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Sleepwalking Into Infertility: The Need for a Public Health Approach Toward Advanced Maternal Age

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In Western countries today, a growing number of women delay motherhood until their late 30s and even 40s, as they invest time in pursuing education and career goals before starting a family. This social trend results from greater gender equality and expanded opportunities for women and is influenced by the availability of contraception and assisted reproductive technologies (ART). However, advanced maternal age is associated with increased health risks, including infertility. While individual medical solutions such as ART and elective egg freezing can promote reproductive autonomy, they entail significant risks and limitations. We thus argue that women should be better informed regarding the risks of advanced maternal age and ART, and that these individual solutions need to be supplemented by a public health approach, including policy measures that provide women with the opportunity to start a family earlier in life without sacrificing personal career goals.

Keywords: advanced maternal age, assisted reproductive technologies, egg freezing, empowerment, reproductive autonomy

In Western societies today, where women enjoy a greater level of equality and play a more significant role in the work force than ever before, delayed motherhood has become prevalent. While women’s most fertile years are in their early and mid 20s, this is a time in their lives when they often wish—and are socially expected—to invest in education, career building, and financial stability. This turns the biologically ideal window of time for reproduction into a challenging time to start a family, putting the socially ideal timing to start a family out of synch with the biologically ideal timing to do so.

As increasing numbers of women choose to postpone childbirth until later in life, most Western countries are witnessing shifts in average maternal age at birth (McDonald 2002; Hadfield 2007; Liu and Case 2011; Wyndham, Marin Figueira, and Patrizio 2012). For instance, between 1973 and 2006, the United States experienced a sixfold increase in the number of women giving birth for the first time at age 35–39 years, and the number of American women giving birth for the first time between 40 and 44 years quadrupled between 1985 and 2012 (Mathews and Hamilton 2014). Similarly, between 1987 and 2005, Canada experienced an almost threefold increase in the proportion of first-time mothers over 35 years (Liu and Case 2011), and the proportion of Canadian women giving birth in their early forties doubled between 1988 and 2008 (Daniluk and Koert 2012). A number of factors explain this tendency. One is social progress (McDonald 2002; Hadfield 2007; Friese 2008) and the move toward gender equality that empowers women, allowing them to benefit from more academic and professional opportunities. Another factor is the development of new and more efficient contraceptive methods coupled with increased social acceptance of contraception and the availability of safe and legal abortion, which enhance reproductive autonomy by allowing women to have greater control over their reproductive outcomes (Fidler and Bernstein 1999; Commission for the Ethics of Science and Technology 2009). Finally, the development and continuous improvement of assisted reproductive technologies (hereafter ART), coupled with their positive portrayal in the media, promote a widespread notion that women can now conceive and give birth later in life than before, completing the social perception of women as having almost unlimited reproductive autonomy (Fidler and Bernstein 1999; Friese 2008; Wyndham, Marin Figueira, and Patrizio 2012).

At the same time, studies show that despite this trend toward postponed motherhood, most people still identify the late 20s as the ideal time to become parents (Daniluk and Koert 2012) and that many women who chose to postpone pregnancy until the age of 35–40 report, in retrospect, experiencing regrets about this decision (Daniluk, Koert, and Cheung 2012). Studies have also shown that despite below-replacement-level fertility rates, the fertility desires of men...
and women, on average, do come very close to the 2.1 threshold of replacement level (Duvander, Ferrarini, and Thalberg 2005). These findings indicate a discrepancy between couples’ fertility ideals and their reality, suggesting that external forces may be driving them in the direction of delaying childbirth and thus that advanced maternal age (hereafter AMA) may not be entirely a matter of personal preference. Some authors point to contributing factors such as social acceptance of later parenthood and overestimation of ART’s ability to compensate for age-related fertility decline (Daniluk and Koert 2012) as examples of such external forces. Others have identified workplace and economic pressures on young couples (McDonald 2002; Miller 2011; Mills et al. 2011), or gender inequality in parental leave uptake (Duvander, Ferrarini, and Thalberg 2005).

Therefore, AMA is not just an individual preference but rather is an outcome of underlying social forces. This raises challenges for women’s reproductive autonomy. Yet solutions that are usually proposed to mediate its impacts are individual and medical in nature. They usually consist of various forms of ART and, more recently, elective egg freezing. For instance, Apple and Facebook recently announced that they would fund egg freezing for female employees who wish to postpone motherhood to concentrate on their careers. Whether ART in general promotes reproductive autonomy is a highly debated question.1

In this article, we aim to demonstrate why the social issue of AMA is not appropriately addressed by such individual medical solutions alone. First, AMA entails significant health risks regarding which the public is not adequately informed. Second, ART involves medical risks, as well as inequalities in access. Third, ART—as the only solution to AMA—does not address the social pressures imposed on women and couples to delay parenthood. In the second section, we aim to show that despite certain challenges, AMA can be successfully and ethically addressed as a social concern, and more specifically as a public health issue. We identify opportunities for prevention and health promotion that are in keeping with the notion of empowerment. In doing so, we acknowledge ART as potentially enhancing reproductive autonomy. That is, individual medical solutions such as in vitro fertilization (IVF) and egg freezing should be offered as part of a broader range of measures aiming to promote reproductive autonomy, measures that are not only technological but also social and political.

