

Elective Oocyte Cryopreservation: The rights and obligations of women,
employers, insurance companies and the government.

A THESIS
SUBMITTED TO THE FACULTY OF
UNIVERSITY OF MINNESOTA
BY

Christopher Barbey

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF ARTS

Leigh Turner

August 2016

Acknowledgements

I would like to thank the Center for Bioethics Faculty and Staff for their support throughout the years I spent as a student at the University of Minnesota. In particular, I should mention Leigh Turner, Joan Liaschenko and Dianne Bartels. Also, I thank Aditya Karandikar and Anne Friedrich for their assistance with the content analysis in Chapter 4. Equally important are my parents, who gave me encouragement and allowed me to live with them as I completed this document.

Dedication

This thesis is dedicated to my friends.

Abstract

Oocyte cryopreservation, or “egg freezing,” is the practice of preserving unfertilized oocytes for later fertilization. This practice allows women to extend their reproductive years. In 2014, Facebook and Apple announced that they would begin to subsidize their female employees’ elective use of oocyte cryopreservation technology to more easily reconcile the demands of career and family life. This announcement prompted public controversy and moral debate. Responding to a bioethics & lay literature that is often vague about concrete recommendations, I explore the nature of the benefits and risks of elective oocyte cryopreservation, and specify the rights and obligations of women, insurance companies, employers and the government regarding access to elective oocyte cryopreservation. I also evaluate, through a summative content analysis, the ways in which oocyte cryopreservation is marketed to women. Following this, I argue that there is no compelling moral reason for the state to mandate insurance coverage of this use of the technology. I also argue that more substantial maternity and paternity leave privileges are better equipped to provide many of the social benefits that elective oocyte cryopreservation is alleged to provide. I conclude that it is permissible to offer elective oocyte cryopreservation in the market and through employee health benefits so long as women also have access to counseling and reasonable maternity leave benefits.

Table of Contents

List of Tables.....	vi
List of Figures.....	vii
1. Elective Oocyte Cryopreservation in Scientific and Social Context.....	1
a. The Procedure Itself.....	2
b. Scientific and Social Antecedents to Elective Use.....	6
i. The Development of Vitrification.....	9
ii. The Evolving Perspectives of Professional Societies.....	10
2. Literature Review.....	13
3. Normative Analysis.....	19
a. Autonomy.....	24
b. Justice.....	30
c. Beneficence and Non-maleficence.....	33
4. Persuasive Advertising of Elective Oocyte Cryopreservation.....	38
a. Content Analysis Background.....	40
b. Empirical Method.....	42
c. Findings.....	44
d. Discussion: Analysis of the ethics of persuasive advertising.....	54
5. Conclusion.....	57
a. Recommendations for Policy.....	65
i. A Negative Right to Access Elective Oocyte Cryopreservation.....	66

ii.	Against a Positive Right to Access Oocyte Cryopreservation.....	70
iii.	Allowing Access to Oocyte Cryopreservation Together with Enhanced Parental Leave Privileges.....	72
6.	Bibliography.....	76

List of Tables

i. Table 1: Code Descriptions.....	46
------------------------------------	----

List of Figures

i. Figure 1: Code Frequencies.....	45
------------------------------------	----

Elective Oocyte Cryopreservation in Scientific and Social Context

Late in 2014, two Silicon Valley giants, Facebook and Apple, announced that they would subsidize their female employees' use of elective oocyte cryopreservation as part of their employee benefits package. This will enable female employees to electively postpone childbearing, and to do so virtually indefinitely. This announcement generated public controversy about the ethical permissibility of this use of the technology. Although this use of oocyte cryopreservation may bring great social benefits to individual women by relieving pressure to have a child before the biological clock times out and by—according to some—eliminating the difficult choice between career and family, a flurry of magazine and newspaper articles decried the move for reinforcing sexist, careerist values and for not meaningfully increasing women's reproductive autonomy (Good & Savulescu, 2009; Harwood, 2009).

Such public controversies typically attend developments in reproductive technology. Even though such technologies are often routinized quickly, normalization is not ethical justification and skepticism is warranted. When life's essential functions are concerned, it is never foolish to anticipate and consider moral and social consequences of new uses for biotechnology. In this thesis I aim to provide a more balanced analysis of the frequently polemic perspectives on elective oocyte cryopreservation in the popular media and academic discourse. Following that, I provide recommendations for policy.

The Procedure Itself

Before beginning a normative examination of the elective use of oocyte cryopreservation, it is crucial to gain a comprehensive understanding of the historical and scientific context of elective oocyte cryopreservation. Oocyte cryopreservation is a highly technological approach to conception. The act of “freezing” is just one small step in a much larger and more complex process. Practically speaking, oocyte cryopreservation involves five steps: an IVF cycle, vitrification, thawing, intra-cytoplasmic sperm injection and embryo transfer. It is a long procedure that requires women to be willing to undergo multiple invasive procedures over the course of weeks and to spend thousands of dollars. Below I outline each step of the process.

Every woman seeking to preserve her oocytes for later fertilization must first undergo a 4 to 6 week IVF cycle. This is the process by which her oocytes are extracted. During the cycle, she is subject to hormone therapy that suppresses the natural menstrual cycle and subsequently incites her ovaries to over-produce mature oocytes, releasing more than the typical single one over the course of the month. The overproduction of oocytes increases the likelihood of conception since there is no guarantee that each oocyte will be successfully frozen, thawed, fertilized or gestated.

The first phase of the IVF cycle, which lasts two to four weeks, begins with the oral administration of contraceptives to suppress ovulation and ends with a daily injection of Lupron. After 8 to 12 days of Lupron injections, ovulation is triggered through the administration of a human chorionic gonadotropin injection. Within two days after this

injection, mature oocytes are retrieved via a laparoscopic procedure (USC Fertility, 2016; Dellenbach, Nisand, Moreau, Feger, Plumere, Gerlinger, Brun & Rumpler, 1984).

Once retrieved, the oocytes are vitrified. This process was first described by Kuwayama (2005) and validated by Cobo et al. in 2008. In the vitrification process oocytes are bathed in a medium containing ethylene glycol and dimethyl sulfoxide (DMSO), then they are frozen using liquid nitrogen and maintained at that temperature until they are warmed for use. After warming, the oocyte is fertilized *in vitro* via intracytoplasmic sperm injection (ICSI) (Cobo, Domingo, Perez, Crespo, Remohí & Pellicer, 2008; Bolt, 2011). After injection, the embryos are monitored under a microscope for proper development and transferred to the woman's uterus after 2 to 3 days.

The embryo transfer process consists of a “minor” clinical procedure not requiring anesthesia by which the 2 to 3 day old embryo is placed inside the uterus. This procedure may be accompanied with hormone replacement therapy to create an “implantation window” during which time the embryo can successfully implant, allowing the pregnancy to continue normally. Hormone therapy typically lasts until the end of the first trimester of pregnancy.

The scientific data about the efficacy of oocyte cryopreservation, and the likelihood of bearing a child as a result of the procedure are difficult to interpret. What makes them difficult to interpret is that there are an enormously large number of possible outcome measures for scientists to use to describe the efficacy of the procedure. For instance, one might report clinical pregnancy rate (i.e. the rate of pregnancies that progress to the stage at which the fetus can be viewed via ultrasound), pregnancy rate,

implantation rate, fertilization rate, or live birth rate. And one can report each of these per frozen oocyte, per thawed oocyte, per embryo transfer or per egg retrieval. Each of these measures has its uses, but the wealth of possibilities makes analyzing oocyte cryopreservation from a normative perspective quite difficult because scientists' inconsistency makes it very hard to get a broad view of the data.

To add to the challenge of interpreting empirical data, the most “common sense” measure of efficacy for oocyte cryopreservation is not reported *anywhere* in the data. I think that most women, when considering whether or not they should freeze their eggs would want to ask “If I walked into the clinic tomorrow and went through one whole IVF cycle, how likely would I be to have a kid, years down the road, when I’m ready?” If they looked to the literature they would find no straightforward answer because no papers on this topic report the live birth rate per egg retrieval. Moreover, most studies are plagued by design limitations that are not immediately evident. For example, many studies use small samples and some systematically sampled for poorer quality oocytes (American Society for Reproductive Medicine [ASRM], 2013).

Though much about oocyte cryopreservation is unclear, some conclusions are uncontroversial. One important finding is that success rate varies greatly between women—a phenomenon also observed in IVF with fresh oocytes. Some women are poor responders to IVF whereas others are not. The age at which the oocytes are retrieved also has been shown to influence the likelihood of success. Studies of the “poor responder” phenomenon in standard IVF reveal that poor responders can expect a pregnancy rate of 14.8% and normal responders 34.5% with fresh oocytes (Oudendijk, Yarde, Eijkemans,

Broekmans & Broer, 2012). This difference is driven principally the age at which the oocytes are extracted though it may further vary by clinic and other biological factors. The relationship between age at oocyte extraction and birth rate post-thawing is thought to result from the correlation between increasing maternal age and decreasing oocyte quality (Oudendijk et al., 2012).

In recent years, meta-analyses of the published work on oocyte cryopreservation have helped to clarify some aspects of the picture for scientists, but perhaps not for women seeking the service. Although there is still contradictory data and uncertainty originating from less-than-ideal study design, the outlook for oocyte vitrification is on balance positive. One important point from this research is that vitrification is far superior to slow-cooling and that most studies show vitrified oocytes have similar pregnancy outcomes as fresh oocytes. As Paramanatham et al. (2015) conclude, “Current literature suggests that vitrified oocytes produce superior IVF results to slow-frozen oocytes and may yield comparable outcomes to IVF with fresh oocytes in certain patient populations.”

In spite of the fact that researchers do not report live birth rate per egg retrieval, there is good reason to suspect that the live birth rate per egg retrieval with vitrified oocytes is similar to the live birth rate with normal IVF. Studies reporting with metrics other than live birth rate per retrieval show that IVF with vitrified oocytes is equal to IVF with fresh oocytes. Cobo et al. (2010) report in *Human Reproduction Update* that they found no significant difference in fertilization, implantation or pregnancy rate in a study of IVF comparing fresh with vitrified oocytes. For the sake of the normative argument to

follow, it is reasonable to assume that, 31.6% (what the ASRM advises is the per retrieval rate of live birth for IVF) of women will reach a live birth after going through one egg retrieval, and freeze/thaw cycle.

Scientific and Social Antecedents to Elective Use of Oocyte Cryopreservation

The history preceding the elective use of oocyte cryopreservation by individual women and its incorporation into employee benefits reaches far back in time. The ability to preserve a human oocyte is virtually useless without *in vitro* fertilization (IVF) and one can trace the beginnings of IVF at least as far back as the 1890s when scientists achieved pregnancies in small mammals from ova transferred from one animal to another (Edwards, 1996). While it took approximately eighty years for this animal-based research to find its way to medical practice on humans (with the birth of the first IVF baby, Joy Louise Brown, in 1978) it only took about eight years before IVF was supplemented with oocyte cryopreservation. In 1986, an Australian doctor, Christopher Chen, reported the first pregnancy and birth with a thawed ovum (Chen, 1986).

Although IVF is now a common and largely uncontroversial infertility treatment, in its early days, critics of IVF expressed concerns about the risks that the technology posed to the potential mother and her children, and its relatively low efficacy, which resulted in pregnancies less than 25% of the time (Cohen, Trounson, Dawson, Jones, Hazekamp, Nygran & Hamberger, 2005). Those coming from a religious perspective decried the practice because it entails creating a surplus of embryos that are never

implanted and never become children (Gurmankin, 2003; Banerjee, 2006). It is in a similar context of debate that oocyte cryopreservation enters the scene, but despite the controversy, there seems to be agreement that elective use of oocyte cryopreservation is quickly becoming more popular (Petropanagos, Rodriguez, Campo-Engelstein, Zoloth & Woodruff, 2015).

Oocyte cryopreservation existed in an experimental and purely medical context for many years without drawing significant media attention. Though there were some important criticisms of oocyte cryopreservation made on the grounds of racial injustice (Roberts, 2012), the general public did not seem to think there were significant moral issues associated with the technology. The technology was initially used in the medical context for women who, as a result of some illness or gonadotoxic therapy, will find themselves unable to conceive a child with eggs of their own (American College of Obstetricians and Gynecologists [ACOG], 2014). The paradigmatic candidate for medical oocyte cryopreservation is probably a young woman undergoing chemotherapy.

One might propose any number of reasons for why *medical* oocyte cryopreservation does not attract significant public scrutiny while social oocyte cryopreservation does. A likely explanation is that its use as a relief from suffering gave it the imprimatur of moral legitimacy; it certainly does seem cruel to deny a woman who will lose her fertility through no fault of her own the chance to regain it. The situation is quite different for elective oocyte cryopreservation, however.

The paradigmatic candidate for elective use is a healthy, urban woman in mid-twenties to mid thirties who has a demanding and prestigious career that forces her to

divert time and energy away from social and romantic pursuits toward personal and professional development. Perhaps the public's moral skepticism about elective uses of the technology is rooted in the intuition that this woman does not "deserve" oocyte cryopreservation in the same way as patient with the illness. Her need is rooted in a choice rather than "medical necessity." Others might see something more suspicious in the public's simultaneous acceptance of oocyte cryopreservation for medical uses and skepticism about social oocyte cryopreservation. One might interpret this as a manifestation of sexism if the technology is acceptable when it encourages women to assume their prescribed role as mothers but unacceptable when it promotes equal participation in the workforce. In either case, elective oocyte cryopreservation is becoming more popular (Petropanagos, 2010; Ramanathan, 2014).

In discussing the history of oocyte cryopreservation scholars typically suggest two precursors to oocyte cryopreservation's growing popularity for social uses and its current position in the public eye. First is the development of vitrification, a dramatic technological improvement over the prior method of slow-cooling oocytes (a procedure that left eggs more vulnerable to damage from ice crystal formation). Second is the increasingly positive stance toward the technology taken by professional organizations governing the practice of reproductive medicine.

