

## In Vitro Fertilisation: 40th Anniversary Debate on 13 September 2018

### Summary

On 13 September 2018, the House of Lords is scheduled to debate a motion moved by Baroness Deech (Crossbench) on the “40th anniversary of the first baby born using in vitro fertilisation”.

This briefing provides background information on in vitro fertilisation (IVF), including a timeline of developments in terms of both medical advances and regulatory changes in the field of reproductive science in the UK over the past four decades; statistics on the use of IVF in the UK; and a brief overview of some of the issues that have arisen in connection with the subject of IVF treatment in recent years. These include barriers to access through the NHS for some individuals and couples; the prohibitive cost of private treatment for many who may be unable to conceive without assistance; and accusations, including from fertility experts such as Lord Winston (Labour), that claims made by some private clinics about the success rate of treatment cycles can be misleading. The briefing then highlights a selection of further information, including an overview of what IVF entails; articles marking the 40th anniversary of the birth of the first ‘IVF baby’, Louise Brown, in 1978; and recent reports from the Human Fertilisation and Embryology Authority (HFEA), the independent statutory regulator of fertility treatment and human embryo research in the UK, on IVF and the fertility sector as a whole.

### Background: In Vitro Fertilisation

In vitro fertilisation (IVF), a process in which eggs are fertilised manually with sperm outside of the body, is one of a number of different fertility treatments available for individuals or couples seeking a method of assisted reproduction.<sup>1</sup> During an IVF cycle, if fertilisation is successful the resulting embryo is allowed to develop for between two and six days before being transferred back to a womb.<sup>2</sup> Success rates for IVF have doubled over the last 25–30 years to around 30 percent, according to the current chair of the HFEA, Sally Cheshire, but this still means that most people who undergo IVF treatment are unsuccessful in their attempt to have a child.<sup>3</sup> Furthermore, success rates fall dramatically with increases in a woman’s age—to only around 2 percent for women aged over 44.<sup>4</sup> IVF is the most common fertility treatment for people who are unable to conceive naturally, but it is not the only option available.<sup>5</sup> Others include drug treatments; intrauterine insemination, also known as artificial insemination, in which high-quality sperm is injected directly into the womb; surgery; or surrogacy.<sup>6</sup>

IVF has now been a viable fertility treatment option for over 40 years, with Wednesday 25 July 2018 having marked the 40th anniversary of the birth of Louise Brown, the first ‘IVF baby’.<sup>7</sup> Born to Leslie and John Brown in Oldham in 1978, Louise’s arrival was made possible by the pioneering work of Professor Sir Robert Edwards (1925–2013), Dr Patrick Steptoe (1913–1988) and Jean Purdy (1946–1985).<sup>8</sup> Over the course of the past four decades, over 300,000 babies have been born in the UK as a result of IVF treatment and it has been estimated that the innovation has assisted in the delivery of anywhere between 5 and 10 million babies worldwide.<sup>9</sup>

Over the past 40 years, IVF has been the subject of both continual improvements in effectiveness based on medical advances in the field of reproductive science, and a changing regulatory landscape stimulated

by these developments.<sup>10</sup> Today, the HFEA regulates IVF in the UK by licensing, monitoring and inspecting fertility clinics. It also collects data on fertility treatments and provides free and impartial information to the public on these treatments; fertility clinics; and egg, sperm and embryo donation.<sup>11</sup>

