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The ethics of postponed fatherhood

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1 **THE ETHICS OF POSTPONED FATHERHOOD.**

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5 **1. Introduction**

6 **a. Older mothers**

7 Discussions about the best age to reproduce have been abundant in ethical literature.
8 Until recently, these discussions focussed on the age of women. Many scholars have tried to
9 come to grips with the effects on the child's well-being of having an older mother. Often,
10 authors have focused on the social effects, such as the fact that older mothers may not be in
11 good enough health to care for the child or the risk for the child of losing her mother at a
12 young age (Bernstein and Wiesemann 2014). Two themes related to motherhood and age have
13 specifically received some attention: the possibility to use oocyte freezing to store a woman's
14 oocyte so that she can have children later in life without risk for infertility or chromosomal
15 abnormality, and the possibility for postmenopausal motherhood using donated (or frozen)
16 oocytes.

17 A much discussed case of postmenopausal motherhood is that of Adriana Iliescu, a
18 Romanian woman who gave birth in 2006 at the age of sixty-six using donor oocytes. In a
19 paper discussing this case, Daniela Cutas (2007) reviewed the argument that postmenopausal
20 motherhood is illegal and should be forbidden. She demonstrates that a stress on the (old) age
21 of mothers in order to forbid them becoming mothers is ageist: parents have all sorts of
22 imperfections, and it would be untenable to only forbid motherhood based on age (Cutas
23 2007). In a paper discussing egg donation in women over fifty, Anna Smajdor (2008)
24 describes how, when Rod Steward became a father, the media focussed on his joy at having a

1 new son, a stark contrast with how the case of Adriana Iliescu was covered. Smajdor asks us
2 to consider two scenarios, one of a sixty-year-old women using oocyte donation and the
3 sperm of her much younger partner, and one of a sixty-year-old man and his much younger
4 wife, using sperm donation and the wife's oocytes. Smajdor asks it is truly so that mothers are
5 more important to their children or whether this is discriminatory prejudice (Smajdor 2008).
6 In an analysis of the British media, Rachel Shaw and David Giles (2009) have found that
7 older women, or women who postpone motherhood for a variety of reasons, have been
8 described as being selfish and wanting to have it all, a critique that is seldom applied to older
9 men (Shaw and Giles 2009). Although in a recent study, Tracey Mills et. al. (2015) describe
10 how delayed childbearing was portrayed as positive, especially when related to celebrity
11 births (T. A. Mills, Lavender, and Lavender 2015).

12 **b. Older parents and their children's health**

13 The discussion on maternal age has at least partly focused on the medical
14 consequences of postponed motherhood. Much has been documented in the literature about
15 how so-called advanced maternal age has consequences for the health of both the mother and
16 her child. It has been stated that postponing motherhood until after thirty-five may affect
17 fertility, pregnancy outcomes and the health of future offspring (Boyd et al. 2008). In
18 particular, gynecologists urge women to 'have their children early' because postponing
19 motherhood may decrease their fertility and increase the risk of that they will have
20 chromosomally abnormal children (Campbell 2009). I acknowledge that there are health risks
21 to the woman in having a later pregnancy, and that the focus on late motherhood also has to
22 do with the fact that women get pregnant and have historically been considered the primary
23 care givers. With this paper, I want to demonstrate that this focus, at least in relation to the
24 health of offspring, should be revisited in the light of new scientific knowledge on the impact
25 of advanced paternal age.

1 Both in the scientific literature as well as the popular press, there is up till now not
2 much attention to the fact that also the age of the father may influence fertility or the health of
3 offspring. As Stephanie Bernstein and Claudia Wiesemann (2014) have stated, studies on the
4 risks of higher paternal age for pregnancy and childbirth are underrepresented in medical
5 research. A PubMed search they conducted in January 2014 with the keyword “late
6 motherhood” yielded 109 results as compared to 17 results for the keyword “late fatherhood”
7 (Bernstein and Wiesemann 2014).¹ A recent analysis of the media covering older parenthood
8 by Lisa Campo-Engelstein et al (2015) showed that, with regard to effects of parental age on
9 offspring, a majority of the articles in US Newspapers focused on harm to the fetus caused by
10 maternal age. Moreover, those newspaper articles dealing with maternal effects have four
11 times more a tone of blame than those dealing with paternal effects. In the latter case, the tone
12 was more one of reassurance. They also found that women experience and are made to
13 experience more anxiety about age-related preconception harm than men (Campo-Engelstein
14 et al. 2015).

