

Ethics, legal, social, counselling

Spare embryos: 3000 reasons to rethink the significance of genetic relatedness



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Abstract

IVF laws in Victoria, Australia provide that human embryos must not remain in storage in excess of 5 years. Studies reviewing the fate of surplus human embryos reveal that close to 90% of couples choose to discard their excess embryos and that hundreds of embryos are disposed of annually. It has been argued that human embryos are a valuable resource and that there is a need to consider educational programmes to encourage couples to donate spare embryos to other infertile couples, rather than discard them. Surveys show that one reason that so few embryos are donated is that couples attach great significance to genetic parenthood. Advances in reproductive technology may necessitate a review of biological definitions of family and the importance of genetic relatedness. It can be argued that it is unreasonable to conclude that genetic ties are so significant that embryos should be discarded rather than donated and raised by non-genetically related parents. It is suggested that education programmes should encourage reflection on people's beliefs about the importance of genetic relatedness with regard to what makes a family. Open embryo donation or directed embryo donation programmes might cause couples to change their minds, or alleviate their anxiety about donating embryos to others.

Keywords: *embryo donation, genetic parenthood, human embryos*

Introduction

A routine consequence of many IVF procedures is that more embryos than patients can use for their own treatment are produced, and these are cryopreserved for future use. However, when couples with frozen embryos complete or discontinue IVF treatment, they face the decision of what to do with these embryos.

An exact picture of what happens to surplus embryos in Australia is hard to establish because these data are not collected by any central body, and because of the variation in state legislation or guidelines with regard to storage time limits for embryos. Australian publications that give data on the fate of surplus frozen embryos (Darlington and Matson, 1999; McMahon *et al.*, 2000; Kovacs *et al.*, 2003; Burton and Saunders, 2004) reveal that given the choice, very few people donate their unwanted embryos to others, preferring disposal or continued storage where possible. A third option became

available in January 2003 when Australian Federal legislation permitting embryo research, under some conditions, was enacted (Research Involving Human Embryos Act, 2002). Couples with surplus embryos (created prior to April 2002) can now also choose to donate these to research.

According to IVF laws in Victoria, Australia that came into effect on 1 January 1998, human embryos can remain in frozen storage for a maximum of 5 years (Infertility Treatment Act, 1995). Until recently, Victoria couples with surplus embryos reaching the legal storage limit faced only two options: (i) to have the embryos disposed of, or (ii) to donate them to another infertile couple. Prior to the legislative change of January 2003, studies reveal that more than 80% of Victoria couples chose to dispose of surplus embryos, while less than 10% donated these embryos to others (Oke *et al.*, 1998; Tinney *et al.*, 2002; Kovacs *et al.*, 2003). Whether the option of donating to research will affect the decisions of Victoria couples remains to be seen; however, surveys of couples intentions

outside of Victoria (McMahon *et al.*, 2003; Burton and Sanders, 2004) suggest a continuing preference for disposal or research over donation to others.

Why donate embryos to others?

In a recent paper reporting on the fate of surplus embryos, Kovacs *et al.* (2003) reveal that over the past 10 years, 3000 surplus embryos have been disposed of from their Melbourne clinic alone. Kovacs *et al.* (2003) and others (e.g. Savulescu, 2003) argue that surplus human embryos are a valuable resource and that couples should be encouraged to donate embryos to other infertile couples rather than discard them. He points out that the waiting time for donor embryos at their Melbourne clinic is on average 3 years, with 98 couples currently on the waiting list (Kovacs, 2003). Interestingly the US Department of Health and Human Services has recently released US\$1 million in grants to launch embryo-adoption public awareness campaigns (US Federal Register, 2002).