The Development of Vitrification

Vitrification represents a dramatic leap in technology. Is it not exactly “freezing.” To vitrify means to convert something into a glass-like substance. The vitrification procedure for human oocytes utilizes ethylene glycol and dimethyl sulfoxide as “cryoprotectants” which prevent the water present in the oocyte from forming ice while still allowing the cell to be cooled enough to preserve it.

The earliest successes in human oocyte vitrification came in the mid 2000s (Kuwayama, 2005). Since then, vitrification has been shown to have clear advantages over slow cooling in oocyte cryopreservation due to the large size of unfertilized oocytes (Edgar & Gook, 2009; ASRM, 2013). Utilizing the vitrification process, close to 100% of oocytes survive cryopreservation. The most favorable studies of the old slow-cooling method reveal that 70 to 80% of oocytes survive cryopreservation. Slow-cooled oocytes also implant at a dramatically reduced rate compared to freshly recovered oocytes and suffer from compromised development. This finding is in contrast to the results for vitrification, which have no difference from fresh oocytes (Edgar & Gook, 2009). The increased public interest in oocyte cryopreservation has been attributed to this significant leap forward in success rates (European Society of Human Reproduction and Embryology [ESHRE], 2012).

Evolving Perspectives of Professional Societies

Following these technological developments came a shift in the scientific and medical community's view of oocyte cryopreservation. Before the development of vitrification, there was substantial evidence that oocyte cryopreservation was rather unlikely to yield live births and that the slow cooling process posed risks for the developing embryo (ASRM, 2013). These shortcomings of the slow-cooling method prompted the American Society for Reproductive Medicine, the American College of Obstetricians and Gynecologists (ACOG) and the Canadian Fertility and Andrology Society (CFAS) to all consider oocyte cryopreservation "experimental." Following developments in vitrification, in 2005, the ASRM released a guideline saying that they no longer consider the procedure experimental. The ACOG and CFAS followed suit and affirmed the guideline.

For the ASRM (2013), it seems the removal of the "experimental" label had more to do with the ASRM concluding that the slow-cooling procedure lacked a favorable cost/benefit ratio than with there being insufficient data, because there was a sizeable amount of data showing that success rate was rather low. This moral tint of the ASRM's view is also evident in the hesitant tone of the document in which they removed the experimental label. In that statement, the ASRM questions the elective use of the technology, saying that, "Data on the safety, efficacy, cost-effectiveness, and emotional risks of elective oocyte cryopreservation are insufficient to recommend elective oocyte cryopreservation." They proceed to claim that, "Marketing this technology for the

purpose of deferring childbearing may give women false hope and encourage women to delay childbearing,” because, “success rates appear to be significantly lower for women who cryopreserve or vitrify oocytes over the age of 38.” They conclude, “Patients who wish to pursue this technology should be carefully counseled about age and clinic-specific success rates of oocyte cryopreservation vs. conceiving on her own and risks, costs, and alternatives to using this approach.” These approaches imply concern for women’s autonomy rather than concern with the state of the science.

Despite this hesitance, the ASRM’s endorsement of oocyte cryopreservation technology for medical uses and their confidence in its safety and efficacy for *medical* applications seems to have galvanized businesses across the country. These businesses have begun to offer oocyte cryopreservation services as a means to delay childbearing without medical need. Perhaps the businesses that sell this service feel that distinction between elective and medical uses is somewhat arbitrary or biased.

The ASRM statement and the subsequent statements from other professional organizations also seem to have generated enthusiasm about the technology in the popular media. Following shortly after the ASRM published its guideline and after it was affirmed by other professional organizations, a number of strongly worded pieces were published in popular media outlets that went so far as to assert that egg freezing is “the most powerful gender equalizer of all” (Richards, 2013; see also Inhorn, 2013; and Richards, 2012).

Perhaps the explanation why such enthusiasm arose after the release of the ASRM guideline is that the ASRM does not go so far as to say that oocyte preservation *should*

not be administered for the sole purpose of delaying childbearing, nor that such a use is indefensible. They merely state that they do not recommend it themselves and say that, in the case a woman wants to use it for elective purposes, she should have access to professional counseling. It might also be that the doctors who offer this service and those authors who sang its praise in the media take a more substantive moral position, as S.E. Richardson does, arguing that if a woman can consent to using this technology in response to a medical issue then she should also be able to do so in response to a social situation. In her words, “Women should be allowed to come to their own conclusions and take their own risks.”

While the cause might be difficult to identify—considering the hesitance of professional societies and widely visible criticisms of it in the media—public enthusiasm certainly exists and clinics selling this service even cite the ASRM guideline in support of their practice, emphasizing that recent removal of the “experimental” label is a positive sign that egg freezing is a special, exciting, cutting edge scientific technique.

Literature Review

Facebook and Apple's announcement that they would begin to subsidize their female employees' elective use of oocyte cryopreservation sparked controversy in the media. Notably, Marcia Inhorn penned an article for CNN strongly in favor of women taking advantage of such benefits when their employers provide them, and of women footing the bill themselves. In her view, the "recently perfected" technology of oocyte cryopreservation is a "game changer that just might allow women to defy the notion that they can't have it all" (Inhorn, 2013). Sarah Richards also took to the popular press with optimism. Her article in the Wall Street Journal says, "Amid all the talk about women "leaning in" and "having it all," the conversation has left out perhaps the most powerful gender equalizer of all—the ability to control when we have children."

Not all women share this hopeful view that oocyte cryopreservation represents a powerful, game-changing equalizer. Many commentators have responded to this view with criticism. Rene Almeling, Joanna Radin and Sarah S. Richardson (2014) wrote in another article for CNN that, "the proposal to help women put motherhood on ice so they can focus on their jobs is shortsighted." They advocate for a different approach to reconciling the demands of career and family life. They say that oocyte cryopreservation "is not a solution to the overwhelming pressures that result from companies requiring long work hours and constant availability. Instead, we must demand policies that have been demonstrated to alleviate the strain for mothers and fathers alike: a living wage, reasonable work hours, paid parental leave, and child care." Others echo this claim,

stating that oocyte cryopreservation is “isn't quite the panacea the media would have you believe, and it turns out, all this coverage may be pushing an individualized solution to a deeper systemic problem.” (Urist, 2013) Going further, Françoise Baylis, on the *Impact Ethics* blog, argues that, “normalizing egg freezing does nothing to correct the fundamental social injustice experienced by women in the workplace who are effectively forced to choose between having a career and raising a family.”

In response to such energetic public moral debate, bioethicists should take a careful look at the claims made by the media and by fertility clinics about oocyte cryopreservation. However, although the sociological, ethical and anthropological literature on reproductive technologies *in general* is extensive, the corresponding literature on oocyte cryopreservation is modest. The bioethics literature is particularly thin, with many of the commentators remaining vague about what they actually think should happen, content to communicate their vague optimism or skepticism through philosophical argumentation or speculative claims about potential consequences. Most bioethics articles avoid providing detailed recommendations for policy and fail to deal adequately with objections.

Despite these weaknesses, any thorough analysis of the ethical and social implications of oocyte cryopreservation that aims to provide recommendations practice and policy should begin by reviewing the relevant bioethics literature. After all, the essence of many of the most salient ethical concerns is already present within it. Commentators on elective oocyte cryopreservation have argued a variety of positions: that we need more critical thinking about the ethics of the practice (von Wolff, Germeyer

& Nawroth, 2015), that it is a gender equalizer, that it should be covered under insurance (Stoop, Cobo & Silber, 2014), that it risks promoting false hope (ASRM, 2013), that it has the potential to level the economic playing field (Goold & Savulescu, 2009), that doctors should provide it because of the benefits and autonomy it can bring to women, (ESHRE, 2012) that it will create social justice problems (Roberts, 2012), that it may be an unnecessary instance of medicalization (ESHRE, 2012), that it will entrench inequality between men and women and that the goal of workplace parity is better reached through a social solution (Shkedi-Rafid & Hashiloni-Dolev, 2012), that we should be ware of deceptive marketing practices (Harwood, 2009), and more (Cattapan, Hammond, Haw & Tarasoff, 2014).

Many of the existing articles ground their perspective in one or a few of these considerations. Arguing in support of elective uses of oocyte cryopreservation, one of the most well-composed articles is Imogen Goold & Julian Savulescu's "In Favor of Freezing Eggs for Non-Medical Reasons" (2009). Of the papers that express skepticism, some of the most effectively argued are Karey Harwood's "Egg Freezing: A Breakthrough in Reproductive Autonomy?" (2009), and Alana Cattapan et al.'s "Breaking the Ice: Young feminist scholars of reproductive politics reflect on egg freezing" (2014).

Goold and Savulescu make a compelling quasi-utilitarian case in favor of elective oocyte cryopreservation. They argue that oocyte cryopreservation is as safe as other fertility treatments and because of this there is no reasonable justification for withholding it as an elective procedure from women. They discuss data documenting that this

procedure shows no increased likelihood of major birth defects above IVF and other data that shows just how far the technology has progressed since the recommendations that oocyte cryopreservation be withheld from use for social reasons were made. They speculate that oocyte cryopreservation can increase economic equality between the sexes, since “the point at which women typically leave the workforce to have children is . . . important for their career prospects and earning capacity.” This, they claim, will help close the wage gap.

According to Goold and Savulescu, EF can also bring benefits beyond the working world. Women, especially women with high career ambitions, sometimes find themselves in their late thirties having not found the right partner. For these women, SEF would relieve the pressure of having to find the man or woman they are confident raising their child with before “the clock runs out.” Women who *have* found the right partner may have done so later in life or still may not be ready to have a child. Oocyte cryopreservation would be useful for these women too. According to Goold and Savulescu, oocyte cryopreservation would also carry benefits for children and men. It could mean fewer failed relationships (because women have more time to find a suitable partner) and there are scientific data to show that children born to older, more financially stable parents are much better off than children born to more financially insecure parents. Thus, Goold and Savulescu conclude that there is a “compelling case” for the adoption of elective oocyte cryopreservation.

Other scholars are less optimistic about the potential of elective oocyte cryopreservation to bring significant benefits to women. Goold and Savulescu

unfortunately do not respond directly to their criticisms or consider how these criticisms weigh against the utilitarian merits of the technology. This may be because much of the opposition to elective oocyte cryopreservation comes from lay publications that do not always offer detailed, philosophically minded criticisms. Nonetheless, there are at least a few skeptical academic papers arguing that the technology is not so clearly beneficial. These provide at least the beginnings of arguments against elective oocyte cryopreservation.

One such paper is Karey Harwood's "Egg Freezing: A Breakthrough in Reproductive Autonomy?" (2009). She questions whether women who are using this technology—many of whom use it as a last resort—are really expressing any meaningful kind of freedom. She worries that the women who will use these services are made "vulnerable by their age and lack of good alternative options" and that this "ultimately undermines the conditions necessary for women to exercise reproductive autonomy." The idea is that because the choice to use elective oocyte cryopreservation comes from a place of desperation, it is not really free. Other texts echo and corroborate this claim with personal anecdotes (Wildman, n.d.).

Alana Cattapan et al.'s 2014 article *Breaking the Ice: Young feminist scholars of reproductive politics reflect on egg freezing* (2009) articulates a different set of ethical concerns. At the outset, the authors express skepticism about the rhetoric surrounding the technology. They urge that the idea that oocyte cryopreservation will enable women to "have it all" is a great oversimplification. They argue that, "Rather than increase funding for child care or create positive messages about diverse family forms, the focus remains

on extending women's fertile years by way of risky biomedical interventions." These authors also note that elective oocyte cryopreservation can reinforce social justice concerns because of its high cost. They say, for women who are not already somewhat wealthy and financially stable, this technology does not constitute a "game changer."

In the closing section of their paper, these authors briefly mention that they are concerned about whether this technology will have the effect of commodifying "women's bodies and tissues" but they do not go into depth about what they mean. Commodification is a common ethical concern in bioethics but the phenomenon is quite complex. It is not clear that elective oocyte cryopreservation for the purpose of delayed childbirth *per se* commodifies women's bodies. Such a practice is not similar to practices that clearly do commodify women's bodies such as prostitution or commercial surrogacy, in which another person pays for the use of a woman's body.

If these authors were right that oocyte cryopreservation for the purposes of delayed childbirth involves commodification, they still fail to show that this commodification is problematic—there is at least some space for disagreement about the significance of the commodification. Even though all cases of commodification involve treating a person improperly, there might be reasons to accept some small amount of improper treatment even if this is not ideal. This seems especially likely if the benefits brought to a woman by her use of this technology are greater than the dignitary harms that result from whatever degree of commodification allegedly takes place.

Normative Analysis

For the purposes of engaging in a focused and complete analysis of oocyte cryopreservation and of the ethical and social concerns represented above it would be helpful to begin by organizing them. Bioethics scholarship provides a ready tool for this purpose: Beauchamp & Childress' *Principles of Biomedical Ethics* (2001). The *Principles of Biomedical Ethics* is one of the foundational texts in bioethics. Although it is not without its critics (Turner, 2003), it remains a useful tool for the scrutiny of ethical issues in biomedicine in virtue of the way it helps us identify potential moral concerns (McCarthy, 2003; Clouser & Gert, 1990). Utilizing Beauchamp and Childress' framework of ethical principles will help us bring to light the moral concerns about oocyte cryopreservation and connect this work to a significant approach in bioethics.

Beauchamp and Childress refer to their *Principles of Biomedical Ethics* as a “common sense” “theory” of ethics, meaning that it derives from a “common morality” to which “morally serious” persons ascribe. In their eyes, the common morality (at least as it applies to medicine) involves commitment to four basic principles each of which are *prima facie* binding, meaning that they must be obeyed unless they are contradicted by another equal or stronger principle. The four principles are *respect for autonomy*, *nonmaleficence*, *beneficence*, and *justice*.

They distinguish these common moral principles from communal norms, which derive from “particular cultural, religious and institutional sources.” The difference between the two is that the common morality has normative force and it can be validly

appealed to as the justification for moral argument. In other words, the common morality “establishes obligatory moral standards for everyone.” To contravene the common morality, then, is to *actually* behave improperly, and not merely to contravene a social convention or norm.