**ETHICAL CHALLENGES: OFFERING INDIVIDUAL AND MEDICAL SOLUTIONS TO A SOCIAL PROBLEM**

ART and elective egg freezing are often portrayed and perceived as appropriate solutions to age-related infertility. Indeed, they are thought to promote reproductive autonomy in that they open up options for women to start their families at a time that suits their values, goals, and preferences (Dondorp et al. 2012; Capps et al. 2013). In the case of egg freezing, they are also thought to promote gender equality by extending women’s reproductive cycle and somewhat closing the gap with men’s reproductive capacity (Dondorp et al. 2012). However, the increased use of these technologies to overcome age-related infertility or to extend the female reproductive cycle also raises some serious ethical concerns. In addition, they fail to address the risks associated with AMA for those who do achieve a spontaneous pregnancy.

**Advanced Maternal Age and Risks for Mother and Child**

While the trend toward delaying pregnancy gains momentum throughout the Western world, AMA carries significant health risks, even when pregnancy is achieved spontaneously. Women who are pregnant at an older age run higher risks of ectopic pregnancy; fetal death and pregnancy loss; obstetric complications such as preeclampsia, gestational diabetes, and delivery by cesarean section; preterm delivery; low birth weight; and chromosomal abnormalities in the offspring (Hoffman et al. 2007; Liu and Case 2011). Multiple births are also more common in older mothers, even when they conceive spontaneously (Beemsterboer et al. 2006). In addition to obstetrical complications, conditions such as cerebral palsy, developmental delay, learning disability, sensory impairment, language delay, and attention and behavioral problems have higher incidence in twins (Deandon 2010). While most attention is paid to the risks of maternal age, paternal age, often correlated with maternal age, is also associated with higher risks of negative outcomes such as ART failure, miscarriage (Balasch 2010), autism and schizophrenia (Kong et al. 2012).

These risks of delaying pregnancy are not widely known. A recent study showed that even in a highly educated population, at least 50% of couples do not have sufficient knowledge of the risks of AMA to make an informed decision regarding reproduction. The authors conclude that public and corporate education, social marketing, health promotion, and reproductive counselling are required in order to promote informed decisions (Tough et al. 2007).

**“Sleepwalking into Infertility”: Increased Risk of Infertility, Associated Need for ART, and Lack of Awareness**

AMA is strongly associated with increased rates of infertility. Natural conception leading to a live birth occurs within a year of trying to conceive for 75% women at 30, 66% at...
35, and 44% at 40 years of age (Leridon 2004). Delayed pregnancy thus means increased use of ART, which is usually indicated after 1 year of unsuccessfully trying to conceive (Soini et al. 2006). ART are commonly understood to include procedures such as ovarian stimulation, artificial insemination, in vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI), and preimplantation genetic diagnosis (PGD). These procedures can be performed with or without sperm or egg donation, but egg donation is usually recommended for women over the age of 45 due to extremely low success rates of IVF if the women's own eggs are used (Marinakis and Nikolaou 2012).

ART now also offers a new option that allows women to plan ahead for a delayed pregnancy. Egg freezing is a technique that allows long-term storage of eggs in subzero temperatures. This technique can be used in IVF when more eggs are retrieved than needed for reproduction, or as a means of fertility preservation in the case of patients suffering from a condition or undergoing a treatment that might compromise their fertility, such as chemotherapy. Elective egg freezing, however, is a novel use of the same technique by healthy young women who freeze their own eggs to increase their chance of conceiving a child with IVF later in life, if needed. Although no reliable data are available, it is believed that to date, hundreds of babies have been born worldwide as a result of elective egg freezing (Stoop, Cobo, and Silber 2014). Considering that for many women in their 40s, an egg donation from a younger donor is required for a successful use of IVF, elective egg freezing may be described as “self-donation” where the young donor and the older recipient are in fact the same woman.

ART and elective egg freezing do not guarantee success in achieving a pregnancy later in life. In fact, for many women, they represent false hopes. The success rate of ART decreases with maternal age. While 37.4% of fertility patients aged below 35 years achieve a live birth after a cycle of IVF and ICSI with their own eggs, 26.5% of those aged between 35 and 39 achieve the same result, and the number drops to 11.4% at age 40 and above (Gunby 2011). These statistics respectively rise to 50.0%, 36.5%, and 33.5% when donated eggs are used (Gunby 2011). However, egg donation entails a host of other implications, such as the difficulty and cost of obtaining donor eggs and the absence of genetic link with offspring. It also raises the ethical issues involved in prospective offspring interest in knowing their genetic origins (Ravitsky 2010). Elective egg freezing may also increase the success rate of IVF for older women, but this technique is far from being able to guarantee success and some have expressed concerns that it thus represents a “false promise” of preserving fertility, and may actually contribute to women’s decision to wait longer to start a family (Dondorp et al. 2012; Capps et al. 2013; Practice Committees of American Society for Reproductive Medicine 2013).

