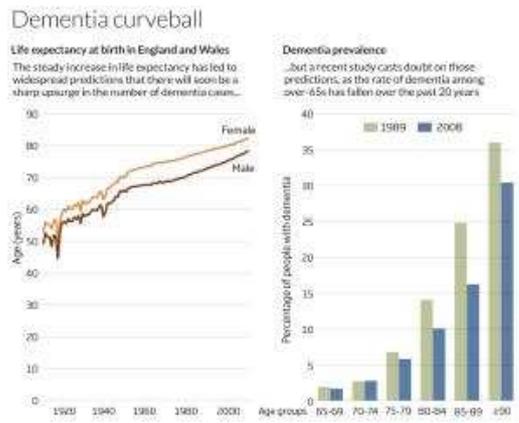


# My New Scientist

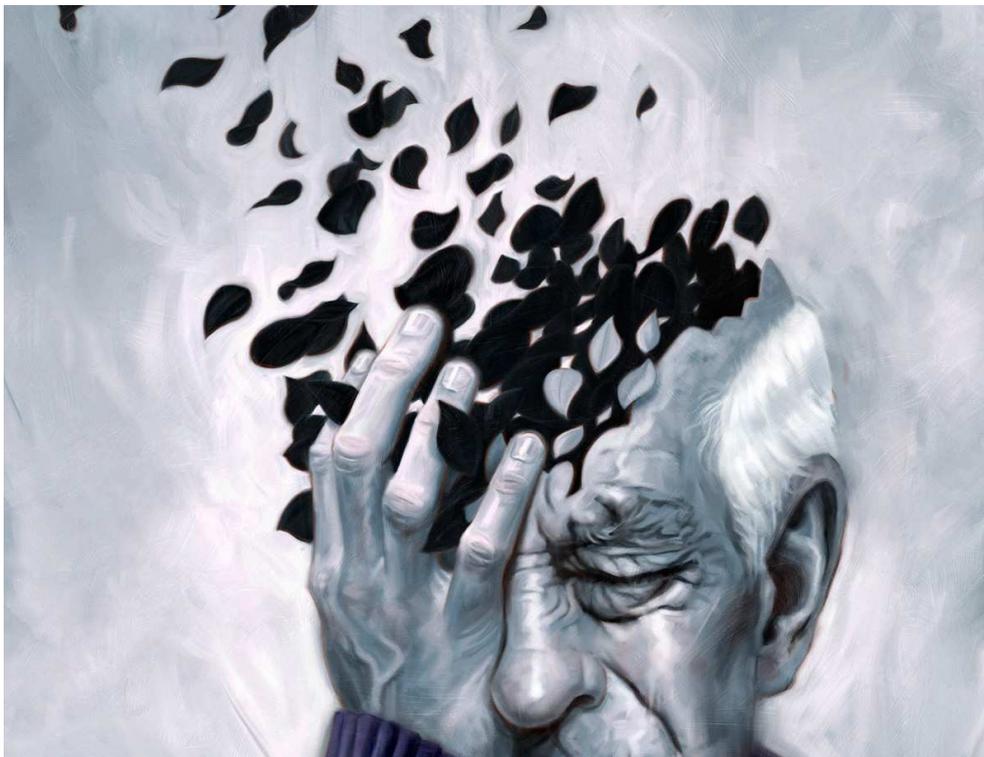
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## Defusing dementia: Why is risk of Alzheimer's falling?

09 January 2014 by [Liam Drew](#)  
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Dementia curveball  
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How well our minds function in old age is a major determinant of our quality of life (Image: *Cracked Hat Illustration*)

### Editorial: ["Dementia: A silver lining but no room for complacency"](#)

*Our chances of getting dementia in old age are lower than ever – and there are ways we can all cut that risk further still*

MY PATERNAL grandfather died shortly before I was born. The man my father's stories conjured up

was physically and mentally tough: a first world war veteran who was boisterous with his drinking buddies and, at home, an old-fashioned head of the household.