Since the mere recognition of the importance of respect for autonomous choice, the avoidance of harm, the provision of benefits and the just distribution of medical resources does not make a moral *theory*, Beauchamp and Childress advocate for a process of specification and balancing of the principles. By this process, the abstract, indeterminate commitments represented in the principles are made concrete and applicable to a situation at hand. Specification involves asking questions like, “how do I respect autonomy in this *specific* case?” Balancing involves questions like, “When the principle of beneficence bids me to *X* and the principle of justice bids me to do *-X*, how should I proceed?”

The process of specification and balancing—since the authors leave it rather open ended—is bound to lead different morally serious persons to different conclusions about the proper course of action in a particular situation. This is not a problem for Beauchamp and Childress, but rather a fact of moral life: different people can have different views about the proper course of action in a given circumstance and they can each be justified. In their view, indeterminacy is inherent in ethics. So, Beauchamp and Childress’ *Principles of Biomedical Ethics* proposes a rather thin theory of ethics. It asserts some central ethical values—saying that those are legitimate values because anyone who is

serious about ethics allegedly agrees with them—and gives a few, general hints about how to reason from these abstract notions to concrete cases.

Clouser and Gert leveled criticism of Beauchamp and Childress' work based on the absence of a way to resolve every disagreement. They argue that Beauchamp and Childress' principles are an insufficient replacement for moral theory. In their words, "The 'principles' are in fact not guides to action, but rather they are merely names for a collection of sometimes superficially related matters for consideration when dealing with a moral problem." They function "neither as surrogates for moral theories nor as directives or guides for determining the morally correct action," because, as they see it, if the principles lack a systematic and explicit relationship to one another, the conflicts between them are always unresolvable. Genuine moral theories—when they do make use of principles—always take care to specify the relationship between potentially competing dictates.

These criticisms are not as devastating as they might appear. Although there is merit to Clouser and Gert's criticism, they are proposing too strict a standard for bioethics by suggesting that our arguments must always clearly and neatly fit into the rigid framework of a single theory, and that we should always argue from the fundamental features of these theories. They are right that the *Principles* do not constitute an ethical theory in the sense of what Kant, Mill or Rawls constructed, but such moral theories are not the only type of framework worth considering when thinking about applied ethics.

Clouser and Gert themselves make a case for the usefulness of the *Principles* when they say, “At best, ‘principles’ operate primarily as checklists naming issues worth remembering when considering a biomedical moral issue” and that they help people consider a case from “diverse and conflicting points of view.” This is exactly how I use the *Principles* in this thesis. This function of the *Principles* does not strike me as a problem so much as a limitation. That is why, in this thesis, my ethical analysis goes beyond the *Principles* when it gets to specific claims concerning policies and practices.

Here, I use other concepts—such as a particular conception of autonomy, and notions about rights and obligations—to support my claims about what sorts of policies we should adopt with respect to elective oocyte cryopreservation. The *Principles*, even if flawed in some ways, is a fine text so long as one takes it for what it is: a starting point for developing a moral perspective rather than an end point that could justify that perspective.

There is evidence that Beauchamp & Childress actually intended their principles to function in exactly this way even if they are frequently careless in describing the *Principles* as a theory. In the introductory chapter of the fifth edition, Beauchamp and Childress say, “Our four clusters of principles do not constitute a general moral theory. They provide only a framework for identifying and reflecting on moral problems.” So long as we are aware of Clouser & Gert’s criticisms, and so long as we take the *Principles of Bioethics* for what it is intended to be, we will not deceive ourselves into thinking we have a systematic set of principles to “apply” or use as a standard for ethical justification. Rather, what we have is a scheme for organizing and identifying potentially

significant ethical issues. Accordingly, in this thesis I use the *Principles*' framework for just this purpose. In the following sections I have merely grouped a variety of ethical concerns represented in the literature by the scheme in the principles.

Some readers might object to my choice to use the *Principles* in this thesis because it is either too formulaic to be a realistic approach to ethics that fails to understand other ways of moral reasoning, or because, given that elective oocyte cryopreservation is a women's issue, I would be better served by approaching this issue with a feminist framework for ethics.

First, It's not clear to me that there is anything obviously wrong about a formulaic approach to ethical analysis, and such a criticism ignores the fact that—beyond the trivial assertion of the importance and relevance of autonomy, justice, beneficence and nonmaleficence to oocyte cryopreservation—the ideas contained in *Principles* are not the ones that do the normative work. I accept *as a premise* that the ideas of autonomy, beneficence, nonmaleficence, and justice ought to be considered, but the ideas I use to justify my normative analysis are ideas about rights, what *justice* means, obligations, and a particular conception of autonomy. The *Principles* are used primarily for the purposes of organizing and identifying these moral concerns.

Second, an approach that uses the *Principles* may itself be a feminist approach to bioethics. The idea that social issues involving women must be engaged via an explicitly feminist framework for ethics assumes that a feminist approach to ethics is incompatible with the use of the *Principles*. However, Alison Jaggar allows that, no matter what their other differences, all cases of feminist ethics aim to eliminate the oppression of women

(Tong & Williams, 2009). The concerns for women's autonomy and justice for women are central to feminist ethics and politics and central to the idea of eliminating oppression. Similarly, so is a concern for women's access to benefits and their freedom from harm. These are the same ideas around which I organize my ethical analysis. So, insofar as the analysis below ultimately aims at the goal of ameliorating the oppression of women—which it thoroughly does—then this thesis *is* a work in feminist ethics, even if it does not take an explicitly feminist approach.

Autonomy:

Concerns about women's autonomy are the most salient ethical issues in the debate about the elective use of oocyte cryopreservation. The discussion of autonomy breaks down into two parts: (1) a discussion of whether or not elective oocyte cryopreservation should be available to women (2) a discussion of the ways that the availability of oocyte cryopreservation stands to increase or decrease women's capacity for autonomy if it is made available.

In this section of the paper, I will discuss the second portion of the debate about autonomy. Arguments about the first portion tend to incorporate claims about justice, beneficence and nonmaleficence in addition to claims about autonomy. (Those with a paternalistic viewpoint argue that the risks and low efficacy justify withholding it from women who would choose to use it electively and those with a more "laissez-faire" perspective say that we should let individual women, through the process of informed

consent, determine what level of risk and efficacy they are willing to tolerate individually.) Since the perspectives about the first question also turn on concepts other than autonomy, I will postpone engaging with the first debate until the final section of the paper where I will pull together my analyses under each of the four principles and come to a conclusion about how oocyte cryopreservation should be available. For now, my analysis will focus on how the elective use of oocyte cryopreservation affects women's autonomy.

Engaging with the question of how women's autonomy stands to be enhanced or diminished through the elective use of oocyte cryopreservation, the extant literature—popular and academic—has examined four questions: (1) does oocyte cryopreservation “buy time” for women? (2) Will this technology lift the burden of oppression or will it merely shift the burden? (3) If egg freezing is a “last resort” can we truly consider the choice to do it free? (4) Will oocyte cryopreservation be marketed deceptively? The first three questions end up not being as distinct from one another as some scholars assume. I therefore examine them together in what follows. I explore the fourth question in a separate section.

Perhaps the most prominent claim among proponents and vendors of oocyte cryopreservation is that, through oocyte cryopreservation, women who are (for whatever social reason) unable to have children in the present can buy themselves extra time to have children in the future. One fertility clinic notes on its website that as “advances in cryopreservation, or freezing techniques improve, women are offered *more choices* when contemplating a delay in having a baby” [emphasis added] (California IVF, 2009). Two

scholars arguing in favor of egg freezing for non-medical reasons claim that women's biological clock constrains their choices so as to encourage less beneficial career outcomes (Goold & Savulescu, 2009). But the assertion amongst those who praise the technology is that it can actually enhance autonomy. Autonomy does not equate to having more options.

Autonomy is a broad, contentious and powerful concept in the history of western ethics and, although there is little consensus about it within mainstream philosophy, it is typically agreed that autonomous action requires two distinct capacities (Christman, 2015). First, autonomy is thought to require a mental capacity—i.e. an individual must have the proper mental constitution that enables her to form desires and intents that are authentically her own. Second, it requires a capacity for action. This is the capacity to act according to one's authentic desires, making the world align with the vision that one has for it. According to this conception, to act freely is to act in such a way that one's behavior conforms to one's autonomous desires and intents.

Generally speaking, the practical capacity to behave in accordance with one's true desires and intents requires time, the right circumstances, and the right resources. In the specific case of delayed childbearing, to act autonomously means to overcome certain biological limitations. Where oocyte cryopreservation is concerned, only women who have an autonomous desire to delay childbearing would find their autonomy enhanced; and it would be enhanced in the sense that their external circumstances would be more permitting of their desire to delay childbearing. For women who don't desire to delay childbearing, for those who have a non-autonomous desire to delay child bearing, and for

those who have a non-autonomous desire to bear children now, the availability of this technology makes no difference in terms of the level of freedom they experience.

What fertility clinics intend to communicate, as far as I can tell, is that egg freezing is helpful with regard to autonomy for a woman with a particular kind of wish: that is, oocyte cryopreservation creates the practical capacity to realize a woman's autonomous desire to have autologous children later than her body would typically permit because it gives her the practical capacity to act in accordance with a desire for something it is impossible to do without it. For oocyte cryopreservation to be an asset in securing greater autonomy, it has to work, and whether or not it works well enough is hotly debated. The data about the efficacy is of oocyte vitrification is complex and difficult to interpret.

In the best-case scenario, the data suggest that oocyte cryopreservation is about as likely to result in a live birth as IVF—IVF succeeds in about 33% of cases. This kind of success rate might seem acceptable to many women. One might argue that we are bound by consistency to allow women to do IVF with cryopreserved oocytes if the success rate is the same as with typical IVF (Goold and Savulescu, 2009). This position, however, ignores a very crucial difference about the context in which the choice to freeze oocytes is made and some features of how women actually benefit—with regard to autonomy—from oocyte cryopreservation. Women will always choose to cryopreserve in a state of uncertainty—i.e. they cannot *know* whether they will use their preserved oocytes. In fact, the women who engage in oocyte cryopreservation are actually far less unlikely to reap

the benefit of increased autonomy that the technology provides than are those women who undergo IVF (Hodes-Wertz, 2013).

Although the live birth rate per retrieval in standard IVF can probably be expected to be equal to IVF with vitrified oocytes, an important difference is that a woman choosing to engage in standard IVF is certain that she has a fertility problem at the time of treatment—i.e. she can be certain that she needs the treatment. The ideal candidate for oocyte cryopreservation, a younger woman, will not know if she will need her cryopreserved oocytes until perhaps a decade *after* the time of freezing. She makes the decision to freeze based only upon the guess that she will need them. The ideal candidate, however, is not the typical user. The typical user is likely to make the decision to freeze closer to the time at which she needs to use them, around age 35—meaning that her oocyte quality has degraded, making her chances of success much lower (Hodes-Wertz, Druckenmiller, Smith & Noyes, 2013).

In the cases of both the ideal and typical user, oocyte cryopreservation stands a rather low chance of fulfilling its purpose of increasing women's autonomy by helping women secure the practical capacity to exercise their autonomous desires. The typical user is the most biologically unlikely to find success with elective oocyte cryopreservation, and the ideal candidate is also the most likely to experience a change of social circumstances that result in her not ever needing to use her frozen oocytes.

The paper published by Hodes-Wertz et al. (2013) is particularly revealing. Their data on the usage of oocyte cryopreservation reveal that, only 6% of women who freeze their eggs actually use them, and then only about one third of these women achieve a

pregnancy via a thawed oocyte. In short, 98% percent of women who freeze their eggs do not use them. This means that only 2% of women secured a capacity to act in a way that they couldn't have otherwise. Rephrased: only 2% of women secured the enhanced autonomy that they sought by engaging in oocyte cryopreservation.

While the fact that most women didn't secure any benefit from oocyte cryopreservation doesn't diminish the significance of the enhanced autonomy and satisfaction experienced by the 2% of women who had children with thawed oocytes, it does mean that very few women actually ended up securing the material benefits they sought upon beginning to work with a fertility clinic. This casts doubt on the argument that oocyte cryopreservation enhances autonomy; nearly one hundred percent of the women who use oocyte cryopreservation do not enhance their autonomy through this procedure.

So, we would be wise to eschew the enthusiastic optimism of the commentators in the popular media who believe that oocyte cryopreservation is a "game changer" with regard to reproductive autonomy or equity in the workplace. The picture is much more mixed than what would merit that kind of response. We should be skeptical about oocyte cryopreservation's ability to enhance autonomy for all but a very small group of women.

Moreover, we should acknowledge that if oocyte cryopreservation became more popular, cheaper and effective, it wouldn't merely have the effect of adding to the set of options that women get to choose from. It would offer up its own imperative for action; technologies beg to be used. If it became "normal" for women to use cryopreservation to delay childbirth, employers would begin to expect that all women who are serious about

their careers would make use of oocyte cryopreservation. In the eyes of many of the feminist commentators on this practice, this would not be a much better state of affairs than the current one. In this view, the effect on autonomy would be a wash.

Justice:

One perennial concern with all reproductive technologies is their relationship to broad, structural inequality along the lines of race and class. Brezina and Zhao (2012) note, “Perhaps one of the most obvious ethical challenges surrounding ART is the inequitable distribution of access to care.” It is well established that childbirth and motherhood are major determinant of the pay gap between men and women (Bertrand, Golden & Katz, 2009; Budig & England, 2001; Waldfogel, 1998). Accordingly, it would be unjust for only some women to have access to the means by which this inequity could be resolved. Thus, it would seem that women might have a presumptive moral claim on the government to ensure that all women are provided with any resources that encourage equal participation in public life.

Yet, in the United States ARTs are typically not covered under public or private insurance policies (Neumann, 1997). This means that the cost of any ART, oocyte cryopreservation included, is likely to be prohibitive for all but the wealthiest women. This feature of women’s ability to access elective oocyte cryopreservation could also be the basis of an argument banning oocyte cryopreservation or an argument against the availability of oocyte cryopreservation solely as a consumer good or through insurance

policies that are tied to competitive positions in the workforce—if fairness between women is the problem, then the fairness issue could also be resolved by distributing the technology to no one.