It is well known and documented that prolonged infertility (Powell, 1992; Sandelowski, 1993) and long donor embryos queues (Kelly, 2001) cause many couples to experience great anxiety and frustration. Kovacs is not alone in suggesting the cost-effectiveness of utilizing surplus human embryos. The advantages of frozen embryo transfers compared with repeat IVF stimulation, oocyte retrieval and embryo transfer cycle are well documented, and include reduced health risks and costs with a significant contribution to assisted reproduction birth rates. Van Voorhis estimates that frozen embryo cycles incur approximately one-quarter of the financial costs of repeat IVF cycles (Van Voorhis *et al.*, 1995). Interestingly, evidence suggests that human embryos can be safely cryopreserved and successfully thawed following up to 12 years (and possibly longer) of frozen storage (Revel, 2004). The legal requirement in Victoria that embryos be removed from storage after only 5 years is not based on the efficacy of long-term cryopreservation, but rather on concerns about the build-up of embryo banks and the possibility of hundreds of abandoned embryos (Szoke, 1999). The Kovacs paper confirms that this is a concern with his clinic reporting a 6-fold increase in the number of human embryos in frozen storage in 10 years.

Ironically, while assisted reproduction clinics around the world share similar problems with embryo bank build-ups and discard large numbers of embryos (Lornage *et al.*, 1995; Hounshell and Chetkowski, 1996; Yding Anderson *et al.*, 1996; Edward and Beard, 1997; Van Voorhis *et al.*, 1999), the European Society of Human Reproduction and Embryology reports that in many countries the supply of IVF services does not meet demand (ESHRE Capri Workshop, 2001). According to this report, the supply of IVF services is sufficient for less than one-third of couples with persistent infertility and standard indications for IVF. The authors reason that the insufficient level of supply of assisted reproduction services is due in part to the high cost of IVF services. They cite surveys of 24 countries which reveal that in 18 countries the cost of a single IVF cycle is more than 25% of GDP per capita and conclude that '[a]ccess to IVF/ICSI services is limited to the well-off in many countries...' (ESHRE, 2001, p. 1525). A recent report from the Bertarelli Foundation reiterates the conclusion that 'one of the most important barriers to access to infertility treatment is cost'; (Lunenfeld and Van Steirteghem, 2004).

Clearly, cost-effectiveness alone suggests the need to rethink the fate of surplus frozen embryos. Donating to others rather than disposing of some of the thousands of human embryos which become surplus around the world each year represents at least one opportunity to utilize valuable health resources.

Why are so few embryos donated?

Financial costs are not the only costs associated with the fate of frozen embryos. Decisions about what do to with surplus embryos are, for many couples, agonisingly difficult (McMahon *et al.*, 2000; Söderström-Antilla *et al.*, 2001; Tinney *et al.*, 2002). In one Victoria study, the failure of 30% of couples to respond to letters requiring a decision about surplus embryos has been attributed to their inability or unwillingness to make such a decision (Oke *et al.*, 1998). Several Victoria studies have surveyed couples to examine the factors that influence their decisions about the fate of their spare embryos (Oke *et al.*, 1998; Tinney *et al.*, 2001; Fuscaldo and Gillam, unpublished data). Among the reasons given by the vast majority of couples who decide to discard rather than donate their embryos to another couple, a number of responses reflect the notion that donating an embryo would be like giving away a child. Concerns were also expressed about the welfare of children raised in the absence of their genetic kin and the suitability of potential recipients. For many couples, problems associated with donor anonymity, such as the possibility of being contacted by a grown-up child, featured in the reasons given for deciding not to donate their spare embryos (Victoria IVF law requires that embryo and gamete donors provide identifying information, which is made available to children resulting from such donations, should they request this information, on turning 18 years of age; and the UK is about to implement the same principle from April 2005 onwards).

Assumptions about genetic parenthood

These surveys suggest that many couples equate donating an embryo with failing in their parental duties or harming a child that results from their donation; a view reiterated in the media (Canold, 1999; Arndt, 2002) and in academic criticism of gamete and embryo donation (Callahan, 1992; Benatar, 1999; Nelson, 2000). This reasoning is not surprising, given the social and historical norm that gives precedence to biological families and defines 'real' parents according to their genetic relationship with children. Although further studies are required to fully explore the attitudes of men and women making such decisions, it is clear that the decision not to donate embryos is often associated with assumptions about genetic parenthood. These assumptions, as revealed by the reasons couples give for choosing disposal rather than donation of spare embryos, include the following notions: (i) genes define parenthood, (ii) genetic parenthood generates special duties and (iii) genetic parents are best.

