Fear of dystopia should not blind us to the huge potential of gene editing

If we had given in to such hysteria over IVF, Louise Brown would never have been born

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‘Designer

babies on horizon”, ran the headlines. Last week, the Nuffield Council on Bioethics, an independent body advising on policy, published a report on genome editing and human reproduction.

New scientific techniques, such as CRISPR-Cas9 – molecular “scissors” that allow scientists to snip the genome at specific points – have transformed genetics in recent years and raised questions about what is practically possible and ethically acceptable. Despite the lurid headlines, they are not ushering in a new world of designer babies.

The genetic modification of embryos is illegal in Britain except for strictly controlled research purposes and the Nuffield Council report did not call for a change in the law. What it suggested was that there exists no fundamental moral objection to genome editing.

Such editing may be “morally permissible” so long as it takes into account the “welfare of the future person” and does not “produce or exacerbate social division or the unmitigated marginalisation or disadvantage of groups within society”. Even with these caveats, there is no prospect of geneedited humans in the near future. The science is in its infancy and techniques remain untested and hazardous. A recent study suggested that CRISPR does not cut the genome cleanly but causes considerable damage and that as the body repairs the damage new mutations may be introduced. It will be a long time before such issues are resolved sufficiently even to contemplate human therapies.

The debate about human gene editing is less about what may happen tomorrow than about fundamental fears of dystopian change. “It is not fanciful to say that... the end of human beings as a wild breeding race could be in sight,” claimed the Times. “Any small impover-

ished country" would be able to "improve its wealth and influence" by "breeding a race of intellectual giants". This would pose an "extremely grave" threat "to accepted human values".

That article was published not last week but in 1969. And in response not to gene editing but to the then new technology of IVF.

On Wednesday, the first ever IVF baby, Louise Brown, will turn 40, an event that will be publicly celebrated. We have lost most of our anxieties about IVF. Those old fears – about scientists playing God or about the resurrection of eugenics – have, however, become transferred to a new biotechnology.

One issue that seems genuinely new is that of "germline" editing. "Somatic therapies" alter genes in an individual but do not affect his or her children. Germline therapies modify the genome in an egg, sperm or embryo; any changes are passed on to future generations. For many critics, to burden future generations with possibly dangerous genomic alterations without their consent is unconscionable. It is true that any alteration to the germline should be undertaken only with the greatest of care and with far more knowledge than we currently possess. That's one reason designer babies are not on the horizon. But refusing to alter the genome when one could to do so safely is also to affect the future. If it ever became possible to eliminate, say, the gene that causes cystic fibrosis, not then to do so would condemn future generations to suffer unnecessarily from a wretched condition. There is nothing ethically superior in leaving things be if it is possible to change them for the better.

Perhaps the most vexed question is about genome modification not for therapeutic reaso… (to eliminate genes causing disorders) but for enhancement – attempting to improve a child's intelligence or physical appearance.

There are a number of disorders, such as cystic fibrosis, caused by the mutation of a single gene. These would be ideal candidates for genetic modification. Most complex traits, whether intelligence or appearance or musical ability, are, however, shaped by a multitude of genes. "Enhancement" would require altering hundreds of genes, with myriad untold collateral consequences. It's an unlikely scenario. If you want make a child more intelligent, filling the house with books is far more effective than modifying genes.

If, 50 years ago, society had given in to fears about IVF we might be living in a world without fertility treatments. In 50 years' time, we may have lost our current anxieties about genetic engineering, just as we have shed concerns about IVF. By then, designer babies might really be on the horizon. At which point, we could take reasoned decisions about human germline modification. Until then, we should encourage the practical research and the ethical debates, without giving in either to the hype or to the dystopic fears.