What is sex selection?

Usually the sex of a baby is the result of a random sperm lottery, with a fairly even chance of getting a boy or a girl (see the full Big Picture: Sex and Gender issue at http://bigpictureeducation.com/sex-and-gender for more details).

Sex selection is the process of biasing this lottery in favour of one or other sex. People may want to do this either for medical reasons (in order to avoid serious genetic disorders) or for social reasons (if they have a strong desire for a child of a particular sex).

How do you choose a baby’s sex?

All eggs carry an X chromosome, while sperm carry either an X chromosome or a Y chromosome. An egg fertilised by an X-bearing sperm creates a girl, while a Y-bearing sperm will produce a boy.

‘Natural’ methods

The X chromosome contains more genetic material than the Y chromosome. As a result, X-bearing sperm are heavier and are therefore slower swimmers. Some people think that parents can capitalise on this difference to influence the sex of their offspring by, for example, changing the timing of intercourse relative to ovulation. The logic behind this timing is that having intercourse (for example) five days before ovulation is more likely to result in a boy than intercourse two days before ovulation.

Popular books such as Taking Charge of Your Fertility promote such ‘natural’ methods to parents, although many studies have found that they have almost no effect on a baby’s sex.

Sperm sorting

The weight differential between X and Y chromosomes is the basis for sperm sorting. This is a physical technique in which slower-swimming X-bearing sperm are separated from Y-bearing sperm. However, while sorting sperm by weight can increase the likelihood of giving birth to a boy or a girl, the technique cannot guarantee the sex of a baby.

More recently a fluorescent dye has been used which binds to DNA and shows up X chromosomes as bigger patches of fluorescence. This is a more accurate way of sorting sperm, though it is still not completely dependable, and the success rate is higher for selecting girls as opposed to boys. One study in 2006 found that the success rate was 91 per cent for those seeking girls and 76 per cent for boys; the company involved in this study says in 2014 that their success rate is now 93 per cent for girls and 82 per cent for boys.

Preimplantation genetic diagnosis (PGD)

PGD involves a single cell being plucked from an IVF (in vitro fertilised) embryo while it is still at the eight-cell stage. The cell can then be analysed so that an embryo with, for example, a serious genetic disorder is not implanted in the womb. As well as enabling testing for numerous hereditary diseases, PGD also makes it possible to find out the sex of an embryo.

PGD is available on the NHS in the UK, but it is tightly controlled by the Human Fertilisation and Embryology Authority (HFEA) and only allowed for those families who are at risk of having a child with a certain genetic or chromosome disorder.

The likelihood of becoming pregnant after a PGD cycle is fairly low – often around 20 per cent, though this is improving. In 2011 in the UK, 383 cycles of PGD were offered, resulting in 121 live births – meaning there was a 31.6 per cent live birth rate.

According to the HFEA, a successful PGD cycle depends on many factors, including age and whether there are any infertility issues. Additionally, a woman may not have enough eggs to launch the cycle in the first place, embryos may be damaged when cells are removed, or all of a couple’s embryos may be affected by the genetic disorder, meaning that none can be implanted in the womb.

Abortion

Most women receive an ultrasound scan between weeks 18 and 20 of pregnancy, and by this stage it is possible to determine the sex of a baby. Some doctors have expressed concern about informing parents of their child’s sex at this early stage. They fear that some parents who are disappointed that their child is not the sex that they want might seek an abortion. Abortion for non-medical reasons is legal in the UK up until week 24 of pregnancy.
What is IVF?

One in seven couples in the UK have trouble conceiving. IVF, or in vitro fertilisation, is an assisted reproductive technique that helps couples having difficulty conceiving naturally.

Eggs and sperm are taken from parents and brought together in the laboratory to allow fertilisation (hence the name in vitro, meaning ‘in glass’). The embryo begins to divide, and while it is still at the few-cell stage it is implanted in the mother’s womb and allowed to fully develop.

Around 1 in 50 babies born in the UK are conceived by IVF. Almost 50,000 women had IVF treatment in the UK in 2011. The figures from 2010 show that over 25 per cent of IVF cycles resulted in a live birth.

As of 2013, couples should be offered three cycles of IVF treatment on the NHS providing they meet certain criteria (e.g. treatment should start before a woman’s 40th birthday). An average of three cycles are usually required before pregnancy is achieved, with each cycle of treatment costing up to £5,000.

IVF is not a risk-free procedure: the drugs given to stimulate the release of eggs can cause a range of side-effects, including ovarian hyperstimulation syndrome (OHSS), and can increase the risk of multiple pregnancies. There is also a slightly higher chance of an ectopic pregnancy.

What is the HFEA?

The HFEA was established in 1991 following the Human Fertilisation and Embryology Act. It is a government-appointed body that regulates fertility treatment and embryo research.