But what exactly would make an oocyte cryopreservation access disparity like this unjust? One intuitive way to approach such questions about reproductive technology—one favored by the Supreme Court—is through a rights based framework. From this perspective the justness of an access disparity would turn on one’s conception of the nature of the right to procreate. In particular, it would matter whether or not one thinks of this right as “positive” or “negative.”

Positive rights are those that demand the state to provide substantive assistance to facilitate the right. Negative rights only require noninterference from other citizens or the state. Those taking the stance that there is a positive right to procreate argue that the state has obligations to facilitate reproduction—and to do so equally for all citizens. Those who assert that the right is negative hold that there is no such obligation on the part of the state (Brake & Millum, 2013). Traditionally, rights related to reproduction have been considered negative and to entail no obligation on the part of the state to facilitate the use of ARTs by those who cannot afford them on their own. Yet, the absence of a positive right to reproduction alone does not imply that ART access disparities are just.

Even if there is no positive right to reproduce that would itself entail a state’s obligation to provide access to oocyte cryopreservation, there may still be other considerations that would require the state to intervene in a way that would decrease access disparities to oocyte cryopreservation. We might start to build an argument to

justify government support for access to oocyte cryopreservation from commentary on the Supreme Court ruling in *Roe v. Wade*.

Justice Ginsberg, writing in the North Carolina Law Review opined that the court failed in not explicitly linking its ruling to discrimination (Ginsberg, 1985). Although the author of the decision, Justice Blackmun, later noted that *Roe v. Wade* “implicated constitutional guarantees of gender equality” the official decision was grounded in notions of autonomy, not equality (Planned Parenthood of Southeastern Pennsylvania et al. v. Casey, Governor of Pennsylvania, et al., 505 U.S. 833 (1992)).

Arguing from the perspective of equality, there might be a legal argument in favor of binding private insurance companies or public health insurance to cover oocyte cryopreservation and since doing so would facilitate women’s equal participation in public life. Moreover, equality could provide the basis of a strong *moral* argument in favor of increasing of oocyte cryopreservation access.

However, any argument in support of increasing oocyte cryopreservation access for those who cannot afford it because not doing so would contribute to social inequality *must* presume that oocyte cryopreservation would actually create a disparity. The claim would be empty if oocyte cryopreservation failed to work. The data on oocyte cryopreservation reveal that it is probably not a viable means to facilitate equal participation in public life and so, mandating its coverage in public or private insurance will likely not contribute to social equality.

Although the live birth rate per retrieval is about equal to IVF and high enough to make oocyte *seem* like a reasonable approach to facilitate equality, the problem lies in the

usage data for elective oocyte cryopreservation. Only two out of every 100 women who have their oocytes frozen manage to yield a live birth from their frozen oocytes. With success rates and usage rates so low, there is little likelihood that egg freezing could make anything more than a negligible contribution to broad social inequality. If oocyte cryopreservation is unlikely to contribute to a just distribution of benefits in society—i.e. if it is unlikely to facilitate women’s equal participation in public life—then there are no strong reasons to require the government to subsidize its use on the basis of justice.

One might object to this argument because it takes for granted the fact that current usage patterns will remain the same. However, anyone objecting along these lines would have to show that there is a good reason to believe that usage patterns would change. There is no reason to think that usage patterns would change dramatically if the law were to mandate insurance coverage for oocyte cryopreservation. Perhaps more women would begin to utilize oocyte cryopreservation but there is no evidence to suggest that these women would be any better at predicting their own likelihood of using oocyte cryopreservation than the women who use it currently.

Beneficence and Non-maleficence:

In this thesis I have combined the principles of beneficence and non-maleficence into one section for the sake of convenience. As we have seen, very few women actually end up using their frozen eggs. In discussing the significance of the balance between the benefits and risks of oocyte cryopreservation we should recognize two perspectives on

the distribution of benefits and risks or harms. First is the broad, social perspective that takes the population level usage patterns into account, and second would be a perspective that focuses on an individual woman making a decision for herself. Viewing oocyte cryopreservation from both of these perspectives will yield a different characterization of the balance of risks and benefits.

Taking the broad view, we see that very few women end up using their frozen eggs. Although the “scientific” rate of success for oocyte cryopreservation is perhaps acceptably high—equal to IVF—actual women use their frozen eggs so infrequently that the balance of risks and benefits seems skewed hopelessly towards risk. However, taking the individual as our point of analysis, and assuming that this woman could be sure that she will use her frozen oocytes, we get a very different view, something more consistent with the balance of risks and benefits of IVF, the use of which is generally uncontroversial.

As in IVF, there are evidently minimal harms to the children born of cryopreserved oocytes, but there are rare and potentially major health risks to women who engage in oocyte cryopreservation. As a part of the process of harvesting the oocytes that will then be frozen, women must undergo ovarian hyperstimulation. This process involves a hormone therapy that some women can have a negative reaction to (Ellison and Meliker, 2011). The risk of hormone therapy-related ovarian hyperstimulation syndrome (OHS) is small but the symptoms can range from mild to extreme. Women undergoing ovarian hyperstimulation experience moderate to severe OHS in 3% to 8% of cycles. Severe cases occur in 0.1% to 2% of cycles. The symptoms of OHS include

nausea, vomiting, shortness of breath, pleural effusions, ascites, clinical dehydration, and thromboembolism (O'Donovan, Al Chami & Davies, 2015). In rare cases, death may be a result (Society of Obstetricians and Gynaecologists of Canada-Canadian Fertility and Andrology Society, 2011) Unfortunately the risk of OHS increases with youth, meaning that those women who are most likely to bring a pregnancy to term to are also the most likely to suffer this side effect.

Taking the social perspective—one that acknowledges the low usage rates—we see that women are unlikely to suffer any adverse consequences besides having to pay thousands of dollars. However, they are also very unlikely to secure any benefit; upon choosing to engage in oocyte cryopreservation, only 6% of women believe that they are “unlikely” to make use of their frozen oocytes, but the available data shows that only 6% of women use their frozen eggs (Hodes-Wertz et al., 2013). Many of the women who forego the use of their frozen eggs end up conceiving naturally or via IVF with fresh oocytes (Hodes-Wertz et al., 2013). Since only 1/3rd of the women who use their frozen eggs bring a child to term, 98% of women who seek this service privately have invested a substantial amount of money in an insurance policy they never needed in the first place. Those women whose use of it was subsidized have exposed themselves to risk for only a small chance of benefit.

The balance of risk and benefit from this perspective is unfavorable. It counts against the implementation of policies or regulations that encourage oocyte cryopreservation's use. But it strikes me that this isn't the only valid way to look at the balance of risks and benefits. We should also consider the issue by focusing on the

choices of individual women because, presumably, some women can be more certain than others about whether they will use their frozen oocytes.

If a woman could be certain that she would use the oocytes she has preserved, then balance of risks and benefits is quite different. With each egg-retrieval, a woman has about a 33% chance of achieving a live birth. This is similar to the likelihood of success in IVF with fresh oocytes—an ART “which is well-resourced and actively promoted as a means for infertile people to conceive children” (Goold & Savulescu, 2009). From this perspective, the benefits and risks align favorably. Or, at least, they are consistent with the balance that our society has already deemed acceptable in the realm of ARTs.

A woman who is confident enough in her future to know that she is very likely to utilize her frozen oocytes, and who is informed about the risks and likelihood of success, should be free to make whatever decision she sees fit. This is how we approach other medical procedures and how we manage the risk of failure in the context of other ARTs. From the perspective of the individual woman, we should not count the low population usage rates, the risk of the failure of oocyte cryopreservation, or the risk of medical complications for the would-be mother against her freedom to choose to engage in the practice if she herself judges the balance of risks and benefits to be acceptable.

We are left with a mixed picture of elective oocyte cryopreservation: On the one hand, the technology stands to help some women increase their autonomy. The procedure also doesn't seem poised to contribute to significant social injustice, considering the low usage and success rate. On the other hand, no data substantiate the claims made about the benefits the technology can bring. The best-case success rates still appear rather low to

merit treating one's frozen oocytes as an "insurance policy"—there's still a substantial chance that the procedure will fail to result in a live birth. To fill out this mixed ethical picture we should examine the technology in its current social context.

Persuasive Advertising of Oocyte Cryopreservation

The preceding discussion about the balance of risks and benefits involved with oocyte cryopreservation should prompt us to ask why the usage rate of vitrified oocytes is so low. One explanation might be that women are being convinced they need a service that they actually do not require—e.g. that the clinics offering these services have wrongly exploited women's fears of not having a child to turn a profit. Some scholars writing on oocyte cryopreservation have worried that this might be the case (Harwood, 2009). If fertility clinics do advertise their services exploitatively, then we have reason to worry that these advertising strategies actually undermine women's autonomy.

If the fertility clinics that provide oocyte cryopreservation services withhold information regarding low success rates and low usage rates, and if they advertise their services primarily by cultivating anxiety in potential customers or by linking oocyte cryopreservation to desirable personal traits and lifestyles, then we could say that fertility clinics use *persuasive* advertising techniques rather than *informative* advertising (Crisp, 1987). Persuasive advertising is ethically dubious because it undermines autonomy by exploiting the hopes, fears and desires of potential customers. It does not engage with their deliberative faculties or help them make an informed decision that suits them. Obstacles to informed decision-making such as this might explain why so many women never use their preserved eggs.

Unlike many of the questions about the ethical and social implications of oocyte cryopreservation, we are not restricted to speculation when we consider advertising

practices. Fertility clinic advertising practices can be examined empirically. We can provide a direct answer to Harwood's (2009) worries that women considering oocyte cryopreservation may be exploited by for-profit clinics that will try to profit from women's sense of "desperation" at their waning fertility. Since oocyte cryopreservation for social reasons is already available to women at numerous private, for-profit clinics across the country we can examine how these clinics advertise their services to see if concerns about manipulative and misleading advertising are warranted.

To gain insight into the way that oocyte cryopreservation is marketed to women, I conducted a content analysis of the advertising materials that fertility clinics use to sell their oocyte cryopreservation services. Content analysis is a common research technique for examining open-ended textual data. According to Weber (1990), it is useful for determining the focus of social attention with regard to specific phenomena. Though the technique has been frequently used to investigate media messages and advertising in recent years (O'Connor, 2014), it was originally developed in the 18th century in Northern Europe as a means to analyze scripture (Hsieh & Shannon, 2005). Since its development, it has found applications in psychology, anthropology, education, linguistics and history (Harwood & Garry 2003). It has been enthusiastically adopted for health research, particularly in nursing.

Content Analysis Background

Though there are many varieties of content analysis and philosophical paradigms under which one might use content analysis to approach a research question, the purpose of content analysis is to reveal the meaning of a text by reducing the content of a large amount of textual data into a smaller, more manageable and analyzable set of themes through a rule-based and replicable process (Harwood & Garry, 2003; Stemler, 2001). Hsieh and Shannon (2005) describe three distinct approaches to this process: *summative*, *conventional* and *directed*. These approaches differ in both the approach to code development and the approach to analysis.

Conventional content analysis is an “inductive” method, meaning that the researchers develop codes and themes by engaging with the data, rather than imposing a preconceived theoretical framework upon it. In this process, researchers immerse themselves in the data, gaining a sense of the whole and then returning to it to make notes and develop preliminary codes that encapsulate the text's core elements. The outcome of a conventional content analysis is a description of the text's key themes along with an explanation of their relationship to one another (Hsieh & Shannon, 2005). Conventional content analyses are appropriate in exploratory studies, when there is little information on a given topic.

Conversely, a directed content analysis is appropriate for extending or specifying an already well-defined theory. In directed content analyses a preexisting theory is used to develop codes prior to the examination of the text in question. This *a priori* coding

frame is then applied to a new data set in the hope of supporting or disconfirming a theory (Hsieh & Shannon, 2005).

Summative content analysis is the third type that Hsieh and Shannon identify. Summative content analyses are typically a sub-genre of conventional content analyses. Summative analyses are quasi-quantitative and sometimes thought of as “mixed-methods” because, in addition to exploring the qualitative meanings of and relationships between concepts and themes present in the text, summative content analyses track the frequency of certain phrases or concepts within the text to give an impression of the relative salience of these themes to the reader.

The content analysis I present here follows the approach taken by Johnson (2012) who analyzed fertility clinic websites to determine how welcoming they are to queer couples. The approach is inductive and summative. It yields qualitative and quantitative results and a manageable set of themes through which I have identified some of the core ideas and strategies that fertility clinics use in their advertising for elective oocyte cryopreservation services. I elected to adopt an inductive, summative approach because doing so allowed me to examine both manifest and latent aspects of content while also yielding quantitative counts that provided the basis for understanding the prevalence of certain themes in fertility clinic advertising.

Empirical Method:

Websites have become essential tools for businesses trying to gain attention, recruit customers, and distinguish themselves from their competitors. The information fertility clinics provide on their websites is an indicator of the nature of their practice (Johnson, 2012). Since websites are likely to be the first point of contact that women seeking oocyte cryopreservation will have with a fertility clinic, it is reasonable to examine fertility clinic websites if one wants to gain insight into how oocyte cryopreservation is advertised to women.

My analysis focuses on the textual content of the websites of fertility clinics that provide egg-freezing services for non-medical indications in exchange for profit. Since companies located in Silicon Valley have been the first to include oocyte cryopreservation in their benefits package, I have chosen to limit the scope of my analysis to the websites of those fertility clinics that offer egg-freezing services for social reasons and which are located in the San Francisco Bay Area. Following convention, I define the Bay Area as the area within San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin Counties (Association of Bay Area Governments, 2014). The clinics in this area are the clinics that are most likely to be accessed by women working for Facebook and Apple, the biggest employers that make this service free to their employees.

I have identified these clinics through the CDC's most recent Assisted Reproductive Technology National Summary Report, published in 2014. There are 17

fertility clinics listed in that report and which are located in the San Francisco Bay Area. Two of these clinics do not offer any oocyte cryopreservation services, two only offer it for “medical” uses and one does not offer oocyte cryopreservation but does allow women to choose frozen donor eggs. I will analyze the webpages of the remaining 12 clinics. I downloaded copies of these websites for later analysis in April 2015.