15 As oocytes of older mothers are often aneuploid, after thirty-five a woman’s fertility
16 begins to dwindle. There is an increased chance of having children with a chromosomal
17 abnormality, such as Down syndrome. If women cannot reproduce in their twenties, it has
18 been suggested that they can freeze their oocytes so that these can be used at a more
19 convenient time (Pennings 2013). Companies such as Facebook and Apple have offered to
20 pay for oocyte freezing to their female employees in order to ensure fertility and to be able to
21 reproduce at a later time, a practice that has been widely discussed in the media. So called-
22 social freezing has been discussed in ethics literature as well, including the ideal time of
23 informing women about this possibility (early thirties) and whether a distinction should be
24 made between social and medical freezing (Mertes and Pennings 2011; Pennings 2013).

1 Interestingly, the possibility for men to freeze sperm before they desire to reproduce has been,
2 until recently, much less discussed. I will come back to this point later on.

3 In the rest of this paper, I argue that emphasis on maternal age both in scholarship and
4 the media reveals a gendered assumption on parental responsibilities. My aim is fairly modest,
5 I do not claim to be able argue that mothers and fathers have equal responsibility in all cases,
6 but I demonstrate, in the light of scientific evidence, that when the health of offspring is
7 concerned, an emphasis on the contribution of maternal age is disproportional. In order to do
8 so, I will present some of the research that has been undertaken on the effects of postponed
9 fatherhood on the health of the future child. I will also apply two principles that are often used
10 in traditional bioethics to defend certain reproductive technologies. *Procreative autonomy* has
11 been defined as the right of people to decide whether, when and under which circumstances to
12 procreate. It has been quoted also in the context of prenatal screening and diagnosis
13 (Wilkinson 2015). *Procreative beneficence* states that if people can influence the well-being
14 of their (future) child they have all reasons (or in some versions even an obligation) to do so
15 (Savulescu and Kahane 2009; Savulescu 2001). I shall argue that there is a disproportionate
16 stress on the responsibilities of women and on advanced maternal age. As the advice to
17 women to reproduce earlier and the offer of prenatal testing to avoid certain conditions seems
18 to be based on the principles of procreative autonomy and/or procreative beneficence as
19 ethical principles, consistency requires that the same amount of attention should be paid to the
20 risks associated to both maternal and paternal advanced age. If such a conclusion is
21 undesirable, these recommendations are disproportionate, as they convey the message that
22 fathers and mothers are not equally responsible for the health of their (future) child.

2. Genetics, screening and procreative autonomy

a. Procreative autonomy and disability

As stated earlier, procreative autonomy entails the right of people to decide whether, when and under which circumstances to procreate. It has been specifically named in the context of prenatal screening and diagnosis as the rationale behind the endorsement in public policy of these practices (Wilkinson 2015; Wilkinson 2010). Indeed, in public health related documents, the offer of prenatal screening is often presented as a means to offer the woman reproductive choice, as she can decide whether to screen for, to terminate or to continue with a pregnancy or whether she is prepared to raise a child with a disability, in many cases Down syndrome (Dondorp and van Lith 2015). Feminist and disability scholars, such as Adrienne Asch (2003), have questioned whether it can really be possible to support the goals of including people with disabilities and at the same time promoting the use of embryo selection and selective abortions to prevent the births of those who would live with the disabilities (Asch 2003). Scholars have also questioned whether restricting access to prenatal screening to a panel of diseases that are considered severe enough does truly enable reproductive autonomy, and, as Adrienne Asch argues, line drawing based on severity of diseases still suggests that it would be better to prevent the birth of children with these conditions. She says that if true reproductive choice is at stake, prospective parents should have access to knowledge about conditions that are thought less severe, such as tone deafness and color blindness, otherwise it is actually society that makes the decision, not the parents (Asch 2003). I argue in the next section that by screening and focusing only on conditions related to maternal age, such policies are not only ableist, they are possibly also sexist.

