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Abandonment and Accumulation:

Embryonic Futures in the United States and Ecuador

When frozen embryos are publically debated in the United States, they are most often positioned as having two possible future trajectories: (1) as individual humans and (2) as contributors to stem cell research. Long-term embryo accumulation threatens both of these futures. An accumulated embryo is stuck in a clinic, held back from having an individual future or from contributing to science. There are other kinds of futures, though. For some patients in the United States and Ecuador, where I conducted ethnographic research, future reckoning involves a vision of responsibility toward embryos embedded within a specific family. For these patients, frozen embryo donation to another family or to science constitutes abandonment. The future at stake is not that of an individual embryo's life, but a group's future who would abandon one of its own. These patients would rather destroy embryos than freeze them for a future away from their relations. [Ecuador, United States, in vitro fertilization, future]

Frozen embryos pose several problems in the early-21st-century United States, among them, the related problems of overaccumulation and the future. These problems escalated in 2003 when media outlets reported on a survey conducted by the American Society for Assisted Reproductive Technology that found that there were over 400,000 embryos frozen in cryopreservation tanks in the United States (Wade 2003). The news stories implied that there is a problematic (over)abundance of cryopreserved embryos, a sort of freezing frenzy.[1] Since then, media accounts have used the 400,000 frozen embryos to fuel ongoing national debates about life and biotechnology, debates that evoke different kinds of futures for these embryos (Babington 2006; Schorn 2006; Weiss 2003).

The problematic specter of future overaccumulation emerged yet again in late 2008 around the reportage of a Duke University survey of 1,020 patients from nine IVF clinics around the United States, who were asked about the future of their frozen embryos left over after IVF cycles (Lyerly et al. 2008). The authors of the study found that the majority of respondents, 54 percent, said they were very likely to use their frozen embryos for future attempts at pregnancy; 21 percent said they were very likely to donate them for research; 7 percent said they were very likely to donate them to another couple to have children; and 4 percent said they wanted their

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embryos "frozen forever." Although these respondents imagined various futures for their embryos, a full 20 percent said they were very likely to want their embryos discarded. These patients did not want their frozen embryos to come to future fruition at all, either as individual persons or as stem cells. They wanted them destroyed, although many specified they wanted this done "compassionately." The study authors sympathized with this sentiment toward compassionate destruction because of their own understanding of embryo excess. They used the word "excess" seven times and "accumulation" five times to describe frozen embryos, and they positioned their study as a call "to limit increasing the number of stored embryos" (Lyerly et al. 2008).

As a long-time observer of assisted reproductive technologies in both the United Sates and in Latin America, especially Ecuador, I am intrigued with how the Duke survey poses the problem of specific kinds of frozen embryo futures and the problem of excess, accumulated embryos. I came across a similar array of responses toward embryonic futures in the private IVF clinics in Ecuador where I have conducted ethnographic research since 2000.[2] In the short term, some Ecuadorian patients want their embryos to remain frozen for future attempts. Others want to donate their frozen embryos to other couples. And as with the U.S. respondents to the Duke study, a sizable minority of Ecuadorian patients (and practitioners), especially in the supposedly traditionally Catholic highlands, are more comfortable with embryo destruction than with accumulation through ongoing cryopreservation or with donation. For these patients, as with the 20 percent of patients in the Duke study, individual frozen embryos should have no future.

This wish to prevent embryonic futures diverges from more commonly imagined fates for these microscopic objects. In the United States, when frozen embryos are discussed and publically debated they are most often positioned as having two possible future trajectories, (1) as individual humans and (2) as contributors to stem cell research, understood as benefitting society at large. As I have written elsewhere, these two trajectories are partially produced through ongoing North American battles about abortion and euthanasia, what I call "life debates" (Roberts 2007). On the one side of these debates, right-to-life activists, evangelicals, and the Catholic Church call for the protection of embryos, fetuses, and the brain dead as innocent, human life. On the other side are pro-choice activists, feminists and right-to-die proponents, who champion patient autonomy, the individual right to life and death, and on-demand abortion (Ginsburg 1998; Kaufman 2005; Kaufman and Morgan 2005). Life frames the terms of these debates. To note William Roseberry, "life" is "the language of contention," "a common language or way of talking about social relationships that sets out the central terms around which and in terms of which contestation and struggle can occur" (Roseberry 1993:361). The contestation in this case centers on the life status of liminal entities, like the brain dead. Often elided are questions about the means of their production, the economic and technical resources required to sustain them, or their effects on the living.

Frozen embryos are now central to life debates. For many Evangelical Christians, the production of frozen embryos is left mostly unquestioned, but their disposal is problematic. Frozen embryos are "life." They should be brought to fruition as individual humans in the future—they should be donated to other families, a trajectory called for by right-to-life activists and conservative, free market politicians

like President George Bush. The Catholic Church is one of the few institutions that does criticize the production of frozen embryos. According to the Church, frozen embryos should not be produced at all—IVF is a "gravely evil act" because the process produces, then destroys, embryos. In other words, IVF is akin to abortion (Ratzinger 1987). In addition "The horror of spare embryos" has been deemed an affront to human dignity, "an abusive situation against those lives, which can be compared to therapeutic cruelty" (Zenit 2003).[3] Now however there are debates within the church about what should be done with these embryos. Some Catholic ethicists call for embryo donation for adoption despite their problematic creation (Zenit 2003).

Other participants in the life debates situate frozen embryos as "not life" and, for them, frozen embryos can be donated "to science," used in biotechnological research for a better societal future, and, not incidentally, wealth creation. As a participant in the Duke study, Jacqueline Betancourt explained why she donated her frozen embryos "to science," "We were just comfortable with the idea that they weren't going to be destroyed. We didn't see the point in destroying something that could be useful to science, to other people, to helping other people" (Grady 2008). Either way, "life" or "not life," something should be done with these entities. They should be allowed a future as an individual, or they should become scientifically and economically productive. They should not remain inert. Other kinds of futures or nonfutures become harder to think, then, within the contentious language of life debates in the United States, debates that have gone global to varying degrees.

