- Birth rate / Population



FERTILITY

DECLINING POPULATIONS ARE NOT SIGNS OF 'SPERMAGEDDON', SAY EXPERTS

Birth rates are falling around the world, but it's not necessarily cause for alarm

Given the influx of news stories, you'd be forgiven for thinking the human race is slowly killing itself off with pollution, microplastics and forever chemicals. Reports of falling semen counts have fuelled talk of a so-called 'spermageddon', while fertility treatments and the number of politicians' promises to pay women to have children are on the rise.

So, do we face extinction by infertility? We spoke to Prof Allan Pacey, male fertility researcher and sperm biologist at the University of Manchester, and Prof Sarah Harper, Director of the Oxford Institute of Population Ageing. The bottom line: there are causes for concern, but that doesn't mean we're in the midst of a crisis.

WHY DO SOME PEOPLE THINK WE'RE FACING 'SPERMAGEDDON'?

It all goes back to a study published in 1974, which found that the sperm counts in American males were down compared to data collected in the 1950s. While the initial study didn't identify a cause, reports into declining sperm counts in the decades since have put the problem down to a number of factors, including climate change, genetic defects in people's DNA, and, more recently, microplastics.

> **"Increasingly, families are having fewer children and populations are not naturally replacing themselves"**

Not all experts are convinced, however. A different study, which also came out in 1974, used the same dataset and came to different conclusions, but failed to receive the same coverage as the first study.

Pacey worries about confirmation bias – an imbalance of attention and subsequent research in favour of one side of the argument – because of the heavy focus on the earlier study. That is despite, as he points out, the first paper's two comparative datasets being inconsistent, featuring participants from different age groups, which is a significant factor in determining fertility.

Decades later, "we still haven't sorted it out," says Pacey. "I'm still on the fence about spermageddon."

In fact, a 21-year study published in 2018 revealed little change in the sperm quality of the Danish men who participated. Pacey's own study on Danish donors found

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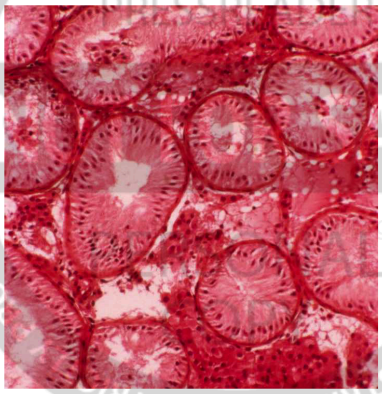

A light micrograph of a seminiferous tubule, where sperm is produced, on an infertile man

no evidence of sperm count declines, apart from changes to sperm motility (the effectiveness of how sperm moves) during the COVID-19 years. Both studies suggest that fears of a spermageddon may be somewhat overexaggerated.

A recent review of existing research into sperm counts, published in the journal *Nature,* found that while there are pockets of decline, the "available data do not enable us to conclude that human semen quality is deteriorating worldwide."

IS THERE EVIDENCE THAT GLOBAL INFERTILITY IS ACTUALLY ON THE RISE?

Ultimately, it depends on how you define infertility. In terms of the number of children being born, birth rates are certainly falling. Yet experts say there is no evidence for a global trend of people facing difficulties in conceiving.

From Harper's perspective, "when you're looking at eight billion people having children, the fact that you have a very small percentage of the world's population unable to have children doesn't make that much difference at the bigger population level – though, of course, it does for individuals."

2.1

The replacement fertility rate is around 2.1. The current global birth rate is hovering around that figure, having more than halved since 1950.



While more people are now attending infertility clinics, Pacey says that isn't necessarily an overall sign of rising infertility. Instead, he puts it down to the increased opportunity for treatment, as well as infertility being less stigmatised than it has been historically. Many people around the world are also deciding to have children when they're older, which raises the risk of infertility.

As for sperm count decline, Pacey considers it a "scientific leap of faith" to take issues like microplastics and forever chemicals and draw a "dotted line" to infertility. "That kind of scientific extrapolation worries me."

Is it possible for these issues to become a problem in the future? We don't know, says Pacey. Talking about microplastics and semen is important, but within a wider context.

SO WHY ARE POPULATIONS DECLINING IN MANY PARTS OF THE WORLD?

Increasingly, families are having fewer children and populations aren't naturally replacing themselves. In countries like South Korea, China and the USA, birth rates have fallen below the replacement rate of 2.1 children per woman. Meanwhile, the United Nations projects that the global population will continue to grow to 9.7 billion by 2050, then decline or flatten off towards the end of the century.

"That could be summed up as an infertility epidemic," says Pacey, although he personally takes a slightly different view. "I think it's a demographic consequence of economic development."

It's a view confirmed by demographers. According to Harper, falling birth rates are the result of a complex web of factors. Among them are higher infant survival rates, access to family planning, education of women and high-quality childhoods.

SHOULD WE BE WORRIED?

Harper makes it clear that infertility is a "completely different question" to declining fertility in demography. Certainly, the first is "really crucial for families where there is infertility." From a global population standpoint, however, Harper isn't worried about falling birth rates. And in terms of planetary load, she thinks it's "great" given that we "live on a finite planet." Population decline as a result of economics and education is far better, she says, than if we "artificially boost our population" with government incentives.

"It's not a crisis. We've known that it's going to happen," Harper adds. A combination of artificial intelligence and healthy "mid-life and older adults who can drive our economies" will keep our incomes and pensions safe.

Pacey has a different response: "I am concerned, but perhaps not for the reasons people would think."

He highlights the barriers to fertility support for people experiencing biological infertility, including cost. Poverty and domestic violence against women can also be traced back to infertility, where male partners assume that infertility is a female problem. "From that point of view, I'm very concerned about infertility," he says. "But do I think it's increasing because of extraneous human factors? I'm less convinced. That doesn't mean I don't think it's an important question and we shouldn't answer it."

Harper doesn't rule out factors such as contamination and plastics starting to cause fertility problems in the future, but, at the moment, what's more important, is the decision whether or not to have children in the first place, and "all the variables that come into that decision."

She adds that infertility trends "would have to be huge" to affect the global population. "I can't imagine a world where we would get to that… I'd be really surprised if it really impacted at the population level."

10 billion by 2050?

The UN projects a global population of between 9 and 10 billion people by 2050, before it plateaus and declines. Prof Sarah Harper anticipates that it might increase further: "We may even have 15 billion people on the planet" by the end of the century, depending on population rates in Africa. It would only begin to fall in the 22nd century.