Rather than analyzing the entire content of these websites (which would be too extensive) I have limited my analysis to the specific pages of these websites that discuss oocyte cryopreservation services. My approach to this content analysis follows closely in the footsteps of Johnson who utilized an inductive, summative approach combining a quantitative analysis of the prevalence of certain themes within the texts and a qualitative interpretation of the manifest and latent aspects of content. My approach differed from Johnson only in the way the codes were developed. Instead of working independently, I developed the codes in a team, using the help of two undergraduate interns at the University of Minnesota Center for Bioethics. We developed the codes via an iterative process of textual interpretation, discussion, code production and application. Developing codes in a team increases reliability. Since we engaged in a summative analysis our texts needed to be split up into coding units. We chose individual clinics as our coding unit because clinics were unique in how they presented information on oocyte cryopreservation. This choice of coding unit also allowed us to conveniently discuss the percent prevalence of themes within the population of fertility clinics in the Bay area.

Once the full set of codes was developed, I coded the entire data set and the other two members of the team each coded a different half. For the purposes of calculating

reliability, the two other coders were treated as a single individual. Inter-coder reliability was calculated. Percent agreement was 93% and Cohen's Kappa was 0.86. The few (5 total) instances of disagreement were discussed and resolved to reach finalized frequencies that are the basis for analysis and presented in the graph below. Finally, the codes were organized under the headings of three themes to further summarize the content of the websites.

Findings:

Fertility clinics vary greatly in the amount of information that they convey about oocyte cryopreservation on their websites. One clinic devotes six separate pages to the technology. In contrast, two clinics only gave oocyte cryopreservation a few short paragraphs. Although the websites varied greatly in length, they varied less with regard to content. The coding frame that we developed distills the core concepts and strategies that fertility clinics use to market their services. The frequencies of codes are given a visual representation in **Figure 1** and a description of the code meaning is provided in **Table 1**.

The most commonly emphasized concept is that by utilizing the egg freezing services provided by these clinics, women can gain *Options & Agency*, becoming more “empowered” to align their reality with their desires. Ten out of the 12 fertility clinics we examined employ *Scientific and Medical Legitimization*—i.e. the use scientific jargon detailed technical information to emphasize the “cutting edge” nature of oocyte

vitrification and to differentiate the services they provide from the ostensibly identical services of other clinics.

Many of the fertility clinics examined make specific suggestions about social indications for egg freezing. The two suggestions that predominated were that oocyte cryopreservation can help women reconcile the competing demands of family life (8 out of 12 clinics) and that it can relieve the pressure to find the right partner with which to have children (half of the clinics). Three of the 12 clinics framed aging in such a way as to suggest that *Aging* creates a need for oocyte cryopreservation. Three clinics suggested the procedure is gaining *Popularity*.

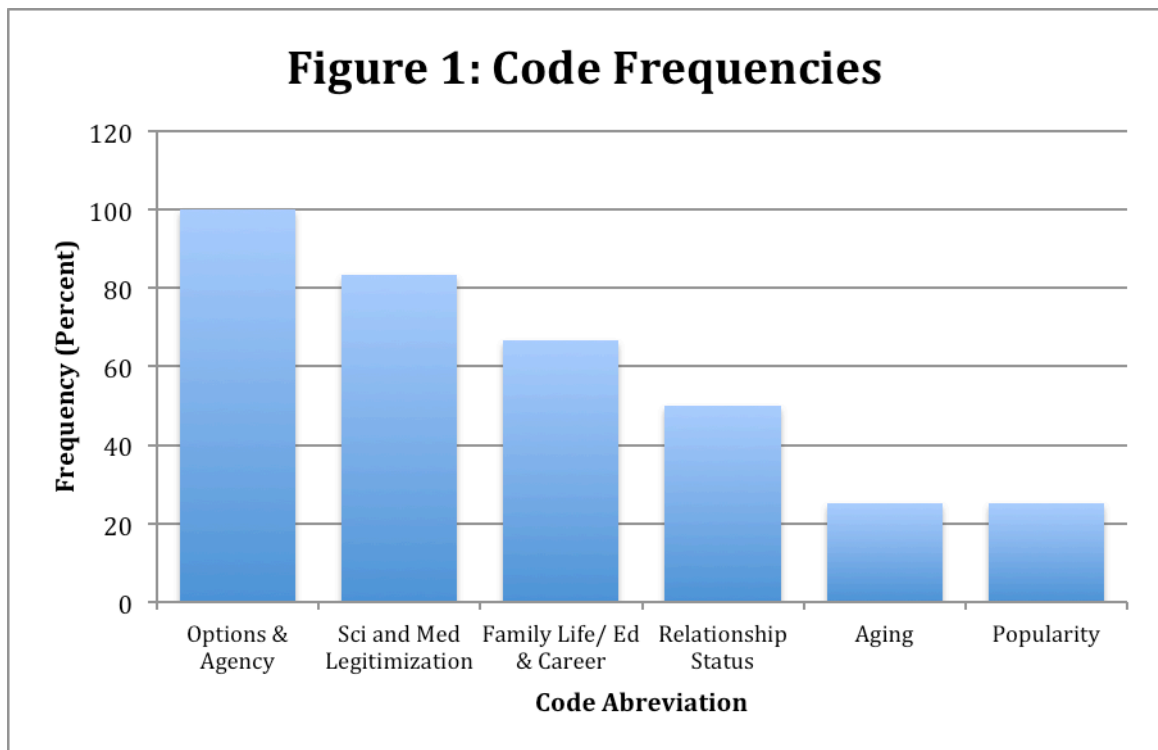


Table 1: Code Descriptions		
Theme	Code	Description
The Meaning of Time	Characterizations of Aging	A very broad code that applies to sources that describe what aging means to women, what it's like, or what sorts of things accompany aging. Frequently aging is characterized in a way that necessitates or suggests a legitimate need for EOC.
The Normalization of Social Egg Freezing	Scientific and Medical Legitimization	This code applies to sources that describe in detail the procedure of EOC and vitrification. It also attaches to sources that engage in "product differentiation" by employing scientific language and emphasizing the clinic's allegedly distinguished reputation, its pioneering role in the field, or its success & skill with EF. It is also used when clinic websites direct their audience to professional organizations or other experts on EOC.
	Increase in Popularity	This code denotes sources that explicitly or implicitly suggest that EOC is increasing in popularity or becoming a widely accepted practice.
Reasons to Freeze	Options and Increased Agency	Applies to sources that emphasize that EOC is empowering and gives women more options, more freedom or more control, frequently by implying that it allows her to have children when she is "ready".
	Make Family Life Compatible with Education and Career	This code attaches to sources that suggest that EOC is a way to reconcile a career life with a family life.
	Non-Ideal Relationship Status	This code is for sources that reference certain kinds of relationship status as reasons why it would be smart to freeze one's eggs. This code also applies to sources suggesting that egg freezing can help solve the problems of poor relationship status.

From a broad view of the codes and the themes contained therein, it may not seem as though the fertility clinics engage in any questionable advertising practices. However, a closer examination reveals a more complex picture. This content analysis of fertility clinic websites reveals that three broad themes prevail in the advertising of oocyte cryopreservation. First, websites provide *reasons to freeze*. Second, they suggest that elective oocyte cryopreservation is currently in the process of *normalization*. Third, they make claims about *the meaning of time* for aging women.

That these themes form the basis of fertility clinic advertising suggests that fertility clinics attempt to create a market for their services by deeming legitimate a broad swath of uses of the technology, that they attempt to build desire for the service by describing “indirect” and unsubstantiated benefits of the procedure and by casting the biological, personal, social and political situation of women in a light that implies an urgent need for oocyte cryopreservation. To gain credibility for their claims, fertility clinics emphasize the alleged popularity of oocyte cryopreservation as well as interesting but ultimately unimportant technical information to highlight the high-tech nature of the procedure of oocyte cryopreservation, thereby gaining *scientific and medical legitimization*.

Advertising via these strategies does not make it easy for women to make reasonable and informed decisions about whether or not to freeze. Although it is true that these clinics are not obliged to be purely informative in their advertising, many of the

features that are thought to necessitate stricter advertising standards in medicine are still present in the provision of these elective services. Advertising for oocyte cryopreservation should not make use of the persuasive techniques mentioned above. Rather, it should aspire to help women make an informed decision by emphasizing accurate and easily interpretable statistics about success rates, usage rates, costs, and risks.

Unfortunately, fertility clinics that provide oocyte cryopreservation services withhold information regarding low success rates and low usage rates, and they advertise their services by apparently cultivating anxiety in potential customers or by linking oocyte cryopreservation to desirable personal traits and lifestyles. Fertility clinics use persuasive advertising techniques rather than informative advertising.

In the sample, the fundamental notion that motivates the need to utilize oocyte cryopreservation for non-medical reasons is that time is running out. Clinics make statements about aging that seem intended to cause alarm; they emphasize statistics about age-related fertility decline and utilize value-based rather than fact-based commentary. Their statements along these lines serve not to clarify the decision making process but to impede the process of considered, informed decision-making. One clinic stated that, “Everything changes. Life moves quickly. The future is unpredictable.” Another clinic claimed, “Your reproductive potential will never be as good as it is today.” Such statements are true but, in the context of the websites, they paint a skewed picture of reality, considering that most women never end up using their oocytes, and they appear designed to exploit the anxieties of women seeking cryopreservation services.

Clinics also imply that, prior to the use of this technology, it is normal for women to have internal tension and feel out of control: “Studies with focus groups of single women have shown that women who have already chosen to freeze their eggs report a calming sense of control.” This clinic provided no reference to this study and did not identify the authors. Although strong statements like this are comparatively rare in the data set, they encourage the kind of attitude about aging that makes oocyte cryopreservation seem like a necessity to fix an urgent problem and provide relief. While oocyte cryopreservation may provide some psychological relief, the evidence that it provides any material benefit is scant.

All fertility clinics in the sample provide visitors to their website with a set of suggestions about which social conditions create a need for egg freezing and a sample of the reasons that a woman might use to justify freezing her eggs. The clinics claim that oocyte cryopreservation technology gives a woman greater agency and control over her life and allows her to hold down a prestigious job while permitting her to shoulder the burdens of being a good mother.

The most popular reason offered for elective oocyte cryopreservation is that the technology will be a liberating force in the prospective client’s life, allowing her to overcome the burdens imposed on her by modern life. By paying for the services the clinic provides, one website claims, women can achieve a higher degree of personal freedom to dictate the course of their lives in the way that they wish. Clinics say that their oocyte cryopreservation services offer women “more choices when contemplating delaying having a baby” (California IVF) or in determining the course of their lives. They

say that egg freezing is “empowering” and the most forceful clinics state that egg freezing is a way to “achieve control over your future” (Pacific Fertility Center) or that egg freezing will allow women to “take control” (Advanced Fertility Associates Medical Group). Other clinics are less bombastic about this personal benefit of egg freezing. They use more cautious language that merely mentions that their services allow women to live life at their own pace, having children when they are “ready”.

Two thirds of the clinics assert that utilizing their services will allow women to reconcile the competing demands that well educated, successful women face and give them more time to be deliberate about how they bring their lived reality into accord with an ideal vision for their lives. In making these suggestions, fertility clinics picture women’s lives in a way that may not accurately represent the diversity of possible lifestyles. They also hide other potential solutions to the common problem of reconciling the demands of career and family. According to some scholars’ speculations about the social effects of elective oocyte cryopreservation, the technology will help women achieve these advantages, but among scholars there is no consensus here.

Despite the debate, some fertility clinics still make these claims with forceful language. In the words of one clinic, “Relationships are unpredictable and the demands of education and career can make it impossible to find the time to have and raise kids.” Clinics that tout the agency-enhancing aspects of oocyte cryopreservation draw upon core aspects of American values and notions about success, freedom and justice using the language of liberation in the service of financial gain. The descriptions fertility clinics give of the kinds of lifestyle that elective oocyte cryopreservation makes possible should

be viewed as assertions about what success, freedom and justice mean for Americans. These clinics do not merely offer a high-tech service, they also sell a character ideal and reinforce the claim that a certain lifestyle is the one women ought to have. By offering these models and adorning their websites with images of women striking powerful poses and of beautiful mothers holding impossibly perfect babies, clinics convey the idea that elective oocyte cryopreservation will allow those who take advantage of it to live a life in which she is more fulfilled by her interpersonal relationships and one that allows her to reach her full potential as a member of the workforce.

In reality, this is not guaranteed and whether it is possible is a hotly disputed claim. No data support the notion that women who utilize oocyte cryopreservation have children with better fathers, no data support the idea that it allows women to have more successful careers and no data support the basic claim that this technology makes women more free. Though these claims may stand to reason, each one is based on speculation—and reasonable critics of the technology have even come to opposite conclusions, suggesting that, far from offering greater freedom, elective oocyte cryopreservation just creates a new venue for the same sexist pressures that women feel today (Harwood, 2009). We should worry, according to Harwood, that the technology will come to be an imperative for working women, a “new normal.” If it is true that elective oocyte cryopreservation can help women reconcile the demands of education and career with family, then its popularization will put women who do not wish to use the technology at a comparative disadvantage, and there will be considerable social pressure to use the technology to compete with women who are comfortable using it.

Clinics attempt to give credibility to their claims about the social usefulness of oocyte cryopreservation and garner trust from potential customers by employing scientific and medical language and by suggesting that even as oocyte cryopreservation represents a dazzling leap of technological innovation, its use for “social” reasons is already becoming increasingly common, routine and normal.

Clinics commonly refer to recent developments in the science of oocyte cryopreservation or to the medical community’s increasingly accepting attitude toward the technology. For example, three clinics (California IVF, Lane Fertility Institute, and Sutter Health) mention that the American Society for Reproductive Medicine recently issued a statement saying that they no longer consider EF experimental. However, none of these clinics disclose that the ASRM does not yet recommend the procedure for non-medical uses. In emphasizing these developments and incorporating potentially misleading statistics about the efficacy of the oocyte cryopreservation procedure and scientific information clinics imbue their sales pitches with a false air of legitimacy.