But beside those tales sat his life's sad, unelaborated footnote; that he ended his days demented and degraded.

When I ask directly, my dad recalls his father sitting silently for hours, endlessly nursing an empty tea cup, oblivious to all. But my parents prefer not to go into detail. My mum says: "People just didn't talk about dementia 40 years ago."

Today, though, we talk about dementia a lot. With life expectancy continuing to rise and the baby-boomer population bulge standing on the cusp of old age, Western countries face what is sometimes called a looming tsunami of dementia. Such is the urgency that last month London hosted the first G8 summit on the subject, where the world's eight richest countries agreed to coordinate their research efforts against the problem.

The epidemic will place huge strain on healthcare systems; in the UK, the annual cost of caring for someone with this condition is more than the average salary. And on a personal level, the prospect of a long life loses its appeal if it ends this way.

But wait a minute. All the gloomy predictions have been based on a central assumption that people will continue to develop dementia at the same rate as they always have. It is a reasonable assumption – age is the primary risk factor for dementia – but it may well be wrong. There is emerging evidence that the dementia rate in developed countries has fallen.

Since the average age of the inhabitants of Western countries is rising, this may not be enough to stop the total number of people with dementia from increasing. So we still need to plan accordingly at the societal level. But our individual chances of succumbing appear to have decreased. For once, this is a good-news story about dementia.

The search is now on to uncover what has driven these trends, so that they can be maintained and maybe even amplified. "I think this gives some basis for cautious optimism," says Kaare Christensen, an epidemiologist at the University of Southern Denmark in Odense, who led some of the research. "There seems to be huge potential for further progress – if we don't destroy it."

How well our minds function in old age is a major determinant of our quality of life. A small decline in cognitive abilities is an almost inevitable part of ageing. For most people this is a gentle downward turn in mental agility, frustrating but with no great impact.

If this fall-off is more than usual for someone's age, but not enough to interfere with their day-to-day living, it is classed as mild cognitive impairment. This is a high-risk state for progression to dementia.

Dementia is a general breakdown of the intellect and personality, with disintegration of memory, attention and emotional control. Of all the diseases linked to ageing, for me this is the most fearsome. It is degrading for the person concerned and heartbreaking for those around them.

About two-thirds of dementia cases are caused by Alzheimer's disease, in which neurons die off amid distinctive clumps of protein. The next most common form is vascular dementia, caused by deterioration of the brain's blood vessels and often involving minor strokes. There are other, less common subtypes, plus a growing belief that dementia at very old ages typically involves a mix of different forms of disease.

What's always been known is that the risk of dementia rises markedly with age – seemingly inexorably. Very few cases occur before the age of 60, and between 60 and 70 the condition is still restricted to an unlucky 1 per cent or so. After this point, though, the odds worsen significantly: about 5 per cent of 70 to 80-year-olds are affected, and beyond 80 the risk rises ever more sharply ([see graph](#)).

The logic has always seemed inescapable: the more 80-year-olds there are around, the more people there will be with dementia. The number of people with dementia globally is often predicted to triple by 2050.

### **Unequivocally good news**

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But over the past few years there have been hints that the actual numbers didn't fit this picture.

Research suggested that dementia was on the retreat. The studies weren't conclusive, though – either they were too small or their findings statistically borderline.

Now, however, leading medical journal *The Lancet* has published two studies involving thousands of people within the space of a few months, which definitively challenge the orthodoxy.

One compared [two surveys of dementia numbers](#) in the UK, done 20 years apart. The first, from 1994, led to the conclusion that there were about 650,000 people with the condition. With the increase in average age of the population over the intervening years, the repeat survey – which used exactly the same tests and definitions – should have found nearly 900,000 people with dementia. But the count came up over 200,000 short. Looking at how the illness affected specific age groups, it appeared that people were developing dementia later in life ([see chart](#)).

The finding came as a welcome surprise to Carol Brayne, the epidemiologist at the University of Cambridge who led the study. "It has been a very positive experience," she says. The editorial that *The Lancet* ran to accompany the paper described the findings as "unequivocally good news".

