk of heart disease.

If you're interested in learning more about the complexities of fatty acid metabolism, you can find a more comprehensive version on Wikipedia. But in short, researchers are interested in the potential benefits of docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and docosapentaenoic acid (DPA).

The fish oil story reflects the challenges involved in translating research evidence into community knowledge and behaviour. And it shows why those who stand by evidence in medicine must be prepared to give up their most cherished beliefs if the science demands it.

The Heart Foundation 2008 Position Statement is a good place to start. It is a serious public health document, which takes a balanced, evidence-based approach.

A table in the document sets out the levels of evidence supporting the rationale for its recommendations. But only one finding has level 1 (the highest level) evidence to support it — that is, the statement that fish oil supplements have a favourable

effect on serum triglyceride levels and high-density lipoprotein (HDL) cholesterol levels (good cholesterol).

Although one might assume this to be a good thing, there is not a similar level of support for the direct link between fish oil and improved heart health. It may be that this positive effect on blood lipid ratios is too small to have a useful benefit when applied routinely to real, paying customers outside of clinical trials.

Most of the other planks of the position have level 2 or 3 evidence, which translates to positive results in individual studies without support from meta-analysis or systematic reviews of multiple studies. The number of studies with negative or inconclusive results does not affect these ratings.

The Heart Foundation noted this shortfall and designated areas for further study, which include doing higher-level reviews and better studies with robust methodology. As an organisation that strives to use the best evidence to form policy, I expect it will update and amend its recommendations to reflect the findings of such new studies as they come in.

The biggest gap in the research on fish oil supplements has been between their effects in test tubes and small pilot studies, and the real world of clinical practice. A definite mechanism for how omega 3 fatty acids provide cardiac protection has never been agreed on, which makes predicting clinical effects in real patients difficult.

An early systematic review in 2006 supported fish oil for heart health. But reading the body of the paper, it's hard to see how the researchers came to such a positive conclusion. They comment throughout on the variable methods of studies reviewed and the mixed outcomes reported. They mostly favour a small positive effect but don't consistently point the same way.

There are also other, similar reviews from the early 2000s which draw mixed conclusions.

In the last few months there have been major systematic reviews in the *Archives of Internal Medicine*, the *Annals of Internal Medicine* and the *Journal of the American Medical Association* (*JAMA*) which have all separately failed to support a clear effect on people in the real world.

The *JAMA* study demonstrates pretty comprehensively that omega 3 supplements aren't effective at preventing cardiac problems such as heart attacks, stroke, sudden death and arrythmias. What makes this study more credible is that it has included both dietary and supplement studies. Whether you are getting your omega 3s from a capsule or from tins of tuna, it seems unlikely that they are doing much good.

So what does this all mean for those taking omega 3 supplements?

Well, fish oil may be reasonable as an add-on therapy for very high-risk cardiac patients who can't tolerate other, more effective treatments.

Research on fatty acid supplementation is likely to continue, and some specific use may still be found for such supplements. The evidence that omega 3 can reduce the symptoms of inflammatory arthritis, for example, still appears promising.

Efforts to encourage Australians to eat more fish should push on, because preferring fish to red meat is still a worthwhile change for other health reasons.

But it's becoming increasingly clear that having a quarter of the population on fish oil as a preventive supplement is an unjustifiable expense. I will await the self-regulatory response from advertisers of fish oil products to this avalanche of new evidence with interest, as should Australia's regulator of therapeutic goods, the Therapeutic Goods Administration.

37. Peanuts stop motion sickness

Merlin Thomas & Chris Tikellis
Baker IDI Heart & Diabetes Institute

At the start of *The Hitchhikers Guide to the Galaxy*, the ever-resourceful Ford Prefect buys four packets of salted peanuts, ostensibly to prevent motion sickness. We sometimes get them on flights too. But do they work or is it just science fiction?

Motion sickness is a common problem, not just for hitch-hikers. Planes, boats, cars and even our television screens are moving faster and more frequently than ever before. And so are our stomachs.

Nausea is triggered in some people when there is a mismatch in what their senses are telling them about the world around them. When taking off in an aircraft, for instance, the vestibular system in the ears detects the plane's acceleration and tells the brain you are moving. But the eyes send a different message.

The same sort of mismatch can occur when watching a moving image on the big screen or in virtual environments (known as cyber sickness) — it looks like you're moving, but your senses are telling you that you're sitting still.

Given the right (or wrong) stimulus, almost everyone can be made to feel unwell. Some people are troubled by motion sickness more than others, especially children and those who also get migraines. Women may be more vulnerable to travel sickness than men, especially Asian women. Infrequent travellers may also have more problems, as habituation usually improves tolerance for bumpy take-offs or landings.

The simplest way to reduce motion sickness is to synchronise your senses. If you're in a car, look forward rather than out the side window, where things are moving fast. (I know I'm

always worse in the back seat.) Fixing on a stable visual reference point, such as the horizon, also helps.

Avoid things that exacerbate the conflict of your senses, such as reading or texting in a moving car.

Another allopathic trick is to counteract the motion sickness. Feelings of queasiness are partly a result of the sympathetic nervous system being activated (the same fight or flight response that makes you feel sick when nervous). So things that activate the opposing parasympathetic system — slow, deep breathing, cooling your face and listening to relaxing music — can lessen the effects of motion.

Eating a (small) meal five to forty-five minutes before the stimulus can also reduce the severity of motion-induced nausea and vomiting. So if budget-conscious airlines don't feed us, it's hardly a wonder we are sick of flying.

It's thought that activating the parasympathetic nervous system, specifically at the stomach level, stimulates normal rhythmic activity and suppresses the rapid, irregular contractions associated with feeling sick (known as gastric tachyarrhythmia).

This effect partly depends on what you eat. Tasty, protein-rich snacks seem to be the best. This may be because protein, more than other nutrients, stimulates the stomach hormone, gastrin, which triggers regular stomach contractions.

Peanuts, of course, are protein-packed legumes and they're much tastier when roasted and salted. But while Ford Prefect might be right to suggest his motion sickness could be lessened by eating salted peanuts, it has never been proven.

Although there are benefits to eating protein, it doesn't prevent all the symptoms every time. And peanuts clearly have their own risks for choking, asthma and anaphylaxis, which have led to calls for them to be banned on all planes, as well as schools.

But if peanuts are not the answer, what is? You could take medication or abandon car, boat and air travel. Maybe a

talented chef could come up with a tasty, protein-rich alternative to snack on after we board. But it wouldn't be the same as that little bag of salted nuts.

38. Reading in dim light ruins your eyesight

Harrison Weisinger
Deakin University

The idea that reading in dim light ruins your eyes isn't my favourite wives' tale about 'leisure activities' causing blindness, nor is it the most obscene! In any case, it's simply not true.

I'll begin my expose with a brief explanation of how we see.

The eyes are equipped to catch the light reflected off, or generated by, objects in our world. When light enters our eyes, it's focused by the front layers of the eye onto the retina — a delicate layer of just a few rows of cells, less than half a millimeter thick — which sits at the back of the eye.

The light that falls on the retina is referred to as the image. The retina begins the process of decoding the image and sorting this into information that tells our brains about its brightness, colour, shape, size, and movement. The information, in the form of neural signals, is then passed back to the brain, which further processes the data before bringing it to the attention of our conscious mind.

Some animals, such as owls, have retinas that are specialised for seeing even the tiniest amount of light. Put simply, they see clearly in conditions that we consider pitch black because their retinas contain 'rod' detectors. These rods are very sensitive, but can't decode colour (owls are colour blind). There are close to

60,000 of these rods per square millimetre of retina, which translates to owls' incredible sensitivity and sharpness of vision — called acuity.

Humans also have many rods, which is why we're able to see when driving at night when there's very little light around. But rods become useless in bright or even normal light levels. That's why we also have 'cones', which are much better in daylight and allow us to see colour. These cones can be found throughout the retina, with the greatest number in the centre.

When you turn off the lights, your 'night vision' gradually kicks in over six or seven minutes, as you stop using your cones and start using your rods. There are no rods at the centre of the human retina, which gives rise to the fact that we have low sensitivity to dim light in our central vision. That's why, when you go outside on a clear night and look directly up at a faraway star, you won't be able to see it. You can only see a star by looking to the side of it, thus using your rods.

On the flipside, in order to read, we practically only use the cones in the centre of our vision. To test this for yourself, try reading a column while looking to the side of that column — impossible.

So reading in dim light — or reading at all — is possible when there is enough light around for the cones to pick up a signal.

Your eyes won't be harmed but you may give yourself a headache. This is because, from an evolutionary perspective, the eyes weren't designed for straining to see close-up objects for sustained periods. They are much better suited for looking out into the distance over fields of buffalos (not that many of us have that luxury in our modern-day lives).

Of course, eyestrain — the feeling of tired or aching eyes and headache — may indicate that you need glasses, or perhaps the glasses you're wearing may need an update. If you are concerned about the health of your eyes, see your optometrist for a check up.

39. Reading from a screen harms your eyes

Harrison Weisinger
Deakin University

The time most of us spend looking at a screen has rapidly increased over the past decade. If we're not at work on the computer, we're likely to stay tuned into the online sphere via a smart phone or tablet. Shelves of books are being replaced by a single e-book reader; and television shows and movies are available anywhere, any time.

So, what does all this extra screen time mean for our eyes?

Well, you'll be pleased to hear that like many good eye myths, there is simply no evidence to support this old wives' tale.

Once we reach the age of 10 years or so, it is practically impossible to injure the eyes by looking at something — the exception, of course, being staring at the sun or similarly bright objects. Earlier in life, what we look at —or rather, how clearly we see — can affect our vision because the neural pathways between the eye and brain are still developing.

When we read from a piece of paper, light from the ambient environment is reflected off the surface of the paper and into our eyes. The retina at the back of the eye captures the light and begins the process of converting it into a signal that the brain understands.

The process of reading from screens is similar, except that the light is emitted directly by the screen, rather than being reflected.