Clinics attempt to normalize elective oocyte cryopreservation by claiming that it is becoming more popular. One clinic flatly stated, “Today, more and more women are choosing to cryopreserve their oocytes or embryos for the purpose of preserving fertility” (CARE for the Bay Area) and two other imply the same idea. One utilizes quasi-testimonials from pop-culture celebrities. Another claims that they make their services financially accessible, implying that women from all social strata utilize this technology. For example, “we want this insurance policy to be in reach of every woman who dreams of having children some day. We will freeze and STORE your eggs for 5 years for only

\$5200. That’s about \$1000/year!” By making it clear to women that other women are using the technology, fertility clinics give its use greater social sanction, but they do not assist with reasonable decisionmaking.

By describing leaps in technology, fertility clinics draw on the cultural authority that medicine and science hold in America, thereby garner a greater sense of trust from potential clients. These scientific details potentially distract website visitors from truly important information. The “seductive appeal” of science & scientific detail has been well documented (Garner, Gillingham & White, 1989; Weisberg, Kiel, Goodstein, Rawson & Gray, 2008). The educational psychology on “seductive details” has demonstrated that including interesting details that are ultimately irrelevant to the central themes of a text can dramatically reduce a reader’s comprehension of overall meaning.

In the context of medically significant decisions, the imperative is to preserve lucid decision-making that gives the proper amount of attention to the central considerations. However, much of the technical information present on fertility clinic websites risks giving women an exaggerated sense of understanding while not actually providing any useful information for a woman trying to make an informed decision about whether or not to freeze her eggs based upon success rates and risks. The important information for a woman deciding to freeze her eggs is that which concerns the risks to herself, the likelihood of success, and the health of her potential child. Yet, the “scientific” information that fertility clinics provide on their websites frequently has little to do with this.

Focusing on the content of fertility clinic websites, we are left with the impression that (1) fertility decline is a serious and perhaps underappreciated problem, (2) that egg freezing allows women to achieve a greater degree of freedom and control over their lives and (3) that the elective use of oocyte cryopreservation has the imprimatur of modern science and medicine. None of this is so simple. In view of the data on efficacy, the data on usage, and the positions of professional organizations, it seems safe to say that the impression given by the fertility clinics is biased. How should we judge this bias from a moral point of view?

Although elective oocyte cryopreservation is not a “medical” procedure in the sense that it is a treatment for an illness, it still bears many important similarities to medical care—as everything about elective oocyte cryopreservation is identical to medical oocyte cryopreservation except the circumstance that prompts women to freeze their oocytes. It is therefore instructive to note that the approaches to advertising used by these fertility clinics are out of step with what has been considered appropriate for medical services. Historically, the medical profession has eschewed advertising altogether, viewing it as categorically inappropriate for the profession.

Discussion: Analysis of the ethics of persuasive advertising

Until the early eighties, it was the official expectation that physicians would earn patients by establishing a good reputation within the community they served and within their peer group solely by providing good service (Dyer, 1997). Until 1982, the American

Medical Association (AMA) formally prohibited all advertising in its code of ethics, which stated, “It is derogatory to the dignity of the profession to resort to public advertisements or private cards or handbills inviting the attention of individuals affected with particular disease.” However, in a 1982 move to promote fair competition in health care, the Supreme Court ruled that, in virtue of its stance toward advertising, the AMA was in restraint of trade. The ruling in this case prohibited the AMA from “Restricting, regulating, impeding, declaring unethical, interfering with, or advising against” physicians or their affiliates from publishing prices, describing services, or soliciting business through contracts and gave the FTC the right to review and revise subsequent modifications to the AMA’s code of ethics (Dyer, 1997).

The Supreme Court’s ruling in this case reflects a shift Americans’ attitude toward the institution of medicine. Although different scholars locate the beginning of this shift at different times (Siegler, 1985; Steinhardt, 2002), most agree that throughout the 21st century, American society has increasingly placed higher value on the patient’s right to self determination and put faith in the notion that patients know what is best for themselves. Under this paradigm of patient autonomy, patients are viewed not as wards, under the care of expert physicians, but more as consumers, seeking services that they view as appropriate for themselves. This change in understanding of how medicine ought to function necessitates new mechanisms for the protection of patient autonomy.

Although this change is not without critics, critics and supporters alike might agree that these changes in the practice of medicine nevertheless should be understood to necessitate a new kind of patient protection. Presumably, the judges of the Supreme

Court case viewed their new legislation as a mechanism to protect the ability of a consumer of medical services to make informed decisions about the care that they seek; the ruling could be regarded as the proper response to this new need; if medicine is provided in a market context, patients need protections just like consumers. What grounded the fiduciary obligation to refrain from advertising, in the eyes of the American Medical Association prior to 1982, was informational asymmetry, high stakes and the vulnerability involved in medical care. These key features of medical care are likely also the ones that Supreme Court thought justified the promotion of advertising. They thought that, given the risks involved with medical procedures, patients should be as informed as possible and advertising can contribute to their knowledge. However, advertising can only contribute to informed decision-making if it facilitates rational deliberation and is not deceptive. In the case of oocyte cryopreservation, it may be that advertising accomplishes exactly the opposite of this goal. Rather than contribute to informed decision-making, it may be that, for the layperson, medical advertising adds another layer of obscurity to medical information.

To serve their moral purpose, advertisements for medical services or quasi-medical services like this one must contribute to informed decision making. My empirical analysis of fertility clinic websites suggests that fertility clinics engage in “persuasive” as opposed to “informative” advertising techniques (Crisp, 1987). They utilize “puffery,” linking, through imagery, suggestive language and the use of unsubstantiated claims that the utilization of their service to traits that potential clients desire and coupling undesirable traits with the consumer’s condition prior to using the service. They also use

techniques that appear designed to heighten any sense of anxiety a woman may hold about age related fertility decline. This anxiety engenders a sense of need for oocyte cryopreservation in the minds of potential clients. Clinics rarely include straightforward information about the success rates of the procedure, preferring to focus on the speculative “indirect” benefits of utilizing the technology.

This contradicts what we normally think contributes to sound decision-making. It is generally agreed that an informed decision to undergo a medical treatment must be based on facts and self-knowledge, rational, and not whimsical or unduly influenced by unusual circumstances. The advertising practices adopted by fertility clinics to market oocyte cryopreservation do not seem to contribute to this kind of cool, informed and rational decision-making. If anything, these practices seem more likely to provide an obstacle.

In view of these advertising practices, and in view of some of the problems I identified in the foregoing normative analysis, we would be wise to eschew the enthusiastic optimism of the commentators in the popular media who believe that oocyte cryopreservation is set to shift the paradigm for working women. The true picture is much more mixed than would merit that kind of positive response found in the popular media. I suspect that, in the eyes of many of the critics of elective oocyte cryopreservation, the situation with respect to workplace parity would not be much better than it is now if oocyte cryopreservation were to become popular. Therefore, we should not be so complacent about the way our societies choose to organize work and career. What should be resisted, in their eyes, is not women’s biological limits but society itself.

In the following concluding section, I engage this idea and develop recommendations for policy.

Conclusion

Perhaps it is not surprising that the recent debate surrounding oocyte cryopreservation has arisen from developments in Silicon Valley. Silicon Valley and its visions for the future are usually controversial. The industry seems to attract equal measures of praise for ushering in new, beneficial paradigms for work and communication, and criticism for its naïve faith in the power of technology to make meaningful social change.

In his recently published book, *To Save Everything, Click Here: The Folly of Technological Solutionism*, Evgeny Morozov (2013) applied the term “technological solutionism” to describe a common attitude in Silicon Valley toward social problems and their remedies. Morozov argues that leaders in Silicon Valley frequently advocate for superficial, technology-based solutions to problems that are fundamentally political, social and moral. These approaches preponderate in Silicon Valley, says Morozov, because of how easy it is to characterize social problems in myopic ways that fail to acknowledge their historical and political complexity and etiology. Although the majority of Morozov’s criticisms focus on the digital products and services of Silicon Valley businesses, the core idea applies equally as well to oocyte cryopreservation as it would to a new software tool.

The criticism that oocyte cryopreservation falls short of being a panacea for economic inequality between the sexes seems to motivate much of the controversy, and with good reason: one problem with “quick fixes” for social problems is that they may

actually be obstacles toward more substantive social change. Insofar as oocyte cryopreservation gives the impression that women have more reproductive options while remaining ineffective, and merely shifting the burden of sexist pressures onto a different group of women, oocyte cryopreservation will be one such obstacle. Elective oocyte cryopreservation, like many of the technologies that Morozov cites in his book, attempts to fix a social problem perfunctorily, without an eye toward long-term or structural reform. Rather than improving our situation, it may actually entrench and obscure the sexist social structure that created the need for the technology in the first place.

The history of other technologies supports this prediction about oocyte cryopreservation. Take the problem of work-life balance, for instance. Early on in the history of the personal computer, it was thought that powerful and mobile computational devices would bring great benefits to workers. It was alleged that computers and mobile technology would so greatly increase efficiency that, if they did not stop at granting us all a life of leisure, they might even eliminate all jobs causing mass unemployment (Guest, 2002). Yet we know from our personal experiences in the 21st century that the popularization of personal and mobile computers has had quite the opposite effect: the workday has actually become much longer and intruded further into our private lives (Hill, Miller, Weiner & Colihan, 1998).

In view of this history—and other histories like it—there is reason to fear that Facebook & Apple’s implementation of the oocyte cryopreservation and its eventual popularization may have similarly unexpected consequences. Moreover, characterizing the problem of sexism in the workplace as something that would be solvable if we could

only “fix” women’s biological clock is myopic and ignorant of the way that gender norms and the organization of labor—not biology *per se*—make full careers difficult for women with families to achieve. So, to view oocyte cryopreservation as a viable solution to the problem that faces the young women who would make use of it would be to misunderstand what these young career women struggle with.

The problems facing ambitious women who also wish to raise families demand comprehensive social and political resolutions because these problems are not merely biological—i.e. it is almost never true that a woman’s diminishing reproductive capacity is the sole motivation that would incite her to seek oocyte cryopreservation. It is the chronologically limited character of her reproductive biology in concert with a particular set of pressures, norms, and expectations that engender her desire to preserve her fertility. This is evidenced by the reasons that women provide for engaging in oocyte cryopreservation—these reasons even track the strategies that clinics use to advertise their elective oocyte cryopreservation services and mirror the anecdotes in the popular journalistic literature which describe women who are busy with law school when they are not at their full-time job or who repeatedly meet men who are unwilling to commit to family life (Wildman, n.d.). The “problem” of fertility decline is deeply rooted in the pressures and expectations of career life and not so much in biology.

If we want a more complete solution, we ought to engage with what creates these non-biological forces as well. But this doesn’t mean that there is no use for oocyte cryopreservation; the mere fact that oocyte cryopreservation is not a panacea for working women does not itself count against all elective uses of it for fertility preservation.

Oocyte cryopreservation has the potential to be helpful for *some* women even if it falls short for others.

While the lens of technological solutionism enables us to bring some important worries about oocyte cryopreservation into focus, it risks obscuring the benefits. Even if a “fix” might have grown out of a dubious characterization of a problem, and even if it might fail to be a complete solution to that problem, it may still have *some* benefits. We know, for instance, from research on women’s motivations for engaging oocyte cryopreservation, that the most popular reason that women give for utilizing SEF is their lack of a current, suitable partner (Hodes-Wertz, 2013). This is perhaps not a social problem in the way that inequality of opportunity in the workplace is; oocyte cryopreservation might be the unique advantage that can help women in this situation.

If we are concerned with elective oocyte cryopreservation’s moral propriety we should not write it off immediately because it is a “quick fix”. Rather, we should take it as one approach to change among other possible alternatives, each of which will carry its own positive and negative consequences, and each of will need to be evaluated against the others. We must compare oocyte cryopreservation to other strategies to approach the goal of workplace parity.

Oocyte cryopreservation’s low success rates, low usage rates, high expense, and likelihood of popularization shifting the burden of oppression onto women who do *not* wish to delay childbearing all count against the claim that elective oocyte cryopreservation will contribute to workplace equity. Unlike oocyte cryopreservation, there is a substantial body of research showing that strong parental leave policies can

contribute to equality between the sexes. In this context, parental leave has several advantages over oocyte cryopreservation. It can facilitate sharing the burden of child-rearing, it brings benefits to men, it does not involve the bodily harms that oocyte cryopreservation does, it is free for the women who wish to make use of it and it would necessarily be available to all women in the workforce, not just those who have a lot of money or occupy high ranks at companies that can afford to include elective oocyte cryopreservation in their benefits.

Data on parental leave analyzed by the Pew Research Center reveal that the United States is unique among the richer countries in the first world in not mandating any period of paid parental leave (Livingston, 2013). This is particularly odd in light of the benefits that parental leave can bring. Parental leave improves child health, increases women's employment prospects, counteracts the negative effect in earnings that typically associated with having children, and increases fathers' involvement with childcare (Ruhm, 1998a; Ruhm 1998b; Waldfogel, 1998; Seward, Yeatts & Zottarelli, 2002).

Whereas oocyte cryopreservation appears to have the potential to constrain women's choices in some cases, parental leave appears as though it would add to the set of options available for women. By giving men and women the privilege of taking time off from work, it gives women the opportunity to share the responsibilities of childbearing with their partners, giving them more time to devote to other aspects of their life should they choose to do so. Moreover, it does not require women to make financial investments or undergo medical treatment to compete equally with men in the workplace. For these reasons, parental leave seems better positioned to contribute to women's

autonomy, and to contribute to gender parity in the workplace and gender parity more generally.

The situation with regard to parental leave can only be expected to work out in more in favor for women as time passes. There is evidence that earnings play a role in the decision to take advantage of parental leave (Seward et al., 2002). As the hourly pay gap closes, more of the gap in lifetime in earnings can be explained by childbirth and parenting responsibilities. With women making ever more similar wages to men, there is less incentive for men to continue working while women stay home to take care of children. Data show that fathers want to be more engaged with their children (Parker, 2015), and that fathers' use of parental leave is correlated to higher spousal earnings (Sundström & Duvander, 2002).