The other study looked at the health of [two groups of Danish people](#) in their mid-90s, born a decade apart, in 1905 and 1915. The nonagenarians were asked to complete a battery of physical and mental tests. While the two groups had similar physical health, those born in 1915 markedly outperformed the earlier-born in cognitive tests. "They were not stronger, but they were smarter," says Christensen, who led the study. "The two papers complement each other beautifully."

The big question, naturally, is why things changed. Neither study was designed to uncover the reasons behind any trends, but we can make educated guesses. The main suspects are long-term trends of rising prosperity, education, and better health; all these things seem to be good for the brain.

The idea that learning and thinking could ward off the physical diseases that bring on dementia has been controversial. "It was very fringy in the beginning," says Yaakov Stern, a neuropsychologist at Columbia University in New York, who has spent the last 25 years investigating this idea.

His interest was sparked in the 1980s, when a colleague claimed that more highly educated professionals were less likely to develop Alzheimer's disease. Sceptics thought there must be other explanations – perhaps these groups simply performed better on the cognitive tests used to diagnose Alzheimer's, or maybe the low income that goes hand in hand with lack of education was linked with other risk factors.

But these possibilities were ruled out by further studies, and the notion began to gain support that intellectual activities create a resilience to age-related decline across brain networks. Such "cognitive reserve" helps the brain to keep functioning despite mild physical deterioration, so the theory goes. "Just because you have pathology doesn't mean the brain says 'I'm going to drop dead,'" says Stern. "The brain says 'I'm going to do the best I can.'"

Happily for the cognitive reserve theory, populations did become better educated over the first half of the 20th century in many Western countries – including the UK and Denmark – through improved access to education and repeated increases in the school-leaving age. Both Brayne and Christensen think education is probably one part of the explanation for their findings.

Could this trend continue? The school-leaving age in the UK, for instance, has risen further since the people in the British study were at school. And in recent decades growing numbers of people have gone on to higher education. It remains to be seen if this will drive further improvements or whether, perhaps, there might be an upper limit on the protection afforded by early-life education.

Of course, for many of us it is too late to do anything about our schooling. But cognitive reserve is not just set by formal education. It is also affected by the mental demands of our jobs and our intellectual activities throughout life. "Cognitive function is modifiable right across the life course," says Marcus Richards, an epidemiologist with the UK Medical Research Council's Unit for Lifelong Health and Ageing in London. "It's never too late to take control of protecting it."

This idea has been seized upon by firms that produce "brain training" computer games. There is no question that practising a computer task makes you better at that task, as any gamer will tell you. But it remains uncertain whether such skills can help brain function in general, as the adverts claim, nor do we know how long any benefits might last.

The first study to show that a computer game could lead to benefits beyond the console appeared just three months ago. A game designed to help people get better at multi-tasking [enhanced their powers of attention and working memory](#) for at least six months. But before placing any faith in such an approach, bigger and longer studies are needed, ideally ones that also measure rates of dementia.

In the meantime, there are less controversial – and arguably more enjoyable – ways of building your cognitive reserve, like taking up mentally taxing hobbies such as the card game bridge, or playing a musical instrument. A full social life may also protect against dementia, according to several studies.

Just existing in the modern world – with its mobile phones and constant multimedia inputs – may be much more intellectually stimulating than it was 50 years ago. "Life now is very cognitively demanding for everybody," says Stern.

But mental stimulation is not the brain's only input – there are also its physical inputs, in the form of oxygen, energy and nutrients, delivered by the blood supply. Animal research has shown that healthy blood vessels are critical for good cognitive function in later life, minimising the risk not just of vascular dementia but the other forms too. "It would be unreasonable not to think that vascular factors played a role," says Brayne.

Certainly rates of heart and vascular disease have been falling in Western countries since the 1970s, probably due to a mix of factors, including better awareness of the risks of smoking, high cholesterol and sedentary lifestyles, and the wider use of drugs to control blood pressure. One study that hinted at falling dementia rates – before the recent research in *The Lancet* – compared people's brain circulation with MRI scans, and found that later-born people had healthier blood vessels ([Neurology, vol 78, p 1456](#)).

