The placebo effect is negligible

Tell that to your brain, though it probably won't believe you.

The word *placebo*, from the Latin for "I shall please," first turned up in medical texts in the 18th century, defined as a treatment intended to make a patient happy rather than do any actual healing. So why do placebos sometimes work?

Placebos are often called sugar pills, and indeed, they're sometimes tablets made of sugar or starch, though a placebo can be any form of faux medical therapy or treatment made to look like the real thing. Scientists include placebo groups in clinical trials thanks to the work of anaesthesiologist Henry K. Beecher, MD. In 1955, Dr. Beecher analysed 15 studies in which patients with various diseases had received placebos and found that about 35 percent of them responded as though they had received real treatments.

This finding had major implications for the study of new drugs and other therapies, since it suggested that about one-third of sick people get better if they think they're receiving treatment. As a result, when scientists conduct a clinical trial of a new drug or therapy today, they have to account for the placebo effect. An experimental therapy is usually considered a flop if it fails to treat significantly more than 35 percent of the patients who receive it.

Some recent studies have cast doubt on Dr. Beecher's 35 percent rule and on the concept of the placebo effect in general. However, studies show that placebo treatments are surprisingly effective for a variety of conditions, including Parkinson's disease, depression, and gastrointestinal problems such as irritable bowel syndrome. Conditions with the highest response rates tend to be those with symptoms that are difficult to quantify, such as pain.

Skeptics claim that any response to a placebo is "all in your head." They're right, in a sense. Sophisticated medical imaging shows that people given placebos experience significant changes in brain chemistry. At least 30 studies have shown that when people who are experiencing some form of pain are told they will receive a pain reliever but are given a placebo instead, their bodies nonetheless produce morphine-like compounds called opioids.

More important, placebos seem to diminish pain. In one study, researchers applied heat to the skin of volunteers until it hurt. Then they applied a phony cream on the sore skin, telling the volunteers that the salve contained soothing medication. More than 70 percent of the volunteers said the placebo cream relieved their pain.

"The brain has the capability to exert control over the rest of the body, but we really don't know how it works," says Columbia University research psychologist Tor D. Wager, PhD, who led the study.

The placebo effect appears to go beyond pain reduction. For instance, in a recent experiment, asthma patients who believed they were receiving the drug salmeterol but were given placebos not only felt better but also had improvement in their lung function, though not as much as people who received the real drug.

Does CPR usually bring people around?

How many times do films or TV dramas feature someone kneeling over their collapsed friend, desperately pumping up and down on their chest, breathing into their mouth and begging them to wake up? After a few tense moments, there's some coughing and spluttering from the person on the ground, they open their eyes and their life has been saved. We can all rest easy.

But is it like that in the real world? Cardiopulmonary resuscitation, or CPR, is designed to help someone who's had an unexpected cardiac arrest – in other words their heart has stopped beating strongly enough to pump blood around the body, depriving the brain of blood flow. The idea of CPR is not to start the heart beating again, but to get oxygen into a person's lungs to prevent brain damage. To restart the heart would usually require an electric shock.

This is why it's essential not to give up on CPR before medical help arrives. It buys you time, but it needs to be done hard and fast, which soon tires you out, so you need to get yourself into a position where you can continue for a long time, or ideally take turns with someone else. If someone without a pulse appears to recover and regain a pulse through CPR then the chances are that their heart was still beating faintly all along.

So don't be surprised if someone doesn't immediately come back to life. It doesn't mean you're doing it wrong; it's rare for CPR to rouse someone from unconsciousness straight away.

You wouldn't get that impression from fiction, though. In studies of medical dramas, resuscitation was shown to be successful 75% of the time on US television, whereas there was a more realistic 25% success rate in British dramas. Even that 25% rate is higher than many places actually achieve. The success of CPR depends a lot on where you live and how fast you can get medical help. A review of studies across many countries found a survival rate of just 5.35% in New York compared with 37% in the German city of Heidelberg.

Over the years there's been a lot of debate over the best way of doing CPR. For a long time most guidelines recommended 15 compressions on the chest, followed by two breaths into the person's mouth, followed by 15 compressions again, repeating this sequence until medical help arrives. In 2005, many organisations including the American Heart Association, changed their recommendations to 30 compressions followed by two breaths. But now there's research suggesting the breaths might not even be needed at all, a finding which might well encourage more people to come to the aid of a stranger in the street. At the University of Arizona, Professor Gordon A Ewy and his team demonstrated in laboratory studies using animals that compressions alone were just as effective as compressions with breaths.