There are other kinds of futures, though. In this article I analyze both U.S. media accounts of the 400,000 frozen embryos, and the Duke study, in juxtaposition with my ethnographic work in Ecuador to describe futures not fully shaped within the life debates that can seem so all encompassing. My ethnographic research in Ecuador suggests how to understand why some patients and practitioners in the United States want their embryos to have no future. For some IVF patients and practitioners in both nations, future reckoning involves a vision of relatededness and responsibility toward existing families and to the embryos that could become embedded within those families. The donation of frozen embryos to another family or to science, then, would constitute abandonment. Instead of "live" embryos, these patients have "related" embryos. Related embryos in the United States and Ecuador are not exactly the same however. In the United States, related embryos still tend to be individuals, although not autonomous individuals. In Ecuador, however, for participants with related embryos, the future at stake is not as much that of a related individual but the future of the group that would irresponsibly allow a family member to leave its bounds. For both Americans and Ecuadorians with related embryos, destruction is preferable to the external circulation of future individuals or the endlessly generative future potential of stem cells. And in both cases the patients and practitioners who destroy embryos withdraw at least temporarily from life debates and the bioscientific economies that produce them.

Frozen Embryos

Embryos have a history and a politics in each of the nations where they are produced in vitro. The embryo in North America and Europe has become synonymous with

early human life, partly because of the emergence of IVF itself. Currently in the United States embryos invoke human "life" in the popular and scientific imagination (Franklin and Roberts 2001), with recent controversies about stem cell research making that connection stronger (George and Tollefsen 2008; Herold 2006). This link allows IVF practitioners and patients to envision these externally manipulated cells as "babies," which is important given that the take-home baby rate with IVF is a relatively low 30 percent.

The embryo was not always caught up in life debates, though. Out of body, or in vitro, human embryos have been circulated in the United States along scientific pathways since the late 19th century and early 20th century during the formation of professional embryology. The majority, however, have been embryos expelled or extracted from women's bodies that were not understood within the framework of life or death (Morgan 2009). During this early period of embryology, the border zone between embryo and fetus remained indistinct, and embryos were made to speak to debates concerning race and the human–nonhuman divide, not to the question of life's beginnings as they are today (Morgan 2009). The development of in vitro fertilization in the 1970s produced a new object, the live, out-of-body embryo. The subsequent development of embryo cryopreservation in the 1980s allowed for the suspension and storage of these in vitro embryos. The fact that embryos can be frozen allows for their controlled future circulation. They cannot be legally sold anywhere, but their life potential can be activated if transplanted, and they can generate "transcendent value," for the nation or for humanity if they are used in stem cell research, which involves hopes of future profit as well (Franklin 2006).

Cryopreservation is used most commonly to harness, move, and store embryos left over after embryo transfer during an IVF cycle. Technically, IVF practitioners can extract anywhere from 1 to 40 eggs from a woman's follicles in a single cycle. These eggs are combined with sperm in a Petri dish in the hopes of fertilization. Not all of the eggs will fertilize, but often there are more embryos than can be transferred back into a patient's womb. With the right equipment and infrastructure, clinics can freeze these embryos, a process that takes about three to four hours. The biologist first gradually brings the embryos to a low temperature with liquid nitrogen. When the embryos are cold enough, the biologist puts the embryos in pipettes that are then stored in liquid nitrogen tanks, which can usually hold more than 20,000 embryos each. Fees for embryo storage vary by clinic, region, and nation, reflecting the cost of the tanks, liquid nitrogen, and monitoring, including alarms, tracking systems, and bookkeeping.

The *what* of what is frozen can also vary. The term *embryo* has, since the first half of the 20th century, generally meant the period between conception and eight weeks of gestation; however, the American College of Obstetrics and Gynecology (ACOG) currently uses the term *pre-embryo* in defining the early fertilized mass of cells. ACOG calls the one-celled entity formed at fertilization, a "zygote." From day 2 to day 15, the mass is called a "pre-embryo," divided into the stages of blastomere, morula, and blastocyst. After implantation, at day 15 or 16, when differentiation has passed the point of twinning, the cell mass is then called an "embryo" (ACOG 2004). ACOG's definitions of these multicelled masses do not prevent most of those involved in the IVF industry in the United States and Europe,

as well as elsewhere, from using the term *embryo* for any cell mass after fertilization. Thus, cryopreservation, which often takes place when the mass has reached 4 to 8 cells on day two or three, is generally understood as the freezing of embryos, not pre-embryos.

In many Western European nations, embryos are produced, stored, and circulated along well-documented legal and ethical pathways that are publically discussed and regulated. This has not been the case in the United Stated where the federal government has never sponsored a single grant for IVF research, and there are no federal regulations that directly pertain to the production and care of embryos in IVF clinics. In the early days of IVF, the late 1970s through 1980s, life debates about abortion and euthanasia effectively prevented the federal government from recognizing or regulating the industry, which ultimately allowed for the rapid expansion of the private, unregulated IVF industry (Marantz Henig 2003). Decades later, extra embryos, new objects created through the ubiquity of IVF, have become another actor in life debates that promise to keep research on embryonic stem cells in the private sector, less regulated than in nations like England and France.

The George W. Bush administration stood firmly on the prolife side of the life debates. His administration also supported "unregulated" markets. One of Bush's signature acts was to restrict federal funding to the research labs that used one of 65 already existent stem cell lines, ensuring "an enormous captive market for the handful of companies holding patents on viable stem cell lines" (Cooper 2008). The life debates that limited federal funding for stem cell research allowed laboratories without federal funding to use newly produced embryos for research and remain completely unregulated. In addition, the 2001 "legislative maneuver" (Cooper 2008) that extended patent law to stem cells facilitated the biotechnology revolution and directly encouraged embryo production within IVF clinics.