Studies have shown that the general population also tends to overestimate ART’s capacity to overcome infertility (Lampic et al. 2006; Tydén et al. 2006; Maheshwari et al. 2008). For instance, 59% of women did not suspect that ART were less effective at 40 than at 30 (Maheshwari et al. 2008). The authors highlight the need to better inform the general public in order to promote informed decision making, but note that the best way to do so is yet to be identified (Maheshwari et al. 2008).

Media coverage of ART also contributes to the manufacturing of false hopes, as it tends to focus on success stories much more than on failures or on the risks of AMA and infertility treatments (Bachrach 2006; Cooke 2010). Moreover, women today exercise an unprecedented degree of reproductive autonomy and may be tempted to confound its two meanings: While contraception and legal safe abortion facilitate the choice not to pursue an undesired pregnancy, reproductive technologies do not guarantee women the ability to have a child whenever they desire (Friesoe 2008; Wyndham, Marín Figueira, and Patrizio 2012).

**Medical Solutions Entail Medical Risks: Risks Associated With ART**

ART and elective egg freezing are problematic solutions to age-related infertility because they involve medical risks. As women undergoing IVF and women acting as egg donors, women undergoing elective egg freezing are exposed to the risks involved in ovarian stimulation and egg retrieval, which include ovarian hyperstimulation syndrome (OHSS), adnexal torsion, thrombo-embolic complications, and bleeding and infection of the reproductive system (Vloeberghs et al. 2009). These conditions account for approximately 2% of women undergoing the procedures, and they can be life-threatening (Vloeberghs et al. 2009). Hormonal stimulation was long thought to increase the risks of breast, uterine, and ovarian cancer (Deonandan 2010). Recent data suggest that this hypothesis may not be founded, but further longitudinal and comparative research is needed to confirm these results (Sergentanis et al. 2013; Siristatidis et al. 2013; Diergaarde 2014). In addition to these health risks, pregnancies resulting from ovarian stimulation (thus including most IVF pregnancies) present an increased prevalence of complications such as placenta previa, gestational diabetes, preeclampsia, and fetal heart-rate variability (Fortunato and Tosti 2011). It is not clear whether these complications would apply to elective egg freezing, as in these cases pregnancy occurs many years after ovarian stimulation. While the benefits of successful IVF treatment in infertile women are widely considered to outweigh these risks, this calculation is not as clear for elective egg freezing, given that many women may end up never using the retrieved and frozen eggs (Dondorp et al. 2012). And while eggs frozen as a measure of fertility preservation for cancer patients may not be used either, the immediate threat to fertility caused by cancer treatment is generally considered to justify the risks involved in retrieving those eggs (Capps et al. 2013).

Studies have also found a mild increase in the prevalence of many health conditions in children conceived through ART. This phenomenon was first attributed to the
increased rate of multiple births, and elective single embryo transfer (e-SET) policies helped reduce these risks, especially in countries with reimbursement schemes for ART (Pinborg et al. 2013). However, high rates of multiple births continue to be an issue in countries that have not adopted a strict e-SET policy, with 30 to 50% of multiple births resulting from ART (Savage et al. 2011). Moreover, studies are now showing that singleton babies born as a result of ART also carry increased risks for certain complications and conditions (Pinborg et al. 2013). ART singleton births present up to threefold increase in rates of obstetrical complications such as preterm birth and low birth weight (Steel and Sutcliffe 2009) and a twofold increase in prevalence of congenital abnormalities for singletons born after IVF with or without ICSI. Such birth defects include musculoskeletal, cardiovascular, urogenital, and chromosomal anomalies (Steel and Sutcliffe 2009). These impacts may be attributable to phenomena occurring at the various steps of assisted conception, such as ovarian stimulation and embryo manipulation, conservation, freezing, and thawing, but they may also result directly from the condition causing the infertility in the first place (Soini et al. 2006; Steel and Sutcliffe 2009). In addition, ART are thought to involve genetic and epigenetic consequences that remain unclear due to a lack of longitudinal research. For instance, problems related to epigenetic changes and gene-imprinting defects that can be passed to the next generation have been shown to be more prevalent in ART-conceived children (Soini et al. 2006; van Montfoort et al. 2012). Using egg donation may eliminate some of these ART-related risks.

ART is also associated with a variety of psychosocial price tags. Women undergoing IVF have higher rates of anxiety and negative self-image and they present decreased satisfaction with their marital and familial functioning (Deonandan 2010). This phenomenon is exacerbated by the fact that many women undergoing treatment never achieve a pregnancy (Deonandan 2010).