But what would happen with people in real-life emergencies? It's not easy studying this – since you don't know who's going to collapse and where, it's impossible to randomise passers-by to do CPR with or without breathing into the person's mouth. However, in 2004 Arizona began a public information campaign explaining that people didn't have to give breaths in order to attempt CPR with a video showing you how to do it (see below). The result was a dramatic increase in the number of bystanders prepared to have a go, leading to an increase in survival rates from 18-34%, Not only did just as many people survive even with no breaths, but giving compressions without interruption in this study protected against damage to the brain.

This is still a matter of debate, especially in Europe. The American Heart Association recommends that in the event of an unexpected cardiac arrest untrained people should use what's known as "Hands Only" CPR, though its latest consensus statement says there's still not enough evidence to discourage those who've had training from giving breathing. These results only apply to adults. In children under the age of 12 it's still recommended breathing into their mouths as well.

Perfect beat

Then there's the question of speed. The 2010 US guidelines suggest a rate of at least a hundred compressions a minute. Humming a tune can help you to get the right pace: the Bee Gees 1977 hit Stayin' Alive, or perhaps Half a Pound of Tuppenny Rice, if you happen to know it. Research from 2012 that sought to find the ideal speed for survival found that it wasn't a case of the faster the better; there were decreasing returns once they reached a speed of 125 compressions a minute.

Sometimes people are nervous about whether or not CPR is needed. It's not dangerous to do it to someone who turns out to be conscious after all. If they open their eyes and start pushing you away then you can stop. The greater risk is that people mistake a person's final gasps for breath as a sign of consciousness and then decide not to do CPR. In fact this so-called agonal respiration can mean they're dying in front of you.

One thing I discovered when I learned CPR in London, trying it out on the mannequin or Resusci Annie as she's better known, was how hard you have to press. Although the ribs and the breastbone flex to an extent, it's not surprising that it can result in a sore chest and even a broken rib or two. It's worth it though. Although you're not bringing someone back to life, you're giving them the chance for someone else to save them. The result can still be the same – you save a life.

Childhood vaccinations dangerous?

When I was an infant I had whooping cough and was ill for three months. I don't remember it, of course, but I know it was very distressing for my parents. I do remember later trips with my researcher father to his laboratory where he worked on a vaccine for polio and to hospitals where infected children my own age were on iron lungs. That was very distressing.

I mention this because today people don't see such diseases. They aren't frightened about whooping cough or polio. In contrast, 100% of parents in Western Australia had their children vaccinated against polio when the vaccine was made available in 1956. Why? They were scared of their kids getting polio, a terrible disease as reflected in its other name, infantile paralysis.

Because today's parents don't have first-hand experience with dangerous infectious diseases they can be misled by myths about the supposed dangers of childhood vaccination: for instance, whooping cough vaccine causes brain damage; the measles, mumps and rubella (MMR) vaccine causes autism and vaccination causes cot death or sudden infant death syndrome (SIDS).

There is no truth to any of these claims. We in Australia have some of the best population data in the world on vaccination outcomes in children and it's absolutely clear these myths are just that, myths.

The whooping cough myth started in the 1974 in the United Kingdom when some parents claimed that after being vaccinated their children were diagnosed with neurological disorders, what they called "brain damage".

In fact, it was a coincidence. The first signs a child has a genetic or other brain disorder occur about six months of age. The vaccine is given at two, three and four months, hence the incorrect assumption that the latter caused the former.

I was a student in the UK at the time. It was disastrous that the medical and epidemiological professions didn't respond after the kids were shown on television with the claims of vaccine caused brain injury. The government paid compensation, reinforcing the false vaccination-brain damage association.

As a result, the rate of vaccination dropped from 81% to 31% by , triggering the most horrendous epidemic of whooping cough. In one year, 21 children died and thousands were hospitalised with severe pneumonia and, sadly, brain damage from the infection.

The fear of the disease influenced parents to vaccinate again and immunisation rates went back up and disease incidence went down. But it's a tragedy that it took an epidemic to prove that vaccination is protective. Several major studies also demonstrated clearly that whooping cough vaccines were protective against brain damage and not causing it.

The misguided belief that vaccination causes SIDS is also a case of myth by coincidence. The peak age of SIDS is four months, following vaccinations given from two to four months. The timing of the two events is associated in people's minds, despite study after study showing no connection.

Instead, the research shows SIDS is linked strongly to lying babies on their face or having their head covered with bedding or toys. Other risk factors include smoking, not breastfeeding, overcrowding and over-heating.

The myth that the MMR vaccine causes autism is particularly naughty. It was started in 1998 by a scientist who published the claim in a widely-reported paper in The Lancet.

Again, vaccination rates fell precipitously and outbreaks of measles, mumps and rubella occurred. It was revealed the scientist had undeclared conflicts of interest and had engaged in scientific misconduct. The paper was retracted but the damage was done.