Challenging assumptions

We argue that it is time to re-visit these assumptions. While accepting that how people feel about their embryos is a personal matter, it is desirable to encourage reflection on what has until recently been taken for granted. Clearly, advances in reproductive technologies reflect the importance in society of

biological parenthood and genetic kinship, but the same technology has complicated understanding of what makes a parent and what ties families together. The advent of gamete and embryo donation and the possibility of separating genetic and social parenting necessitate a review of the significance attributed to genetic relatedness and suggest that strictly biological definitions of parental roles are abandoned. As evidenced in one surrogacy dispute, it is technically possible for more than six individuals to be the 'parents' of a child. In the 'Baby Jaycee' case, a child conceived following embryo donation and gestational surrogacy, the 'parents' include three different women, the gestational, genetic and intended social mothers and a genetic and an intended social father, neither of whom is necessarily a legal father (Vorzimmer *et al.*, 1998). A further complication, following the advent of mitochondrial transfers, is the possibility that a child can now have more than one genetic mother (Barritt *et al.*, 2001). Attempts to align parenthood with 'biological facts' may have made historical sense; however, it is no longer possible to discover who is a 'real parent' through a simple blood test (Alpern, 1992; Silver and Silver, 1998). As Ruth Macklin points out, competing claims, such as those between gestational surrogates and commissioning parents, are a matter for decision and not 'discovery' (Macklin, 1995).

Similarly, we argue that the genetic relationship that exists between donors and their embryos does not automatically entail that they, and they alone, have overriding claims over or duties for the embryos or children that result from their donations. The assumption that genetic relatedness gives rise to special obligations is based upon the problematic claim that progenitors acquire duties because they cause a child to exist (Nelson, 2000; Kolers and Bayne, 2001; Fuscaldo, 2005). However, even if this causal account of parenthood and the corollary view that genetic parenthood generates duties were accepted, it does not follow that only genetic parents can meet children's needs. It is argued that even if progenitors incur parenting duties, it is reasonable to share these duties or to transfer them to other willing and capable individuals (as opposed to Benatar's view, 1999). In the case of embryo donation, it is clear, given the long waiting lists, that such donations will bring into existence a child for whom there are many people willing, able and often desperately longing to take on parental responsibilities. In one dramatic example, on learning that British law required the destruction of more than 3000 embryos, 200 women from the Italian town of Massa requested a group prenatal 'adoption' to avoid what they referred to as mass infanticide (Demartis, 1998).

It is suggested that it is unreasonable to conclude that genetic ties are so significant that embryos should be discarded rather than donated and raised by non-genetically related parents. Certainly, many people derive great pleasure from shared family histories and attach profound meaning to their kinship and genetic heritage. However, there exist many different cultural groups where genetic relatedness is not the sole or most important determinant of what makes a family, for example where adoption, fosterage and surrogacy are not uncommon or where children are seen as a communal responsibility (Sault, 1998; Donner, 1999). Even in Western culture, the many successful experiences of couples who adopt or form blended families following divorce show that genetic ties are not the only ties that bind children and parents

(Bartholet, 1993; Cherlin, 1999; Amanto, 2000). In a recent paper, Ford and Morgan illustrate legal changes which reflect this cultural shift and acknowledge that '...what really matters about families is not genetic relationships, but bonds of care between people who may or may not be biologically related'. (Ford and Morgan, 2004).

In response to claims that it is wrong to create children who will be cut off from their genetic heritage, or that the welfare of children raised in the absence of their genetic kin is compromised, the evidence to date leaves room for doubt (Golombok *et al.*, 1996; Baetens and Brewaeyns, 2001; Brewaeyns, 2001, Baetens *et al.*, 2003). Moreover, the highly contentious claim that children raised by other than their biological parents are somehow harmed (Daly and Wilson, 1994; Galston, 1995; Strang, 1995) does not entail that this is *so* harmful that it is better to destroy embryos rather than donate them to other couples. Nor does it follow that nothing can be done to ameliorate any 'harms' associated with embryo donation. The point made is that even if 'blood is thicker than water', no harm is done when 'water is thick enough'.