### ***Timeline: Development of IVF in the UK***

- **1978:** The world's first 'IVF baby', Louise Joy Brown, is born, following the work of Robert Edwards, Patrick Steptoe and Jean Purdy.
- **1984:** The Report of the Committee of Inquiry into Human Fertilisation and Embryology (July 1984, Cm 9314), otherwise known as the Warnock report, recommends that a statutory body be created to oversee IVF treatment and research using human embryos.
- **1985:** The Interim (Voluntary) Licensing Authority is established as a temporary measure, as a result of the Warnock report.
- **1990:** The Human Fertilisation and Embryology Act 1990, which set up the Human Fertilisation and Embryology Authority (HFEA), receives royal assent.
- **1991:** The HFEA, the world's first fertility treatment and embryo research regulator, starts work.
- **1993:** Social sex selection is banned through HFEA guidance.
- **2001:** The law is updated to allow embryonic stem cell research for serious diseases and to ban reproductive cloning, through the Human Fertilisation and Embryology (Research Purposes) Regulations 2001 and Human Reproductive Cloning Act 2001 respectively.
- **2003:** The Human Fertilisation and Embryology (Deceased Fathers) Act 2003 allows a man to be registered as the father of a child born using his sperm (or embryo created using his sperm) after his death.
- **2005:** Anonymity removed: people conceived with the help of donor eggs/sperm/embryos can now find out the identity of their biological parent(s).
- **2007:** European Union Tissues and Cells Directives, which introduce common safety and quality standards for human tissues and cells across the European Union, incorporated into UK law.
- **2007:** 'One at a time' report to the HFEA marks the start of the campaign to reduce multiple births, the single biggest risk of fertility treatment.
- **2009:** The Human Fertilisation and Embryology Act 2008 comes into effect: same-sex and unmarried couples can now both be legal parents without having to adopt; sex selection is outlawed; human 'admixed' embryo research enshrined in law.
- **2010:** Robert Edwards wins the Nobel Prize in Physiology or Medicine.
- **2015:** The UK becomes the first country to legalise the use of mitochondrial donation techniques to allow women who carry the risk of serious mitochondrial disease to avoid passing it onto their children.
- **2016:** The HFEA approves the use of gene editing in research.
- **2018:** Louise Brown celebrates her 40th birthday on 25 July.<sup>12</sup>

### **Statistics: IVF in the UK**

According to the HFEA, 32 percent of heterosexual couples in the UK experience unexplained infertility.<sup>13</sup> Of those who seek fertility treatment as part of their efforts to have a child, IVF is likely to be the option most choose to pursue.<sup>14</sup> Indeed, heterosexual couples—ie, women registered with a male partner—comprised the vast majority of those who sought IVF treatment in 2016, accounting for

95.3 percent of the 64,903 IVF treatments provided to women in that year.<sup>15</sup> Of the remainder, 1,683 treatments were for women who registered with a female partner (2.5 percent of the total), 1,272 were for women who registered with no partner (1.9 percent of the total), and 232 were for women who registered as a surrogate (0.3 percent of the total).<sup>16</sup>

In March 2018, the HFEA published a report based on data collected from those who had undergone IVF cycles and other forms of fertility treatment between 2014 and 2016. Key observations and findings included the following:

- Between 1991 and 2016, there were over 1,100,000 IVF treatment cycles in UK-licensed clinics.
- In 2016, there were just over 68,000 IVF treatment cycles, resulting in 20,028 births. This represented a 4 percent increase from 2015 to 2016.
- Since 2014, frozen IVF treatment cycles have increased by 39 percent.
- In 2015, birth rates for frozen cycles exceeded fresh for the first time.<sup>17</sup>

In addition, for 2016 in particular, the HFEA report noted:

- 31 percent of IVF treatment cycles used frozen eggs, up from 27 percent in 2015.
- 12 percent of IVF treatment cycles used donor eggs, sperm or both.
- The birth rate per embryo transferred (PET) was 21 percent for all cycles.
- The birth rate PET for frozen cycles was higher than for fresh cycles for the second year in a row (22 percent frozen, 21 percent fresh).
- 41 percent of IVF treatment cycles were funded by the NHS.<sup>18</sup>

The report recorded that 42 percent of IVF patients were aged under 35 in 2016.<sup>19</sup> Of the remaining 58 percent of patients, 23 percent were aged 35–37; 14 percent were aged 38–39; 14 percent were aged 40–42 and 4 percent were aged 43–44. Of all IVF treatment cycles conducted in the UK in that year, 3 percent were for women aged over 44—up from 2 percent in 2014.<sup>20</sup> As a result, the mean average age of an IVF patient in 2016 was 35.5; an increase of about a year on the average age recorded in 2000.<sup>21</sup>

### **Average Success Rates Decline with Age**

The success rate of IVF depends on several factors, including a woman's age; endowment of eggs; and the cause of her infertility if applicable. The HFEA has calculated indicative figures for the average chance of a birth resulting from IVF treatment depending on a woman's age.<sup>22</sup> The figures in the following table show that the likelihood of a birth resulting from an IVF cycle for a woman using her own eggs and a male partner's sperm decreases significantly with age:

<b>Woman's Age</b>	<b>Chance of Success (percentage)</b>
Under 35	29
35–37	23
38–39	15
40–42	9
43–44	3
Over 44	2

(Source: HFEA, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018)

## Access to IVF on the NHS in England

Fertility services are regulated by the HFEA on a UK-wide basis, but the commissioning of these services is devolved to the national level.<sup>23</sup> In England, the HFEA has noted that the trend over the past few years has been for Clinical Commissioning Groups (CCGs) to “reduce the number of treatment cycles they fund”. In 2013, for example, 24 percent of CCGs were recorded as following the current National Institute for Health and Care Excellence (NICE) guidelines on the provision of IVF. These state that women aged under 40 should be offered three cycles of IVF treatment on the NHS if they have been trying to get pregnant through regular unprotected sex for at least two years or they have not been able to get pregnant after twelve cycles of artificial insemination. The guidelines add that one cycle should be offered to women aged 40–42.<sup>24</sup> However, by 2017 the percentage of CCGs offering services in line with these guidelines had dropped—with only 12 percent offering access to IVF treatments in line with the NICE guidelines, and some no longer offering IVF cycles to any patients.<sup>25</sup>

While CCGs have a legal duty to ‘have regard’ to the NICE guidelines, the guidance is not mandatory.<sup>26</sup> This has led to a “patchy service” across England, according to the HFEA, as CCGs may differ in what fertility services, if any, they offer in their area.<sup>27</sup> CCGs may also impose their own criteria for patients wishing to access IVF on the NHS. For example, some may require that prospective patients not already have any children; fall into a certain age categories, such as being under 35; or not smoke.<sup>28</sup> Regarding remedies to this pattern of variation across England, the Government has stated that it “strongly supports” efforts by NHS England and the HFEA to “see how commissioning of fertility services could be improved”.<sup>29</sup> The Government has stated that this has included “ongoing work to develop a benchmark price to inform what the NHS would pay for in vitro fertilisation treatments”. In addition, it has noted that commissioning guidance aimed at further encouraging implementation of the NICE guidelines was being developed. In November 2017, it was stated that both products, regarding the benchmark price and commissioning guidance, were expected to be “ready for use” in the 2018/19 financial year.<sup>30</sup>

In July 2018, the Government cited figures from the campaigning organisation Fertility Fairness (FF) on the number of CCGs that offered three cycles of IVF in line with the NICE guidelines. These were compiled using data from freedom of information requests.<sup>31</sup> The most recent FF figures indicate that 24 CCGs offered three cycles of IVF to patients in 2017 (although different conditions are applied by the CCGs counted within this figure). In contrast, seven CCGs were listed as not offering any cycles to patients (Basildon and Brentwood CCG, Cambridgeshire and Peterborough CCG, Croydon CCG, Herts Valleys CCG, Mid Essex CCG, North East Essex CCG and South Norfolk CCG).<sup>32</sup>

## Private Clinics: Cost and Claims

Individuals and couples who have not been deemed eligible for IVF cycles on the NHS, or who have been unsuccessful during the cycles they have undergone, may choose to pursue private IVF treatment. Indeed, some 60 percent of IVF treatments in the UK are pursued privately.<sup>33</sup> The HFEA regulates private clinics in the UK but not the pricing of their services. In addition, it does not collect pricing information for comparison purposes by prospective patients.<sup>34</sup> However, the HFEA does state that the cost of private IVF treatment may run to thousands of pounds, including fertility drugs and treatment add-ons (not all of which may have been proven to work).<sup>35</sup> A cycle of IVF with a private provider can cost up to, or in some cases exceed, £5,000.<sup>36</sup> The high cost is likely to be prohibitive for many prospective patients and may also be a factor in the reported increase in the number of people seeking IVF treatment abroad, often in countries with a less regulated fertility sector than that which exists in the UK.<sup>37</sup>

Furthermore, public figures such as Lord Winston (Labour), a fertility expert, have criticised some private clinics for allegedly exaggerating the chances of patients achieving a successful pregnancy as a result of IVF cycles delivered under their supervision.<sup>38</sup> In addition, Lord Winston has suggested that widely-used average success figures, including those from bodies such as the HFEA, are potentially misleading people considering treatment. In a recent interview with the *Yorkshire Post*, Lord Winston stated:

[...] the reality is, people are being sucked into IVF without a full recognition of exactly how low the success rate is. The HFEA records success rate per embryo transfer, but that in itself is misleading, because a large number of women start a cycle but never get to the embryo transfer stage, either because their ovaries don't respond or because the eggs don't fertilise.<sup>39</sup>

## Key Documents

- HFEA, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018
- NHS, '[IVF](#)', accessed 31 August 2018
- HFEA, '[Happy Birthday Louise Brown](#)', 31 August 2018; '[New Exhibition Opens to Celebrate 40 Years of IVF](#)', 31 August 2018; and '[Speech Delivered by Sally Cheshire CBE, Chair, Human Fertilisation and Embryology Authority, Science Museum, London, 5 July 2018](#)', 5 July 2018
- HFEA, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018; and '[State of the Fertility Sector: 2016–17](#)', December 2017

## Further Information

- HFEA, '[Celebrating 40 years of IVF](#)', accessed 31 August 2018
- Science Museum, '[Science Museum Celebrates 40 Years of IVF With New Exhibition](#)', accessed 31 August 2018; and '[IVF: 6 Million Babies Later](#)', accessed 31 August 2018
- Roger Highfield, '[First IVF Baby Louise Brown Celebrates 40th at the Science Museum](#)', Science Museum Blog, 26 July 2018
- Roger Highfield, '[Jean Purdy, the Unsung Mother of 6 Million IVF Babies](#)', *Times* (£), 22 July 2018
- '[Oral Question on 'Human Fertilisation and Embryology Act 2008: Frozen Egg Storage](#)', HL Hansard, 12 July 2018, col 961
- Martin Johnson, '[Robert Edwards: Nobel Laureate in Physiology or Medicine](#)', 7 December 2010
- Baroness Deech, '[Gresham Lectures: Everyone is Interested in Fertility](#)', *Guardian*, 15 July 2008
- Gresham College, '[Reproductive Technologies and the Birth of the Human Fertilisation and Embryo Authority](#)', 25 September 2008; '[Ethics, Embryos and Infertility](#)', 27 October 2008; '[Choosing Your Baby](#)', 20 November 2008; '[Fertility and Feminism](#)', 16 February 2009; and '[The Ethics of Reproduction](#)', 24 February 2010
- British Fertility Society, '[Homepage](#)', accessed 31 August 2018
- UK Parliament, '[Human Fertilisation and Embryology \[HL\] Act 2008](#)', 13 November 2008