In 2013, the American Society for Reproductive Medicine (ASRM) stated that egg cryopreservation should no longer be considered experimental, although it did not endorse its routine elective use in women without fertility issues wishing to extend their reproductive window “because there are no data to support the safety, efficacy, ethics, emotional risks, and cost-effectiveness of oocyte cryopreservation for this indication” (The Practice Committees of the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology 2013). However, the European Society of Human Reproduction and Embryology (ESHRE) in Europe stated that it did not find convincing arguments against the elective use of the technique, but stressed the importance of providing accurate information on effectiveness and risks to women choosing this option (Dondorp et al. 2012). These recommendations received much media attention (Hodgkiss 2012; Revelant 2013), making elective egg freezing a hotly debated issue.

Elective egg freezing is controversial because it involves an invasive risky procedure performed on a healthy woman, who is not undergoing IVF for fertility treatment nor facing medical risks to her future fertility, except the typical reduced quality of older eggs. These risks must be understood in the context of limited data on how the use of previously frozen eggs impacts the chance of conception, perinatal outcomes, and the long-term health of offspring.

### Individual Solutions Raise Equity Concerns

ART and elective egg freezing as solutions to age-related infertility are not equally accessible to all women who might need them. These technologies are expensive and they are not covered, or only partially covered, in most jurisdictions. Even in the 15 U.S. states that mandate insurance coverage for infertility treatment, there are inequities in access across socioeconomic groups (Bitler and Schmidt 2012). A cycle of IVF costs between $8000 and $12,000 (Hughes and Giacomini 2001; Macaluso et al. 2010), and in most cases, more than one cycle is required to achieve a live birth (Luke et al. 2012). The financial burden created by ART thus makes it beyond the reach of many women and forces some into debt, adding to the stress associated with infertility (Spar 2006).

The phenomenon of AMA as an infertility cause can be arguably seen as a social disparity in itself. Studies have shown that AMA is the most prevalent infertility cause among highly educated and socioeconomically advantaged women, while sexually transmitted diseases are the lead cause in lower socioeconomic and less educated groups (Terava et al. 2008; Bell 2010). This is a public health concern in itself that is beyond the scope of this article, and we addressed it elsewhere (Lemoine and Ravitsky 2013). While one could be tempted to conclude that given this state of affairs, every woman who has postponed motherhood has the financial means to afford IVF or egg freezing, this is not necessarily true, as having completed long studies or having invested in one’s career does not necessarily guarantee a large income. Therefore, even within the AMA group, there can be disparities in capacity to afford ART when funding is not public or insurance not legally mandated. Moreover, in many countries that do publicly fund IVF, there are restrictions related to maternal age at the time of treatment, so that cost remains a barrier to access for many older women. For instance, Finland and the Netherlands set the upper age limit for treatment as low as 40 (Agence de la biomédecine 2012). Finally, some countries that do publicly fund IVF, such as Germany and France, set criteria with regards to social and marital status such that only “stable” heterosexual couples with a

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3. Feminist literature on ART has often stressed the fact that in cases of male factor infertility, women are subjected to medical risks when they are not infertile themselves (Lorber 1989). This goes beyond the scope of this article. Here, we view the “parental project” as a shared experience, and infertility as a social condition that can affect couples, not only as a medical condition that can affect individuals.
medical infertility diagnosis have access (Agence de la biomedicine 2012). Hence, even within the group of women affected by AMA-related infertility, when ART is the only solution, disparities in access to treatment cause inequities.

**Individual Solutions Fail to Address Social Problems**

ART and elective egg freezing offer individual solutions to a social problem, putting “the onus of the problem” on women as individuals (Farrell 2012) rather than on society as a whole. As solutions to age-related infertility, they “obscure the social and economic circumstances as to why childbearing may be deferred by many women” (Capps et al. 2013, 18), failing to address the tremendous social pressures experienced by younger women to establish themselves before becoming mothers. As an example of such pressures, Peter McDonald (2002) points to cultural barriers existing in the labor market:

> There is a very strong tendency among those in main-stream jobs to protect their rights in the welfare system. The result is an insider-outsider labour market in which the insiders tend to be middle-aged males and the outsiders are women and younger people. The safest strategy for women and young people is to become “insiders” and to delay or eschew family formation. . . . In order to protect themselves from risk, individuals must maximize their utility to the market. This means that the need to focus upon the acquisition of saleable skills, work experience and a marketable reputation. At the same time, they need to accumulate savings or wealth as a personal safety net. They also need to maintain flexibility of time and place so that they can react to opportunities as these arise. The risk-averse individual in a world that rewards market production is unwise to devote time or money to social reproduction. (McDonald 2002, 430)

This “boys’ club” culture is arguably the motive behind the recent introduction of corporate-funded elective egg freezing for female employees. It may seem, at first sight, to enhance reproductive autonomy, but a possible motive behind it is that it is easier to find technological ways to (temporarily) welcome women into the current cultural structure, than to change the culture itself in order to appropriately accommodate the real needs of young women, thus allowing them to choose motherhood at a variety of ages.