Although the Catholic Church consistently condemns IVF and the cryopreservation of embryos as against the dignity of their humanity, neither George Bush, nor right-to-life groups, called for the end of the enormously successful IVF industry and all it generates, including the extra embryos that provision the expansion of stem cell research capitalization. Instead, Bush supported "embryo adoption" from IVF clinics, what right-to-life groups in the United States call "orphanages," a strategy that simultaneously "protects" the life of the embryos and promotes the "free market" by leaving the IVF industry unregulated. This approach clearly diverges from Vatican policy but is in line with the economic rationality of many conservative Christians. Within this logic, stem cell research can have a regenerative future in the unregulated private sector, and frozen embryos can have a future life in the homes of individual, private, nuclear families. This stratagem, made possible by cryopreservation technology, allows for both the creation and protection of life and wealth.

Live Futures

Regardless of their position in the life debates, most North American and Western European IVF participants and commentators tend to assume that the transfer of an embryo to a woman's uterus activates the possibility of an individual. Campaigns for the protection of frozen embryonic life focus on individual embryo futures, a focus

that promotes their movement into nuclear families who want individual children. When President George W. Bush held a press conference in 2005 surrounded by children born from frozen embryo adoption, he emphasized embryo individuality by proclaiming "the children here today remind us that there is no such thing as a spare embryo. Every embryo is *unique* and genetically complete (Stolberg 2005). Social scientists of biotechnologies, especially of Western Europe and North America, make similar assumptions about the future individuality of embryos even if they do not agree with Bush's prolife politics. For instance the sociologist Melinda Cooper argues that "the whole point of reproductive medicine is to culture the fertilized egg cell to term—in other words to actualize its biological promise in the form of the *future individual* organism" (Cooper 2008; emphasis added). On either side of the life debate transferred embryos are assumed to be future individuals. The individuality of the embryonic life is its most salient feature. I found this presumption of individuality among many IVF practitioners and patients in Ecuador as well.

The first IVF clinics in Ecuador opened in the early 1990s. By 2002, there were nine active IVF clinics in Ecuador with more in the planning stages (a relatively high number for an extremely poor and rural nation of less than 12 million). In total, these nine clinics, all located in Quito and Guayaquil, Ecuador's two largest cities, conducted a total of roughly 350 to 400 IVF cycles a year. Throughout 2002–03, the period of my most intensive field research, the cost of an IVF cycle in Ecuador ran from $3,000 to $5,000 depending on the clinic, while in the United States the average cycle costs from $10,000 to $15,000, a difference that stems primarily from lower labor costs. Still, though, IVF is more expensive for Ecuadorians. The costs are relatively higher than in the United States, given average income and cost of living. When I began my research in Ecuador then, I assumed that I would encounter only middle- to upper-class patients in the clinics, similar to the United States where IVF is not covered by insurance. It was a surprise to find that Ecuadorian IVF patients were from more heterogeneous class backgrounds than those I met in my earlier U.S.-based research on IVF and surrogate motherhood. A sizable minority of Ecuadorian IVF patients, about 25 percent, were *de bajos recursos* (of low resources) and made less than $500 a month. Despite this heterogeneity, Ecuadorian patient approaches to frozen embryos were less determined by class than by region. How embryos' futures mattered depended on whether patients were from coastal Guayaquil or from sierran Quito.

I was also surprised to find that, given the Catholic Church's condemnation of IVF, the practice of IVF was in many ways less problematic than in the United States, where the introduction of technology and other parties to the naturalized, nuclear family often causes anxiety (Modell 1991; Strathern 2005; Thompson 2005). I eventually came to see that IVF was less of a problem in Ecuador, because in both regions, children are understood as produced through reciprocal material collaboration with family members, God, and saints. Adding doctors and technological mastery to this mix of relations enhances a child's and parents' relatedness, as well as proclaims their parents' ability to seek medical care in the private sector. Not all technological practice was greeted with the same enthusiasm across regions however. Practitioners in both regions were proud when they were able to offer cryopreservation. It indicated the advancement of their clinics. But while the technology solved problems for practitioners in Guayaquil, especially the problem of life, it caused new problems

for many practitioners in Quito, who were more concerned with the boundaries of family than with life.

Nearly all patients and practitioners in Guayaquileño clinics, near the coast of Ecuador, embraced the arrival of cryopreservation in 2002 with great enthusiasm, primarily because the practice solved the problem of life. The practice was described as "saving life." Guayaquil is Ecuador's largest and most commercial city, with a specific political and economic history of "free" labor organization that has produced more liberal practices of personhood, placing an emphasis on individuality (Clark 1998). Embryos in Guayaquil tend to be conceptualized as individuals whose future lives should be preserved. Dr. Castillo, a laboratory biologist at an IVF clinic in Guayaquil, told me how he and other clinic staff had struggled with the Catholic Church's condemnation of IVF. Dr. Castillo argued that cryopreservation was the best way to diffuse the church critique of embryo disposal. His claim ignored the fact that the Church condemns cryopreservation as well. Dr. Castillo explained, "I prefer to freeze embryos": *No están en el tacho al menos están en el tanque* [Better in the tank than the dustbin]. This statement, proverblike in its economy of expression, exemplified the stakes of his anxiety. Freezing preserves embryonic life. Several years earlier Dr. Castillo's clinic had begun a frozen embryo donation program where patients with frozen embryos could pass them on to other patients, another way to save embryonic life. These embryos were individuals. They were not tied to a particular family. They could be circulated through embryo donation, and as Dr. Castillo told me their lives could be "suspended for the future," as long as they were preserved.

In my discussion with Dr. Vega, the staff psychologist at Dr. Castillo's clinic, he emphasized that suspended temporality did nothing to affect the embryo's future.

> The church experts say it is considered a human life, the new cell, and the union of sperm with the egg. To avoid this controversy you can say to the church "look, we are freezing these embryos" and after ten years you can revive them and they continue being the same being. Nothing is lost. Nothing.