Such myths demonstrate why it's absolutely crucial that medical researchers obtain solid laboratory data about new and combination vaccines, test them rigorously and obtain very good surveillance and monitoring data. The public must have confidence that the research is done and done well.

That's why the Australian Academy of Science has just released a booklet – The Science of Immunisation: Questions and Answers – which explains the basics of vaccination and debunks common myths about vaccines and vaccination. It draws on expertise from a broad sector of the Australian science community, from virology and immunology to my field of epidemiology.

I urge all Australians to get the truth about the myths. Vaccination is a wonderful development in public health. It has prevented enormous suffering and millions of deaths worldwide. The benefits of vaccination outweigh the very small risk of unwanted side effects. Just ask the parents of 1956.

Water births risky?

"Women aren't dolphins" is a phrase often use when talking about by those who question why women want to immerse themselves in pools or warm baths during labour and birth. They forget that we're not mountain goats or birds, but that doesn't stop us from rock climbing or hang gliding.

As more scientific evidence emerges about the benefits of water immersion in labour and birth, hospitals and birth centres are increasingly adding large baths to their delivery rooms. The New South Wales department of health has even given a directive that "all maternity services offer access to water immersion in labour (target 100% by 2015)", in an attempt to decrease the rising caesarean section rate.

There are tales of generations of women in the South Pacific giving birth in shallow sea water, but long before this – and possibly throughout the history of humankind – water has been used for pain relief.

The modern use of water immersion for labour and birth began in 1970s Russia when Igor Tjarkovsky, a boat builder, began looking into the therapeutic effects of water. He later installed a glass tank in his home for women to use during childbirth.

Michel Odent, the French obstetrician, went on to popularise water immersion in the 1970s and 80s in Europe, after installing a plastic paddling pool in a French hospital and finding it reduced women's need for painkillers. His first water birth occurred by accident and Odent soon realised the potential benefits of leaving women in the water for the birth.

Water births moved from fad to mainstream maternity care in 1993, with the publication of the United Kingdom's Changing Childbirth report, which recommended pool facilities be an option available to women in all UK maternity units.

The benefits of using water in labour are mainly attributed to buoyancy, hydrostatic pressure and the effect of warmth. Women can move more easily than on land, enabling them to change position with ease. Movement and relaxation help facilitate positive neuro-hormonal interactions that alleviate pain naturally.

There is some evidence that water immersion may be associated with improved blood flow in the uterus, lower blood pressure, less painful contractions, shorter labours and fewer interventions. There are also psychological benefits, with women feeling more in control and that they have their own space, with the bath forming a natural barrier between her and the health providers.

A common concern with water birth is that the baby could try to breathe underwater and drown. But healthy babies have what's called a diving reflex (or bradycardic response), which causes the infant to hold his breath when under water. The reflex is stimulated via the infant's facial skin receptors, which detect the water and inhibits breathing.

There are also concerns about increased tearing of the perineum (the tissue between the vagina and anus) due to the lack of control of the baby's advancing head. But randomised trials to date, and more importantly a systematic review of these trials, has not shown this to be the case.

Last month I published a study in the Journal of Midwifery examining the outcomes of 6,144 Australian women who had normal vaginal births in a birth centre over a 12 year period. I compared outcomes for the mother and baby when women gave birth in water, with those who gave birth in six other birth positions on land: kneeling or all fours, squatting, side lying, semi seated, using a birth stool and standing.

Compared with water birth, the women who gave birth on a birth stool had nearly one-and-a- half times higher rate of major perineal trauma and more than twice the rate of haemorrhage after delivery.

There was no difference in major perineal trauma and haemorrhage after delivery between women who gave birth in water and those who opted for a semi-seated position, the most common birth position in Australia.

Compared with water birth however, babies born in a semi-seated position had a four-and-a-half times higher incidence of five-minute APGAR scores less than seven. APGAR scores rate the newborn's breathing effort, heart rate, muscle tone, reflexes and skin colour. A score of less than seven at five minutes following the birth indicates medical intervention was needed to resuscitate the baby.

We controlled for as many variables as we could, including whether it was a first or subsequent birth, a long period of pushing, a big baby, or a midwife or obstetrician undertaking the delivery. All these women had normal vaginal births so surgical birth was not a variable.

So the idea that babies are more likely to drown if born in water, or that rates of tearing and injury are worse, doesn't hold up.

While women may not be dolphins, they are drawn to water during labour and birth, with little evidence of harm and some evidence of benefit. And once experienced, women usually make the same choice for a subsequent birth and report many benefits to this style of birth.