Treatment by in vitro fertilisation with surrogacy: experience of one British centre

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Surrogacy has been an accepted form of treatment for certain forms of childlessness for centuries.[1] Until recently, "natural surrogacy" was the only means of helping certain women to have babies. In vitro fertilisation surrogacy is now accepted in the United Kingdom as a treatment option for infertile women with certain clearly defined medical problems (box).

In 1985, despite opposition from the BMA, Mr Patrick Steptoe and Professor Robert Edwards, the pioneers of in vitro fertilisation, first proposed treating a patient by in vitro fertilisation surrogacy at Bourn Hall Clinic. After extensive discussions with the independent ethics committee they treated the first couple in the United Kingdom, and the child was born in 1989. In 1989, the clinic's ethics committee drew up guidelines for the treatment of women by in vitro fertilisation surrogacy, and the full programme was formalised in 1990 (table 1). Since then 49 "genetic couples" have received treatment. This review describes our experience of in vitro fertilisation surrogacy since 1989 and discusses some ethical and legal issues.

Summary points

- Treatment by in vitro fertilisation surrogacy is accepted in the United Kingdom for appropriate indications
- In depth counselling is essential for the preparation of couples for treatment
- Treatment of the commissioning couple and the host is straightforward, but must be done in clinics licensed by the Human Fertilisation and Embryology Authority
- Complications of treatment are minimal with appropriate selection and counselling of couples
- Review of each surrogacy arrangement by an independent ethics committee is strongly recommended

Patients and methods

In this review we have defined the couple who provide both sets of gametes as the genetic couple; they may also be known as the commissioning couple or intended parents.[9] The woman receiving the embryos created from the gametes of the genetic couple is known as the surrogate host, the gestational surrogate, or simply the host.

All "genetic couples" were referred by their local consultant gynaecologist or general practitioner and were therefore already selected as probably suitable for this treatment. If the indications for this treatment were appropriate and the couple was medically suitable for treatment and fell within the guidelines laid down by the independent ethics committee to Bourn Hall[12] and the Code of Practice of the Human Fertilisation and Embryology Authority,[13] particularly with regard to the welfare of any child born as a result of treatment, they were informed that they were required by law (the Surrogacy Arrangements Act 1985[3]) to find their own host. The host may be a member of the family, a close friend, or found through a support group such as COTS (Childlessness Overcome Through Surrogacy). If the host was suitable, both couples received in depth counselling. If there were no apparent reasons why the arrangement should not proceed, a combined medical and counselling report was prepared and the arrangement discussed anonymously by the ethics committee. At this meeting the surrogacy arrangements either were approved, held over pending further information and discussion, or rejected. In every case the clinic has acted in accordance with the recommendations of the ethics committee (see *BMJ* website for guidelines).[12]

Since most women requesting in vitro fertilisation surrogacy have normal ovarian function, the manage-

Indications for treatment by in vitro fertilisation surrogacy

- After hysterectomy for cancer
- Congenital absence of the uterus
- Hysterectomy for postpartum haemorrhage
- Repeated failure of in vitro fertilisation treatment
- Recurrent abortion
- Hysterectomy for menorrhagia
- Severe medical conditions incompatible with pregnancy

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Guidelines of the Bourn Hall Ethics Committee are given on the BMJ's website

Table 1 History of surrogacy in the United Kingdom

Year	United Kingdom	Bourn Hall
	No regulation before 1984	
1984	Warnock report —"Make surrogacy illegal"[2]	
1985	Surrogacy Arrangements Act[3] passed by parliament following the "Kim Cotton case"	
	BMA annual representatives meeting—"This meeting agrees with the principle of surrogate births"[4]	
1986		Steptoe and Edwards consider first surrogacy case at Bourn Hall
1987	BMA annual representatives meeting— "Doctors should not be involved"[5]	Ethics committee approves first case
	BMA Report of the Board of Science and Education on surrogate motherhood—"Surrogacy is acceptable for specific indications"[6]	
1988		Treatment initiated and is successful
1989		First in vitro fertilisation surrogacy baby in Britain born
1990	BMA report—"acceptable treatment"[7]	Full surrogacy programme starts
	Guidelines issued[7]	
	Human Fertilisation and Embryology Act[8]	
1991	No ban on surrogacy	Ethics committee issues guidelines
1996	BMA report—"an acceptable option of last resort"[9]	
1997	Health minister orders surrogacy review[10]	
1998	Report of Surrogacy Review Body[11]	
1999		Ethics committee reviews and reissues guidelines[12]

ment of their in vitro fertilisation treatment cycles was straightforward. Ovarian follicular stimulation, monitoring, and oocyte recovery methods have been described previously.[14–16] In all treatment cycles in this series, either all the embryos were frozen and stored for six months of "quarantine" for HIV before transfer to the uterus of the surrogate host or, where a delay in treatment was expected, the semen of the husband from the genetic couple was frozen for six or more months before treatment, when, after a further test for HIV status, it was possible to transfer "fresh" embryos to the host. This policy is in line with the regulation of the Human Fertilisation and Embryology Authority that the sperm used in surrogacy cases should be treated in the same way as donor sperm.[13]