Policy implications

Perhaps one of the problems with embryo donation as it is practised in many countries, where the majority of donations are made anonymously, is that this precludes the possibility of acknowledging both the genetic and social parents. Perhaps also, embryo donors would be less concerned with remaining anonymous if attempts were made to acknowledge that genetic parents are just one type of parent and genetic heritage only one way of understanding identity and history. The recent judgement in the case of an IVF mix-up reflects just such an acknowledgment. A black man whose spermatozoa were mistakenly used to fertilize the eggs of a white woman has been declared the legal and biological father of twins born to the woman. However, the twins remain in the custody of the woman and her husband, who is likely to succeed in his bid to become the twins' legally adoptive father (Lyal, 2003). Such a ruling acknowledges and accommodates the contributions of more than two parents.

In terms of attitudes and policies regarding surplus human embryos, it is suggested (as supported by preliminary research by Fuscaldo and Gillam) that open embryo donation or directed embryo donation (see for example Snowflakes Embryo Adoption Program) might ease some of the anxiety that couples feel about their potential genetic offspring. Such programmes permit negotiated levels of interaction between donors and recipients and acknowledge the contributions of both social and genetic parents. After all, there is no requirement that a child have two and only two parents. Such 'open' and 'directed donation' programmes might also alleviate some of the concerns expressed by couples in a position to donate about the future welfare of children born from their donations and reflect modern views on adoption where by mutual consent offspring and parent may eventually contact each other.

In his paper, Kovacs (Kovacs *et al.*, 2003) concludes that there is a need consider how to encourage couples to donate rather than discard their surplus embryos and proposes that educational programmes might facilitate this goal. It is

suggested that education programmes should encourage people to reflect on and review their beliefs about the importance of genetic relatedness with regard to what makes a family and who has duties to children. Further research is also required to ascertain what factors might cause couples to change their minds, or alleviate their concerns about donating spare embryos to others.

The fact that there are many family forms that meet the needs of children is not new. Despite the seemingly intractable nature/nurture debate, many children have flourished and continue to do so in non-traditional families. Advances in reproductive technologies have simply expanded the options for constructing families and raising children. It has been suggested that based on its current rate of decline, the traditional family could become extinct in the next 100 years (Salt, 2000). What shape families of the future will take is largely within society's control. If there is no necessity to regard genetic relatedness as significantly as is currently done, and given the long waiting lists, the pain of infertility, the reduced costs associated with utilizing surplus frozen embryos, and also that one can ameliorate the anxiety felt by those in a position to donate, then embryo donation should be encouraged in the same way that organ donation is currently promoted.