This cultural accommodation is precisely what is missing in most work environments, as outlined by Mills et al.:

> Women’s employment leads to postponement of childbearing when institutional constraints are large, such as the lack of childcare, low benefit levels or gender-segregating policies that, as Neyer argues, signal to women that it might be difficult, if not impossible, to combine employment and motherhood. (Mills et al. 2011, 854)

Moreover, by not addressing the underlying issues related to corporate culture, elective egg freezing focuses attention on the element of fertility and conception, but neglects the more difficult issues raised by child-rearing, or motherhood broadly speaking. While it may allow some women to conceive at a later age, it postpones the dilemma women face regarding taking time off or slowing down their careers for family building until a time when they are even higher up the corporate ladder. At this later stage, family–work balance is unlikely to be less challenging, in the absence of a supporting culture.

Studies have shown that delaying motherhood does, generally, improve employment opportunities and wage conditions for working women, especially those in the highly educated, upper class category (Miller 2011; Mills et al. 2011). The current message socially sent to young women is therefore that in order to be a responsible mother they should first invest in education, in establishing a career, and in attaining financial and relationship stability. However, the expectation is that they do end up having children and that they assume the role of primary caregiver, as opposed to men, who are expected to have children while continuing to be the primary breadwinner, thus pursuing and achieving their career goals (Berdahl and Moon 2013). In light of these pressures, the choice to delay motherhood must be understood not solely in individualistic terms as a mere personal preference, but rather in the context of the social reality of today’s Western societies. These “social determinants of maternal age” point to the need for socially based measures toward AMA in the form of risk mediation and creation of favorable conditions for childbearing, as a means to improve public health, given that AMA has negative impacts on health (as seen previously):

> Our social practices as well as our social and physical environment are important determinants of the health of all members of the public. These environmental factors in the widest sense of the term encompass risks (and also health enhancing factors) that are in a sense ‘open to all’. A society in which such health risks are relatively well contained, and in which health enhancing factors are well developed, can be said to have a stronger public health compared to other societies. (Verweij and Dawson 2007, 24).

From this perspective, ART and elective egg freezing fail to address the social dimensions of the problem of AMA in terms of policies that would allow women to choose motherhood earlier in life, such as paid maternity leave, subsidized child care, and family-friendly work environments.

**Toward Social Solutions to a Social Problem**

This article does not aim to make a case for limiting ART use and access. ART indeed have the potential to enhance

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4. It could be argued that, to some degree, most individual preferences are shaped by social factors. We would respond that when socially shaped individual preferences negatively affect health, they are often targeted by social initiatives. For instance, smoking, unhealthy diet, and alcohol and drug consumption are individual preferences that are shaped by social factors and addressed by health promotion initiatives.
reproductive autonomy, at least in the sense that they open up opportunities and often help people achieve their personal goals, and as such should remain an option to any woman or couple who chooses to use them. However, we aim to demonstrate that it should not be the one and only intervention addressing the issues raised by the growing prevalence of delayed parenthood. We argue in favor of a public health approach to AMA, as a means of addressing it as a social issue, not just an individual one. We argue that more attention should be paid to preventive measures in informing the general population regarding the shortcomings of AMA and of ART, to promote informed decision making in reproduction. We also maintain that health promotion measures should be in place to allow those who wish to do so to start their family earlier in life, as a means of reducing the health risks associated with AMA and with ART.

A PUBLIC HEALTH APPROACH TOWARD ADVANCED MATERNAL AGE

In 2005 the French High Council for Population and Family suggested including AMA in the public health agenda. The proposition stemmed from four factors: (1) a concern about the French population growth slowing down due to an increased time gap between generations, (2) the increased prevalence of Down syndrome among older parents’ offspring, (3) the increased perinatal mortality and morbidity among older mothers and their offspring, and (4) the increased risk of infertility with advancing age. The council recommended that advanced maternal age be considered a public health concern and proposed various public health measures: (1) Foster scientific research regarding every aspect of the phenomenon, (2) foster discussions among specialists and create guidelines regarding pregnancy care of older mothers and the use of ART, (3) address AMA through public health agenda and laws, (4) educate medical staff and the general public, and (5) foster socioeconomic measures that would make it easier for couples to get ready for parenthood earlier in their lives (High Council for Population and Family 2005). This proposal demonstrated possible measures that governments can take in relation to AMA, while hinting at the social and ethical challenges such initiatives may raise, as discussed below.

Verweij and Dawson (2007) offer a conceptual framework for understanding public health, its scope and justifications. An issue can be appropriately labeled as a “public health issue” when it affects the “health of the public,” not just the health of individuals, and when “public” or collective interventions are required and likely to be effective. In this context, the “health of the public” has three dimensions: aggregate, distributive, and social/environmental (Verweij and Dawson 2007). The justifications put forward by the French Council fit well within this framework.