Dr. Vega emphasized how embryos remain the same being, even over ten years. The temporal suspension involved in freezing was not problematic because frozen embryos are live, almost autonomous individuals, not yet part of a family that might have moved through time without them.

Future life was also important for Eliana and Samuel, a middle-class couple from Guayaquil who had two-week-old triplets through IVF. Like Dr. Castillo, cryopreservation offered Eliana and Samuel a scientific way out of the dilemma of life as posed by the church. They agreed with the church that embryos are life, and as Samuel explained, "the science continues advancing . . . they, the scientists can give a future, with freezing, that used to be thrown out." This couple had undergone IVF right before the clinic began their cryopreservation program. Their IVF cycle resulted in six extra embryos, which Eliana wished they had been able to freeze because of her fear that something could have happened to the triplets in utero or shortly after birth:

> If the pregnancy fails or if they are born but fail, then there is the option of the other embryos that are frozen in the machine. I would have done it at least a year. I read that they can freeze [the embryos] with contracts for a year. Here are our children. They are frozen for the future.

Eliana and Samuel had wanted to donate their six extra embryos to another couple, but there were no patients who were physiologically synchronized to receive the embryos at the time. Freezing would have solved this problem. Dr. Castillo and Eliana and Samuel were intent on preserving the future lives of individual embryos. Their most salient characteristics were their individuality and their life. For patients who already could imagine circulating their embryos outward, cryopreservation and routine embryo donation represented the potential future of an individual child saved or insured. As Eliana explained, the embryos are "frozen for the future"

Related Futures

In Quiteño IVF clinics in the highlands of Ecuador, when it came to embryos there were often other kinds of futures at stake. Quiteño practices of personhood tend to valorize the specificity of particular familial collectives, which produce related embryos, rather than individual embryos, as well as emphasize a different future. Quito is a highland city, historically the seat of colonial government provisioned through a hierarchal, agrarian peasant economy, based on patron–client relations instead of the "free" circulation of labor as in Guayaquil (Clark 2002; Larson 2004). Personhood continues to be constituted relationally within family boundaries (Scrimshaw 1981; Verdesoto et al. 1995). Although many patients and practitioners welcomed the ability to cryopreserve embryos and save their future lives, others were much more anxious about the implications of this technology. They tended to want to throw out extra embryos to prevent the complicated, collective kinship trouble that frozen or donated embryos might entail. In this case the need to prevent the circulation of embryos outside of a particular family grouping loomed larger than the future "life" of an individual embryo. Patients were not sure what doctors would do with their embryos if they could not come back to reclaim them, explaining they did not know where the embryos would end up.

I met Vanessa as she was undergoing her first IVF cycle. She ended up having quadruplets on her third cycle. After her first IVF attempt, her doctors cryopreserved four of her extra embryos. If she got pregnant, Vanessa planned to donate these extras to another couple, because they were life and could help another woman. She didn't get pregnant, though, and the doctors implanted the four frozen embryos for her second IVF attempt, which also didn't work. Even after her quadruplets were born, on her third attempt, the past existence of those four frozen embryos continued to preoccupy Vanessa. When she had them implanted and they didn't take, her mother told her "It's for the best. It's from God I tell you that they are gone. You were very worried about the babies, the frozen ones." The fact that she had considered donating her embryos weighed on Vanessa. She told me if she had done it, it would have been like "abandoning" her child. "There won't be other children that are going to be mine and that someone else could have." Vanessa was like many IVF patients and practitioners I met in Quito, who found the clinical practice of

embryo cryopreservation deeply unsettling. Some rejected embryo cryopreservation from the outset; others like Vanessa, initially acceded to the process then changed their minds. For both these kinds of patients it was ultimately preferable to discard embryos than freeze them, given their concerns about the maintenance of family boundaries into the future.

Frequently God stepped in to prevent quandaries about related embryos. Several patients recounted similar experiences in which they had not wanted to freeze embryos and, fortunately, God blessed them with the amount of embryos that could be transferred, no more. For these patients, it was cryopreservation that God wished to avoid, not IVF. Unlike the God of North American Evangelicals, who cares about preserving individual, future lives, the God of many Catholic, Quiteño IVF patients cared more about the future of a family's boundaries. God helped Berta in protecting her related embryos by making sure there were no extra.

> With freezing I would have been left with my living children [she already had two older children] and my frozen ones there, and in five years the doctor would have discarded them. And I don't want to do this again. And I believe that God facilitated here, because only four embryos formed out of the six [eggs]. Two didn't form and they put the four inside me.

Berta's anxiety about freezing embryos had to do with the temporal suspension of particular embryos as children, in relation to herself and her living children moving through time without them. The frozen embryos would not keep pace. Their separation, produced through temporal suspension, made them a threat to the existent family. God prevented the temporal trouble of extra embryos.

Some IVF practitioners worried as well about the potential for disconnection between embryos and their families, couching this disconnect in terms of abandonment. In Dr. Hidalgo's clinic in Quito, Antonia, the biologist, told me that they had cryopreserved embryos only 23 times in the three years since they obtained the cryopreservation equipment. She advocated *suave* (soft) stimulations by using fewer ovarian stimulation drugs, so there were fewer embryos to freeze. She also routinely threw extra embryos in the trash. For Antonia, the desirability of fewer embryos did not stem from a worry that there is "divine punishment for what we are doing." What worried her was "the future of frozen embryos, because the parents here are frivolous and don't think about them responsibly." I asked her, "Why worry about them at all?" and she told me,

> Because the embryos are cells with future potential. They are going to be children. . . . And for this single reason, [the parents] who make the decision to freeze them and leave them have to be responsible about what happens to them.

