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The text below is about a new reproductive technique. Read it and answer the questions that follow.

## Babies on ice

Egg freezing started out as a necessity for the infertile, but it is fast becoming a back-up plan for the busy. So is this the perfect solution for those who want to delay motherhood - or the ultimate admission that pregnancy and the workplace don't mix? Viv Groskop hears the views of doctors, happy parents and mothers-in-waiting

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Until last year, only one "ice baby"- conceived from a frozen egg as part of the IVF process - had been born in the UK. The past 12 months have seen another three twins born in September 2005, and a fourth baby due to be born earlier this year. Egg freezing - once a near-impossible technique with a negligible success rate - is becoming a reality.

In the Holy Grail of the world of assisted reproduction, egg freezing is the ultimate in fertility control for women. Originally pioneered as a technique for those about to undergo fertility-threatening chemotherapy, its universal potential - were there no moral objections - is extraordinary. Christy Jones, founder of one of the US's first egg freezing clinics, describes it as "on a par with the introduction of the pill". If it were ever to catch on, it would in fact be far bigger than that. Egg freezing allows women to choose a conception date by freezing eggs in their 20s for use as late as their 50s. It is fertility intervention for women who don't necessarily have fertility problems, a sort of precautionary IVF. And, because a healthy woman can carry a baby in her womb long after menopause, in theory it gives her (almost) the same reproductive window as a man. The procedure is the same as IVF. The ovaries are stimulated to produce a batch of eggs, which are then removed with a needle under a mild sedative or general anaesthetic. The eggs are then drained of fluid, injected with a sort of antifreeze, frozen and stored at -196C in liquid nitrogen. They can be stored indefinitely.

Until last year, the technique remained relatively obscure due to its low success rates. But in June 2005, Dr Eleonora Porcu, Europe's leading authority on egg freezing, announced amazing new figures: 80% of eggs were surviving the freeze-thaw process in trials, and pregnancy rates were up to 20%, close to the success rate of regular IVF. So far, around 150 frozen-egg babies have been born worldwide, to patients who needed the technique for medical or ethical reasons - either because they had their eggs harvested prior to chemotherapy or because they had moral objections to the freezing of embryos.

Earlier this year, the London-based Science Media Centre organized a briefing session with a panel of fertility experts which concluded that "putting fertility on ice" could become commonplace in the UK within 10 years. New techniques, it concluded, mean that women in their 20s and 30s would be able to store their eggs for future use as a matter of routine. In the US, it is predicted that by 2007 we will see the results of "lifestyle egg freezing": the birth of the first ice baby born by choice to a career woman, using eggs she had harvested a few years back. Around two dozen US clinics offer the service for \$5,000. Here in the UK, half a dozen clinics can help you out for around £2,000. It is the commercial potential for egg freezing that makes it particularly contentious. Some supporters of the technique - including Porcu - are opposed to using it expressly to delay fertility. Porcu is keen to advertise its successes in medical and ethical cases, but counsels strongly against widespread use - especially for what she considers the "wrong" (ie, non-essential) reasons. Others - such as Dr Gillian Lockwood, of Midland Fertility Services in Birmingham, who assisted in the conception of all four UK ice babies (all "ethical" cases) - believe the technique should be open to anyone who wants it, without judging their reasons.

Many in the infertility business are simply resigned to the onward march of market forces. Geoffrey Trew, consultant in reproductive medicine and surgery at IVF Hammersmith, undertakes egg freezing for cancer and leukemia patients, but draws the line at patients who want to pay their way for personal reasons. He thinks that when egg freezing is not the only medical option, it offers a false insurance policy: "If a patient is 31 or 32, it is far better to discuss smoking, obesity and diet, and to advise her that she is better off not freezing her eggs but thinking a bit more about her fertility." For him, the most important recent advance in fertility treatment is not egg freezing but ovarian cryopreservation for cancer patients, where a sliver of the ovaries is frozen and then reimplanted after cancer treatment. (Kylie Minogue is rumoured to have undergone this procedure.) The first such birth was reported in Belgium in October 2004. *Perhaps predictably, though, barely had ovarian freezing been registered as an option for cancer patients than it was being offered as a lifestyle choice in several US clinics. The point is, Trew adds, patients are being allowed to pick and choose fertility treatments, provided they have the money: "The pressure is for the industry to comply with the patients' wishes - if they're willing to pay enough."*