Advanced Maternal Age and the Aggregate, Distributive, and Social/Environmental Dimensions of Public Health

Based on the previously mentioned inherent risks AMA poses for women and offspring and the prevalence of delayed motherhood in Western societies, it is clear that AMA poses threats to aggregate health. To this we need to add the aggregate short- and long-term impacts of increased use of ART and its associated health risks, as discussed earlier. With regard to distributive health, we showed that ART as a sole solution involves inequities in access. Finally, as also seen earlier, the social and environmental dimension of the public’s health is also involved, as social structures and education/work environments shape the context in which individuals make decisions about the appropriate timing to start their families. It is thus the social context that creates barriers to having children earlier in life, a choice that could prevent the negative outcomes of postponed parenthood. Hence, AMA has implications for all three dimensions of “the health of the public.”

Advanced Maternal Age as Requiring Public/Collective Intervention

Verweij and Dawson present a second meaning of “public” in “public health”: the public or collective nature of the required interventions, such as interventions conducted by institutions, organizations, or by the government itself (Verweij and Dawson 2007). In the case of AMA, governments do have the power and expertise to legislate as suggested by the French Council (described earlier). While research and guidelines regarding ART use have been initiated in many countries by professional societies (National Collaborating Centre for Women’s and Children’s Health 2012; Canadian Fertility and Andrology Society 2015), governments may take the process one step further by developing policies to ensure that these guidelines are observed in clinical settings and that research and monitoring are carried out regarding the outcomes of ART. Research and guidelines regarding AMA in the context of ART use appear scant. As demonstrated earlier, research shows that the general population is not well informed regarding the implications of delaying childbirth, so that education can be another effective tool implemented by the government to promote awareness. Finally, governments can establish socioeconomic measures that promote earlier parenthood. Such an approach is supported in the literature (Soini et al. 2006).

Such measures are currently implemented in varying degrees in some countries. While they may be aimed at increasing birth rates altogether rather than specifically at promoting earlier parenthood, these two variables are closely intertwined since there is a direct correlation between age at first birth and the total number of children.
for the same mother (Mills et al. 2011). The effectiveness of existing measures is reviewed in a later section of this article.

In light of the preceding, we argue that AMA should be considered a public health issue that deserves attention and intervention. While research and monitoring are extremely important, this article focuses on the public health aspects of prevention and health promotion. While delaying childbirth despite associated risks is a personal choice that is in no way condemnable, the principle of autonomy requires that this choice be informed. Hence, interventions that inform the population of the risks associated with AMA are necessary and justified. At the same time, such interventions can only be appropriate if and when the ethical and social challenges they raise have been appropriately addressed, as discussed next.

**Advanced Maternal Age: The Challenge of Social Backlash**

The progress made in the area of gender equality and the expansion of women's reproductive autonomy have immense social and individual value. Consequently, attempts to raise awareness of the benefits of childbearing at a younger age may be very poorly received. They may be perceived as endorsing a limitation of women's reproductive autonomy (Commission for the Ethics of Science and Technology 2009) and as an invasion of their privacy.

The sensitivity and complexity of this problem can be illustrated through the strong reactions elicited by the 2005 French Council’s recommendation. For instance, the secretary of the National College of Gynecologists and Obstetricians called the High Council’s discourse “paternalistic” and emphasized that this phenomenon is socially constructed and that women should not be blamed, and the chief of a Maternal Pathology department rejected the term “public health issue” and promoted a more individual-centered approach with closer care for older mothers (Blanchard 2005).

The French recommendation provoked reactions in Québec as well, where the President of the Council for Family and Children described the French approach as “alarmist and exaggerated” (Leduc 2005). The president of the Association of Obstetricians and Gynecologists of Québec compared advanced maternal age to population aging, as a social phenomenon entailing irreversible social cost but for which “we must avoid blaming anyone whatsoever” (Leduc 2005). Finally, a University of Montreal professor stated that Québec sees very negatively “any attempt of the government to intervene in what happens in people’s bedrooms” (Leduc 2005).

The issue reemerged in Québec in 2009 when the Commission for the Ethics of Science and Technology published its recommendations on ethics and assisted human reproduction (Commission for the Ethics of Science and Technology 2009), which included a prevention agenda for infertility with health promotion measures regarding AMA. Eventually, neither the French nor the Québec governments followed these recommendations and AMA remained unaddressed as a public health issue, as evidenced by the absence of a relevant mention in policy documents (Quebec Ministry of Health and Social Services 2010; Government of France 2012; Ministry of Social Affairs and Health of France 2012; Quebec Ministry of Health and Social Services 2012).

It is worth mentioning that a few years prior to these policy struggles, in 2001, the American Society for Reproductive Medicine (ASRM) had taken upon itself to develop a public information campaign on the main preventable causes of infertility, including AMA. The campaign caused a significant media outcry and many potential partners declined involvement due to the sensitive nature of the subject. The ASRM estimated that 99% of the media attention was directed toward the issue of maternal age, as opposed to the other elements of the campaign, namely, sexually transmitted infections, tobacco use, and unhealthy weight (Soules 2003).6

As seen through the preceding quotes, much of the criticism targeting the French Council’s statement revolved around the notion of blame. The same can be said regarding the critique of the ASRM campaign. While stakeholders stressed—in reaction to the French Council’s statement—that no individual should be blamed for the social phenomenon of AMA (Blanchard 2005; Leduc 2005), many infertile people did report feeling that they were being blamed for their infertility after seeing the ASRM campaign (Soules 2003; Morris 2012). Indeed, health education historically tended to stress individual factors at the expense of social and structural factors (Faden and Faden 1978; Guttmann and Salmon 2004). This failure to consider the cultural and socioeconomic contexts in which people make health decisions can result in a counterproductive “blame the victim approach” (Yeo 1993).