Some people worry about the 'radiation' coming from screens but there's nothing unhealthy about it. The radiation is, for the most part, just visible light, which is why we can see the screen in the first place. Most of the other emissions that lie

outside of the visual spectrum are either low energy and unharmful, or absorbed by one of the front few layers of the eye, including the tear film.

It's practically impossible to injure the eyes by looking at something — except for the sun.

In the past, people used to buy screen covers to dim the light being emitted from their screen. I suspect this did little more that dim the light — causing them to squint and strain. I like bright, shiny screens but the choice between a shiny and matte screen is really only one of personal preference.

Many people complain that prolonged periods looking at a screen gives them headaches and sore eyes. This is perhaps a result of the fact that, when looking at a screen and focusing on nearby objects, our eyes are not really doing what they've been designed for. The eye evolved predominantly to be able to look out over fields for potential food or for hungry lions, with the occasional requirement to look at things up close.

We can look up close when the lens inside the eye 'accommodates'. This requires contraction of muscles inside the eye. When we fixate on a nearby object (say, a screen), we also must turn our eyes inwards. This is called convergence.

With hours on a screen, the muscles of accommodation and convergence can fatigue and give rise to the symptoms we know as eye strain. In my experience, this is one of the most common causes of headache in people who work on screens all day.

This is not to say that screens cause permanent harm — the symptoms should spontaneously resolve when you take a break. Otherwise, spectacles can do a little of the focusing work required to look at a screen.

Many people also report that their eyesight deteriorated shortly after starting a new (screen-based) job. Invariably, this coincides either with increased reading (papers or a computer screen) or reaching middle age.

From the age of 12 or so, our ability to accommodate is gradually declining as the lens inside the eye stiffens. By the

early 40s, accommodation has reduced to the point where reading up close can be problematic. Those stubborn enough to persist eventually present with eyestrain.

The next question about reading from a screen is 'Does size matter?'

The answer is probably not. If the reader is able to focus on the screen (by accommodating, assisted by the correct spectacle prescription or a combination of the two), then font size won't be an issue. When not impaired by eye disease of optics, the human eye can resolve right down to phone-book sized letters and smaller.

If anything, the increased brightness of your smart phone or e-book will help you to see the fine print.

I admit that when a friend of mine suggested that I start to read on a tablet, I gave him the oft-heard response, 'I prefer the feel of books', or one of its many variants.

But I have since changed my tune, and I confess to being a fully fledged e-book addict. Not only has buying books become something I can do 24/7, but I can now read in bed without annoying my wife by keeping the light on!

40. SPF50+ sunscreen almost doubles the protection of SPF30+

Ian Olver
Cancer Council Australia

It's likely Australia's sunscreen regulations will change this summer, enabling manufacturers to label their products as SPF50+.

The sunscreen industry has championed the proposed change, led by Standards Australia, because the SPF50+ label will prompt many Australians to buy new product, thinking they're getting significantly higher protection from the sun.

But what does SPF50+ actually mean? And will it provide better protection?

The Sun Protection Factor (SPF) indicates the amount of ultraviolet light B (UVB) radiation that can reach the skin (and cause sunburn) with sunscreen, compared with no sunscreen.

In other words, SPF ratings indicate the multiples of time you could spend unprotected in the sun without burning, assumingthe ultraviolet (UV) rating was constant.

But no sunscreen offers full protection from the sun. And the increment in UVB filtering between SPF30+ and SPF50+ is small, increasing protection from 96.7% to 98%. That's a 1.3% increase, not almost double, as many people may think when making a purchasing decision.

Many sunscreens contain a combination of 'inorganic' (minerals, produced using chemical processes) and 'organic' (chemical) ingredients.

Inorganic ingredients both absorb and reflect UV radiation, whereas organic ingredients only absorb. This means the energy from the UV radiation is used to convert the organic chemical into another form. But you wouldn't feel any heat produced from such a change.

As our understanding of sunscreen's role in protecting consumers from skin cancer evolves, sunscreen manufacturers are offering other protections. 'Broad spectrum' sunscreens now protect against UVB and UVA radiation, which we now know contributes to the development of skin cancer.

Inorganic ingredients, such as titanium dioxide and zinc oxide, may offer a broad spectrum protection, but they simply reflect the UV. They also tend to be gentler on the skin.

So what's likely to happen if and when SPF50+ comes on to the market?

My concern is that consumers will think the increased SPF factor offers significantly better protection than the products they're accustomed to. And if this leaves Australians using less sunscreen and neglecting other protection behaviours, we're likely to see a future spike in skin cancers.

Australia has one of the highest rates of skin cancer in the world due to our climate and large fair-skinned population. More than 10,300 Australians are diagnosed with a melanoma each year and an estimated 434,000 people are treated for one or more non-melanoma skin cancers.

Despite the popular Slip, Slop, Slap campaign from the 1980s, more than 1,830 Australians die from a skin cancer each year, even though it's largely preventable. Skin cancers form when skin cells are damaged by UV radiation penetrating the skin. Tanning without burning can still cause damage — if you've been exposed to enough UV to cause tanning, sufficient damage has been done to cause cancer.

It doesn't matter whether you use SPF30+ or SPF50+ sunscreen, the best way to protect yourself from skin cancer is with a combination of clothing (slip), sunscreen (slop), hat (slap), sunglasses (slide) and shade (seek), whenever the UV index reaches three or above.

Tips for applying sunscreen

- Make sure your sunscreen is at least SPF30+, water resistant and broad spectrum, which protects you from UVB and UVA.
- Apply 20 minutes before you go outdoors and reapply every two hours.
- Use at least one teaspoon of sunscreen for each limb, your face and the front and back of your body.
- Check the use-by date.

- Never rely on sunscreen — whether SPF30+ or SPF50+ — as your only defence against the sun.

41. Take a vitamin a day for better health

Clare Collins
University of Newcastle

Forget an apple a day, vitamin manufacturers would have you believe it's important to take daily vitamins to boost your health.

And a surprising proportion of Australians do. Data from the last National Health survey (back in 1995) showed that up to 30% of Australians had recently taken vitamin or mineral supplements — mostly for preventive health reasons.

More recently, the 45 and Up study of more than 100,000 Australian adults found that 19% of men and 29% of women reported taking vitamin or mineral supplements.

But most healthy people don't need to take vitamins. A better safeguard for your health would be to spend the money you save from not buying supplements, on buying more vegetables and fruit.

The Australian Guide to Healthy Eating (AGHE) translates the national dietary guidelines into recommended daily food serves to help Australians eat better, without the need for vitamins or mineral supplements.

In a nutshell, the aim is for adults to have a minimum daily intake of:

- two serves of fruit
- four to five serves of vegetables

- four to six serves of wholemeal or wholegrain breads and cereals
- two serves of reduced fat dairy products
- one serve of lean protein
- a small amount of healthy fats.

The problem is, we just don't follow the advice in the dietary guidelines, or eat like the patterns suggested in the AGHE.

The last National Nutrition Survey of dietary intakes in adults (from 1995 — this is currently being updated) found that we had inadequate intakes of vegetables, fruit, wholegrain cereals and dairy products. We also consumed too much fat, especially saturated fat, and over a third of our daily energy intake came from energy-dense nutrient-poor foods, aka 'junk' foods.

So what do we do: turn to vitamin and mineral supplements to make up the shortfall? Or try harder to encourage Australians to eat better?

I vote for the second approach, because taking supplements is not without risks.

Take lung cancer, for example. Epidemiological research indicates that eating more fruit and vegetables is associated with a reduced risk of lung cancer. After this relationship was recognised, a number of clinical trials then gave people supplements of beta-carotene, given it's a major carotenoid (pigment) in vegetables and fruit.

But the supplements had the opposite effect and actually increased the risk of lung cancer in smokers.

Medical problems that arise due to excessive intakes of vitamins and minerals are almost always due to intakes of supplements. To develop toxicity from vitamins in food you'd have to eat excessive amounts of specific foods such as carrots (which could make your skin turn yellow) or liver (vitamin A toxicity would leave you with blurred vision, dizziness, nausea and headaches).

There are, however, people with health conditions or in a particular life stage when they really need vitamins. This includes people with chronic medical problems (such as cystic fibrosis, coeliac disease, pancreatitis), people on restrictive diets to achieve rapid weight loss, and those with conditions that interfere with their ability to eat properly.

Women planning a pregnancy also require additional nutrients. Folic acid supplements are strongly recommended in early pregnancy to reduce the risk of having a baby with neural-tube defects such as spina bifida.

Let's leave vitamin supplements to those who need them, and call this myth busted.

42. Take an aspirin a day after you turn 50

Michael Tam
University of New South Wales

Aspirin is a historical marvel. It's been manufactured for more than a century and is still in widespread use. No other medication can claim as many different narratives and uses as this analgesic — it's been known as:

- A traditional medicine — aspirin-like treatments, based on salicylate, have been derived from plants such as willows for millennia.
- An international blockbuster — at the turn of the 20th century, aspirin was one of the few effective treatments for fever and pain, and was wildly popular (and profitable).

- A hazard to children — aspirin was recognised in the 1980s as a potential cause of childhood death.
- A modern wonder-drug — aspirin has been resurrected as an important and inexpensive medication for the prevention and treatment of heart attacks and strokes.

And there are many fascinating tales of intrigue, international politics and corporate espionage in aspirin's history.

German affiliates undermined the manufacture of explosives in the United States during World War I by cornering the market of a key ingredient, under the guise of aspirin production. And Germany was forced to hand over the trademark 'Aspirin' as part of war reparations in the Treaty of Versailles.

In the modern context, it is commonly believed that once individuals reach a certain age, it's wise to take 'an aspirin a day' for good health.

This narrative starts in 1948 with Dr Lawrence Craven, a general practitioner in California. He had observed that aspirin was a mild blood thinner and reasoned that it might be able to prevent heart attacks.

Dr Craven enrolled his male patients, aged 40 to 65, into a clinical trial and asked them to take aspirin daily. In the 1950s, he published three articles on his trial and concluded that aspirin appeared to protect his patients from heart attacks and strokes.