Reproductive technology has developed at such a rapid pace since 1991 that the HFEA has had to constantly consider new issues, including sex selection. An HFEA public consultation on the subject in 2002 revealed that 80 per cent of people were against the idea of sex selection for non-medical reasons. However, the government raised the issue again, and between August and November 2005 the Department of Health undertook a wide-ranging consultation on fertility legislation.

In October 2009 the practice of sex selection for social reasons became prohibited under an amendment to the Human Fertilisation and Embryology Act.

Sex selection folklore

If you want your child to be a boy:

- have intercourse in dry weather on the night of a full moon when there is a north wind blowing
- men – wear your boots to bed, hang your pants on the right bedpost, tie a string around your right testicle and bite your wife’s right ear
- women – lie on your right side, eat red meats and sour food, and pinch your husband’s right testicle before intercourse.
Medical reasons

A number of serious genetic disorders are linked to the sex of a child. If a girl inherits a faulty gene on her X chromosome, the gene at the same location on her second X chromosome is usually unaffected and can act as a backup. A boy who inherits the same faulty gene on the X chromosome from his mother has no such backup. Associated illnesses (so-called X-linked conditions) include haemophilia, which causes uncontrollable bleeding due to a mutation in a blood-clotting protein gene located on the X chromosome. These sorts of medical cases are the only instances in which the HFEA currently allows PGD technology to be used.

Non-medical or social reasons

Parents who have had a child or children of one sex may feel a strong desire to have a baby of the opposite sex to complete their family. This is referred to as 'family balancing'.

In some cultural groups there is a preference for sons rather than daughters, leading to a shift in the usual 50:50 demographic split between men and women. (See Big Picture: Sex and Gender for further discussion on social and cultural issues relating to gender: http://bigpictureeducation.com/sex-and-gender)

In March 2005 the House of Commons Science and Technology Select Committee concluded that there is "no adequate justification for prohibiting the use of sex selection for family balancing". However, sex selection for non-medical reasons was made illegal under the Human Fertilisation and Embryology Act of 2008.
SEX SELECTION

Key issues

Reproductive rights

Some of those in favour of sex selection strongly oppose the fact that the HFEA controls who is able to make use of reproductive technologies. They argue that parents have a right to be free to make their own reproductive decisions.

Critics of this view think that sex selection gives parents too much freedom. They argue that government intervention is necessary to prevent reproduction from being viewed simply as a consumer activity, and they point to the fact that the majority of the population is opposed to sex selection for social reasons. There is currently disagreement over whether sex selection causes identifiable harm.

Supporters of free choice argue that sex selection causes no harm to anyone and that it is an issue that should be left up to parents and their doctors. Opponents believe that this ignores the interests of the child and the potential social implications of sex selection, which could be damaging.

The welfare of the child principle

The Human Fertilisation and Embryology Act of 1990 states that parents cannot receive reproductive treatment “unless account has been taken of the welfare of any child who may be born as a result of the treatment (including the need of that child for a father) and of any other child who may be affected by the birth”. This ‘welfare principle’ sounds simple but it has generated much controversy.

The first objection to the principle is that the future welfare of children of couples that conceive naturally (i.e. who do not require techniques such as IVF to help them have a child) is never assessed, and as a result the welfare principle unfairly penalises parents with fertility problems.

The second objection is that the quality of a parent–child relationship is the result of many complex factors and fertility clinics are not trained or equipped to assess these.

Finally, it is argued that the welfare principle may be meaningless: how can you measure the welfare of a child who doesn’t yet exist?

Is sex selection safe?

Healthy children have been born following the use of PGD and sperm sorting, but as these techniques have only recently been developed their long-term safety implications are unknown. Some critics advocate banning sex selection altogether because of this element of risk, while others propose using the technology only for compelling medical reasons, in accordance with current HFEA regulations.

Those in favour of sex selection respond that since the first IVF baby – Louise Brown – was only born in 1978, the long-term safety of IVF has also yet to be established and needs further research. They argue that if PGD and sperm sorting are to be rejected on safety grounds, then for the sake of consistency IVF and many other medical innovations must be abandoned as well.

Parental expectations

One of the most widespread objections to sex selection is that parents who choose the sex of their child may burden that child with preformed ideas about how they should behave based on their sex, reinforcing sexual stereotypes and causing psychological damage. In addition, it is feared that children conceived naturally may be treated differently to their sex-selected siblings, possibly leading to feelings of inferiority.

Supporters of reproductive choice defend their position by arguing that all parents are likely to have preformed ideas of how their offspring should behave. Furthermore, they argue that these expectations are a normal part of parenthood and are not necessarily a threat to the psychological health of a child.
People have the right to choose so long as their actions don’t cause harm to others. Parents have the right to choose the sex of their child since this only affects the family concerned.

It is not the job of the state or unelected public bodies to interfere in personal decisions and to make assumptions about the motivation of parents who want to choose the sex of their child. Parents can be trusted to have their child’s interests at heart and to love their child.