These policy and intervention struggles demonstrate the heightened social sensitivity of AMA and the challenges facing a public health approach. Hence, while public health interventions toward advanced maternal age are justified and likely to be effective, the social context makes it extremely challenging for governments or other organizations to tackle the issue without creating the perception of aiming to reduce women’s reproductive autonomy and without causing a social backlash.

**Advanced Maternal Age and the Ethics of Empowerment for Health Promotion**

We argue that including AMA in any kind of public health intervention, even a simple educational campaign, requires an ‘ethics of empowerment’ approach. Introduced by Michael Yeo in 1993, this health promotion approach demands that people be assigned a “prospective” responsibility for their own health, as opposed to a “retrospective” one. “Prospective responsibility” means that the responsibility attributed is for finding and operating a solution (while a

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6. For a more detailed analysis of the ASRM educational campaign, see Lemoine and Ravitsky (2013).
“retrospective responsibility” would mean that people are attributed responsibility for the problem). Hence, attributing a prospective responsibility does not entail the notion of “blaming the victim” for negative health outcomes (Yeo 1993). In addition, the ethics of empowerment requires that people be provided with concrete tools allowing them to act on the information that is provided in order to assume their prospective responsibility (Yeo 1993). Moreover, communities need to be involved in order to provide an appropriate social environment for individuals to implement change. Hence, it is not sufficient to inform people about the risks of AMA and suggest that they should take action to prevent infertility or adverse birth outcomes in their future, without providing them with concrete tools and educating communities toward the desired social change. Resources must be in place to allow them to take action despite the social forces that lead them in an opposite direction, and efforts must be made to mitigate the adverse outcomes of these social forces.

If designed correctly, public health interventions, such as the ASRM campaign to inform the population regarding known causes of infertility, which undoubtedly include AMA, do not necessarily entail the stigmatization or blame associated with retrospective responsibility. Using the right vocabulary, these initiatives can convey messages that reflect the attribution of prospective responsibility, as they encourage young individuals and couples to consider delaying parenthood in the context of all the associated risks. They can therefore be ethically justifiable (Lemoine and Ravitsky 2013). However, such interventions must be conducted in conjunction with the implementation of social measures targeting communities that would actually empower individuals and couples to become parents at a younger age by creating appropriate conditions and providing the necessary support. It is worth noting that both the Québec Commission and the French Council’s recommendations indeed reflected sensitivity to the ethics of empowerment.7 However it is also worth noting that “empowering” couples to become parents at an earlier stage of life should be seen as a means to promote reproductive autonomy and health, rather than as a means to boost birth rates or promote any other public agenda.

To determine what social measures are required, we first need to explore the reasons for which women tend to postpone childbirth. A meta-analysis of the factors influencing women’s decisions to delay childbearing found that for many women, it is important to be at the right point in their lives, having reached educational and career goals and arrived at a financially secure and stable lifestyle, before choosing to become mothers. Another factor mentioned is the need to be in a stable relationship. Many women preferred the support of a suitable partner before considering having a child (Cooke 2010).

These considerations can be generally divided into three categories: education and career concerns, financial concerns, and finding the right partner (Chapman, Driscoll, and Jones 2006). Public policy can affect two of these three: It can facilitate the removal of education and career related barriers to motherhood and create financial mechanisms to facilitate earlier motherhood. Concerns related to the difficulty of finding the right partner or to the lack of relationship stability are personal in nature and obviously beyond the scope of public policy measures.

In light of these reasons for delaying childbirth, the resources needed to support prospective responsibility for safeguarding fertility can be identified. First, measures are needed to facilitate work–life balance and to ease the economic pressure on young women and couples. Work–family balance requires several types of collaborative efforts by employers and governments. Generous and flexible parental leaves with the possibility of a gradual return to work, on-site care facilities for children, flexible work hours, availability of short-term leaves for family reasons, possibilities for working part-time or working from home, and policies on gender equality are good examples (McDonald 2002). Second, financial incentives should be created to allow individuals the choice of starting a family earlier in life. These can take the form of regular allowances, maternity grants, government loans, tax credits, tax deductions, subsidies for children’s goods and services, and housing assistance (McDonald 2002).