Freezing embryos was not something Antonia took lightly. Her anxiety about the procedure arose not from individual embryo death but, instead, from the embryos' potential future abandonment by patients who had responsibilities to those embryos as parents. Frozen embryos signaled future related children that might be abandoned by a family, not current or future individual life that must be preserved.[4]

The future of related embryos in the highlands is tied to Ecuador's long-standing national whitening project, a 19th- and 20th-century response to what was understood as the degeneracy of racial mixture between colonial Spanish and native Indian (de la Cadena 2000; Larson 2004). Although mestizaje is often portrayed as a celebration of the mixture that made the nation, its underlying message regards the unquestioned progressive replacement of blacks and Indians and the unquestioned desirability of whiteness for the nation (Radcliffe and Westwood 1996). In Ecuador's highland IVF clinics this whiteness imperative shaped concerns about family boundaries, where embryo cryopreservation could lead to problematic mixtures. Dora, a Quiteña IVF patient, framed her uneasiness with frozen embryos in terms of the potential for racial confusion after the time lapse of cryopreservation.

> Imagine one year, two years that they maintain them. This gives me a bit of fear that they should endure all this time. It makes me a little afraid that they are going to confuse them when they put other embryos in me. Like what happened with that English woman that had a black child. Remember that? They say that the clinic confused the embryos. That makes me scared. It seems like a noble cause to give a hand to other people, to help, but no, I won't give them.

As for many Quiteños, for Dora, the temporal suspension of embryos threatened to breach the racial boundaries of her family, putting its future at peril.[5]

When patients and practitioners felt obliged to make sure their embryos stayed within certain racial and family boundaries, the technical practices that make up cryopreservation presented the potential for child abandonment, exemplified by Vanessa's explanation that God preferred the death of embryos to the abandonment of cryopreservation. Anxieties about frozen embryos involved a very specific temporality. Recall Dr. Vega's argument that frozen live, individual embryos remain the same being, even after long-term cryopreservation. In contrast, for patients and practitioners who cared more about embryonic relations than individual, embryonic life tended to worry about embryonic suspension through time as threatening disconnection from a family. An embryo circulated among strangers or frozen for ten years looks like abandonment of a family member. For these Ecuadorian patients and practitioners, embryos are connected to larger families. They exist amid a kin group with its own history, as well as race and class status to preserve, and for this reason their individual biographies need to be curtailed.

Some IVF participants in the United States similarly worry about the potential future of frozen embryos away from their families of origin, although these embryos are more individual in their relatedness than they are in Quito. North American press accounts have tended to focus on the potential future life of embryos; there is evidence in these same accounts of another approach to frozen embryos that also emphasizes connection to a family and prompts the destruction of embryos' futures. After Bush's call for embryo adoption, the *New York Times* ran an article entitled "It's Not So Easy to Adopt an Embryo" (Belluck 2005). It seems that, despite Bush's incitement-to-life and the existence of embryo adoption, few couples in the United States with frozen embryos actually donate their embryos to other couples, even if they were initially enthusiastic about the prospect. In the *New York Times* article,

couples explained that they are uncomfortable with having their genetic children raised by someone else, or with the possibility that a child born from donated embryos might wonder why they were not the embryos chosen to be raised by their "real" parents.[6] Patients in the Duke study voiced a similar concern. Kim Best had 14-year-old twins through IVF and nine embryos frozen in the clinic where she underwent her IVF cycle. She explained that the embryos had the potential to become beautiful people, so donating them for research seemed horrifying to her. "Destroying them would be preferable" (Grady 2008). Her teenage daughter thought she should donate them to another couple, but Best could not contemplate that either because she would not know "what kind of parents they were with or what kind of life they had." Her concern was not so much the boundaries of her family as a whole, but more her responsibility to future individual members of her family. She did not want her individual embryos to have a future away from her care or a future in a research lab, precisely because she is related to them.

The Duke study enumerated the discomfort some patients have with embryo donation. Of the patients they surveyed, 59% did not want to donate their embryos to other couples—"mostly because they did not want someone else bringing up their children, or did not want their own children to worry about encountering an unknown sibling some day." This future could involve a "some day" when siblings might unknowingly mix. Like the patients and practitioners I encountered in highland Ecuador, the Duke authors couched the long-term preservation of embryos in terms of "abandonment." In describing patient quandaries in the face of frozen embryos, the author argued: "In addition to reflecting patients' burdens, delayed decisions create difficulties for the providers who are responsible for safe storage or disposition of apparently *abandoned* embryos" (Lyerly et al. 2008).

And just as in the Ecuador highlands, "care" of related embryos could entail destruction. It's worth quoting at length the Duke author's summation of how parental responsibly correlates with embryo destruction.

> Few patients in this study were very likely to choose the option of reproductive donation, despite federal funding in support of reproductive donation programs and avoidance of the perceived moral pitfalls associated with embryo destruction. Only 7% of participants indicated that they are very likely to choose reproductive donation; in contrast 59% were very unlikely to choose this option. Our data help to explain the reluctance toward reproductive donation. The principal components analysis captured a domain that has previously not been measured, which we called "concerns for embryo, potential fetus, or child." Eight factors loaded on this domain; seven were thematically linked as fertility patients' expressions of "*parental" responsibility*—concern about or responsibility for the health or welfare of the embryo or the child it could become. [Lyerly et al. 2008]

Lyerly and colleagues found that even within the charged atmosphere of North American life debates, few IVF participants wanted their embryos to become connected to another family. Patients couched their concerns about this possibility in temporal terms of potential, or becoming. The authors found that

> parental responsibility towards this future individual child, towards its health and welfare took a somewhat surprising turn, not embryo preservation, but instead restricting embryo circulation through destruction. It is interesting that this broadly endorsed domain was negatively associated with reproductive donation and positively associated with options not resulting in a child, *including thawing and discarding and freezing embryos indefinitely*. These findings highlight the necessity of offering options that result in *embryo destruction*, or limiting the numbers of embryos created or cryopreserved by screening embryos for quality before freezing. Going forward, public policy discussions about embryo disposition practices should broaden their scope to incorporate patients' notions of *procreative responsibility*. [Lyerly et al. 2008, emphasis added]

The Duke authors call for recognition of a kind of responsibility that values familial connection to individual embryos outside the terms of the life debates. This procreative responsibility entails embryo destruction not the responsibility to ensure an embryo's future. The right kind of embryo future is imagined still as individual, although one that exists in relation to a specific family. Although highland Ecuadorian IVF participants who worried that the possession of frozen embryos could call into question the future of a family who would abandon one of its own to strangers, the North American patients worried about their responsibility to care for their related individual embryos into the future. In the United States, the reputed home of rugged individualism, individuals can also be related.