Dr Craven died in 1957 (of a heart attack!) and his results — which were published in the obscure *Mississippi Valley Medical Journal* — were promptly forgotten.

How aspirin works in clotting and bleeding was discovered in the 1960s. And by the 70s and 80s, aspirin was tested in clinical trials for heart attacks and strokes. These studies demonstrated that aspirin was effective in preventing further heart attacks or strokes (known as secondary prevention).

In the 1990s, our 'medical myth' was not considered a myth. The American College of Chest Physicians (ACCP), a

respected group that publishes guidelines on the use of blood thinners, recommended that aspirin 'be considered for all individuals over age 50 years who are free of contraindications'.

But others were less confident about such a broad recommendation. Firstly, although aspirin is unambiguously beneficial for those who already had cardiovascular disease, the evidence was less clear for those who did not (such use is known as primary prevention).

Secondly, long-term aspirin therapy has potential harms — it increases the risk of bleeding, which, in some cases, can be life threatening. Conceptually, if an individual's risk of cardiovascular disease is low, then the potential benefit of aspirin would not outweigh the potential harms from bleeding.

The most recent recommendations from the ACCP (published February 2012) are a 'soft' suggestion for aspirin for primary prevention in those aged 50 years and above. It recognises that the benefits to heart attacks and strokes are closely matched with the risk of major bleeding.

The authors were swayed by some recent data suggesting aspirin might lower cancer risk and death. Nevertheless, they emphasised the need for shared decision making between doctors and patients.

So, is that the end of this particular aspirin narrative?

Not quite. In keeping with the drama of the history of aspirin, a major study examining the role of aspirin in primary prevention was published in the same month as the ACCP guidelines. It confirmed that the benefits of lowering heart attacks and strokes were similar to the increased risks of bleeding.

Importantly, the study found no reduced risk of cancer, which is contrary to previous reports.

Behind this lack of clarity is the uncertainty of small numbers — trying to balance a small gain with a small risk. For someone who has never had a heart attack or stroke, the likelihood of benefit from aspirin is low, but the payoff could be

massive. Similarly, the odds of being harmed by aspirin are also low, but could be catastrophic if it occurred.

Those aged over 50 years without a history of cardiovascular disease may benefit from regular low-dose aspirin. But that depends on their individual risk (and perceptions of risk) of heart attack, stroke and major bleeding.

So, before you pick up the aspirin for your daily dose, talk to your GP about the potential risks and benefits for you.

43. Vitamin C prevents colds

Michael Tam
University of New South Wales

Vitamin C is so often suggested as a treatment for the common cold that it's almost considered common sense. This well-known vitamin is primarily found in fruits and vegetables, with small quantities in some meats.

With a healthy diet, most of us should get all the vitamin C we need from food. But this doesn't stop many Australians boosting their intake through vitamin supplements.

A story on vitamin C should start with scurvy. The other name for vitamin C is ascorbic acid, which literally means 'anti-scurvy'. As vitamin C is required to build and repair body tissue, its deficiency leads to a range of horrible symptoms including bruising, bleeding, loose teeth and poor wound healing.

Until the modern era, scurvy was a major cause of death in those without access to fresh food, particularly sailors on long sea-voyages and medieval city dwellers.

The history of vitamin C tells an important story about science in medicine — and informs us about three key elements of medical research:

1. Treatments need to be tested in clinical trials

The first (documented) clinical trial of a medical treatment was by Scottish Royal Navy physician James Lind in 1747. He divided sailors suffering from scurvy into different treatment groups and found the sailors who received oranges and lemons made a drastic recovery.

Although fresh citrus fruits had been reported as effective for scurvy prior to Lind's study, it had never been tested systematically. At that time, it was but one of many purported treatments (most of which we now know to be useless). Lind had demonstrated an unambiguously effective treatment for a potentially deadly condition.

2. Medical practice needs to be informed by new research

The medical establishment in the 1700s rejected Lind's findings. The prevailing view was that scurvy was related to spoiled food and hygiene. As this was an age where clinical trials weren't the norm, no one replicated the findings.

It wasn't until four decades later that another Scottish Navy physician, Gilbert Blane, instituted health reforms and mandated the use of lemon juice.

3. Assumptions without empirical confirmation are risky

Unfortunately, scurvy was far from conquered. Fresh citrus fruits were impractical on long sea-voyages so juice and concentrates were carried instead.

In the late-1800s, a change in the preserving process and a switch to limes resulted in a juice that was devoid of any vitamin C content — useless for preventing scurvy. It was wrongly assumed that it was the 'acidity' that mattered. The lack of therapeutic testing contributed to the disastrous 1911 Scott expedition to the South Pole. The team members were beset with scurvy, 150 years after Lind's experiment.

Scurvy was finally identified as a nutritional deficiency in the early 1900s, and by the 1930s, vitamin C was found to be the essential nutrient involved.

Moving forward a few decades, the belief of the effectiveness of vitamin C for colds gained momentum following the publication of *Vitamin C and the Common Cold* by esteemed chemist Linus Pauling (one of the few people to have won more than one Nobel Prize). Pauling extensively promoted vitamin C as having a wide range of health benefits and took large regular doses of supplements.

But like the history of citrus and scurvy, it's not enough to simply claim reasons why something should work. Assumptions are risky and treatments need to be tested. So what does the research evidence actually show?

When used as a treatment for cold symptoms in the general population, vitamin C supplements appear to do no better than a placebo, even in large doses (greater than one gram a day).

If you take vitamin C supplements every day for prevention, you still won't avoid any colds. But the symptoms may be milder and the duration of symptoms slightly reduced — about half a day for a typical cold lasting a week.

It's important to remember that we don't know if regular high-dose vitamin C supplements are entirely safe when taken over the long-term. There is some evidence to suggest they aren't.

We all become afflicted by the common cold at times and it would be wonderful if something as simple as vitamin C supplements made a meaningful difference. But unfortunately, as the saying goes, many a beautiful theory has run aground on awkward fact.

Even taking the most favourable interpretation of the evidence, vitamin C supplements have only a minor effect on symptoms — and that's only if they're taken every day.

44. We're not getting enough sun

Ian Olver
Cancer Council Australia

Myths abound about UV radiation and its effect on our health. We hear that sun-protection has triggered an epidemic of vitamin D deficiency; being tanned protects you from sunburn; a tan looks healthy; and 'old' skin doesn't need to be protected from the sun like 'young' skin does.

Myth, myth, myth, myth!

What is beyond doubt is that Australia is the world's skin cancer capital, yet skin cancer is the most preventable of all common cancer types.

There were 11,000 cases of melanoma diagnosed in Australia in 2008. Deaths from melanoma and non-melanoma skin cancers combined in 2007 (the latest mortality data) totalled just under 1,800. And each year, around 400,000 non-melanoma skin cancers are treated by Australian doctors, costing taxpayers hundreds of millions of dollars.

Many of these patients might have thought their sun exposure was doing them good.

While some sun exposure is vital to good health, Australians in most parts of the country only need a small amount. UV radiation here is harmful to fairer skin types compared with UV levels in most other parts of the world populated predominantly by Europeans. The harms of sun exposure in Australia far outweigh the risks of vitamin D deficiency.

During summer, most of us get adequate vitamin D from just a few minutes' daily exposure to sunlight on our face, arms and hands, on either side of the peak UV periods — before 10 am and after 3 pm.

In winter in the southern parts of Australia, where UV radiation is less intense, people need about two to three hours of sunlight spread over a week. In winter in northern parts of the country, you can still maintain adequate vitamin D levels by going about your day-to-day activities, so there's no need to deliberately seek UV exposure.

Some groups are at higher risk of vitamin D deficiency, such as naturally dark-skinned people, those who cover their skin for cultural reasons, osteoporosis patients, people who are housebound and babies and infants of vitamin D deficient mothers. People in these groups should talk to their doctor about whether they need a vitamin D supplement.

The point is, we can all get our vitamin D without the risk of sunburn.

Does a suntan protect you from sunburn? In most cases, no. A tan can offer very limited protection, but no more than SPF4 (the lowest sunscreen rating), depending on your skin type. A tan does not protect from DNA damage, which can lead to skin cancer.

What about the idea that a tan looks healthy? Although there is a cultural association between tanning and outdoor activities, the reality is that in most cases a tan is a mark of damaged skin. It may not be obvious at first, but over time tanned skin becomes more visibly wrinkled and in many cases patchy and discoloured, compared with skin that has been protected from harmful UV radiation.

People of northern European descent have skin that has not evolved to be suitable for exposure to the Australian sun's intense UV radiation, so a tan is neither natural nor healthy.

Then there's the myth that UV damage to skin occurs predominantly in childhood. Although babies and young children have more sensitive skin than adults, UV damage to your skin at any age increases your risk of skin cancer.

One of the world's most comprehensive studies of sun protection among adults monitored 1,600 people in sunny Nambour, Queensland, with an average age of 49, and found that those who regularly used sunscreen over four-and-a-half years developed significantly fewer squamous cell carcinomas. Over 10 years, the group applying sunscreen also developed half as many melanomas as the control group.

So sun protection can reduce your risk of skin cancer at any age.

That's why it's important to slip (on a shirt), slop (on some sunscreen), slap (on a hat), seek (shade) and slide (on your sunglasses), knowing you'll be reducing your skin cancer risk while in most cases still getting enough incidental sunlight for good health.

45. Cranberry juice prevents bladder infections

Michael Tam
University of New South Wales

You might eat them in a sauce alongside your Christmas turkey or drink them juiced, perhaps with a shot of vodka. But the sweet, tart cranberry is also well known as a remedy for preventing urinary tract infections (UTIs).

Cystitis — an infection and inflammation of the lining of the bladder — is the most common form of UTI, with symptoms including:

- the frequent urge to pass urine
- a stinging or burning sensation when passing urine
- smelly urine

- cloudy or bloody urine
- pain in the low abdomen or pelvis.

This condition occurs frequently in women, with one in three experiencing cystitis at least once in their life. As a general practitioner, it would be unusual for me to not see a case of cystitis most weeks. In most cases, cystitis is easily treated with a course of antibiotics.