1 **b. Genetic conditions and advanced paternal age**

2 Certain conditions have been associated with advanced paternal age, and the
3 mechanism behind the genesis of these conditions has been known for some time now
4 (Chianese, Brilli, and Krausz 2014). The primordial germ cells in a male, the cells that
5 produce the sperm, are constantly dividing during a man's lifespan (Bray and Gunnell 2006).
6 This constant dividing of the cells allows for more chance of changes in the DNA to occur,
7 and some of these changes can be detrimental. Advanced paternal age has been linked to
8 occurrences of syndromes such as achondroplasia (Wyrobek et al. 2006) and Apert Syndrome
9 (Glaser et al. 2003), but they are also linked to an increased occurrence of cleft lip and cleft
10 palate (Bille et al. 2005). The reason why prenatal screening is up till today focused primarily
11 on chromosomal abnormalities linked with advanced maternal age (\geq thirty-five) is probably
12 due to historical reasons: the occurrence of one or more extra chromosomes or the lack
13 thereof was easily detected using early screening techniques. Hence, as I argue elsewhere, the
14 introduction of these screening techniques is more due to a technological imperative, then to
15 the fact that Down syndrome itself is the one condition that women should be given the
16 opportunity to exercise their procreative autonomy for (Hens 2015). Given the fact that
17 women are nowadays systematically told that reproducing after thirty-five substantially
18 increases their risk for a child with a chromosomal abnormality, scientific evidence that points
19 to the increased risk of having a child with a genetic condition in case of advanced paternal
20 age would call for the same kind of counseling if the father is older. **What a woman is**
21 **counseled** for is that if she has to reproduce after a certain age, she can avail herself of certain
22 technologies to avoid the birth of a child with a disability. If these technologies are deployed
23 to enhance reproductive autonomy, also the risks associated with reproducing with an older
24 man should be mentioned, otherwise the counseling is biased towards health outcomes that
25 are related to a woman's age.

Comment [A1]: Please clarify. Does/should counselling only target women or do you mean to suggest counselling (is or ought to be) for any intending parent, where advanced age is a factor?

1 **c. Comprehensive and noninvasive screening**

2 One could argue that the syndromes and genetic conditions related to reproducing with
3 older sperm are very rare. Hence, to install additional screening programs specifically for
4 these conditions, in case of older fathers, may seem to be unnecessarily complicated.
5 However, I argue that two recent developments in the field of prenatal with the advent of new
6 screening techniques make the introduction of such screening more readily available: with the
7 advent of sequencing and analysis of the entire genome it is possible also to detect these de
8 novo occurrences of genetic mutations at the same time. Although such screening is currently
9 not standard in prenatal screening, in the future it will be possible to define a panel of
10 mutations to be screened for simultaneously. Until now, invasive screening techniques, which
11 are associated with a risk for miscarriage, have been offered to women after the age of thirty-
12 five, because of an increased chance that the fetus has Down syndrome in case of advanced
13 maternal age. This would probably not be applicable to the case of advanced paternal age, as
14 here the risks of a genetic mutation in the sperm is much lower, and women would probably
15 not want to run the risk of a miscarriage for a condition that is very rare. However, with the
16 advent of Non Invasive Prenatal Testing (NIPT), which can be done earlier in pregnancy,
17 which does not imply an increased risk for miscarriage, and which may in the future also
18 include screening of DNA mutations, it makes sense to include mutations associated with
19 advanced paternal age in the screening. Hence, if the aim of prenatal screening is truly to
20 enhance reproductive autonomy and to allow women to decide for themselves whether they
21 can cope with raising a disabled child, there is no reason to not include mutations linked with
22 paternal age. If screening for Down syndrome is endorsed for women above a certain age, and
23 screening for de novo genetic mutations can be done simultaneously with the same test and
24 noninvasively, this could be included in case of an older father, regardless of the relatively
25 low incidence of these mutations. As I have argued in another paper, a screening program

1 focused only on one or a subset of conditions (in this case Down syndrome) may be ableist, as
2 screening programs that target one specific condition and neglect others have no adequate
3 answer the of disability-rights criticism that states that the offering of such tests already
4 assumes a negative attitude towards the condition and the people having the condition (Hens
5 2015; Munthe 2015). If counseling and screening is offered specifically in the context of
6 advanced maternal age, targeting a condition that is related to advanced maternal age, while
7 neglecting other conditions related to advanced paternal age, this focus is also gender-biased.
8 Moreover, it gives the impression that a woman's procreative autonomy is only applicable to
9 certain conditions, that are related to her own age, and not to those related to the age of the
10 genetic father.