Although enhanced parental leave privileges appear to be the better alternative in terms of increasing workplace parity, there are some things that oocyte cryopreservation can do for women that parental leave cannot. Regardless of their employment situation or their leave benefits, some women may still wish to delay childbearing for personal reasons. Some women may simply not want to have children until so late that it would necessitate cryopreservation and others may not presently have an economic or social situation that they deem acceptable for children. Whatever the limitations of oocyte cryopreservation in terms of gender parity, there are real and significant benefits.

While oocyte cryopreservation may provide some unique benefit to a small number of women who use it, it can only help bring workplace parity at great expense and while still forcing women to do something unusual and difficult if they want to level

the playing field in their career. Parental leave is free to those who would use it. It is widely used when it is available, and it does not place the burden of action exclusively on women. Additionally, parental leave has the advantage of bringing distinct benefits to men who might otherwise be prevented from participating equally in family life due to expectations and the needs of career life.

Recommendations for Policy

Understanding now what benefits oocyte cryopreservation can provide, what risks it carries, what potential justice issues may or may not arise from its use, and how these relate to parental leave in terms of progress toward workplace parity, we should return to the suggestion I made at the beginning of this thesis that many of the bioethics scholars who have published on oocyte cryopreservation fail to make concrete recommendations for policy. They stop before articulating the practical implications of their ethical arguments. Since oocyte cryopreservation has recently begun to grow more popular, it is important that bioethics scholars, with their particular expertise, make the connection between the “abstract” ethical point of view and practical recommendations for policy.

In these final sections, I aim to provide an argument that connects the ethical considerations explored above to policy. As stated in the abstract, I aim specify some of the rights and obligations of women, insurance companies, employers and the government with regard to access to elective oocyte cryopreservation. I argue that the foregoing considerations suggest that there is no persuasive reason to adopt policies that

prevent elective oocyte cryopreservation from being accessible as a privately provided service or through employee health benefits so long as women also have access to reasonable maternity leave benefits, but also that there is no compelling reason to conclude that the state has an ethical obligation to mandate coverage of this service. The reasons I provide in support of this perspective are that oocyte cryopreservation is unlikely to increase reproductive autonomy, that the claims that oocyte cryopreservation will increase workplace parity are unsubstantiated, that there is little reason to worry about the technology creating large-scale social inequality, and that enhanced parental leave privileges are likely to be better means to reach the goal of gender justice in the workplace.

A Negative Right to Access Elective Oocyte Cryopreservation

We should accept the claims that women should be free to seek this service independently and that companies should not be barred from providing it—i.e. the claim that women have a negative right to oocyte cryopreservation—because the two arguments to the contrary are weak. The first argument is that the low efficacy rate associated with oocyte cryopreservation necessitates withholding it from elective use. The second argument is that access disparities would create greater inequity between rich and poor women in terms of their ability to have children and that this would oblige us to withhold access. The first argument is mistaken and the second is not as powerful as it might seem.

Medical ethics has traditionally placed a premium on the ability of an informed patient to make the appropriate medical decision for herself. In this paradigm, the physician is conceptualized as playing the role of a facilitator, explaining the medical perspective, giving the patient a sense of the outcomes, and, through his or her actions, helping the patient manifest his or her preferences (Groll, 2011).

In this perspective, it is part of the *patient's* charge to determine the acceptability of the risk-benefit ratio of the proposed treatment plan. To prohibit women from accessing elective oocyte cryopreservation on the basis of its likelihood of success would be inconsistent with the typical perspective we take on the proper extent of patient autonomy. Since we believe that an informed patient can make an autonomous decision about a medical procedure when she has full knowledge of the benefits and risks, there is no reason to single out elective oocyte cryopreservation for special treatment, arguing that women can somehow not make decisions about this procedure for themselves. To do so would be arbitrary and it would be overly paternalistic.

One might question whether this argument, grounded in medical ethics, applies because some scholars have argued that elective oocyte cryopreservation is not a strictly medical procedure. Although there is debate about the distinction between *medical* and *non-medical* in cases like this (Goold & Savulescu, 2009), any uncertainty about whether this procedure counts as medical care or merely a product or service available to consumers in the market like anything else speaks in support of women's freedom access to it as they wish; while poor consumer choices may not be beyond reproach, it is an important aspect of respect for autonomy to refrain from interfering with such choices.

A ban on elective oocyte cryopreservation that is justified by the procedure's rate of success is also partially inconsistent with our attitudes toward IVF, since IVF with fresh oocytes and vitrified oocytes have been shown to have the same success rates (Goold & Savulescu, 2009). While the ASRM expresses hesitance about elective oocyte cryopreservation it expresses no corresponding anxiety about women's use of IVF with fresh oocytes in the context of age-related fertility decline. In fact, in the United States, our collective attitude toward IVF is more like enthusiasm than hesitance. Ten states mandate that insurers offer or provide IVF (Neumann, 1997). We should have the same attitude toward each.

Though the low usage rate of cryopreserved oocytes might appear to speak against this argument from consistency, it does not do so directly. Low usage rates may merely suggest that clinics engage in dubious advertising practices. (And, as we have seen, they do.) They also might also mean that women choose to engage in oocyte cryopreservation *knowing* that they are unlikely to use it—i.e. they may be utilizing it as a kind of insurance policy. There is some evidence for this (Hodes-Wertz, 2013). The fact that women want to use this service in this way ought not to remove her right to choose it.

And it is no help to critics to appeal to the ASRM's guideline here either. That document suggests that the low birth rate is likely to give women a false sense of hope and security, but the idea of false hope doesn't bring any force to critics' arguments because false hope requires incorrect knowledge. Arguments against a woman's negative right to cryopreserve her oocytes electively relying on false hope assume that women will

have misconceptions about the procedure. If it is true that women have misconceptions about this technology, this is a problem that could be ameliorated or entirely avoided by better counseling and without resorting to a ban on the technology. If women want to make the decision to use the technology, they can rightly do so as long as they are informed. Given that elective oocyte cryopreservation may bring benefits to women, the proper response to this worry is not to seek a ban, but to more facilitate informed decision-making.

To analyze the second argument—the one that says that, because elective oocyte cryopreservation has the potential to create social injustice between women who can pay and those who cannot, we should limit women’s access to it—we need to have a sense of the magnitude of the disparity that this technology could create. Without this, we would not be able to examine the relative weights of the conflicting ethical concerns of justice and individual liberty.

There are currently no data to show that oocyte cryopreservation provides the benefits fertility clinics suggest that it does. In fact, the evidence shows that it changes very little for many of the women who use it. Therefore, elective oocyte cryopreservation’s potential to contribute dramatically to social inequity across race or class lines seems low. Given the low potential for exacerbating social inequity, concerns about social injustice should not outweigh individual women’s right to choose to cryopreserve their oocytes if they feel they should. However, this might change in the future. If it eventually happens that a substantial number of women belonging to the upper strata of society begin using this technology, and if it can be demonstrated that they

reap significant benefits from it, then the concerns about social justice would be greater and, perhaps, great enough that we should reconsider.

If we accept that respect for women's autonomy extends to an informed decision about whether or not to cryopreserve and if the elective use of oocyte cryopreservation will not contribute to a significant social injustice then women should be allowed to express their negative right to engage in oocyte cryopreservation.

Against a Positive Right to Access Elective Oocyte Cryopreservation

The fact that women have a negative right to engage in elective oocyte cryopreservation does not, of course, entail that they have a *positive* right to access the technology. An argument against prohibition is not an argument that obliges the state to *facilitate* use of the technology. Just as I find no compelling arguments to prevent women from freely accessing elective oocyte cryopreservation, I argue that the state has no obligation to either include it in Medicaid or mandate that insurance companies or employers make elective oocyte cryopreservation available.

Regarding other assisted reproductive technologies (ARTs), Dan Brock (1996) has argued that there can be a positive right to access ARTs that is grounded in a quasi-utilitarian perspective that acknowledges the right to self-determination, women's wellbeing, and equality of opportunity as important concerns. While this argument might support access to other ARTs, it does not apply as well in the context of oocyte cryopreservation.

Brock grounds his argument in favor of government support for access to ARTs in “people’s interest in making significant decision about their own lives for themselves,” in the contribution that ARTs can make to an individual’s good, and in the “unjust gender inequalities typically suffered by women” when they have children. In this view, when a technology provides benefits in these realms, it should be covered “as part of any comprehensive package of health care benefits” which is “available to all.”

While it is a fine argument on its own, it fails here because of the uncertainty about whether oocyte cryopreservation actually brings such benefits. With regard to women’s wellbeing and their equality of opportunity in society, there are a features of the technology which suggest that it can only bring minor benefits to a select few women, if any at all. The relatively low efficacy and the fact that only a very small proportion of the women who use the technology secure the desired benefit of increased self-determination mean that oocyte cryopreservation only ever helps a very small number of women achieve greater autonomy. Approximately two percent of women secure the practical capacity, via the use of the technology, to bring their biological reality into line with their desires and plans for having children. This evidence suggests that elective oocyte cryopreservation does not help women in effecting the content of their “significant decisions” about their lives.

The fear expressed by Harwood that oocyte cryopreservation will merely shift the burden of oppression rather than lifting it also counts against the idea that oocyte cryopreservation can provide the benefits that would require the government to facilitate access to it. If the increasing popularity of elective oocyte cryopreservation eventually

causes it to become the norm—i.e. if it becomes *expected* that women who want to succeed in their careers will engage in elective oocyte cryopreservation, then it is likely that oocyte cryopreservation will not actually increase reproductive autonomy but merely perpetuate unjust gender inequalities by forcing women down a different path—and not one that is any more “free.”

If elective oocyte cryopreservation fails to increase gender equality and if it rarely contributes to women’s wellbeing by increasing their practical capacity for self-determination, then there is not a compelling case for a government obligation to mandate its coverage in private insurance or for including in public insurance.

Allowing Access to Elective Oocyte Cryopreservation Together with Enhanced Parental Leave Privileges

Given that oocyte cryopreservation does not meet the criteria that ground a positive right to its access, the government should not mandate its coverage nor should it be obligated cover it in public insurance. However, out of respect for autonomy, we should preserve women’s negative right to access this technology by allowing access to it in the marketplace by allowing employers to subsidize their employees’ use of this technology, and by allowing private insurers to cover it if they wish. Where elective oocyte cryopreservation is available, unbiased counseling should be available to women who seek it so that they are not misled by commercially motivated advertising and can make an informed decision about the procedure in full knowledge of the risks, success

rates, and usage patterns. Additionally, if the fears that oocyte cryopreservation may entrench gender inequality are legitimate, then the government should ensure that this does not happen.

One strategy to avoid the entrenchment of such inequity would be to ensure that women also have universal access to more substantial parental leave privileges. Longer, paid parental leave meets the criteria that Brock uses to ground a positive right for reproductive technologies; it can enhance self-determination by giving women the opportunity to share the responsibilities of childrearing with their partners and it doesn't force women to wait until later in life if they want to reconcile career and family life. More substantial parental leave contributes to equality because it does not require a financial investment, because it does not require women to undergo medical procedures, and because it encourages men to take part in childcare. It contributes to wellbeing because it doesn't expose women to the risks associated with the IVF cycle. Presumably, the fact that parental leave meets these criteria which require the government to provide access certain new reproductive technologies, means that the government has an obligation to provide access to paid parental leave as well. Such privileges would establish a norm of father participation in childrearing and, as such, would help resolve the present justice issue.

If women have access to elective oocyte cryopreservation through the marketplace or through employee benefits while the government or their employer ensures access to substantial parental leave privileges, it would represent a more comprehensive effort to resolve the problem of workplace inequity because it

would not prevent women from using oocyte cryopreservation as a method to achieve reproductive autonomy and because it would not *force* women to utilize oocyte cryopreservation if they wish to maintain full career and family lives. Ensuring access to substantial parental leave rightly relieves women of the responsibility to take risky, and potentially financially burdensome action if they wish to participate fully in the workplace. Moreover, ensuring women have access to both of these options would help ensure that Harwood's fears about shifting the burden of oppression on to those women who do not accept oocyte cryopreservation as a method to reconcile career and family would not come to pass because these women would have another strategy.

While we should accept the benefits that elective oocyte cryopreservation can bring, we must also acknowledge that it is not a solution to the problem of workplace inequity. Elective oocyte cryopreservation is conceptualized—by those who sell it, and by those who support its use—as something that can accomplish what more substantial parental leave privileges would provide. The foregoing analysis reveals this to be a tenuous claim. The available scientific data on elective oocyte cryopreservation reveal that it has a low potential to increase autonomy, that it carries a low ratio of benefits to risks, and that access disparities are unlikely to contribute significantly to social inequality. This shows that there are no moral grounds that establish a positive right to access the technology. Yet, women ought to have control over their bodies, and they ought to be able to make choices for themselves about reproduction. So, a negative right should be maintained. My content analysis of fertility clinic websites should make us question the extent to which for-profit fertility clinics encourage informed decision-

making. However, so long as women are in a position to make an informed choice about whether or not to engage in oocyte cryopreservation electively, they should be able to exercise that right.