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References

- Alpern KD 1992 Genetic puzzles and stork stories: on the meaning and significance of having children. In: Alpern KD (ed.) *The Ethics of Reproductive Technology*. Oxford University Press, Oxford.
- Amanto PR 2000 The consequences of divorce for adults and children. *Journal of Marriage and the Family* **62**, 1269–1287.
- Arndt B 2002 In the name of the father. *The Age*, Dec 12, p. 4.
- Baetens P, Brewaeys A 2001 Lesbian couples requesting donor insemination: an update of the knowledge with regard to lesbian mother families. *Human Reproduction Update* **7**, 512–519.
- Baetens P, Camus M, Devroey P 2003 Counselling lesbian couples: requests for donor insemination on social grounds. *Reproductive BioMedicine Online* **6**, 75–83.
- Barritt JA, Brenner CA, Malter HE, Cohen J 2001 Mitochondria in human offspring derived from ooplasmic transplantation. *Human Reproduction* **16**, 513–516.
- Bartholet E 1993 *Family Bonds, Adoption and the Politics of Parenting*. Houghton Mifflin, Boston.
- Benatar D 1999 The unbearable lightness of bringing into being. *Journal of Applied Philosophy* **16**, 173–180.
- Brewaeys A 2001 Review: parent–child relationships and child development in donor insemination families. *Human Reproduction Update* **7**, 38–46.
- Burton PJ, Saunders K 2004 Patient attitudes to donation of embryos for research in Western Australia. *Medical Journal of Australia* **180**, 559–561.
- Callahan D 1992 Bioethics and fatherhood. *Utah Law Review* **3**, 735–746.
- Canold L 1999 Raising a brood of IVF commodities. *The Age*, Oct. 21, p.12.
- Cherlin AJ 1999 Going to extremes: family structure, children's well-being, and social science. *Demography*, **36**, 421–428.
- Daly M, Wilson M 1994 Some differential attributes of lethal assaults on small children by stepfathers versus genetic fathers. *Ethology and Sociobiology* **15**, 207–217.
- Darlington N, Matson P 1999 The fate of cryopreserved human embryos approaching their legal limit of storage within a West Australian in-vitro fertilization clinic. *Human Reproduction* **14**, 2343–2344.
- Demartis F 1998 Mass pre-embryos adoption. *Cambridge Quarterly of Healthcare Ethics* **7**, 101–103.
- Donner WW 1999 Sharing and compassion: fosterage in a Polynesian society. *Journal of Comparative Family Studies* **30**, 703–730.
- Edwards RG, Beard HK 1997 Destruction of cryopreserved embryos. *Human Reproduction* **12**, 3–11.
- ESHRE Capri Workshop Group 2001 Social determinants of human reproduction. *Human Reproduction* **16**, 1518–1526.
- Ford M, Morgan D 2004 Misconceived conceptions: Leeds Teaching Hospital NHS Trust v Mr & Mrs A & Others. *Journal of Medical Ethics* **30**, 478–479.
- Fuscaldo G 2005 Genetic ties: are they morally binding? *Bioethics*, in press.
- Galston W 1995 Public Morality and Public Policy: the case of children and family policy. *Santa Clara University Law Review* **36**.
- Golombok S, Brewaeys A, Cook R *et al.* 1996 The European study of assisted reproductive families: family functioning and child development. *Human Reproduction* **11**, 2324–2331.
- Hounshell CV, Chetkowski MD 1996 Donation of frozen embryos after in vitro fertilization is uncommon. *Fertility and Sterility* **66**, 837–838.
- Infertility Treatment Act 1995 Victoria, Act no. 63/1995, available from The Infertility Treatment Authority (ITA, the statutory body which administers Victoria's IVF legislation). URL: <http://www.ita.org.au/> [accessed 3 December 2004].
- Kelly J 2001 Anxious couples join in queue for donor embryos. *Herald Sun*, January 3, p. 1.
- Kolers A, Bayne T 2001 Are you my mommy? *Journal of Applied Philosophy* **18**, 273–285.
- Kovacs KT, Breheny S, Dear MJ 2003 Embryo donation at an Australian university in-vitro fertilisation clinic: issues and outcomes. *Medical Journal of Australia* **178**, 127–129.
- Lunenfeld B, Van Steirtegham 2004 Infertility in the third millennium: implications for the individual, family and society: Condensed Meeting Report from the Bertarelli Foundation's Second Global Conference. *Human Reproduction Update* **10**, 317–326.
- Lornage J, Chorier H, Boulieu D *et al.* 1995 Six year follow-up of cryopreserved human embryos. *Human Reproduction* **10**, 2610–2616.
- Lyall S 2003, British judge rules sperm donor is legal father in mix-up case. *New York Times International*, Feb. 27. Available from URL: <http://209.157.64.200/focus/f-news/853006/posts> [accessed 16 September 2004].
- Macklin R 1995 Artificial means of reproduction and our understanding of the family. In: Howell JH and Sale WF editors. *Life Choices: A Hastings Center Introduction to Bioethics*. Georgetown University Press, Washington, D.C., p. 294.
- McMahon CA, Gibson F, Cohen J *et al.* 2000 Mothers conceiving through in vitro fertilization: siblings, setbacks and embryo dilemmas after five years. *Reproductive Technology* **10**, 131–135.
- McMahon CA, Gibson FL, Leslie GI *et al.* 2003 Embryo donation for medical research: attitudes and concerns of potential donors. *Human Reproduction* **18**, 871–877.
- Nelson JL 2000 Reproductive ethics and the family. *New Zealand Journal of Bioethics* **1**, 4–10.
- Oke K, Hammerberg K, Blood J 1998 Frozen embryos – what decisions to make? *17th Annual Scientific Meeting of the Fertility Society of Australia*, Hobart, Australia (abstract p. 30).
- Powell S 1992 *When You Can't Have a Child: Personal Stories of Living Through Infertility and Childlessness*. Allen and Unwin, North Sydney.
- Research Involving Human Embryos Act 2002 (Cth), available from URL: www.scaleplus.law.gov.au [accessed 3 December 2004].