As a folk remedy with a long history among Native Americans, cranberry juice was dismissed for years by the medical establishment. But this changed in the 1980s and 1990s when it was discovered that cranberry juice contained chemicals that seemed to stop E. coli (the most common bacteria causing UTIs) from sticking to the lining of the bladder.

Conceptually, if bacteria cannot attach to the bladder lining, then it would be flushed out with the urine and thus not cause an infection.

This thinking has been popularised in the last couple of decades. Cranberry juice and capsules have been widely recommended and promoted as a treatment for preventing bladder infections, particularly for women who suffer from recurrent infections. Health literature aimed at consumers, including high-quality sources, often advise that cranberry products can be used to reduce the frequency of UTI episodes.

In such a setting, it would be natural to believe that cranberry products were a proven therapy! Indeed, I was taught in medical school that cranberry was effective, and have personally prescribed it for my patients in the past.

Curiously, although there appears to be good scientific reasons why cranberry products could work in preventing UTIs, evidence that it does in real patients has been rather murky.

A 2009 Cochrane Library systematic review, which independently analysed all the available evidence, noted that

there was some evidence that cranberry products might work, but it wasn't clear what the 'optimum dosage or method or administration' was.

The large number of dropouts from the available trials also suggested that it might not have been an acceptable treatment over a longer period of time.

This review was updated in October 2012 with the inclusion of newer and larger studies. Disappointingly, this revised appraisal of the empirical evidence seems to suggest that cranberry does not reduce the likelihood of a recurrence of UTIs in women.

I doubt that we have heard the last word on cranberry and there are studies in the pipeline.

But the weight of evidence, especially those from larger and better-designed trials, points towards the likelihood that cranberry products are ineffective for preventing UTIs.

46. A diet high in antioxidants slows the ageing process

Michael Vagg
Deakin University

As Australians' life expectancy nudges past 80 years, it's no surprise that we're searching for ways to add youthfulness and vitality to our later years.

It's a nice idea that a good dose of blueberries, pomegranates, green tea or even an antioxidant supplement could reduce the impact of ageing on the body. But does the science behind antioxidants stack up?

One of the most persuasive scientific ideas in the field is the Mitochondrial Free Radical Theory of Ageing (MFRTA), first proposed back in the 1950s, which explains the ageing process as the result of 'oxidative stress'.

The chemistry is complex but it boils down to the idea that free radicals (ions with an unbalanced charge) react very readily with biological molecules and are subsequently damaged. The changes of ageing — organ deterioration, sagging skin, poorer healing, and so on — are therefore due to accumulated injury.

This theory is supported by some laboratory results, such as the observation that an animal's life span roughly correlates with its metabolic rate (ability to expend energy) and amount of antioxidant activity in a species.

Studies have also shown that raising antioxidant levels in animals seems to increase their life span.

Limiting calorie intake has been found to reduce the production of Reactive Oxygen Species (ROS), which are the most common free radicals in the body.

It's about at this point that the hype begins to take over from the science.

As scientists have interrogated the MFRTA over the past decade, the results have shown some gaping holes in the theory.

More detailed animal research suggests that the longest-living animals have low levels of ROS damage simply because they produce lower levels of these free radicals. In fact, the entire relationship of oxidative damage to longevity has also been disputed.

But it's possible to be right for the wrong reason in science, as ideas are constantly being examined, refined and discarded.

So what about the results of dietary antioxidants in the real world?

Again, the relationship is very complex — early studies linking high dietary antioxidant intake with improved health and longevity have not been reproduced.

In fact, the rates of some types of cancer may be increased in people consuming high amounts of antioxidants.

Perhaps most worrying for people who hit the gym is that antioxidant supplements may reduce the effectiveness of exercise training by preventing the muscles from adapting as well to the effects of the training.

So, a fair summary of the science is that while MFRTA has been a useful and productive scientific hypothesis, it's unlikely to be true in its pure form.

That means for the time being, you can afford to leave the expensive antioxidant supplements on the shelf and choose foods based on their nutritional value.

47. Chicken soup cures the common cold

Merlin Thomas
Baker IDI Heart & Diabetes Institute

Of all the homemade winter cure-alls, chicken soup is the best known and most loved. In fact the term 'chicken soup' has become idiomatic for all things restorative; benefiting every possible problem from the head to the soul.

In many different cultures, chicken soup is a traditional treatment for symptoms of the common cold.

Chicken soup is widely known as 'Jewish penicillin'. In the 12th century, the Rambam, Rabbi Moses Maimonides published, in his *Medical Responsa*, the many health benefits of chicken soup for a range of ailments, from pneumonia to a runny nose.

Some of this may reflect the traditional use of chicken soup as a Sabbath meal and the perceived importance of piety in affecting health outcomes.

Nonetheless, it's a staple among Jewish grandmothers and their snotty grandchildren, worldwide.

Even before the Olympics, Greek grandmothers may also claim they invented chicken soup for the common cold.

Avgolemono is a thick egg and lemon (chicken) broth widely administered for the symptoms of cold and flu, or for their prophylaxis on wet winter evenings.

Although a quintessentially Greek dish, it is likely that its therapeutic use has its earliest origin in Sephardic tradition. Adding the 'all important' lemon may have been the Greek contribution.

Not to be outdone, most Chinese grandmothers are ready and primed to produce chicken soup at the first sign of a sniffle.

In traditional Chinese medicine, illness is perceived as a state of imbalance between yin and yang. Yin represents the darker cooling forces, while yang embodies the lighter, warmer forces.

In this paradigm, the treatment for cold is obviously yang, and chicken soup is a prime example: restoring the yang forces and balancing the cold of yin.

There have been a few attempts to definitively establish these cold-busting effects in clinical studies

One study found that sipping hot chicken soup increased the velocity of nasal secretions (runny noses) in healthy volunteers. This could be a good thing for clearing a blocked nose, but the study showed it only worked for a few minutes and wasn't any more effective than hot water.

So far, studies haven't tested whether chicken soup is really effective in fighting the common cold. And they haven't compared the effectiveness of chicken soup against proven cold-fighting medicines such as analgesics and decongestants.

This does not mean it doesn't work. Just that there is no reliable evidence. Despite this, the legendary status of chicken soup provoked a number of attempts for rational explanations.

These include the effect of heat/steam, rehydration and easy feeding when the throat is raw and the appetite is poor. This goes along the same line as the the 'feed a cold, starve a fever' hypothesis.

Certainly, malnutrition impairs the immune system, and feeding can stimulate and enhance immune responses to viruses. But why is chicken soup a better choice?

Clinical trials using zinc lozenges show they can modestly reduce the duration and severity of cold symptoms if taken within 24 hours of the onset of the cold and in doses of more than 50 mg a day.

Some have argued that chicken soup is beneficial because it is naturally high in zinc, especially the bones and carcass that are used to make the broth. But most soup will contain less than 5 mg a serve. And if zinc was the trick, oysters (at 100 mg of zinc each) should be a better option.

More recent studies have suggested carnosine, a natural antioxidant that is found exclusively in meat, including chicken, may provide another explanation. But it is broken down so rapidly once ingested that little, if any, would reach the nose to provide relief.

Psychological stress is a risk factor for infectious diseases, including the common cold. The effect of 'comfort foods' on stress and mood are real and powerful in some people, but not in others.

Moreover, any effects are usually transient. Chicken soup is hardly an effective way to manage stress and its effects in the long term.

But the real psychology of chicken soup can't be overlooked: the expectation of efficacy, the succour of being cared for, the stimulation of taste on an otherwise dull day.

In traditional cooking, chicken soup is the flavour of home. It may not work, but does that really matter?

48. Dairy products exacerbate asthma

Janet Rimmer
University of Sydney

Dairy products are good for the bones, so we're encouraged to have regular serves of (reduced-fat) milk, cheese and yogurt. But can they make asthma and allergies worse?

Asthma is a respiratory condition that causes the airways to the lungs to constrict when exposed to certain triggers, making it difficult to breathe. One in ten Australian adults and about one in nine children will suffer from asthma during their lifetime.

People with asthma generally aren't put on a restrictive diet because it's rare that food allergens trigger the illness. It's more likely that food additives or food preservatives such as sulphur dioxide (identified on food labels by the number E220) will trigger asthma. This is relevant for 5% to 10% of asthmatics who may need to avoid the additive.

Specific cows' milk-related diseases include cows' milk allergy, food protein-induced enterocolitis (FPIES), lactase deficiency (or lactose intolerance) and milk intolerance.

Around 2% of babies are allergic to cow's milk. In this group, the ingestion of dairy products can cause asthma as well as other symptoms such as hives and vomiting. It's important that parents obtain a correct diagnosis for children with the condition, using skin testing or blood tests to show the presence of allergy (IgE) antibodies to milk.

About 80% of children will grow out of their cow's milk allergy. But while the allergy persists, it's important to seek medical advice about alternative sources of nutrition and when to consider re-introducing milk.

In the other cow's milk-related diseases such as FPIES, lactose intolerance and milk intolerance, the ingestion of milk will cause symptoms — usually gastrointestinal, such as diarrhoea and vomiting — but will not aggravate asthma.

Respiratory allergies such as asthma and rhinitis (hay fever) are usually triggered by what we inhale rather than what we eat.

Some people complain that the ingestion of milk causes a runny nose, makes their throat feel as though it is coated by thick mucus and triggers coughing. But research studies have shown that these sensations are due to the texture of the milk and can be similarly caused by fluids of the same thickness.

Studies have also shown that in people with asthma, the ingestion of milk has no effect on lung capacity and does not trigger asthma symptoms. Drinking cold milk may cause a cough in patients with asthma, but this is more likely to be due to the temperature of the milk and can be avoided by warming the milk.

In children with asthma, a runny nose is more likely to be due to associated allergic rhinitis or a viral infection rather than milk in the diet.

Why we need calcium

Calcium is vitally important in the body for cell functioning. It's stored in the bones and teeth where it supports their structure and function. Dairy products are the main source of calcium in our diet.