Only normal, fit women were selected as surrogate hosts; most were less than 37 years old and all had at least one child. Fertility investigations have not been necessary. Embryo transfer to the surrogate host was either in a natural menstrual cycle or in a cycle controlled with exogenous hormone treatment.[17]

Counselling helps to prepare all parties contemplating this last resort treatment to consider all the factors that will have an influence on the future lives of each of them, and to ensure that they are confident and comfortable with their decisions and trust each other so no one is felt to be taking advantage, or to be exploiting the regulations which parliament laid down in 1990.[8] The BMA in its 1990 report stated: "The aggregate of foreseeable hazards should not be so great as to place unacceptable burdens on any of the parties—including the future child."[7] Counselling of couples in this series always took place in the home of the genetic couples by an independent fertility counsellor (TCA) and required several hours and often several visits.

Legal status of surrogacy

The Surrogacy Arrangements Act 1985, which was hastily drafted following concerns raised by the "Baby Cotton Case" (box) prohibits commercial (but not voluntary) surrogacy agencies and outlaws advertising for or about surrogacy.[3] Only the commissioning couples and the host surrogate may initiate, negotiate, or compile information to make a surrogacy arrangement. The act does not prohibit payments to surrogate mothers. It has been supplemented by clauses relating specifically to surrogacy in the Human Fertilisation and Embryology Act 1990, which restricted "licensable activity" to premises licensed by the Human Fertilisation and Embryology Authority.[8] These activities include the creation or use of an embryo outside the body and the use of donated eggs, sperm, or embryos.

The Human Fertilisation and Embryology Act 1990 clarified uncertainties about the legal status of surrogacy contracts by unambiguously declaring them unenforceable in law (section 36). It clarified the issue of legal parentage by defining the child's legal mother as the woman carrying it, regardless of whether mother and child are genetically related (section 27). These two sections of the act ensure that if the surrogate host changes her mind and decides to keep the child she is legally entitled to do so. If the commissioning couple decide to reject the child it remains the legal responsibility of the host. The act also defines the legal paternity of the child.

Until the 1990 act, commissioning couples had to adopt their own child and all the provisions of the

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The case of Mrs Kim Cotton

1984. Mrs Kim Cotton agrees to have a baby by natural surrogacy for £6500 through a commercial surrogacy agency in the United States. The Warnock Committee is asked to include surrogacy in its report. It states that surrogacy cannot effectively be banned but recommends banning commercial surrogacy. The UK government rushes through the Surrogacy Arrangements Act in June 1985. Commercial surrogacy agencies and individuals acting for commercial gain (other than potential surrogates and commissioning couples) are prohibited. (K Cotton, personal communication)

1976 and 1985 adoption acts applied. Section 30 of the 1990 act, however, allows for the parentage to be changed by the issue of "parental orders," with the following conditions:

- The applicants (the genetic or commissioning couple) must be married
- They must be over 18
- One or both must be genetically related to the child
- One or both must be domiciled in the United Kingdom, Channel Islands, or Isle of Man
- The child must already be in their care
- The birth mother and birth father (if applicable) must have given their consent
- No money (other than expenses approved by the courts) must have been paid
- That application is made within six months of the birth of the child

Under the regulations covered by section 30 of the 1990 act, which came into force in November 1994, the courts appoint a guardian ad litem (for the lawsuit), whose task it is to ensure that all provisions have been complied with.

Results of treatment by in vitro fertilisation surrogacy at Bourn Hall Clinic

During 1989-98, 49 of 61 couples referred to Bourn Hall for treatment by in vitro fertilisation surrogacy were approved by the independent ethics committee (box) and completed a total of 80 ovarian follicular stimulation cycles.

An average of 10 oocytes were retrieved per stimulated cycle and 5.4 embryos were subsequently frozen. 53 hosts subsequently had 87 embryo transfer cycles (mean 1.65; range 1-4), with 2.2 embryos transferred per cycle. Table 2 shows the overall outcome of treatment of the genetic and host mothers. In all, 37% of the genetic couples and 34% of the hosts who started treatment have delivered one or more babies—13 singletons, 5 sets of twins. Most couples who have not been successful after two or three attempts at treatment have decided either to stop all treatment and accept their childlessness or to attempt adoption.