11 One could argue that procreative autonomy and parental choice should be limited to
12 those conditions that are considered 'severe', and screening should not be done for trivial
13 things. As I have mentioned before, this is questioned by both heavy opponents of parental
14 choice as by, for example Adrienne Asch (2003) who argues that line drawing with regard to
15 severity of diseases sends in itself an ableist message (Asch 2003). If lines are drawn between
16 conditions that may be considered equally severe, but that differ only with regard to in which
17 parent the mutation originated, surely this sends a sexist message as well.

18 **3. Epigenetics and older fathers**

19 Epigenetics complicates the issue of advanced parental age even further, as epigenetic
20 alterations on sperm have been linked to certain conditions in offspring. This is relevant both
21 for considerations of reproductive autonomy and procreative beneficence.

22 **a. The mechanism of epigenetics**

23 Epigenetics is a relatively new field of study and seeks to demonstrate the molecular
24 link between genes and environment. Its findings influence the discussion on both procreative

1 autonomy as well as procreative beneficence. That environmental influences affect gene
2 expression has been suspected for quite some time. This explains that in some cases one
3 monozygotic twin expresses a disease thought to be genetic and the other one does not,
4 although they have the same genetic makeup. Epigenetics is a complex field of study, and it is
5 believed that over a 1000 proteins may be involved in gene regulation. One mechanism by
6 which environmental influences can change gene expression is methylation (Jablonka and
7 Lamb 2005). Certain areas or genes in the genetic code can be methylated, which means that
8 the molecules transcribing the DNA to RNA cannot access that specific region of the DNA
9 and the gene does not become transcribed and hence not translated into protein.

10 Although a sperm cell has been considered as a mere vehicle to deliver a man's DNA
11 into the oocyte, this view has now been challenged. Indeed, methylation patterns of sperm of
12 older men have been compared to sperm of the same men when they were younger, and these
13 patterns had indeed changed (Jenkins et al. 2014). This may explain the increased occurrence
14 in children from older fathers of neuropsychiatric conditions such as bipolar disorder and
15 schizophrenia, but also some forms of cancer. Also, a Swedish study suggests that a man's
16 smoking is related to an increased risk for asthma in his offspring, even when the father had
17 stopped smoking years before the conception (Svanes et al. 2014). This is different from what
18 is observed in women, as there the influence of smoking on the health of her future child is
19 proven during pregnancy, but there has been no demonstrable effect of women smoking
20 before conception. However, the behavior of the grandmother, while she was pregnant, seems
21 to influence the oocytes of her daughter, and hence has some influence on the health of the
22 grandchild. So although both the behavior of the father as well as of the mother (when
23 pregnant) or of her grandmother may change methylation patterns and affect the child's future
24 health, the mechanisms may be different for both sexes. Older mothers, as discussed, risk

1 chromosomal abnormalities, but older fathers risk passing certain diseases to their children
2 because of the accumulative epigenetic changes on the sperm (Pembrey et al. 2005).

3 **b. Epigenetics and procreative autonomy**

4 As stated, new findings in the field of epigenetics may have consequences for
5 procreative autonomy. Procreative autonomy is often considered also to imply allowing
6 women to choose whether they are up to raising children with certain challenges that are
7 attributed to conditions that can be screened for at birth. In the paragraph on genetics, I have
8 argued that the fact that older fatherhood is linked to certain genetic disorders calls for a
9 policy that also includes genes related to paternal age in screening panels, as not to do so
10 restricts procreative autonomy only to those conditions associated with advanced maternal
11 age. For epigenetic alterations, prenatal screening is still a long way off. Given the increased
12 risk for disabilities that may arise in future children if sperm from an older man is used for
13 conception, enhancing or respecting prospective reproducers' procreative choice thus implies
14 offering any intended parent who is of an advanced age or who intends to use gametes from
15 an advanced aged donor enough information about possible risks associated with advanced
16 maternal *and* paternal age to make a truly autonomous choice. As the potential epigenetic
17 effects on sperm may occur before people consider reproducing, this knowledge may have to
18 be included in sex education in high schools in order to offer people the possibility to act upon
19 this knowledge in time. It may also imply that national awareness programs need to be rolled
20 out stressing the danger of reproducing late for men or of the dangers of reproducing with
21 older men for women, just as women are now urged to reproduce at a younger age. If
22 procreative autonomy is the driving force behind public policies with regard to reproductive
23 health and prevention, the only possible conclusion is perhaps that if women are counseled so
24 that they understand the possible consequences of reproducing later in life, men should be
25 counseled in the same way as well. Such counseling should be part of preconception care, but

1 should also be reflected in policy recommendations and practices, such as guidelines from
2 professional recommendations.