There are particular times in life — such as during growth spurts in children and adolescents — when new bone formation occurs and adequate dietary calcium is essential to facilitate this process. Maximum bone density is achieved during puberty and the higher it is at this time, the better one's

lifetime bone health will be. This is why adequate dietary calcium intake is especially important in childhood.

Further, many asthmatics are prescribed preventer medication that contains an anti-inflammatory corticosteroid medicine. At high doses, this is associated with the development of osteopenia and osteoporosis. So it's important that asthmatics of all ages have an adequate calcium intake to meet their dietary needs:

- 210 mg daily from birth to six months
- 500 mg in early childhood
- 1300 mg from ages 12 to 18 years
- 1000 to 1200 mg in adults.

These targets are difficult to achieve unless dairy products (milk, yoghurt, cheese) are part of the diet. If you're not getting enough calcium, talk to your doctor or health professional about calcium supplements such as calcium carbonate or calcium citrate.

49. You have to wash with hot water to kill bugs

Merlin Thomas
Baker IDI Heart & Diabetes Institute

Despite decades of medical breakthroughs and growing health budgets, the simple act of washing our hands remains one of the most important things we can do to protect ourselves from disease.

The principle of hand washing is simple: disease-causing germs (bacteria, viruses, fungi and parasites) get onto our hands

and can cause infection if they're transferred to the mouth, nose or eyes — depending on the type of organism, the dose and individual's susceptibility.

Cleaning your hands with soap or detergent can significantly reduce the load of these germs and the risk of passing on illness, particularly after using the toilet and before preparing food.

But does it matter whether we use hot water or cold to wash our hands?

The role of the water in hand washing is more controversial than the role of soap. Although you might wash off the dirt, and your hands may look clean enough, water alone isn't that effective in removing germs, even when it's hot.

Germs grow rapidly in our bodies, which maintains a temperature of around 37°C. So the average hot tap temperature won't kill disease-causing germs. Neither will water simply wash them away.

Most germs are attached to the surface layer of the skin, which is formed from acidic fats, oils and cellular debris. To dislodge the germs, you have to dissolve this surface layer, then mechanically rub them off. This is why you need soap.

And water is helpful in three aspects of cleaning.

The first is solvation — the chemical process that leads to the formation of tiny soap micelles, which allows otherwise insoluble grease, fats and oils to disperse.

The second is lathering and lubrication (or soaping). Most liquid soaps also need a small amount of water to help the product spread across the surface of the hands, where massaging, rubbing, and friction is used to create a lather.

It's not clear whether lathering itself is required to dislodge germs from your hands, but it's an excellent marker for having done the hard work required.

The third reason to turn on the tap is to rinse the soap/detergent (in which many germs are now suspended) from the skin.

In each of these roles, the effectiveness of water bears no relationship to its temperature.

But when given the choice, most of us still reach for the hot tap, even on the hottest of days. Maybe we're simply creatures of comfort and prefer the feel of warm water.

And if this means more people are likely to wash their hands more often, and transmit less disease, I'm happy for this myth to hang around a little longer.

50. You need eight hours of continuous sleep each night

Leon Lack
Flinders University

We're often told by the popular press and well-meaning family and friends that, for good health, we should fall asleep quickly and sleep solidly for about eight hours — otherwise we're at risk of physical and psychological ill health.

There is some evidence to suggest that those who consistently restrict their sleep to less than six hours may have increased risk of cardiovascular disease, obesity and diabetes. The biggest health risk of sleep deprivation comes from accidents, especially falling asleep while driving.

Sleep need varies depending on the individual and can be anywhere from 12 hours in long-sleeping children, to six hours in short-sleeping healthy older adults. But despite the prevailing belief, normal sleep is not a long, deep valley of unconsciousness.

The sleep period is made up of 90-minute cycles. Waking up between these sleep cycles is a normal part of the sleep pattern and becomes more common as we get older.

It's time to set the record straight about the myth of continuous sleep — and hopefully alleviate some of the anxiety that comes from laying in bed awake at night.

So what are the alternatives to continuous sleep?

The siesta

The siesta sleep quota is made up of a one- to two-hour sleep in the early afternoon and a longer period of five to six hours late in the night. Like mammals and birds, humans tend to be most active around dawn and dusk and less active in the middle of the day.

It's thought the siesta was the dominant sleep pattern before the Industrial Revolution required people to be continuously awake across the day to serve the sleepless industrial machine. It's still common in rural communities around the world, not just in Mediterranean or Latin American cultures.

Our siesta tendency or post-lunch decline of alertness still occurs in those who never take afternoon naps. And this has less to do with overindulging at lunchtime and more to do with our circadian rhythms, which control our body clock, hormone production, temperature and digestive function over a 24-hour period.

Bi-phasic sleep

Historical records also suggest that a segmented or bi-phasic sleep pattern was the norm before the Industrial Revolution. This pattern consists of an initial sleep of about four and a half hours (three sleep cycles of 90 minutes each) followed by one to two hours of wake and then a second sleep period of another three hours (another two sleep cycles).

During the winter months, northern Europeans would spend nine or ten hours in bed, with two to three hours of it spent awake, either in one long mid-night period or several shorter wake periods across the night.

The bed was the cheapest place to keep warm and was considered a place of rest as well as sleep. A few hours of wakefulness certainly wouldn't have been considered abnormal or labelled as insomnia.

Can't sleep? Don't worry

These days we expect to have close to 100% of our time in bed asleep, dozing off within minutes and not waking at all until the alarm sounds. Unfortunately this myth sets us up for worry if we find ourselves awake in the middle of the night. And this worry can lead gradually to the development of insomnia.

Humans can sleep on very different schedules, with little difference in wakeful competence. International sleep researchers have trialled a number of different sleep schedules: sleep for 20 minutes every hour; 1 hour sleep every 3 hours; 10 hours sleep every 28 hours. Participants survived easily on all these schedules despite their impracticality in our 24-hour world.

The best quality sleep is obtained during our circadian low phase — when body temperature and metabolic rate are at their lowest. For most people, this occurs late at night. But just like other species, humans can be opportunistic sleepers and satisfy our need for sleep when we get the opportunity.

There's no doubt that the eight-hour solid sleep myth is a relatively recent cultural imposition. And although it satisfies our modern lifestyle, it does have its disadvantages.

Some have lamented the loss of wakefulness between sleep cycles as a valuable time of contemplation or creativity.

But probably the greatest negative impact of the eight-hour sleep myth is its power to create insomniacs out of good sleepers who experience normal awakenings across the night.

51. Osteoarthritis can be 'cured'

Michael Vagg
Deakin University

Switch on daytime television on any given day and you'd be forgiven for thinking there was a cure for the debilitating and dreaded condition, osteoarthritis.

Unfortunately, there's not. And that's not from want of trying. With the exception of the common cold, no everyday health problem has been as extensively studied with such little result.

Osteoarthritis is the most common form of arthritis, affecting around 1.6 million Australians. The hallmark of osteoarthritis is loss of cartilage which lines major joints — this causes the classic symptoms of pain and stiffness in the affected joints.

Or does it? One of the major frustrations in osteoarthritis research is the absence of research showing the correlation between the state of joints on X-rays and the degree of pain and disability the operator of the joint experiences.

To work out what creates the pain in osteoarthritis, researchers need to look beyond the joint.

Many studies using magnetic resonance imaging (MRIs) suggest the bone marrow around the joint is a potent source of pain. And further away, in the spinal cord and brain, there may be abnormal processing of pain signals.

When you add the standard physiological, genetic and psychological complexities common to all types of long-term pain, you begin to see why finding durable, meaningful relief from osteoarthritis pain is so difficult.

What osteoarthritis sufferers don't need is to be presented with a steady stream of fake and cynical products which reflect none of this hard-won knowledge.

Tabloid media, particularly television, often feature products promising relief from arthritis pain. This story from *A Current Affair* is fairly typical of the genre. The product is usually presented as an infomercial, with no critical analysis from the reporter. A couple of testimonial cases are then wheeled out for breathless adoration.

There is also invariably some type of pseudoscientific angle presented as an explanation for the miraculous healing powers of the product. It's often cast as a 'secret breakthrough' discovered by a lone misunderstood genius, who is persecuted by vested interests in the pharmaceutical industry.

So how does this type of misinformation make its way onto our television screens and magazines?

The Therapeutic Goods Advertising Code contains what would be robust protection for consumers — if it were adequately policed.

But the Code is held in such low regard by product manufacturers and distributors that some don't bother to follow the Code. Others don't do their research to understand the Code before tipping thousands of dollars into promoting their questionable devices or pills.

Many of the less scrupulous operators simply ignore TGA sanctions, or make the minimum required changes to their advertising, while maintaining claims about efficacy.

Cynics can chuckle that there's no great harm in condoning this thriving industry built on deceptive advertising. They may even say it's a tax on gullibility.

But it makes things much harder for those of us whose careers involve trying to steer these osteoarthritis sufferers towards the proven interventions that can reduce their disability and pain.

There aren't any miracle cures for osteoarthritis but there are evidence-based measures to treat the condition or reduce its severity. These include:

- peer-led education groups
- carefully tailored weight loss
- cognitive-behavioural treatment
- judicious medication use
- joint replacement.

These measures aren't glamorous and challenge sufferers' beliefs about their pain and their lifestyle. This type of change is hard for individuals to contemplate, and difficult to resource and implement.

For the average Australian without much scientific background, it's easy to see the attraction of a simple and compelling story about a miraculous cure.

So what's the solution? Well, for a start, health-care professions should do more to educate consumers about dodgy arthritis products and avoid lending our professional credibility to endorsing them.

And the government needs to step in with some ruthless regulation.

52. Cracking your knuckles causes arthritis

Michael Vagg
Deakin University

For some it's a morning ritual — cracking your knuckles before beginning the day. For others, it's a way to pass time while pondering a thought or reading something particularly interesting online.

But are generations of well-meaning parents right? Will knuckle-cracking give us arthritis? Or is it just another harmless habit?