Mills and colleagues (2011) have extensively reviewed the literature and found conflicting evidence regarding the effectiveness of direct financial subsidies for childbirth. While earlier research in the 1990s yielded weak or absent relationships between direct payments and birth rates, more recent studies in Sweden, Israel, and Québec have shown significant positive effects. However, these results cannot be generalized (Mills et al. 2011). When it comes to indirect benefits such as tax exemptions, credits, or health care and housing policies, the data are also conflicting (Mills et al. 2011). However, policies aimed at allowing a healthy work–life balance have clearly proven to be effective. For instance, Sweden’s tradition of generous parental leave is one of the main contributors to the country’s highly favorable conditions with regards to families’ income, fertility levels, and women’s employment, compared to other countries (Duvander, Ferrari, and Thalberg 2005). Norwegian studies have also shown that increased availability of affordable quality child-care facilities increases the number of births to younger mothers (Rindfuss et al. 2007; Rindfuss et al. 2010). Hence, policy measures aiming to facilitate work–life balance are more

7. French Council: “The [High Council of Population and Family] promises to continue to reflect on this topic during the next mandate and to propose concrete measures to the relevant economic and social agents” ([High Council for Population and Family], 2005). Québec Commission: The [Commission for the Ethics of Science and Technology] recommends: “That the Minister of Health and Social Services fund a public awareness campaign on the known causes of infertility and the ways to preserve fertility; That the Québec government reinforces socio-economic measures and public policies that incite people to engage in parental projects at an earlier age.” ([Commission for the Ethics of Science and Technology], 2009, 65).
efficient than direct incentives, and may be instrumental in promoting earlier parenthood.

Moreover, it is crucial to level the playing field by promoting a cultural change in the approach of the workplace toward parental leave for fathers. The current situation has been described as a “gendered conflict between paid “productive” work and unpaid “reproductive” work” (Duvander, Ferrarini, and Thalberg 2005). With increasing numbers of women being well educated and earning higher incomes than their husbands, more and more couples choose to share parental leave and/or to function with a higher involvement of the male partner in caregiving activities, in order to maximize the family’s higher income (Berdahl and Moon 2013). However, studies have shown that men tend to be harassed and penalized for taking parental leave and engaging in caregiving activities (Berdahl and Moon 2013). Even within the highly effective Swedish parental leave system, transferability of paternal leave to the mother has been identified as a social force maintaining inequality in parental task sharing (Duvander, Ferrarini, and Thalberg 2005), and a proposition was recently made in parliament for making equal parental leave mandatory for couples (Swedish Parliament 2013). This demonstrates that even the most effective current government policies have their limits and that in some cases, a shift in social attitude is required in order for real change to occur. This is congruent with the need for community involvement in social change, as outlined in the ethics of empowerment. Previous experience has shown that despite initial popular opposition, legislative changes can have positive impacts on gender equality in the workplace and in the family:

Somewhat of a paradox can be discerned in that a majority of individuals were negative to “daddy months” before [their] introduction, with the main argument being that earmarking decreases choice capacity of parents. However, once implemented, the “daddy month” has less opposition and parental behaviour adapts to it. Nevertheless, further earmarking is instead opposed. This indicates several things. When implementing such reforms, policy-makers are up against deeply rooted gender roles around the division of work. Once in place, such institutions may change attitudes around the division of unpaid work and increase support for such legislations (Duvander, Ferrarini, and Thalberg 2005).

More specifically with regard to maternal age, a Swedish report also suggests to extend the benefits of parental leave to students and workers in precarious employment situations (Duvander, Ferrarini, and Thalberg 2005). Once adequate empowering socioeconomic policies have been implemented, unrealistic expectations and false perceptions of reproductive autonomy should be rectified through the provision of accurate and comprehensive information. Large community-based prevention campaigns should be envisaged to promote informed decision making. Another possible measure of setting the record straight is through the involvement of family physicians in “positive family planning” (Bachrach 2006), a measure that was also recommended by the Society of Obstetricians and Gynecologists of Canada (Liu and Case 2011).

Finally, paternal age may not affect fertility as significantly as maternal age, but it does affect birth outcomes and success rates of ART. Therefore, including paternal age along with maternal age in information campaigns on the risks of infertility and adverse birth outcomes would be a justified public health measure, and would have the side benefit of reducing stigmatization and blame targeting women for choosing to delay childbirth.

CONCLUSION

Assisted reproductive technologies, including egg freezing, are tremendous technological breakthroughs that have the potential to enhance women’s reproductive autonomy. However, they need to be understood in a comprehensive way that includes both their limitations and inherent risks. As such, they should not be portrayed as a unique or optimal solution to the current social trend of postponing parenthood. A medical and individualistic approach toward AMA obscures and hinders an understanding of its social context and of the social forces underlying it.

The addition of a public health approach toward AMA has the potential to fill this gap. Despite difficulties associated with social acceptance, promoting earlier parenthood with appropriately designed health communication campaigns can be done in a respectful manner, provided that effective and empowering health promotion strategies, such as financial incentives and workplace flexibility, are previously in place. Reproductive autonomy and gender equality should not only be reflected through women’s ability to choose not to have children at a time that does not suit them. They should also be reflected through society’s ability to remove the barriers that prevent women from having children at a time that they find ideal, without having to sacrifice their career, academic goals, and life expectations. ■

REFERENCES


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