Caught in the middle of all this controversy are the parents of three-year-old Emily Perry, Britain's first ice baby. Helen and Lee Perry, from Ludlow, Shropshire, are reluctant adverts for the process. They know that without egg freezing they would be childless, but they emphasize that they did not set out to use the technique. They ended up taking the egg freezing route not as a result of their willingness to experiment with reproductive technology, but because of their reluctance. Both are Jehovah's Witnesses who believe life begins at the moment of conception. The freezing of embryos - routine in IVF, because they freeze and defrost more reliably than eggs - is unnatural to them, not so much because of their beliefs as Witnesses (it is not a policy of the faith), but because of their personal ethical beliefs. Married since their late teens, Helen, 39, who has a part-time book-keeping job, and Lee, 40, who runs a building company, tried for a baby for six years before realizing that IVF was the only way it was going to happen. Helen had blocked fallopian tubes following a burst appendix at the age of seven. As they researched the IVF possibilities, the realization dawned: they did not want to participate in a process that creates multiple embryos with an uncertain future. They decided to ask for "natural IVF", where one egg at a time is fertilized and implanted. No extra embryos are stored or destroyed. But on the day Helen's eggs were collected, she was diagnosed with hyperovarian stimulation: in one cycle she had produced 34 eggs. (Naturally women produce one egg a cycle. In IVF, fertility drugs are used to produce 12 to 15 eggs, of which the "best" are selected.) It wasn't safe to fertilize and implant an embryo. Their doctor suggested an experimental procedure: freezing the eggs and trying again a cycle later. On a second attempt, one egg was successfully thawed, fertilized and implanted. The rest remain on ice. They hope to conceive another ice baby, a sibling for Emily, at some point. Much as they are grateful to egg freezing, they are

uncomfortable about it becoming a lifestyle choice. "We wouldn't come out and say people shouldn't do it," says Lee, "but my view is you should have medical intervention only when it is required. As a bloke, I wouldn't want all that happening to me unless I had no choice. And it costs thousands - it's not like it's £50. You have to be committed. With the success rate at 20% or lower, it's a lot of time and money for something that there are fairly low chances on. You wouldn't put money on a horse at those odds."

Helen believes egg freezing will increase - not for lifestyle reasons, but because many people do not like the idea of "spare" embryos created by IVF (a process 30,000 women go through annually in the UK). She says people are more aware of ethics than we imagine, regardless of their faith: "I've met lots of women [who have had IVF who aren't religious but are worried about these embryos that are left over and having to be discarded. It does bother them. They are brothers and sisters to their children, and that's difficult for them to cope with." In Catholic Italy this problem has been solved by banning embryo freezing; egg freezing is now routine in IVF cycles. The parents of last year's "ice twins" also had religious reasons. In September 2005, Margaret McNamee, 36, a teacher, and Michael Fahey, 39, an electrician, from Sutton Coldfield, West Midlands, had Isabella and Anna. (No one knows why but, statistically, frozen egg babies are more likely to be girls.) McNamee already had one IVF baby, Matthew, two. At the time of her son's conception, she had three eggs left over, which were frozen before fertilization, because of her views as a Catholic: "We simply couldn't countenance freezing embryos because we would have seen that as freezing little people," she says. "This was a way of trying to have our family while staying true to our principles." The fourth baby, due in early 2006, was also conceived with ethical concerns in mind.