In Ecuador and the United States some of the differences between "individual embryos" and "related embryos" parallel Marilyn Strathern's discussion of the differences between contemporary bourgeois English personhood and personhood for the Hagen in Papua New Guinea. For many IVF participants in the United States and for some in Ecuador, both live embryos and related embryos tend to be individuals like the individual person as described by Strathern for English kinship, in which a baby is a new person that can exist outside its relations (Strathern 1992b). Life, though, makes these individual embryos more circulatable. They are not context dependent. These individual embryos could have a future in any home.

For North American IVF patients who have live but related embryos, circulation is not an appealing option. As in Quito, cryopreservation presents a problem for the North American patients and practitioners who are more concerned with an embryo's place in a family, not its transcendent value as life. Cryopreservation technology brought with it the possibility that the bounds of a particular family could be breached through abandonment. For many Quiteño IVF participants embryos are more embedded within a group than constituted as an individual. These embryos are not autonomous individuals in the bourgeois sense but one formed by its role and positionality in a family, as Strathern describes for New Guinea, where "persons embody their relationship with others" (Strathern 1992a). For these Ecuadorian patients, cryopreserved embryos were "unfinished business."[7] The trouble with cryopreservation is not life or death but the suspension and possible future abandonment and circulation that calls into question the bounds of a larger family grouping.

IVF seems to have fostered similar anxieties about the related status of frozen embryos throughout the world. In other words, life debates and the presumption

of individuality have not come to dominate everywhere, especially in non-Christian contexts. In some Muslim countries where "the right to life" from conception is not at issue, it appears that the maintenance of familial boundaries and familial futures is of great concern. Marcia Inhorn has described the reaction of an Egyptian Muslim couple confronted with extra embryos after traveling to undergo IVF in a Los Angeles clinic. Clinic staff gave the couple three options: freezing, destroying, or donation. The wife explained, "We said, 'destroy.' It is our religion." This couple feared that donation would "inevitably lead to an immoral and genealogically bewildering [and possibly incestuous] mixture of relations" (Inhorn 2003). These couple's embryos were related instead of alive, and their responsibility entailed destruction to prevent future incestuous mixture within a larger family (see also Clarke 2009 and Tremayne 2009 for a similar valuing of relations in reproductive technology in the Muslim world). The ethnographic record is filled with other sites where forms of relatedness, kin, and religion are more urgent than individual life in determining the uses of assisted reproductive technologies. In Israel, issues of Jewish nationalism and the life of women who birth the nation are prominent in shaping how IVF participates take up IVF and gamete donation (Birenbaum-Carmeli 2009; Ivry 2009; Kahn 2000; Nahman 2008; Teman 2010). Anthropologists have also documented how in Vietnam (Pashigian 2009), India (Bharadwaj 2005), and China (Handwerker 1995) IVF participants have concerns about relatedness, lineage, and the nation that loom larger than individual life.

An investment in relatedness more than life might be expected in Jewish, Muslim, Hindu, Buddhist, and Shinto contexts, but despite Christian calls to life, it's also apparent that in the United States and Ecuador, Christianity does not predict an automatic engagement with life debates either. In Ecuador and the United States there are many IVF participants whose embryos are related, instead of live. In Ecuador all of the practitioners and patients I encountered with related embryos were Catholic.[8] And although the Duke study did not correlate religion to response about embryo destruction, we can assume that many of these respondents were Christian, given that 81 percent of the 1,020 Duke survey respondents were Christian—Protestant (29 percent), Catholic (24 percent), other Christian (18 percent), and fundamentalist (10 percent).[9] Apparently, some Christians in both nations have more pressing concerns about their relations (whether individual or not) than the life status of liminal beings.

IVF clinics produce surplus embryos that fuel political, social, and economic debates about the right kind of future. Where life debates are at play, embryos positioned within them tend to be individuals whose lives should be preserved for the future or individual organisms with biological potential to harness. Freezing secures these futures. The capacity to store embryos through time is one of the attributes that makes cryopreservation so appealing for IVF participants who embryos are live or can be used as research material that promises a better future. But the future is not always filled with autonomous individuals. Sometimes what matters is the future of related individuals or a larger kin group, and in these cases the future of these relations and the larger family group can be secured through responsible embryo destruction. For IVF participants in the United States and Ecuador with related embryos, temporal embryonic suspension is exactly what makes cryopreservation so disturbing.

Frozen Assets

Most U.S. media reports assume that our national cache of 400,000 frozen embryos is inherently troubling, conveying a palpable sense of what Charis Thompson calls a "crisis of stockpiling" (Thompson 2005). The troubles these embryos bring partially emerge from the U.S. "life debates" about abortion and euthanasia. Leftover frozen embryos can produce individual futures and life possibilities if they are "adopted" or a future of greater social good if they are used in stem cell research—either autonomous individuals that can be freely moved to another family or entities that can be put to use within an unregulated "free" market. Long-term preservation threatens both these futures.