Reasons for refusal of treatment by in vitro fertilisation surrogacy at Bourn Hall

- Genetic mother more than (guideline) age of 35
- Host surrogate more than (guideline) age of 38
- Poor health of genetic or host mother
- Perceived psychological unsuitability of genetic or host mother
- Perceived concerns about the welfare of the planned or existing children
- Inappropriate indications for surrogacy

Table 2 Results of treatment by in vitro fertilisation surrogacy at Bourn Hall Clinic, 1990-8

Variable	Outcome
Treatment of genetic couples	
No of patients started treatment	49
Mean (range) age at start (years)	32.9 (22-40)
Total (range) stimulated cycles	80 (1-5)
Treatment of host surrogates	
No of hosts started treatment	53
No of cycles to embryo transfer	87
Mean No transfers per host	1.6
Final outcomes	
No (%) delivered/ongoing pregnancies per host transfer cycle	18/87 (21)
No (%) clinical pregnancies per surrogate host	31/53 (59)
No (%) delivered/ongoing pregnancies per surrogate host	18/53 (34)
No (%) clinical pregnancies per genetic couple	31/49 (63)
No (%) delivered/ongoing pregnancies per genetic couple	18/49 (37)

Discussion

In vitro fertilisation surrogacy is now an accepted form of medical treatment in the United Kingdom for a small group of infertile women with unique causes of their infertility, although it remains controversial (box) and is not practised in most other European countries.[7 9] The indications for treatment are limited. The treatment process is straightforward. The difficult aspects are the extreme care with which all parties to the surrogacy arrangement must be assessed clinically and the in depth counselling that is required, both in the short and long term.

Religious attitudes to surrogacy

- Christian view—not acceptable (Catholic or Anglican); "Contrary to unity of marriage and dignity of the creation of the person."
- Jewish view—not forbidden; "The child belongs to the father who gave the sperm"
- Islamic view—not acceptable; "Pregnancy should be the fruit of a legitimate marriage"; "If a host did deliver, the child would be hers."
- Buddhist view—not prohibited, but generally against, because of family ties and legal and moral reasons.

The Surrogacy Arrangements Act 1985 makes surrogacy arrangements on a commercial basis illegal, but it does not make it illegal for a host to receive payment for her services—but section 30 of the 1990 act does, other than for reasonable expenses. It is therefore all the more impressive that women will carry another woman's child for mainly altruistic reasons. The system is simpler in the United States, where commercial agencies are permitted.[18–21] Our experience over the past nine years shows that an altruistic system can work and work well. The main disadvantage of the system is that some women are unable to find hosts and are

Some ethical dilemmas encountered with surrogacy

- The host may wish to keep the child
- An abnormal child may be rejected by both parents
- Is it ethical to pay hosts? Is it ethical not to pay hosts?
- Long term effect on the children is not known
- Long and short term effect on the host's children is not known
- Long term psychological effect on all parties is not known

therefore denied the opportunity of even attempting treatment.

The support and advice of an independent ethics committee is essential in assessing the suitability of surrogacy arrangements (box). Clinicians, counsellors, and scientists may become so involved with trying to help individual couples that some of the more obvious pitfalls in the social, religious, or ethical aspects of treating them can be easily overlooked.

Problems encountered

In several instances, problems have been reported in surrogacy cases, but these are relatively few when related to the number of surrogacy arrangements that have taken place—more than 300 births are known to have occurred with natural and in vitro fertilisation surrogacy arrangements in Britain. Most problems are related to natural surrogacy. We are aware of only one case of in vitro fertilisation surrogacy that has ended in the British courts, with a "tug of love" dispute between the genetic and host mothers. Other well publicised cases have occurred in the United States.

We have encountered no serious clinical, ethical, or legal problems in nine years. In one sister to sister arrangement, failure of the treatment caused disagreement and unhappiness between the sisters, and support counselling continued for more than three years. Both parties to the surrogacy arrangement sometimes have unreasonably high expectations of success, in spite of frank information and counselling. Because the host is fit, young, and known to be fertile, she and the genetic parents expect success and feel badly let down if they fail. Miscarriage has been more common than expected, with 42% of the pregnancies aborting spontaneously in this series. This obviously causes severe stress to both parties, with the host feeling guilty that she has lost the genetic couple's hard-won pregnancy, and the genetic couple feeling guilty that the host has been through the stress of a miscarriage and possible curettage. Full support counselling for both couples in these circumstances is essential. At least half of the hosts will undertake further treatment cycles after failure or miscarriage; if they do not, the commissioning couple must recruit another host and repeat the whole process. Although we have not carried out long term follow up of surrogate hosts, the impression is that they feel fulfilled and are glad to have at least tried to help an infertile couple. Researchers who have followed up hosts found that surrogacy was a positive experience, with strong feelings of fulfillment and altruism, even when payment was received.[22 23]