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- <sup>1</sup> Human Fertilisation and Embryology Authority, '[Explore Fertility Treatments](#)', accessed 31 August 2018. 'In vitro', from Latin, means 'in glass' (Oxford English Dictionary, '[In: In Vitro](#)', accessed 31 August 2018).
- <sup>2</sup> Human Fertilisation and Embryology Authority, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018.
- <sup>3</sup> *ibid*; and Sally Cheshire, '[IVF Regulation: Ensuring Safe and Ethical Treatment](#)', Science Museum Blog, 11 July 2018. The 30 percent success claim appears to be rounded from the average success rate of treatment cycles for women aged under 35 using the 'per embryo transferred' (PET) measure (see table on p 3, and accompanying text, for further information).
- <sup>4</sup> Human Fertilisation and Embryology Authority, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018.
- <sup>5</sup> Human Fertilisation and Embryology Authority, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018, p 8.
- <sup>6</sup> Human Fertilisation and Embryology Authority, '[Explore Fertility Treatments](#)', accessed 31 August 2018.
- <sup>7</sup> Human Fertilisation and Embryology Authority, '[New Exhibition Opens to Celebrate 40 Years of IVF](#)', 31 August 2018.
- <sup>8</sup> Martin Johnson, '[Robert Edwards: Nobel Laureate in Physiology or Medicine](#)', 7 December 2010, pp 1–2. In 2010, Robert Edwards won the Nobel Prize in Physiology or Medicine for his work in developing IVF (Nobel Prize, '[Press Release: Nobel Prize in Physiology or Medicine 2010](#)', 4 October 2010).
- <sup>9</sup> Human Fertilisation and Embryology Authority, '[Speech Delivered by Sally Cheshire CBE, Chair, Human Fertilisation and Embryology Authority, Science Museum, London, 5 July 2018](#)', 5 July 2018, p 2. See also: European Society of Human Reproduction and Embryology, '[More than 8 Million Babies Born from IVF Since the World's First in 1978](#)', 3 July 2018.
- <sup>10</sup> Human Fertilisation and Embryology Authority, '[Celebrating 40 Years of IVF](#)', accessed 31 August 2018. See also, for example: Jeff Wang and Mark Sauer, '[In Vitro Fertilization \(IVF\): A Review of 3 Decades of Clinical Innovation and Technological Advancement](#)', *Therapeutics and Clinical Risk Management*, 2006, vol 2 no 4, pp 355–64.
- <sup>11</sup> Human Fertilisation and Embryology Authority, '[About Us](#)', accessed 31 August 2018.
- <sup>12</sup> Human Fertilisation and Embryology Authority, '[Celebrating 40 Years of IVF](#)', accessed 31 August 2018.
- <sup>13</sup> Human Fertilisation and Embryology Authority, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018.
- <sup>14</sup> Human Fertilisation and Embryology Authority, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018, p 8.
- <sup>15</sup> *ibid*, p 10.
- <sup>16</sup> *ibid*.
- <sup>17</sup> *ibid*, p 9.
- <sup>18</sup> *ibid*.
- <sup>19</sup> *ibid*.
- <sup>20</sup> *ibid*.
- <sup>21</sup> *ibid*.
- <sup>22</sup> It should be noted that the figures are for women using their own eggs and a male partner's sperm and use the PET measure of success. Success rates vary in other circumstances (Human Fertilisation and Embryology Authority, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018).
- <sup>23</sup> Human Fertilisation and Embryology Authority, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018, p 10.
- <sup>24</sup> NHS, '[IVF: Availability](#)', accessed 31 August 2018. See also: NICE, '[Fertility Problems: Assessment and Treatment](#)', updated September 2017.
- <sup>25</sup> Human Fertilisation and Embryology Authority, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018, p 10.
- <sup>26</sup> House of Commons Library, '[Decommissioning of IVF and Other NHS Fertility Services](#)', 16 January 2017, p 3.
- <sup>27</sup> Human Fertilisation and Embryology Authority, '[Fertility Treatment 2014–2016: Trends and Figures](#)', March 2018, p 10.
- <sup>28</sup> NHS, '[IVF: Availability](#)', accessed 31 August 2018.
- <sup>29</sup> House of Commons, '[Written Question: In Vitro Fertilisation](#)', 15 November 2017, 111528.
- <sup>30</sup> *ibid*.
- <sup>31</sup> House of Commons, '[Written Question: In Vitro Fertilisation](#)', 4 July 2018, 157810.
- <sup>32</sup> Fertility Fairness, '[IVF Provision in England](#)', accessed 31 August 2018; and '[IVF League Table 2017](#)', accessed 31 August 2018.
- <sup>33</sup> Human Fertilisation and Embryology Authority, '[State of the Fertility Sector: 2016–17](#)', December 2017, p 3.
- <sup>34</sup> Human Fertilisation and Embryology Authority, '[In Vitro Fertilisation \(IVF\)](#)', accessed 31 August 2018.
- <sup>35</sup> *ibid*.
- <sup>36</sup> NHS, '[IVF: Availability](#)', accessed 31 August 2018. See also, for example: Zeynep Gurtin, '[Happy 40th Birthday IVF. Now Let's Discuss Your Dirty Secret](#)', *Guardian*, 25 July 2018.
- <sup>37</sup> House of Commons, '[Written Question: In Vitro Fertilisation](#)', 6 July 2018, 158661; and Human Fertilisation and Embryology Authority, '[Fertility Treatment Abroad](#)', accessed 31 August 2018.
- <sup>38</sup> '[Oral Question on Human Fertilisation and Embryology Act 2008: Frozen Egg Storage](#)', HL *Hansard*, 12 July 2018, col 961. See also: *Yorkshire Post*, '[Professor Robert Winston: Couples Being Misled Over Chances of IVF Success](#)', 12 July 2018.
- <sup>39</sup> *Yorkshire Post*, '[Professor Robert Winston: Couples Being Misled Over Chances of IVF Success](#)', 12 July 2018.
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