As the advice in the UK's [National Dementia Strategy](#) puts it: "What's good for the heart is good for the brain." The take-home messages are not new: don't smoke, try to stay in shape, and keep an eye on your blood pressure and cholesterol levels. But the recent evidence is providing more incentive than ever to pay heed.

What's more, the benefits of exercise have not only been shown in observational studies – where people who happened to be more active had less dementia – but also in randomised trials, the best kind of evidence. In other words, people asked to do more exercise had less intellectual decline as they aged.

There is, however, another very important factor affecting the health of our blood vessels, and that is what we eat. At the start of the 20th century, malnutrition was widespread in the UK – almost half the men called up to serve in the first world war were found not fit to serve for this reason. People suffered from a lack of vitamins and other micronutrients, as well as a general shortage of calories.

Diets improved markedly over the following decades, thanks to rising prosperity levels and public health measures such as free school meals. Thankfully child malnutrition is now rare in the UK. But could we use diet to improve our brain health still further?

## **Fish appeal**

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The most promising nutrients to target would be the antioxidant vitamins C and E, the B vitamins and folate, and omega-3 fatty acids, abundant in fish. But while observational studies show that eating too little of these substances heightens the risk of dementia, randomised trials of adding extra to the diet, in the form of supplements, haven't shown benefits. Such trials have limitations, though, says Richards; few last longer than a couple of years, while "people are accumulating these dietary exposures over decades".

Still, at the moment most researchers are reluctant to recommend anything other than the standard heart-healthy nutritional advice. That is a Mediterranean diet, rich in fruit and vegetables, with plenty of fish and not too much red meat or high-calorie junk food.

For what gives most concern is dietary excess rather than deficiency. Unlike people born in the first half of the 20th century, later generations have famously got themselves overweight. And today the West is suffering unprecedented levels of diabetes, which also predisposes people to dementia, according to recent research. Some even talk of Alzheimer's being a form of "[brain diabetes](#)".

As no one knows the relative contributions of all the possible factors that could explain why dementia

rates have fallen – diet, education, health – it is impossible to confidently predict future disease rates. Yet it is likely that rising obesity and diabetes will affect future trends and that, says Richards, is something dementia researchers are watching with "nervous anticipation".

For the most pessimistic, the upsurge in these twin risk factors means we should not say that dementia rates are falling, merely that they fell between the two observed generations. For these reasons, and also simply because people are living longer, healthcare systems must be ready. "We still need a society which is adapted to cope with a lot of old people, and a lot of old people with some cognitive impairment," says Brayne. "That message doesn't go away because our paper shows an age-specific reduction."

Which may explain why the recent studies in *The Lancet* did not get much attention at the G8 dementia press conference I attended last month: they might dilute the message that more research funding is needed as a matter of priority. Dementia research is certainly neglected compared with other conditions, in relation to the number of people they affect, and the promise of greater funding that emerged at the summit is essential.

Yet the new studies suggest that researching preventative measures could be a sound investment. For while we may not get to choose when, where and to whom we're born, we do have some control over how we live.

My granddad, born in 1898, had barely any schooling, fought in the first world war and endured the austerity of the second. Born in 1977, I've had over two decades of education and a pretty comfortable life. On the other hand, while he dug graves for a living, I spend my work day mainly sitting down.

Still, since researching this article, I have felt more hopeful about my odds of enjoying a healthy and independent old age. I like the thought that it's within my power to improve those odds. Lately, when possible, I've even been walking instead of taking tube trains, and putting a bit more effort into eating enough fish and vegetables.

It's one thing if my body suffers the consequences of an unhealthy lifestyle – quite another if my mind does too.

**Read more:** ["Dementia and what you can do to prevent it"](#)

*This article appeared in print under the headline "Down with dementia"*

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From issue [2951](#) of New Scientist magazine, page 32-35.

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