Changes to the law

Following a widely reported case in 1997 of a natural surrogacy arrangement which experienced severe difficulties, Britain's health ministers decided to seek views on certain aspects of the legislation relating to surrogacy and "to take stock and reassess the adequacy of existing law in this difficult area."[10] A select review body was appointed and asked specifically:

- To consider whether payments, including expenses, to surrogate mothers should continue to be allowed, and if so on what basis
- To examine whether there is a case for the regulation of surrogacy arrangements through a recognised body or bodies; and if so to advise on the scope and operation of such arrangements
- In the light of the above to advise whether changes are needed to the Surrogacy Arrangements Act 1985 or section 30 of the Human Fertilisation and Embryology Act 1990, or both.

The review body published its report for the government in August 1998 and recommended that:

- Payments to surrogate mothers should cover only genuine expenses associated with the pregnancy
- Agencies involved in surrogacy arrangements should be registered by the UK health departments and operate in accordance with a code of practice which should be drawn up by the Department of Health
- The Surrogacy Arrangements Act 1985 and section 30 of the Human Fertilisation and Embryology Act 1990 should be repealed and replaced by a new surrogacy act.[11]

As yet, no decision has been made by the British government on implementing these recommendations.

Ideal arrangements

We believe that altruism in surrogacy arrangements is ideal but, to make surrogacy a viable treatment option, a modest and sensible payment to the hosts for their services is a reasonable and practical solution. All surrogacy arrangements should be regulated by a committee, possibly under the control of the Human Fertilisation and Embryology Authority. Compliance could be ensured by making it mandatory to receive treatment only in clinics licensed by the authority, where proper care and counselling would be provided. Implementation of these suggestions for the provision of all treatment involving both natural and in vitro fertilisation surrogacy would prevent most problems that have arisen in the past. We believe that most doctors, scientists, nurses, and counsellors involved in the care of infertile couples would not like to see surrogacy banned; indeed, it would be almost impossible to ban natural surrogacy. For the small group of women for whom this is the only available treatment of their infertility, it would be unreasonable and unfair to do so now.

Competing interests: None declared.

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Surrogacy should pay

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After the birth of Baby Cotton—a surrogate arrangement engineered by a commercial agency operating in the United Kingdom for the first time—a law was rushed through parliament effectively banning commercial surrogacy, but voluntary surrogacy through COTS (Childlessness Overcome Through Surrogacy) flourished.

Natural surrogacy was the only option available until the introduction in 1989 of host surrogacy through in vitro fertilisation. This was a tremendous step forward—it established surrogacy as a medical alternative to childlessness. It gave women who previously had no chance, the opportunity to have their own genetic child, albeit through another woman.

With proper screening, both medical and psychological, surrogacy works well. The importance of counselling before, during, and after an arrangement is vital as all parties can avoid the pitfalls if they are made aware of them. Unfortunately, miscarriage occurs all too frequently, so extra support counselling is crucial at this time. It is necessary also when treatment fails, as expectations are unusually high, even though failure rates are clearly acknowledged at the outset.

It also seems wise to have an independent ethics committee to approve all cases on their individual merits, as sometimes both clinicians and potential parents can lose sight of the most important person in all of this: the baby. If, for instance, the intending mother has a genetic condition which prevents her carrying a pregnancy, is the prognosis good for her to live long enough to raise the child? Pregnancy is only the beginning and a very small part; looking after the child is by far the hardest—it is physically and mentally challenging.

The potential surrogate mother has to have at least one child of her own, so that she has already experienced pregnancy and childbirth for herself. Being less than 37 years of age allows the intending parents the maximum chance of success, as generally fertility tapers off after this age.

Problems and benefits

In my experience, surrogacy within families can be more problematic than with strangers. Expenses rarely change hands, so expectations are not always met, especially on the surrogate mother's side. She often comes away feeling used instead of fulfilled. Counsellors should screen for emotional blackmail. Family members can feel pressurised and obliged to help. Obviously this is not always the case, as some families' lives are greatly enriched by surrogacy.

The quarantine period imposed for HIV also acts as an enforced cooling off period. It allows all parties time to examine whether this is the best solution for them and allows them to get to know one another better—something that has not always happened in the past, as shown by the case of Roch v Peeters (reported in the *Mirror*, 13 and 14 May 1997).