Thanks to Dr Donald Unger MD, this medical chestnut has a definitive answer. In 1998, Dr Unger published a Letter to the Editors of the *Arthritis and Rheumatism*, the world's premier rheumatology journal.

Dr Unger reported that he had been cracking the knuckles on his left hand at least twice daily over a 50-year period, while the right hand was never cracked and used as a control.

This heroic study was undertaken in response to advice from various well-meaning relatives who warned him against cracking his knuckles in his early life, and continued with dedication (bordering on pathological) for half a century before the final triumphant publication of the result!

Dr Unger's right hand remained arthritis-free throughout his life. And so did his left.

Fittingly, Dr Unger was awarded the 2009 Ig Nobel prize for Medicine. These awards are presented annually on the eve of the real Nobel Prizes by the organisation Improbable Research for 'achievements that first make people laugh, and then make them think'.

Another earlier study by Swezey and Swezey was published in an obscure journal in 1973. The authors were a doctor and his 12-year-old son.

After seeing Unger's letter, they reported their 10-year follow-up had the same result: no arthritis in cracked knuckles.

So, why do some of us feel the need to crack our knuckles?

Cracking of a joint is most likely due to a rapid change in joint volume causing the brief formation of a bubble of gases such as carbon dioxide (Co2).

These gases are normally dissolved in the joint fluid and escape the solution when the pressure of the joint suddenly lowers.

The unstable gas bubble rapidly implodes and is believed to be the cause of the cracking sound.

Joint cracking shouldn't be confused with the snapping sound made by stiff tendons or other bands of soft tissue sliding between muscles or over bony outcrops.

It's also different from the grinding sound (called 'crepitus' by health professionals) that results from movement of a joint with roughened or worn cartilage.

If you've been worried about your knuckle habit, you can relax and get cracking, because the evidence suggests you're not doing any harm to them.

But if you're a chronic workplace or social knuckle-cracker, the harm may come from those who have to put up with you.

53. Deodorants cause breast cancer

Terry Slevin
Curtin University/Cancer Council Australia

The concern that using deodorants and antiperspirants might increase the risk of breast cancer has been around for at least 15 years, probably longer.

The theory suggests that either parabens, a preservative previously used in some deodorants that acts as a weak form of oestrogen, or aluminium salts used in many antiperspirants, enter the body and contribute to or cause breast cancer.

Studies detecting the presence of traces of paraben and aluminium products in breast tissue and breast tumours are put forward as evidence of the connection.

The other argument supporting this theory centred on the higher proportion of breast cancer lesions being located in the upper outer quadrant of the breast. This is where deodorants and antiperspirants would come into most contact with breast tissue.

Others have observed there is simply more breast tissue in that part of the breast. So if lesions are evenly spread, we would expect to find more disease in that part of the breast.

Another issue is measurement precision. As reported in the study that advanced the theory, between the years 1980 and 1996, there was a lack of compliance with recording cancer lesion location by breast quadrant. Only 17.5% of cases recorded cancer location by quadrant, making meaningful analysis difficult.

On the question of the presence of parabens in breast tissue or breast lesions, detectable measures in tissue do not in itself prove causation of disease. Breast cancers, like most solid tumours, develop their own access to the body's blood as a means to grow. As a result, it's likely that any substance that's in the bloodstream will be detectable in small amounts in the tumour tissue. But it doesn't mean the detected substance caused the cancer.

Nonetheless, as a result of the stories circulating about the potential harms of parabens, most manufacturers of deodorants have ceased using these preservatives. Not because of a proven harm, but because of a suspicion ('market perception') of possible harm, which ultimately affects sales.

What does the evidence say?

Studies aimed at determining if a connection between underarm products and breast cancer really exists have not been able to find a causal link. One study in 2002 looked at about 800 women with breast cancer and a similar number of matched controls. They asked about the use of antiperspirants and deodorants, and underarm shaving habits. They could not find any difference between those with and those without breast cancer for any of these behaviours.

Another small case control study, in 2006 found that 82% of the controls (women without breast cancer) and 52% of cases (women with breast cancer) used antiperspirants, indicating that

using the under arm product might protect against breast cancer. While the study is too small to justifiably make such a claim, it certainly does not support the 'antiperspirants cause cancer' story.

Reputable groups like the American National Cancer Institute, Cancer Research UK, the American Cancer Society and most other major authorities suggest the link between deodorant or antiperspirant use and breast cancer is unconfirmed, or simply a myth.

What about radiotherapy?

Another contributing factor that perpetuates this myth is that patients undergoing radiotherapy are commonly advised to stop using antiperspirants during therapy, on the theory that the aluminium salts may influence the therapy. However, a 2009 Australian study indicated that less than half of patients complied with this advice, with many forgetting (43%) or ignoring (10%) it.

Interestingly, this study also found: 'Of the 233 women who routinely wore a deodorant but abstained during radiotherapy, 19% expressed a lot of concern about body odour and 45% were slightly concerned.' This suggests that many people see a clear benefit in using these products.

Even more recently, a Canadian study found no evidence of antiperspirant use having any adverse effect on radiotherapy treatment for breast cancer.

It's impossible to ignore that the majority of research on the possible link between underarm cosmetics and breast cancer comes from one research group. And it seems despite the absence of evidence to support the link, their search to prove the theory is unlikely to stop.

Who knows, they may ultimately be proven correct. But based on the evidence from most of the other groups researching this question — it seems likely to remain nothing more than a myth.

54. Wearing a bra to bed increases your risk of breast cancer

Lea Budden
James Cook University

Women's breasts are seen in society as symbols of femininity, fertility and sexuality — so are the many different styles of bras worn to support, enhance and protect the mammary glands.

Many women wear bras to bed to support large, painful or nursing breasts. Others just want to counteract any sagging. But can these decorative pieces of clothing, or the underwire, cause health problems such as cancer?

Breast cancer is the most common cancer in Australian women. More than 12,000 women each year are diagnosed with the disease, with the overall risk estimated at one in nine.

Most women will meet someone during their lifetime who has been affected by the disease and its treatment. So it's easy to see why women may be anxious about the risk of breast cancer.

What is breast cancer?

Humans are made up of millions of cells (which contain components such as DNA, chromosomes and genes) that form specialised tissues and organs such as breasts. Women's breasts consist of lobules (mammary glands producing milk), ducts (tubes) and fatty tissue.

When abnormal cells (cancer) grow in the body, an immune response is triggered and these cells are killed. If the body doesn't recognise these foreign cells they multiply and start to invade other cells, tissues and organs in the body. These cancer cells then multiply into tumours or lumps in the body — or in the case of breast cancer, form lumps in breast tissue.

Depending on their size, these lumps can sometimes be felt or seen on mammography screening. Or they may be detected using ultrasounds or biopsies. Other signs of breast cancer include:

- changes to breast shape or size
- breast dimpling, rash or other skin changes
- lumpiness or thickening of the breast
- unusual or persistent breast pain
- nipple sores or discharge
- swelling or discomfort in armpit.

What causes breast cancer?

The cause of breast cancer is still unknown. However, there are some known causes for other cancers such as lung cancer, such as asbestos exposure. Factors that cause cancer are called carcinogens — these include: tobacco, alcohol, ultraviolet sunlight, radon exposure (radiation), chemical agents such as formaldehyde and contaminated water containing arsenic.

Women's risk of developing breast cancer increases with age (over 50 years). Other risk factors include:

- personal history
- family history
- inheritance of mutations in the genes BRCA2, BRCA1 and CHEK2
- exposure to female hormones (natural and administered)
- obesity (poor diet and inadequate exercise)
- excess alcohol consumption.

Cancer Australia's website has a very quick and easy tool to help women calculate their risk of developing breast cancer. It also includes advice about reducing your cancer risk through lifestyle modifications such as reducing alcohol consumption,

maintaining a healthy weight and diet, regular exercise and mammograms for women over 50 years.

Treatment

The treatment of breast cancer depends on the stage at which it is detected. Women diagnosed with early breast cancer are usually offered a choice of either breast conservation surgery (lumpectomy–removal of the breast lump) with radiotherapy or mastectomy surgery (removal of the breast). Other treatment (sometimes called adjunct treatment) for breast cancer may include chemotherapy, axillary clearance (removal of affected lymph nodes) and hormonal therapy.

It's important to remember that breast cancer does occur in younger women. So, if you notice any breast changes or are concerned about your risk, don't hesitate to consult your doctor. Early detection of breast cancer is likely to improve the outcomes of treatment.

But rest assured, there is no evidence that wearing bras — with or without underwires, during the day or at night — increases your risk of breast cancer.

55. You can catch a cold by getting cold

Merlin Thomas

Baker IDI Heart & Diabetes Institute

Colds are more common in the cold winter months. But does the weather have anything to do with why we get sick?

These days, we use other terms such as 'virus' or 'the flu' to describe our sniffles because we have a fair idea of their origins. So when we call it a 'cold', don't we also imply that the temperature outside was the cause?

Growing up, my mum always said: 'Put on your woolies or you'll catch a cold!' But a winter scarf is not a surgical mask; it's hardly going stop me inhaling a virus from other people's coughs and sneezes.

So did Mum confuse getting cold with getting a cold? She could be forgiven for that. More likely, I wasn't listening that closely.

When you think about it, many of the symptoms are very similar. Go out on a cold and frosty morning and inhale deeply through your nostrils — you do get a tingle in your nose.

Take a deep breath in through your mouth and your throat feels strangely dry and coarse. Sometimes, it will even trigger a cough.

If you stay out for too long in the cold, you may start shivering, your hands are cold to touch and fingers go white. You breathe faster and your heart rate picks up. All this happens as the sympathetic nervous system is activated to preserve heat.

These symptoms are similar to those you experience when you have a cold.

As the immune system begins its fight against the cold virus, it resets the brain's control of body temperature. So instead of running close to 37°C, the immune system releases pyrogens, which turn up the heat and establish a new temperature at which the body will run.

This is usually experienced as feeling cold because, from the brain's point of view, you are colder than it wants you to be. So it makes you shiver, breathe faster, and shuts down your peripheries in exactly the same way as it does when trying to cope with cold weather.