- Revel A 2004 Twin delivery following 12 years of human embryo cryopreservation: case report. *Human Reproduction* **19**, 328–329.
- Salt B 2000 as cited by Anne Crawford. The Australian nuclear family could be extinct by the end of the century. True. *The Age*, 7 August, p 1.
- Sandelowski M 1993 *With Child in Mind: Studies of the Personal Encounter with Infertility*. University of Pennsylvania Press, Philadelphia.
- Sault NL 1988 Many mothers, many fathers: the meaning of parenting around the world. *Santa Clara University Law Review* **36**, http://www.scu.edu/ethics/publications/other/lawreview/many_mothers.html [accessed 21 December 2004].
- Savulescu J 2003 The public interest in embryos and gametes. In: Gunning J, Szoke H (eds) *The Regulation of Assisted Reproductive Technology*. Ashgate, Hampshire, pp. 191–201.
- Silver LM, Silver SR 1998 Confused heritage and the absurdity of genetic ownership. *Harvard Journal of Law and Technology* **11**, 593–618.
- Snowflakes Embryo Adoption Program at <http://www.snowflakes.org/> [accessed 3 December 2004].
- Söderström-Anttila V, Foudila T, Ripatti UR, Sieberg R 2001 Embryo donation: outcome and attitudes among embryo donors and recipients. *Human Reproduction* **16**, 1120–1128.
- Strang H 1995 Child abuse homicides in Australia: incidence, circumstances, prevention and control. In: Chappell D, Egger S (eds) *Australian Violence: Contemporary Perspectives II*, Australian Institute of Criminology, Canberra.
- Szoke H, 1999 Cryopreserved embryos. *Human Reproduction* **14**, 1138–1139.
- Tinney L, Hammarberg K, Breheny S, Leeton L 2002 Deciding the fate of excess frozen embryos. *21st Annual Scientific Meeting of the Fertility Society of Australia*, Gold Coast, Australia (abstract p. 41).
- US Federal Register 2002, **67**, 48654–48660. Federal Register online: <http://www.tgci.com/fedrgrt/02-18826.txt> [accessed 21 December 2004].
- Van Voorhis BJ, Syrop CH, Allen BD *et al.* 1995 The efficacy and cost effectiveness of embryo cryopreservation compared with other assisted reproductive techniques. *Fertility and Sterility* **64**, 647–650.
- Van Voorhis BJ, Grinstead MD Sparks AE *et al.* 1999 Establishment of a successful donor embryo program: medical, ethical and policy issues. *Fertility and Sterility* **71**, 604–608.
- Vorzimer, AW, O'Hara, MD, Meyers, LS 1998 *Buzzanca v Buzzanca: the ruling and ramifications*. *Journal of Assisted Reproduction Law* **1**, 1 <http://www.inciid.org/article.php?cat=insurance101&id=17> [accessed 21 December 2004].
- Yding Andersen C, Westergaard LG, Grinsted J *et al.* 1996 Frozen embryos: too cold to touch? Frozen pre-embryos in Denmark. *Human Reproduction* **11**, 703–705.

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