Bibliography

- “2012 Assisted Reproductive Technology Summary Report.” National Center for Chronic Disease Prevention and Health Promotion, 2014.
- Almeling, Rene, Joanna Radin, and Sarah S. Richardson. “Egg-Freezing a Better Deal for Companies than for Women.” *CNN*, October 20, 2014.
<http://www.cnn.com/2014/10/20/opinion/almeling-radin-richardson-egg-freezing/>.
- Banerjee, A. “An Insight into the Ethical Issues Related to In Vitro Fertilization,” n.d.
<https://ispub.com/IJH/6/1/4581>.
- Baylis, Françoise. “Left Out in the Cold: Seven Reasons Not to Freeze Your Eggs.” *Impact Ethics*, October 16, 2014. <https://impactethics.ca/2014/10/16/left-out-in-the-cold-seven-reasons-not-to-freeze-your-eggs/>.
- Beauchamp, TL, and JF Childress. *Principles of Biomedical Ethics*. 5th ed. Oxford: Oxford University Press, 2001.
- Bertrand, Marianne, Claudia Goldin, and Lawrence F Katz. “DYNAMICS OF THE GENDER GAP FOR YOUNG PROFESSIONALS IN THE CORPORATE AND FINANCIAL SECTORS.” *National Bureau of Economic Research Working Paper 14681* (2009).
- Boldt, Jeffrey. “Current Results with Slow Freezing and Vitrification of the Human Oocyte.” *Reproductive BioMedicine Online* 23, no. 3 (September 2011): 314–22.
doi:10.1016/j.rbmo.2010.11.019.
- Brake, Elizabeth, and Joseph Millum. “Parenthood and Procreation.” *Stanford Encyclopedia of Philosophy*, 2013. <http://plato.stanford.edu/entries/parenthood/>.
- Brezina, Paul R., and Yulian Zhao. “The Ethical, Legal, and Social Issues Impacted by Modern Assisted Reproductive Technologies.” *Obstetrics and Gynecology International* 2012 (2012): 1–7. doi:10.1155/2012/686253.
- Brock, Daniel. “Funding New Reproductive Technologies: Should They Be Included in Health Insurance Benefit Packages?” In *New Ways of Making Babies: The Case of Egg Donation*, 213–30. Indiana University Press, 1996.
- Budig, Michelle J, and Paula England. “The Wage Penalty for Motherhood.” *American Sociological Review* 66 (April 2001): 204–25.
- “California IVF: Davis Fertility Center - Specializing in: IVF, ICSI, PCOS, Male Infertility, IUI, PGD, and Endometriosis.” *CALIFORNIA IVF*, March 7, 2016.
http://www.californiaivf.com/fertility_preservation_egg_freezing.html.

- Cattapan, Alana, Kathleen Hammond, Jennie Haw, and Lesley A. Tarasoff. "Breaking the Ice: Young Feminist Scholars of Reproductive Politics Reflect on Egg Freezing." *International Journal of Feminist Approaches to Bioethics* 7, no. 2 (2014): 236–47.
- Chen, Christopher. "Pregnancy After Human Oocyte Cryopreservation." *The Lancet*, April 19, 1986.
- Christman, John. "Autonomy in Moral and Political Philosophy." *Stanford Encyclopedia of Philosophy*. Stanford University, n.d. <http://plato.stanford.edu/entries/autonomy-moral/>.
- Clouser, K. Danner, and Bernard Gert. "A Critique of Principlism." *Journal of Medicine and Philosophy* 15, no. 2 (1990): 219–36.
- Cobo, Ana, Marcos Meseguer, Jose Remohi, and Antonio Pellicer. "Use of Cryo-Banked Oocytes in an Ovum Donation Programme: A Prospective, Randomized, Controlled, Clinical Trial." *Human Reproduction Update* 25, no. 9 (2010): 2239–46.
- Cobo, Ana, Javier Domingo, Sonia Pérez, Juana Crespo, José Remohí, and Antonio Pellicer. "Vitrification: An Effective New Approach to Oocyte Banking and Preserving Fertility in Cancer Patients." *Clinical and Translational Oncology* 10, no. 5 (May 2008): 268–73. doi:10.1007/s12094-008-0196-7.
- Crisp, Roger. "Persuasive Advertising, Autonomy, and the Creation of Desire." *Journal of Business Ethics* 6, no. 5 (1987): 413–18.
- Dellenbach, P., I. Nisand, L. Moreau, B. Feger, C. Plumere, P. Gerlinger, B. Brun, and Y. Rumpler. "Transvaginal, Sonographically Controlled Ovarian Follicle Puncture for Egg Retrieval." *The Lancet* 323, no. 8392 (1984): 1467.
- Dyer, Allen R. "Ethics, Advertising, and Assisted Reproduction: The Goals and Methods of Advertising." *Women's Health Issues* 7, no. 3 (1997): 143–48.
- Edgar, D. H., and D. A. Gook. "A Critical Appraisal of Cryopreservation (slow Cooling versus Vitrification) of Human Oocytes and Embryos." *Human Reproduction Update* 18, no. 5 (September 1, 2012): 536–54. doi:10.1093/humupd/dms016.
- Edwards, RG. "The History of Asisted Human Conception with Especial Reference to Endocrinology." *Endocrinology & Diabetes* 104 (1996): 183–204.
- Ellison, Brooke, and Jaymie Meliker. "Assessing the Risk of Ovarian Hyperstimulation Syndrome in Egg Donation: Implications for Human Embryonic Stem Cell Research." *The American Journal of Bioethics* 11, no. 9 (September 2011): 22–30. doi:10.1080/15265161.2011.593683.

- Garner, Ruth, Mark G. Gillingham, and C. Stephen White. "Effects Of 'seductive Details' on Macroprocessing and Microprocessing in Adults and Children." *Cognition and Instruction* 6, no. 1 (1989): 41–57.
- Ginsburg, Ruth Bader. "Some Thoughts On Autonomy and Equality in Relation to Roe v Wade." *North Carolina Law Review* 63 (1985 1984): 375–86.
- Goold, Imogen, and Julian Savulescu. "In Favour Of Freezing Eggs For Non-Medical Reasons." *Bioethics* 23, no. 1 (January 2009): 47–58. doi:10.1111/j.1467-8519.2008.00679.x.
- Groll, Daniel. "What Health Care Providers Know: A Taxonomy of Clinical Disagreements." *Hastings Center Report* 41, no. 5 (September 2011): 27–36.
- Guest, David E. "Perspectives on the Study of Work-Life Balance." *Social Science Information* 41, no. 2 (2002): 255–79.
- Gurmankin, Andrea D., Dominic Sisti, and Arthur L. Caplan. "Embryo Disposal Practices in IVF Clinics in the United States." *Politics and the Life Sciences*, 2003, 4–8.
- Harwood, Karey. "Egg Freezing: A Breakthrough for Reproductive Autonomy?" *Bioethics* 23, no. 1 (January 2009): 39–46. doi:10.1111/j.1467-8519.2008.00680.x.
- Harwood, Tracy G., and Tony Garry. "An Overview of Content Analysis." *The Marketing Review* 3, no. 4 (2003): 479–98.
- Hill, E. Jeffrey, Brent C. Miller, Sara P. Weiner, and Joe Colihan. "Influences of the Virtual Office on Aspects of Work and Work/life Balance." *Personnel Psychology* 51, no. 3 (1998): 667–83.
- Hodes-Wertz, Brooke, Sarah Druckenmiller, Meghan Smith, and Nicole Noyes. "What Do Reproductive-Age Women Who Undergo Oocyte Cryopreservation Think about the Process as a Means to Preserve Fertility?" *Fertility and Sterility* 100, no. 5 (November 2013): 1343–49.e2. doi:10.1016/j.fertnstert.2013.07.201.
- Hsieh, H.F., and Shannon, S.E. "Three Approaches to Qualitative Content Analysis." *Qualitative Health Research* 15, no. 9 (November 1, 2005): 1277–88. doi:10.1177/1049732305276687.
- Hume, David. *A Treatise of Human Nature*, 1740.
- Inhorn, Marcia. "Women, Consider Freezing Your Eggs." *CNN*, April 9, 2013. "IVF Cycle Details - In Vitro Process - Fertility Treatment at Los Angeles USC Fertility," 2016. <http://usc fertility.org/fertility-treatments/ivf-cycle-details/>.

- Johnson, Katherine M. “Excluding Lesbian and Single Women? An Analysis of U.S. Fertility Clinic Websites.” *Women’s Studies International Forum* 35, no. 5 (September 2012): 394–402. doi:10.1016/j.wsif.2012.05.002.
- Kuwayama, Masashigue. “Highly Efficient Vitrification Method for Cryopreservation of Human Oocytes.” *Reproductive BioMedicine Online* 11, no. 3 (July 15, 2005): 300–308.
- Livingston, Gretchen. “Among 38 Nations, U.S. Is the Outlier When It Comes to Paid Parental Leave,” December 12, 2013. <http://www.pewresearch.org/fact-tank/2013/12/12/among-38-nations-u-s-is-the-outlier-when-it-comes-to-offering-paid-parental-leave/>.
- Marrs, R, K Parenicka, J Vargyas, G. Ringler, and B. Stone. “Use of Human Menopausal Gonadotropins (hMG) and Leuprolide Acetate or Ganirelix Acetate in Poor Responder Patients.” *Fertility and Sterility* 76, no. 3 (2001): S236.
- McCarthy, Joan. “Principlism or Narrative Ethics: Must We Choose between Them?” *Medical Humanities* 29, no. 2 (2003): 65–71.
- Morozov, Evgeny. *To Save Everything, Click Here: The Folly of Technological Solutionism*. New York: PublicAffairs, 2014.
- Neumann, Peter J. “Should Health Insurance Cover IVF? Issues and Options.” *Journal of Health Politics, Policy and Law* 22, no. 5 (1997): 1215–39.
- O’Connor, Cliodhna. “The Brain in Society: Public Engagement with Neuroscience.” UCL (University College London), 2014. <http://discovery.ucl.ac.uk/1420495/>.
- O’Donovan, Oliver, Ali Al Chami, and Melanie Davies. “Ovarian Hyperstimulation Syndrome.” *Obstetrics, Gynaecology & Reproductive Medicine* 25, no. 2 (2015): 43–48.
- Oudendijk, J. F., F. Yarde, M. J. C. Eijkemans, F. J. M. Broekmans, and S. L. Broer. “The Poor Responder in IVF: Is the Prognosis Always Poor? A Systematic Review.” *Human Reproduction Update* 18, no. 1 (January 1, 2012): 1–11. doi:10.1093/humupd/dmr037.
- Paramanatham, Janani, Alon J. Talmor, Tiki Osianlis, and Gareth C. Weston. “Cryopreserved Oocytes: Update on Clinical Applications and Success Rates.” *Obstetrical & Gynecological Survey* 70, no. 2 (2015): 97–114.
- Parker, Kim. “Working-Mom Guilt? Many Dads Feel It Too,” April 1, 2015.
- Petropanagos, Angel. “Reproductive ‘Choice’ and Egg Freezing.” In *Oncofertility*, edited by Teresa K. Woodruff, Laurie Zoloth, Lisa Campo-Engelstein, and Sarah Rodriguez,

156:223–35. Boston, MA: Springer US, 2010. http://link.springer.com/10.1007/978-1-4419-6518-9_17.

“Position Statement on Egg Freezing.” Canadian Fertility and Andrology Society, October 21, 2014.

Ramanathan, Lavanya. “Egg Freezing’s Popularity Is Booming, but It’s a Choice That Offers No Guarantees.” *The Washington Post*, November 20, 2014. https://www.washingtonpost.com/lifestyle/style/egg-freezings-popularity-is-booming-but-its-a-choice-that-offers-no-guarantees/2014/11/20/6b28752c-6b5b-11e4-9fb4-a622dae742a2_story.html.

Richards, Sarah E. “We Need to Talk About Our Eggs.” *New York Times*, October 22, 2012.

———. “Why I Froze My Eggs (And You Should, Too).” *The Wall Street Journal*, May 3, 2013.

Roberts, Dorothy E. “The Social Context of Oncofertility.” *DePaul Law Review* 61 (2012): 777.

Ruhm, Christopher. “Parental Leave and Child Health,” n.d.

———. “The Economic Consequences of Parental Leave Mandates: Lessons From Europe,” n.d.

Seward, Rudy Ray, Dale E. Yeatts, and Lisa K. Zottarelli. “Parental Leave and Father Involvement in Child Care: Sweden and the United States,” 2002.

Shmorgun, Doron, and Paul Claman. “The Diagnosis and Management of Ovarian Hyperstimulation Syndrome.” Joint SOGC-CFAS Clinical Practice Guideline, November 2011.

Siegler, Mark. “The Progression of Medicine: From Physician Paternalism to Patient Autonomy to Bureaucratic Parsimony.” *Archives of Internal Medicine* 145 (1985).

Skolnick Weisberg, Deena, Frank C. Keil, Joshua Goodstein, Elizabeth Rawson, and Jeremy R Gray. “The Seductive Allure of Neuroscience Explanations.” *Journal of Cognitive Neuroscience* 20, no. 3 (2008): 470–77.

Steinhart, B. “Patient Autonomy: Evolution of the Doctor–patient Relationship.” *Haemophilia* 8 (2002): 441–46.

Stemler, Steve. “An Overview of Content Analysis.” *Practical Assessment, Research & Evaluation* 7, no. 17 (2001): 137–46.

- Sundström, Marianne, and Ann-Zofie E. Duvander. "Gender Division of Childcare and the Sharing of Parental Leave among New Parents in Sweden." *European Sociological Review* 18, no. 4 (2002): 433–47.
- The American College of Obstetricians and Gynecologists. "Committee Opinion: Oocyte Cryopreservation." The American College of Obstetricians and Gynecologists, January 2014.
- The Practice Committees of the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology. "Mature Oocyte Cryopreservation: A Guideline." *Fertility and Sterility* 99, no. 1 (January 2013): 37–43.
doi:10.1016/j.fertnstert.2012.09.028.
- Turner, Leigh. "Bioethics in a Multicultural World: Medicine and Morality in Pluralistic Settings." *Health Care Analysis* 11, no. 2 (2003): 99–117.
- Urist, Jacoba. "There's More to Life Than Freezing Your Eggs." *The Atlantic*, May 14, 2014.
<http://www.theatlantic.com/health/archive/2013/05/theres-more-to-life-than-freezing-your-eggs/275812/>.
- USC Fertility. "IVF Cycle Details." *USC Fertility*, 2016. <http://uscfertility.org/fertility-treatments/ivf-cycle-details/>.
- Waldfogel, Jane. "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?" *Journal of Labor Economics* 16, no. 3 (July 1998): 505–45. doi:10.1086/209897.
- Weber, R.P. *Basic Content Analysis*. 2nd ed. Newbury Park, n.d.
- Wildman, Sarah. "Stop Time." *New York Magazine*, n.d.