Section 30 of the 1990 Human Fertilisation and Embryology Act, which allowed for the fast track adoption of surrogate babies, also showed the legal establishment's acceptance of surrogacy.

I strongly agree that surrogate mothers should be fully recompensed for their incredible sacrifice. Pregnancy and childbirth are not without personal risk. Many pregnancies are multiple, often requiring a caesarean section. In the ideal world, egg donors and surrogate mothers would be totally altruistic and prolific. But they are not. Who is exploiting whom? Even when treatment fails, clinicians are not accused of exploiting their infertile patients when the cost of in vitro fertilisation and infertility investigations are prohibitive and the money lost in full. A surrogate mother receives payment only on the successful completion of an arrangement. Overall, surrogacy has a 97% success rate, much better odds than in vitro fertilisation.

It's no surprise to learn that most couples do not go on for further treatment after one or two failed cycles, as often they cannot afford to continue. Many will

accept second best and opt for the cheaper natural surrogacy, which at present is almost a do it yourself procedure, requiring no medical intervention.

An ideal solution?

It would be ideal to monitor all forms of surrogacy through the provision of treatment by a few, well chosen, licensed in vitro fertilisation units, covering all regions of the country. An all inclusive fee could include counselling and medical screening. Couples requiring surrogacy could pay a fee to register. Potential surrogates would register too, but for no charge, and be carefully matched to the couple. All expenses incurred by the surrogate mother would be paid out of administrative funds held by the clinic, from the couple's registration fee. We could adopt the professionalism of the surrogate agencies in the United States, but not the commercialism.

The only drawback would be the cost. Infertile couples are ordinary people from all walks of life. Many cannot afford to pay their surrogate mother's expenses, let alone the cost of in vitro fertilisation or artificial insemination procedures in a clinic. Straight surrogacy arrangements go surprisingly well despite the huge hazards attached. I believe infertile couples should have the choice. They can go through a clinic and meet all the protocols imposed and feel safe in the clinicians' hands. Other couples may prefer to take matters into their own hands and feel that they are back in control. They can proceed in their own time, with artificial inseminations taking place in the more intimate surroundings of their own homes or the home of their surrogate mother.

Whichever method they choose, the benefits experienced by all parties after the successful birth and handover of a long awaited surrogate baby are immeasurable.

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Recommendations for using MMR vaccine in children allergic to eggs

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The measles virus used in the MMR (measles, mumps, rubella) and single measles vaccine is grown in cultures of fibroblasts from chick embryos, and there have been concerns raised about the possible presence of egg protein in the vaccines and the advisability of administration to individuals who are allergic to eggs. We review the evidence for egg as the agent responsible for allergic reactions to MMR or measles vaccine and propose recommendations based on the evidence. The arguments presented also apply to the single mumps vaccine and all other vaccines derived from egg. The recommendations presented have been reviewed and endorsed by the Committee on Infection and Immunisation of the Royal College of Paediatrics and Child Health, and the British Society of Allergy and Clinical Immunology.

Summary points

- The majority of life threatening (cardiorespiratory) allergic reactions to MMR vaccine have been reported in children who are not allergic to eggs; these are more likely to be explained by the gelatin or neomycin contained in the vaccine than the ovalbumin
- MMR vaccine is as safe as any other vaccine, and an allergy to eggs should not delay measles vaccination
- The only children who need to be vaccinated in hospital are those with an allergy to eggs in whom previous exposure led to cardiorespiratory reactions and those with coexisting active, chronic asthma
- Children with milder forms of allergy to eggs can be safely vaccinated without additional precautions
- Any child experiencing an acute allergic reaction to MMR vaccine must have the reaction clearly defined and be evaluated for other allergies

Methods

References were found by performing a Medline search (for the years 1966-99), which identified 51 references, and by searching issue 3 of the 1999 *Cochrane Library*, which identified no references. We also reviewed the reference list of each study identified. Thirty four of the studies identified by the Medline search were relevant; they reported either allergic reactions to MMR or measles vaccine in individuals who were allergic to eggs or reactions in those who were not or examined the components of the vaccine that have the potential to cause an allergic reaction. None of the studies could be classed as meeting the criteria for category I-III evidence since they consisted of reports of isolated or consecutive cases; however there were reports from respected authorities and expert committees (category IV evidence).[1]

Current recommendations

In the United Kingdom immunisation guidelines recommend that all children, except those in whom there is a contraindication, should receive two doses of MMR vaccine: the first shortly after their first birthday and the second before starting school.[2] The uptake rates