

## Sperm banking 'should be free on the NHS' to reduce risks of genetic disease

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Sperm banking should be offered free to all young men in an effort to reduce the risks associated with delayed fatherhood, a new paper published in the *Journal of Medical Ethics* proposes.

This radical initiative has been suggested by Dr Kevin Smith – a bioethicist at Abertay University – in light of the emerging finding that paternal age is strongly linked to an increased incidence of neuropsychiatric disorders such as autism and schizophrenia in subsequent generations.

Although the biology of autism and schizophrenia is still poorly understood, the data that have become available since the arrival of modern [genetic sequencing](#) methods show unequivocally that de novo (new) mutations – those that are not present in the father's own genome but that occur in his sperm – can be an important risk factor for such conditions.

These mutations become more frequent with age and, coupled with the current trend towards later fatherhood in western societies, mean that many more children will be affected by genetic disorders in the years to come.

Indeed, some scientists believe that – over time – there will be a substantial reduction in human fitness because, unlike most forms of prenatal damage, the de novo mutations in sperm have the potential to accumulate over several generations.

From both an ethical and evolutionary perspective, Dr Smith states that early fatherhood would be the best way to reduce the risks of this phenomenon – known as the Paternal Age Effect.

However, due to the stigma attached to teenage parents – and in light of the many benefits that are associated with delayed parenthood – he suggests that the most immediate and practical solution is for all [young men](#) to be given the option to bank their sperm at the age of 18.

He explains:

"With any new scientific discovery, we must always consider the ethical implications in order to work out what society should or should not do in relation to the new knowledge that has been gained. The recent debate around three-parent families is a case in point, and paternal age is no different.

"We know, for instance, that there is a strong correlation between paternal age and new mutations occurring in the stem cells from which sperm are derived.

"These mutations occur deep down at the molecular level and can be as subtle as individual letters of a person's genetic alphabet changing, or small parts of a gene being omitted or duplicated.

"This makes them very different from the genetic anomalies that are associated with maternal ageing – such as those that cause Down's Syndrome where an entire extra chromosome, which encodes thousands of genes, is present.

"The de novo mutations in sperm aren't usually detectable prior to birth in the way that Down's Syndrome can be so, until recently, we knew very little about how frequently they occur.

"A number of recent modern genetic sequencing studies, however, have shown that a surprisingly high level of these new mutations occur in each and every new generation – and that the older the father gets, the more mutations there are.

"While most forms of prenatal damage primarily affect only a single generation, these types of deleterious de novo mutations have the potential to create medical problems in [future generations](#), which suggests that extra weight should be attached to the importance of [paternal age](#).

"If we truly want to prevent future generations suffering from the preventable diseases associated with the Paternal Age Effect, we need to start thinking about how to reduce the risks sooner rather than later."

In the paper, Dr Smith goes on to raise and answer a number of other ethical points, both in respect of individual procreative decisions and societal responsibilities:

"If you're a man and you know there's a risk that your age will increase the chances of your child having a [genetic disorder](#), you may want to know what the best age for you to have children at is in order to reduce the risk of a genetic disorder developing in your offspring.

"From the evidence that has come to light over the past few years it is clear that earlier fatherhood is desirable in terms of maximising genetic integrity.

"However the reality is, of course, far more complex, and in establishing the 'best' age to become a father other considerations beyond genetic concerns need to be taken into account – the stigma of teenage pregnancy needs to be contended with, for example, and there are many advantages to being an older parent, such as increased financial stability

and life experience.

"So we need to find a balance and, although the sperm banking option may seem fairly radical, in principle it is quite simple."

Dr Smith asserts that ethically, there are no obstacles to its implementation: reliable artificial insemination and sperm storage facilities already exist, sperm can be stored successfully ad infinitum, and can be used at any time in life – all that is required is an accompanying [public health campaign](#).

He concludes:

"Although it would require a change in what we as society currently think is acceptable, this could easily be solved with a public health campaign. These have been successful in the past – for example where the link between smoking and low birthweight was established.

"The risks associated with delayed fatherhood are not at present widely known and, from an ethical perspective, those considering parenthood must be made aware of these risks so that they can make a properly informed decision.

"Coupled with the sperm banking option – which could be made freely available through the NHS – this is the best way to reduce the risks of disease associated with de novo mutations for future generations."

**More information:** "Paternal age bioethics." *J Med Ethics*. Published Online First: 2 June 2015. [DOI: 10.1136/medethics-2014-102405](https://doi.org/10.1136/medethics-2014-102405)

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