The other confusing factor is that colds are more common in colder months and least common in summer, so they're temporally associated with cold.

When it's cold, people are more likely to spend longer periods indoors at close proximity to others. This makes it easier for infectious droplets of mucus, which are coughed,

sneezed, or passed on via hands, to transmit from one person to another.

So, the association with cold weather is an example of a confounding factor rather than a causal link. For example, people who carry matches are more likely to develop lung cancer.

For the same reasons, it's still widely assumed that you can breathe in the cold, to literally catch it, so that even when you came back indoors the 'cold' stays with you.

Colds have been recognised as a cause of illness since the beginnings of Western medicine. In the 16th century, the term 'a common cold' was widely used to denote much the same illness we experience today.

Even earlier, in traditional Chinese medicine, illness was perceived as a state of imbalance between yin and yang. Yin represents the darker cooling forces, while yang are the lighter, warmer forces. In this paradigm, a cold is caused by inhaling the cold wind (a yin qi).

Although we all now know that colds are caused by seasonal viruses, this has not stopped us secretly feeling, in our heart of hearts, that getting cold somehow makes this more likely.

A number of theories have been put forward to explain how cold weather may influence our susceptibility to viral attack.

Some studies have suggested that short-term exposure to cold weather or direct chilling alters the immune system or the nose's defences.

Some viruses are killed by ultraviolet light, which is in short supply on cold wet winter days.

Large studies have tried very hard to substantiate this myth. Most famous of all were performed at the Common Cold Research Unit in Salisbury, England, where thousands of paid volunteers were chilled before infected mucus was

exchanged. Although much was learnt about the illness, being wet and cold appears to have little to do with it.

But just because you can't catch 'the cold' doesn't mean you shouldn't wear your winter woollies. Perhaps the most important reason to stay warm is it allows you to venture outside and be active for longer.

Most viruses are transferred and amplified in our heated indoor areas, and risks are greatest to sedentary people. So indirectly, rugging up and going outside does reduce your risk of getting a cold. Mum was right after all.

56. Drink plenty of fluids when you have a cold

Chris Del Mar
Bond University

When sick with a cold, you're likely to be told to rest and drink plenty of fluids — water, juice, tea and the old favourite, chicken soup.

This has been the prevailing advice for generations and seems to be intuitively sensible. With an upper respiratory viral infection, you secrete more fluid from the nose and may be running a fever, which could result in additional fluid loss. Your appetite may also be decreased.

When considering treatment for colds, we first need to work out the desired outcome. Shortening the illness, or, perhaps making the symptoms less severe, would get most people's vote.

Having established the desired outcome, it wouldn't be hard to set up a trial of people with coughs and colds, where

half the group was urged to drink extra fluid and the other half allowed to drink simply when thirsty.

If the trial was set up fairly, and there were enough participants, we would have empirical information about whether drinking extra fluids was effective.

I was part of a small team that searched medical journals electronically for any such trials. What did we find? No one seems to have bothered to conduct the trials. Or if they have, they haven't published them.

I could finish off here with some comment about it being a pity this hasn't been studied properly, and the irresponsibility of folk who go around offering a treatment for which there is no evidence (both of which I believe, incidentally).

But there is a small postscript. In our search for evidence we stumbled across some medical journal articles called 'case series', which outline unusual events that doctors think tell a lesson, or spark a research question.

The doctors describe how series of individual children they treated came to harm after being given extra fluids for what was initially considered a trivial cold (or upper respiratory infection).

Usually, the infection turned out to be more severe than initially anticipated. The children then suffered something called cerebral oedema, which is extra fluid in the brain. This can cause convulsions and brain damage because of the restricted space inside the skull, and can even lead to death.

The doctors writing these case series weren't sure what had caused the cerebral oedemas. It might have been some effect of the infection, of course. But the doctors all suggested it might have simply been the extra fluids the patients were given — sometimes by the medicos themselves (by intravenous drips in a few cases).

This could be the result of the body secreting anti-diuretic hormone, which temporarily shuts off our kidneys from

excreting urine. This occurs in times of severe stress. Anti-diuretic hormone probably evolved in order to protect us mammals from dying of fluid loss when wounded or very ill.

But it might prove fatal if a person with a severe infection was persuaded to drink fluids they didn't need (above that dictated by their thirst) and, at the same time, started secreting anti-diuretic hormone.

Right now, this is all speculation. We don't really know. But until we do, perhaps we should stop exhorting our sniffly kids to 'drink more fluids' because they have a respiratory virus.

57. The flu vaccine will give you influenza

Julie Leask
University of Sydney

We hear it all the time: 'I don't want a flu vaccine. It gives you the flu.' The old, the young and even health professionals make this claim. And it's usually followed by a personal example like, 'the year I had a flu vaccine, I got the worst case of flu ever'.

It's physically impossible for the flu vaccine to cause the flu (influenza) because the vaccines licensed for use in Australia are all inactivated. This means the viral cells in the vaccine have been killed and are not capable of causing infection.

But this belief is persistent because:

1. **The vaccine itself can make people feel a bit under the weather for a couple of days**

   Although the flu vaccine cannot cause true influenza, it makes 1% to 10% of people feel as if they have a mild flu infection. This is the body mounting an immune response to the vaccine — with some experiencing muscle or joint

aches, fever, and tiredness for a day or two. While these symptoms can be unpleasant and inconvenient, the good news is they are evidence the body is responding to the vaccine and developing immunity. When that person has their annual flu vaccine the following year, the side effects are usually less intense.

2. A person might get another virus that feels like influenza

After getting an influenza vaccine, a person might get another virus they mistakenly believe to be influenza. That virus could be rhinovirus, respiratory syncytial virus, adenovirus, parainfluenza, human metapneumovirus, coronavirus, human bocavirus, polyomavirus, or even one that virologists are yet to discover. These can all cause flu-like symptoms which might include fever, sore throat, cough, runny nose, and malaise. And because the influenza vaccine only prevents the influenza virus, a person might still get one of these other viruses. It's understandable that if a person has a vaccine against influenza and they still get an illness that feels like flu, they may either think the vaccine is not effective or worse, is causing their illness. But it's not, it's probably another infection.

3. A person may get a strain of influenza not covered by the vaccine

In some influenza seasons, the strains in the vaccine do not match the circulating viruses as closely as predicted. So, a person might develop influenza from a viral strain that was not in the vaccine.

4. Some people's immune systems don't respond to the influenza vaccine

Some people don't develop immunity from the influenza vaccine so they remain vulnerable to getting influenza. Again, the vaccine isn't causing their disease, it's just not providing the intended protection Age is the biggest factor

here and older people's immune response to the influenza vaccine is not as good as it is in younger people. Does that mean it's not worth older people being vaccinated? No, because they are the group most likely to die from influenza or its complications.

Making the choice

Any decision about having a flu vaccine should be made in consultation with a health professional. But when doing so, it's worth considering the facts:

- Influenza one of our most lethal diseases. Although the death rate is less than one in 1,000 overall, it especially affects older people and is estimated to kill about 3,000 and hospitalise 13,500 Australians aged over 50 each year.
- Influenza costs our nation A$115 million annually in direct health care costs.

Influenza is often thought of as a disease of the old. But while older people are the group most likely to die from influenza, children don't escape the toll. In fact, children under five years of age are the group most likely to be hospitalised for influenza. And my research team found families of children with severe influenza suffered significant disruption, distress and reduced quality of life.

Despite its burden, influenza is the underdog of infectious diseases. Its very name conjures up a folksy familiarity that contrasts with our dread of diseases such as polio, meningococcal disease or whooping cough. The mass media rarely feature stories of influenza's victims — a big motivator of preventive action. In risk perception terms, influenza is a low outrage–high consequence disease: we under-react to it.

The focus on the influenza vaccine's side effects hasn't helped. One vaccine, Fluvax, caused a much higher rate of febrile convulsions in children aged five years or under in 2010

and is no longer registered for use in this age group. But the influenza vaccine generally has a side effect profile similar to most vaccines. There are common but minor side effects, such as soreness at the injection site, and more rare but serious ones like anaphylaxis.

Next time you are deciding whether a flu vaccine is worthwhile, consider that it that it might just give you some protection from influenza. That benefit is even greater if you are at higher risk of serious complications from this disease (if you're aged 65 years and over, are an Aboriginal or Torres Strait Islander, have a chronic disease, are pregnant, are obese); or if you're at risk of getting and passing on influenza through your work (for health care workers), or are planning travel.

And these benefits come with the assurance that the vaccine itself cannot give you influenza.

58. Testicular self-examination is a waste of time

Mark Frydenberg
Monash University

Testicular self-examination is turning men into 'ball-watching neurotics' — that's the view of Keith Hopcroft, a GP from Essex in the United Kingdom. It's unnecessary, he explained recently in the *British Medical Journal*, because it won't necessarily detect cancer and it needlessly induces anxiety.

So, is it time to stop groping your gonads — or to start?

Testicular cancer might be a rare disease, diagnosed in about 690 Australians each year, but it's the second most common cancer in men aged 18 to 39.

The cure rates, however, are among the highest of all cancers, with about 95% of men surviving testicular cancer and going on to live full and active lives — even in advanced cases.

The usual symptom is a hard lump in either testis. The lump can be painful or tender in around one in ten men. Other lumps can also be found in the scrotum, outside the testes, but these are most likely non-cancerous.

As the causes of this cancer are largely unknown, many clinicians recommend testicular self-examination as a means of early detection, particularly in men at higher risk due to undescended testes in childhood, previous testicular cancer or family history.

Testicular self-examination involves feeling the testes, one at a time, using the fingers and the thumb. It's normal for one testis to be slightly bigger than the other and the left testis often hangs lower than the right.

To date, there's no evidence to suggest that death rates are reduced by testicular self-examination. A randomised trial to assess this question would need to be very large, given the low incidence of testicular cancer, and such a study is unlikely to ever happen.