Dr Porcu, speaking from her clinic in Bologna, Italy, is adamant that ethical and medical reasons should be at the heart of decisions to use egg freezing. The technology, she says, was not designed as a form of DIY reproductive delay. She argues the very idea is anti-women because it allows society to maintain the pretence that having a family is a hindrance to a career. She argues that it is taking birth control too far: "You have to take pills. You have to induce superovulation. All this, not because you have a disease but for some hypothetical pregnancy after the age of 40? I think it is risky. And the idea of postponing a pregnancy because it is not accepted in your workplace when you are 30? This is something really violent towards women."

Dr Lockwood at Midland Fertility Services argues the opposite. Egg freezing is, as she puts it, "the ultimate in family planning". At her clinic in Walsall, on the outskirts of Birmingham, the atmosphere is cheery and unclinical. Lockwood has treated hundreds of IVF couples and dozens of candidates for egg freezing, a significant minority for "lifestyle reasons" (who pay their own way: the NHS funds egg freezing only for cancer patients). Down the corridor from her desk is an unassuming room: nondescript blue carpet, strip lighting. This is the cryostore. "In here there are probably about 10,000 potential people," Lockwood smiles, pointing at two dozen canisters half the size of beer barrels. Several contain hundreds of frozen eggs.

Lockwood, 50, is the sort of physician you trust immediately: bright, thoughtful, sensitive, an easy manner. She believes women should have access to technology to help them combine career and motherhood. She decided to specialize in fertility issues early: "When I was in my 20s, a consultant told me, 'My dear, you will have to choose whether you want to be a mother or a doctor.' I thought, 'We'll see about that.'" A mother of three, she had her first child at 26. You are inclined to believe her when she talks about how easy it would be to get your eggs frozen - and the benefits for women who currently have no chance of having a child in addition to the adult life and career they want. She is passionate about the freedom this would give women. Lockwood is breezy about the procedure being undertaken for lifestyle reasons. Egg freezing, she says, involves around five visits to the clinic, plus almost two weeks of self-injection: "IVF has become as outpatient-friendly as we can make it. It's no big deal compared with a bikini wax." At one point during our conversation, she disappears to perform an egg-harvesting procedure on a patient. She leaves at 12.20pm and returns at 12.43pm. There can be side-effects - bloating, tiredness or nausea. "You might not feel your little black dress sits as comfortably as normal," says Lockwood.

One of Lockwood's "lifestyle" egg freezing patients, "Lucy" (not her real name) agrees - with some reluctance - to talk anonymously over the phone. Not, she says, because she is ashamed of what she has done, but because she is a "private person". Lucy, 40, a worker in the IT industry in the Midlands, is one of an estimated 100 British women who have had their eggs frozen because they eventually want a child but are not in a relationship. Her scenario is straight out of Dr Lockwood's casebook. At 28 she met the man with whom she thought she would have children. They never quite got round to it, and when she was 35, the relationship broke up unexpectedly. She decided to have her eggs frozen two years ago, at 38, after seeing television coverage of the Perry family. Now 12 of Lucy's eggs are stored at the Midland clinic. She admits that she does not know if they will ever be fertilized. "There is no guarantee I am going to meet somebody," she says, "I just think that if there are options available that can put you in a position where you have a choice, I'm all for it. I wanted the pressure taken off me because time was running out."

The procedure was harmless, she says, although her views on it seem mixed: "I can't even remember it now. It must be like childbirth - you forget about it as soon as you've got your baby. People are scared of the pain of giving birth, but it's something you just do. You put yourself in that position because the end result is what you want. I remember being at home for a couple of days, feeling uncomfortable and quite weak. But it was nothing, really." The likelihood of Lucy's efforts resulting in a live birth is small: "I can't remember the percentage they gave me, but I know it wasn't very high. It didn't bother me because I had no other choice." There are other issues, questions she can't answer. Will she meet a man within the 10-year storage limit? (Although she could apply for an extension past the age of 48, and even give birth after the menopause.) If not, does she go down the sperm donor route? Until what age is she prepared to wait? She just doesn't know.

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**I. Some people argue against egg freezing as a life-style. Others advocate this choice. Summarize the arguments of both sides. (40pts)**

**II. Develop a well-organized essay of two body paragraphs discussing your opinion about egg freezing. (60pts)**