In Ecuador, the patients with related embryos found cryopreservation deeply troubling and sought to prevent it in the first place or to destroy frozen embryos. Cryopreservation provided too many opportunities over time for embryos to leave a particular family. Likewise some practitioners were disturbed by what cryopreservation could do to specific embryos in relation to specific families. Other practitioners, mostly gathered on the coast, who championed cryopreservation as a means to save individual life, had other more "general" concerns about cryopreservation. They were not concerned with the fate of specific embryos but instead with the long-term mass accumulation of embryos. In 2003, Dr. Castillo, in Guayaquil, was excited about his new cryopreservation equipment that could now save embryonic life in the abstract, not in the particular, but he was also worried about the problem of too many frozen embryos:

> We were all talking the other day about how they are going to accumulate. We have recently begun [freezing] these embryos. If a patient is pregnant, then those [frozen] embryos are going to stay here for a year. You have to see what patients want, afterwards if they don't want them, then . . .

Dr. Castillo trailed off. Embryos are life. He didn't want to dispose of them, but he did not want to accumulate a stockpile of embryos either. Dr. Castillo's clinic had recently signed an agreement with an IVF clinic in Miami that would allow them to send embryos to a cryopreservation bank where they would become available for donation in the United States. His plan was to encourage couples to make a decision after a year to donate their frozen embryos to this program. Embryos were future lives that should be passed on and put to use, not accumulated. Their circulation outward would give these embryos a future as North American children.

Dr. Lucero, an IVF practitioner in Quito with an entrepreneurial zeal, was even more unsettled by the fate of embryos suspended in perpetuity. Dr. Lucero was one of the few Quiteño doctors completely in favor of cryopreservation. He was also unusual for most Ecuadorians, costal or highland, in that he saw scientific research as a legitimate future for embryos. According to Dr. Lucero, long-term cryopreservation could create a bottleneck on the free flow of embryos, which he compared to storing a bicycle for friend but not being able to use it.

> What if you have a bicycle and you left it with me at my house because you are going to go back to your country. You say to me "I will come back in

> three years. Please guard it. But you can't use it." And I have space. But soon my son grows up and he wants a bicycle and your bicycle is here using my space. And it's been five years and you haven't come back. And I don't know anything about you, no telephone number. Nothing. And it's Christmas and I give my poor child the bicycle. I believe I did the right thing, because who knows after all that time. This is what they call ethics in fertility medicine. A percentage should be dedicated for science, to do things with. To look for better ways, for couples that have genetic problems. And another percentage [of frozen embryos] would go to couples who would accept embryos because the embryos don't have a genetic burden. I don't like to hear about throwing out embryos. It gives me bad dreams. After five years the couple should decide what they want, for science, for donation or, [he hesitates] maybe, to throw them out. Many people here say it's they don't want to store them. They would rather have a multiple pregnancy. I will put in three and throw out one. But this is not good, because you could put in three and guard one for another interest later.

Dr. Lucero was a proponent of cryopreservation because it allowed embryos to be circulated for other "interests"—other couples or scientific research, but not for too long. His bad dreams were more about the general waste of potential life or research material, not about the destruction of human life. In fact embryo destruction was ultimately more palatable than suspension in long-term storage.

Lucero's plans for putting embryos to work reverberate with New Testament industriousness. His bicycle story was similar to the good servants in Jesus' Parable of the Talents. These servants invest their money outward into the world and make a good return. The wicked servant buries his money in the fields. In essence he freezes assets.[10] Practitioners and patients who might leave embryos frozen forever might not be wicked, but they thwart exchange by preventing embryos from becoming new people or from becoming material for the greater public good and the greater market.[11] In Lucero's schema the destinies of accumulated embryos are even more threatening than embryos that end up in the trash. Cryopreservation, the temporal suspension of embryos, allows for the harnessing of that potential, but long-term suspension puts either future on hold.

Frozen embryo accumulation was also a problem for many patients in the Duke study, as well as for the study authors. The authors conclude that without consistent clinical policies concerning frozen embryos

> the result is delayed decision making, the *accumulation* of excess embryos, and burdens for patients and providers alike . . . To *limit increasing numbers of stored embryos*, clinicians and policy makers should work to ensure that patients have access to a breadth of options, including research, reproductive donation, and alternative methods of thawing and discarding. [Lyerly et al. 2008]

The authors argue that developing protocols for "considerate" disposal would "reduce the numbers of embryos in storage and help to advance biomedical science, but also may facilitate disposition decisions that are *morally acceptable* to the

majority of fertility patients" (George and Tollefsen 2008; Lyerly et al. 2008). The Duke study found that only 4 percent of respondents wanted their embryos "frozen forever." Most patients evoked the phrase "frozen forever" to signify their fear of this particular kind of stalled future.

The author's call is a plea for circulation or destruction instead of accumulation, with benefits on two fronts—for the advancement of biomedical science and for morality. The novelty of the Duke study is that the authors expanded the domain of morality to include a form of parental care that destroys potential offspring for those "moved by the particular and intimate sense of responsibility" toward "allowing their embryos to become children." In other words, while wanting to prevent the indeterminate accumulation of frozen embryos the authors could envision halting circulation through destruction. In effect, no one seems happy about the long-term cryopreservation of embryos, neither participants with related embryos, nor IVF participants who find cryopreservation beneficial for science or life. For some, cryopreservation in itself, and the long-term accumulation of a family's particular embryos, disturbs related futures. But the "intrinsic" problem of embryo accumulation is most obviously connected to those who engage embryos in life debates. An accumulated, suspended embryo is stuck, held back from having an individual future life or from contributing to a larger societal benefit for the future, as well as from the generation of wealth.

Coda

The conservative legal theorist Robert P. George and philosopher Christopher Tollefson begin their much publicized, 2008 manifesto *Embryo: A Defense of Human Life* with a biblical evocation of the flood; a story of destruction and new life (George and Tollefsen 2008). They tell the tale of Noah Benton Markham, "one of the youngest New Orleans residents to be saved" after Katrina in 2006. At the moment of his rescue Noah resided in an embryo cryopreservation tank.