Nonetheless, there is no evidence that this practice causes harm and Dr Hopcroft's recent comments that it could cause obsessive testicular checking or trigger 'incapacitating anxiety' are unfounded. In fact, most studies have shown rates of testicular self-examination are low, although there has been some increase in recent years, possibly due to greater awareness of testicular cancer.

The benefits of early detection of testicular cancer — before it has spread — are a higher survival rate and a reduced likelihood of toxic treatments, such as chemotherapy or major abdominal surgery. Surely that's worth checking for.

There's no need for GP-based screening for testicular cancer, but self-examination can help educate young men to identify the normal feel of their testes so they're aware when

there is a change in consistency. Most lumps found in the testes will be cancerous, but other lumps in the scrotum are often benign. If men understand the feel of the normal scrotal structures, they may be able to distinguish between these differing types of lumps.

A key issue is that while some men will present with pain, many men delay seeking a medical opinion due to embarrassment or other factors. Some men will wait until their testicle is the size of a grapefruit before seeking medical attention — and that has to change.

Male sexual health is a significant part of overall good health and the male reproductive system plays a role in many areas of wellbeing. The more men know about their bodies — the way they work and how to check on the 'bits below the belt' — the better.

59. Natural cancer therapies can't harm you

Ray Lowenthal
University of Tasmania

One of the most misleading myths of modern medicine is that conventional cancer doctors reject 'natural' therapies in favour of artificial or 'unnatural' cancer treatments. This myth has contributed to the popularity of unproven, alternative cancer treatments.

The truth is that oncologists and other trained medical professionals involved in cancer care welcome and support effective cancer treatments in any form, provided there is evidence to show they can work and are safe.

Making assumptions about the benefits and harms of therapies according to whether or not they are natural is high risk. For example, laetrile, an extract from apricot kernels, was for years promoted as a natural alternative therapy for cancer; yet it is utterly useless for treating cancer and can cause fatal cyanide poisoning.

The herb comfrey, also recommended as an alternative cancer treatment, actually causes cancer.

So 'natural' does not necessarily equate to harmless. Nor does conventional necessarily equate to unnatural. Plenty of natural products are used in chemotherapy. These include extracts from the yew tree (docetaxel, paclitaxel), the opium and mandrake plants (epipodophyllotoxins) and from natural moulds that produce doxorubicin and related drugs, used effectively to treat breast cancer and lymphoma.

Some natural products used in conventional cancer medicine had for centuries been part of traditional folk remedies and have been adapted for modern use after being rigorously tested.

So, the difference between alternative and conventional is not that one is natural and the other is not. The difference is that conventional cancer treatments must be subjected to rigorous research before they can be recommended for use and prescribed by professional oncologists.

The highest level of research is the randomised control trial, which is only applied to a product after lengthy laboratory studies, preliminary testing and approval by an ethics committee made up of medical experts, ethicists and healthcare consumers.

A typical trial involves randomly selecting two groups of patients in large enough numbers to control for physical differences between them. One group receives the new treatment and the other group is given a different treatment or a placebo; the results are then compared. A trial is designed to show that

any significant difference in patient outcomes can only be the result of the treatment being tested.

Oncologists will only prescribe treatments if they have been tested in this way and are found to be effective and safe.

A good example of this testing process on a natural derivative is the development of the drugs vincristine and vinblastine, extracted from the Madagascan periwinkle. Improved through continual clinical trials over 50 years, these so-called 'vinca' alkaloids have been a key part of modern-day successes in curing childhood leukaemia and other cancers that were previously incurable.

Some alternative cancer therapists also promote fad diets, but there is no evidence to support this approach. A healthy diet can prevent cancer and assist people living with cancer. But diet will not cure cancer, which directly attacks the body's cells in a highly destructive and relentless way.

Such a malignant disease can only be cured if the cancer cells are surgically removed before the cancer has spread or if they are destroyed with chemotherapy and/or radiotherapy.

Nor is there any evidence to support mind control in any form as a cancer therapy. Such a belief or expectation in many cases adds to a patient's distress. Can you imagine the terrible trauma of being diagnosed with a potentially fatal cancer and told you can think your way to good health with a positive attitude?

The reality is, we have a limited lifespan; science does not have all the answers to our health needs. But we agree as a society that we should do what we can to increase life expectancy and improve health.

Over the past century, average Australian life expectancy has increased by almost 30 years, largely through a combination of improved infection control, sanitation, diet, immunology and many other advances in medical science.

The changes in medical practice and public policy that have improved our length and quality of life were guided by evidence of what works.

We must let the evidence — not uninformed perceptions of what is natural — guide continuous improvements in cancer treatment.

60. Warts aren't contagious

Michael Tam
University of New South Wales

As a general practitioner (GP), I see a lot of warts. They're a common skin complaint that most people experience at least once in their lives. Common warts are small dome-shaped lumps on the surface of the skin, typically on the back of fingers, hands, toes, and the front of the knee.

Patients who come in with common warts have usually guessed the growths on their skin are 'warts'. But I'm often asked whether they're contagious and whether any of the old wives' tales work as cures.

The classic myth that warts are caused by touching toads is, of course, untrue. There are many folk remedies for warts that range from the magical (blacksmith's water — the water that hot iron has been plunged), to the bizarre (taking a dead cat to a graveyard at midnight), and the gruesome (dripping the blood from the head of a decapitated eel onto the skin).

About a third of common warts will disappear in three months, and most in two years. So this might explain why these treatments were considered effective.

We now know that warts are due to infections from a specific group of viruses — human papilloma viruses (HPV), of which there are over a hundred known subtypes.

HPV came into the spotlight when Gardasil, the 'cervical cancer' vaccine, became part of the Australian immunisation schedule for girls and young women. From 2013, the HPV vaccination program will include 12- and 13-year-old boys.

Although some types of HPV can cause cancers (genital, oral, throat), the types of HPV that commonly cause warts on the face, hands and feet do not. And the types of HPV that cause genital warts are different to the ones that cause common warts.

Gardasil, for instance, protects against HPV types 6, 11, 16 and 18. Types 6 and 11 cause about 90% of genital warts, and types 16 and 18 cause about 70% of cervical cancer. Since the HPV immunisation program started in Australia, there has been a big drop in the rate of genital warts.

Warts are contagious: HPV can be transmitted by direct contact through minor injuries in the skin. After infection, there can be a latency of weeks to years, so warts can appear to come out of the blue.

But rest assured, if you have a common wart on your fingers, you are not going to give yourself genital warts, or even plantar warts, if you touch those parts of your body. Different types of warts are typically caused by different types of HPV, so you could potentially infect the other hand.

So how do you treat common warts?

It is important to remember that most warts will go away with no treatment within about two years. The topical over-the-counter treatments (such as salicylic acid and podophyllotoxin) do work, but require patience and persistence. Cryotherapy with liquid nitrogen, performed by your GP, is probably more effective if you want to get rid of your warts quickly. Nothing works that well for plantar warts.

A wondrous variety of wart treatments live on in the modern day. Banana peel ranks high on a Google search but

lacks research evidence (and there is little reason why it should work). The popular practice of using duct tape doesn't seem to be effective.

We may have moved on from touching toads but wart myths are alive and well.

61. The placebo effect only works on the gullible

Michael Vagg
Deakin University

If you took a pill that had been prescribed to treat your illness and it alleviated your symptoms, that means the medicine worked — right?

What if you took a complementary medicine from a health food store instead?

Or if you were given a sugar pill and you still felt better?

Medicines, surgery and alternative therapies all inevitably cause some degree of placebo response, but it's not just the gullible or suggestible who are affected.

Firstly, you might experience what's known as the Hawthorne Effect.

It goes something like this. If you've identified a problem with your health and sought help for it, you will tend to be making other, related decisions which can reduce your symptoms — or your perception of them.

So if you feel your knee becoming sore, you'll probably tend to use it less and be more careful about what you do. Both may help reduce your pain, independently of the treatment you seek.

Having an involved and attentive health professional to empathise with your concerns will likely strengthen your tendency to get on with life instead of fretting about the pain in your knee and what it might mean.

Secondly, you might succumb to the phenomenon of 'Regression to the Mean', which is a scientific-sounding way of explaining that any long-term complaint will tend to vary around its average level. Some days it will be a bit worse, other days it will feel a bit better than average.

Our inherent bias is to ignore the good days and focus on the bad. If we string together a few days of worsened symptoms, which will happen at some stage, you might be tempted to try something out of the ordinary — such as alternative therapies — to feel better again.

But the longer the symptom is above or below its long-term average, the more likely it is to begin returning to the usual level.

When this return coincides with the trial of a new treatment you saw on TV or bought over the internet, the treatment seems to work. So, you would rationally (but incorrectly) assume you responded to the treatment.

This logic also applies to self-limiting conditions which will last for a set period — whatever treatment is applied — such as back pain or even a cold.

So what proportion of people are likely to experience the placebo effect?

Sham surgery (or placebo surgery) has the biggest placebo response, with some studies reporting positive results in 70% or more of the participants, and long-lasting improvements in function.

This is followed by physical treatments such as acupuncture or Transcutaneous Electrical Nerve Stimulation, and then by pills. Pills can vary from low to high response rates depending on the condition being studied, and active drugs such as

morphine can be more effective if delivered openly instead of being hidden.

The size of the placebo effect in psychiatry research appears to be increasing over time, making it harder to trial antidepressant drugs.

This is likely due to more sophisticated study designs which are more sensitive to bias, and to changing community expectations about the effectiveness of the therapies being trialled. It's not likely to be because people are becoming more suggestible.

Deception is supposedly at the heart of the placebo response, but it seems that even this may be a furphy. The strength of patient-health provider interactions can be such that it's possible to get relief from symptoms when knowingly taking a placebo, if they are primed appropriately.

Interestingly, the placebo response doesn't affect everyone. Placebo pain relief is significantly reduced in people with damage to the frontal lobes, such as stroke survivors, brain injury victims or those with dementia.

The placebo response has social, psychological and biological implications that researchers are still struggling to understand. It's certainly not as simple as being fooled into feeling better.