We control many areas of our lives through the use of science and technology. Sex selection using new reproductive technologies is simply a further step in this process of taking control of our circumstances and changing them for the better.

Sex selection is unlikely to be made available on the NHS. If it is offered privately, parents with a serious desire to choose the sex of their baby will find a way to do so. Also, over time the price will go down and the technology will become more widely available, as has happened with IVF.

We live in a secular state. Legal decisions should not be founded on religious principles. Arguments against interfering with nature and God’s will have been made regarding many scientific advances that are today seen as socially acceptable, so should be ignored – pain relief during childbirth and vaccinations were once thought to be against religious principles.

The genetic influences on appearance and intelligence are so complex that it’s highly unlikely that reproduction will ever be a simple matter of choosing desirable characteristics. In the case of intelligence, the environment in which children are brought up has a decisive role. Also, through legislation and debate we can decide what happens in the future – we aren’t simply opening the floodgates.

Research in the UK shows that demand for boys and girls is fairly equal, so it’s unlikely that the sex ratio would change. Even if demand were uneven, the number of people undergoing treatment would be so small that the effect would be minimal.

Eliminating genetic diseases prevents suffering both for the child and his or her family. It is perfectly consistent to argue that we should try to minimise the extent of disability while also arguing that we should respect the rights of disabled people.

Sex selection is not simply a personal matter, and is likely to have wider consequences for the attitudes and make-up of society. Parents have a right to have as many children as they want, but choosing the sex of a child is a different matter.

No society allows unconstrained freedom of choice, and it is the job of governments and public bodies to set ethical boundaries, having first consulted the public. Unfortunately, parents sometimes do things that do not support the welfare of their child and when this happens the state should step in.

New technologies can have unexpected and negative consequences. We cannot anticipate all of the unwanted side-effects of our actions and do not know what may follow from using technology to interfere in a natural process.

Sex selection involves a lot of money and medical resources, and these could be better used to tackle more serious medical issues. If the procedure is offered privately rather than on the NHS, this will mean that only the rich can afford it, and this isn’t fair.

Reproduction is part of a natural cycle that takes place according to a divine order. We should not be tempted to ‘play God’, deciding who gets born. Religious principles are the source of many of our moral ideas and legal regulations; they must be respected.

Sex selection sets us on a slippery slope towards ‘designer babies’. Once gender choice is accepted, people will be more willing to accept selection for intelligence or physical attractiveness. Children will be turned into commodities (products) that parents pick off a shelf. Having a child is not just another consumer experience.

The sex ratio of the population could be altered, leading to shortages of one gender and creating a sense that one gender is more valuable than the other. In countries like China boys have traditionally been more valued than girls, and the West should not set a bad example by allowing sex selection in our society.

Stopping an embryo with a genetic disease from developing reinforces prejudice against disabled people, suggesting that they are inferior and cannot lead worthwhile lives. It also raises difficult questions: how serious must the disease be in order to justify discarding an embryo? How high a risk must there be of developing the disease?
SEX SELECTION FACTS

FAST FACT
Sperm sorting technology was originally developed for farmers. For example, dairy farmers could ensure they got cows to produce milk, while beef producers could increase their number of bulls, which carry more meat.
Source: cdn.intechopen.com/pdfs-wm/40444.pdf

FAST FACT
In Germany the 1990 Embryo Protection Act recommends one year in prison for anyone undertaking sex selection for social reasons. Sperm sorting for medical reasons is allowed in certain cases, but preimplantation genetic diagnosis is not.

FURTHER READING

Human Fertilisation and Embryology Authority website
A summary of recent HFEA consultations on sex selection and other issues in reproductive technology.
http://www.hfea.gov.uk/122.html

POST Notes
Brief reviews of the main issues surrounding sex selection by the Parliamentary Office of Science and Technology.
Sex selection (2003):
http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-198
Reproductive technologies (1994)
http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-48

Comment on Reproductive Ethics
A public interest group campaigning on issues surrounding human reproductive technology.
corethics.org/

BBC News: Couples should be able to choose their baby’s sex
news.bbc.co.uk/1/hi/health/8665282.stm

Centre for Parenting Culture Studies
blogs.kent.ac.uk/parentingculturestudies/

Spiked Online: Lawyer Emily Jackson argues against the ‘welfare principle’
spiked-online.com/news/article/5272#.VDJpc4BdUb4

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www.hfea.gov.uk/preimplantation-genetic-diagnosis.html#10

HFEA: In vitro fertilisation figures
www.hfea.gov.uk/ivf-figures-2006.html

HFEA: Review of sex selection
www.hfea.gov.uk/517.html

BUPA: Female infertility
bupa.co.uk/individuals/health-information/directory/f/female-infertility

NHS Choices: In vitro fertilization – introduction
www.hs.uk/conditions/ivf/pages/introduction.aspx

NHS Choices: In vitro fertilization – risks
www.nhs.uk/conditions/ivf/Pages/Risks.aspx