> Trapped in a flooded hospital in New Orleans, Noah depended upon the timely work of seven Illinois conservation Police officers, and three Louisiana State officers who used a flat-bottomed boat to rescue Noah and take him to safety. [George and Tollefsen 2008]

Although George and Tollefson mention in passing the many New Orleans residents who, "tragically lost their lives during Katrina," their account ignores the sickening discrepancies of race and class that determined who was abandoned and died, and who was saved in New Orleans posthurricane. The resources that went into first producing then rescuing the future, individual life of the embryo-turned-Noah were simply not available to the majority of the born, New Orleans's poor and black residents. Their futures were less worthy than Noah and the other 1,400 embryos, preserved in Katrina's wake.

These differently weighted and resourced futures mirror those described by Anne Lovell (this issue) in the rallying of Charity Hospital Babies to save the city's public hospital where so many of New Orleans's black and poor babies were born throughout the 20th century. Post-Katrina, the city shut down the hospital to make

way for a new research hospital and bioscience corridor. The mainstream press linked Charity Hospital to dependent welfare mothers and the unworthy indigent, and it valorized the biotech corridor promoting a vision of certain kinds of worthy futures, where resources are expended on entities like frozen embryos. In response, the Charity Hospital Babies demanded that their future be taken into account in the reconstruction of the city. They put up "resistance against redesigning the city as white, middle-class space (this issue). Their origins put them at a disadvantage, though, because as babies born in a charity hospital their lives and their futures were less resourced than babies who began life as formerly frozen embryos.

In the United States and in Ecuador, IVF participants and participants in life debates are deeply concerned about embryos. The stakes are high and meaningful (debates about human life, societal benefit, profit, responsibility, and familial connection) and have material effects. Nevertheless, the effects of life debates and embryo anxieties obscure other material realities. The media coverage surrounding the freezing frenzy of these tiny entities primarily addresses specific kinds of people in both the United States and Ecuador, people with more favored futures. In both locales frozen embryos are produced in private clinics that are unregulated by state institutions. If they are brought to human fruition they come into being as privileged children, not charity hospital babies, and like state of the art biotech facilities, they "promise" a more worthy future.

Life debates can shut down avenues for thinking differently about why so much energy and resources are spent on embryos. Looking at other approaches toward embryos, for instance at the patients who emphasize related futures and responsible embryo destruction, can provide a way out of the language of life. It's not that the IVF participants, who seek embryo destruction, are any more critical of unequal resource distribution than participants in the life debates. In fact their relational boundaries can be more closed to the external world or a sense of the "greater public good" than those involved in life debates. They don't want their embryos to interact with strangers. It's noteworthy, though, that these patients would be unlikely to send out rescue boats to save the future, individual lives of their embryos. Their nonparticipation in life debates allows for reflection on the kinds of futures that the debates themselves promulgate—futures that marshal resources on behalf of individual unborn embryos or privatized embryo research. The dominant focus on both trajectories allow little room for the babies and adults who will never have access to the kinds of future bestowed on these problematic, yet private and privileged, frozen embryos.

Notes

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Scheper-Hughes pushed me to think more carefully about what embryos mean and the kinds of resources they require. I remain grateful for her prodding.

1. The media coverage about the survey contrasted the number 400,000 with the frozen embryo holdings of various European nations, whose IVF industries are regulated by state ministries (Wade 2003). For example, Britain's clinics were estimated to have 52,000.According to the press reports, this numerical difference is the by-product of a more strictly regulated IVF industry in Western Europe, than in the United States. The media accounts did not mention overall population differences between the United States and countries in Western Europe that could partially account for differences in the quantity of frozen embryos. With a population of roughly 300 million in the United States, there is approximately one frozen embryo for every 750 people. In the United Kingdom, with a population of 60 million, the ratio is 1 : 1150, and in Spain with a population of 40 million, the ratio is 1 : 1000, making the absolute differences less stark.

2. In 2002–03, I carried out a year of ethnographic research in seven of Ecuador's nine private IVF clinics. My observations mainly took place in the IVF clinics themselves, watching and talking with practitioners and patients in waiting rooms, laboratories, operating rooms, and patients recovery rooms. In addition I conducted over 130 formal interviews for the project with female infertility patients, their male partners, IVF practitioners, physicians, laboratory biologists, and staff at IVF clinics, egg and sperm donors, surrogate mothers, local Catholic priests, lawyers, and bioethicists. For an expanded discussion of my findings see Roberts (2006, 2008, 2009).

3. See Roberts (2006) for an extended discussion of the relationship of embryos to call for human dignity.

4. Practitioners in both cities would tell me if patients left embryos with them over the long term without paying; they wouldn't discard them, but the Quiteño practitioners were much more uncomfortable with this prospect.

5. Quiteño patient concerns about the potential for uncontrolled embryonic racial mixings mirrored their concerns about egg donation. When doctors recommended egg donation, patients in the sierra tended to want to use known familial donors because they were worried about the provenence of the donor. Patients in Guayaquil were much more comfortable with paid anonymous donation (Roberts 2008).

6. The *Times* did not mention that the Federal Food and Drug administration made it difficult to donate embryos before its requirement for extensive testing of gamete providers was established (Lyerly et al. 2008).

7. Thanks to Gay Becker for this term.

8. See (Roberts 2010) for further discussion of the complexity of Catholic practice in Ecuador.

9. The rest of the respondents gave their religion as Muslim (1 percent), Jewish (4 percent), other (5 percent), and none (17 percent).

10. For an alternate analysis of the parable of the talents see Herzog (1994). He argues that by burying his money the "wicked" servant is actually preventing his master from colleting interest on his labor.

11. Local "life" rhetoric in Latin America surrounding embryos is entangled with global debates around "free trade," which are especially heated in the Andes. Concerns about free circulation and free trade deepened during my periods of concentrated fieldwork as Ecuadorians were intensively following the ALCA talks and anti-ALCA demonstrations that shut down the cities. Patients I met were directly affected by these policy changes when, for instance, they had their livelihood wiped out by the opening of the Ecuadorian textile market to China.

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