3 **c. Epigenetics and procreative beneficence**

4 Another principle that is at stake here is procreative beneficence. Procreative
5 beneficence states that if people can influence the outcome for their child to have a better
6 child they have all reasons (or in some versions even an obligation) to do so (Savulescu and
7 Kahane 2009; Savulescu 2001). For example, in the context of embryo screening, they have a
8 duty to select the embryo that is likely to develop into the child with the best prospects in life,
9 or at least a child without major health problems, and to use the technology that is available to
10 do so. Oocyte preservation can also fit in this picture. As “younger” oocytes are more likely to
11 produce a fetus with a correct number of chromosomes, oocytes without chromosomal
12 abnormalities could be frozen when a woman is in her early twenties, not only to increase the
13 odds that she can still reproduce after thirty-five, but also that she can still have a child
14 without chromosomal aberrations (Goold and Savulescu 2009). Oocyte preservation
15 necessitates, however, ovarian stimulation, and the use of the cryopreserved oocytes requires
16 that she undergoes IVF treatment. It is unclear whether this would still fall under the
17 conception of reasonable effort that the proponents of procreative beneficence presuppose
18 (Savulescu 2001). In any case, sperm extraction, cryopreservation and application for
19 reproduction is far less burdensome than cryopreservation of oocytes is, and may therefore fit
20 more easily under the umbrella of reasonable effort. It is unclear that the conditions we are
21 trying to avoid by advising women to reproduce when they are younger (specifically trisomy-
22 21) are so much worse than those associated with older sperm (specifically schizophrenia). If
23 we have an obligation to avoid problems in future offspring as much as possible, sperm
24 freezing may be preferable. Moreover, the primordial germ cells producing the sperm undergo
25 epigenetic changes, even during puberty. As it may be very difficult to prevent some

1 youngsters (who may become very responsible men later on) from smoking or binge drinking
2 as teenagers, the safest thing to do could be to cryopreserve sperm as soon as this is feasible,
3 at or around the moment of the first ejaculation.

4 **4. Parental age and responsibility**

5 Recently, the possibility of freezing sperm from young man was suggested by Kevin
6 Smith in a paper published in *Journal of Medical Ethics*. Smith focusses on paternal age and
7 the effect of de novo genetic mutations on the health of offspring. He argues that, as the
8 quality of sperm deteriorates with ageing and genetic mutations accumulate, sperm could be
9 frozen to be reused at a later date (Smith 2015). This suggestion has received some media
10 attention, mostly negative. Those who were critical of this possibility suggested that
11 systematically freezing sperm from young men would cost too much for the national health
12 services, that the risk for genetic disorders is really quite small, and that this would be a very
13 artificial approach to procreation.² But the fact that this paper has received so much criticism
14 in itself is telling, and may suggest that there is a resistance among men to being controlled
15 with regard to reproductive options and choices. Women, on the contrary, have been and still
16 are advised to reproduce in time, for reasons of dwindling fertility but also because
17 reproducing later may affect the health of the offspring. Indeed, the possibility to freeze
18 oocytes to preserve oocyte quality has not been met with so much criticism, although
19 Françoise Baylis has pointed out in a blog post that companies such as Facebook and Google
20 that endorse these practices seem to presume that men do not have to make a choice between
21 children and a career and that it is presumed that they can maintain both at the same time.³
22 Along the same lines, in their analysis of press coverage on parental age, Lisa Campo-
23 Engelstein (2015) and colleagues conclude that men's role in reproduction has been ignored
24 and that women have historically been and still remain to be the ones blamed for fetal harm

1 (Campo-Engelstein et al. 2015). Adrienne Asch and Gail Geller (forthcoming) state that with
2 new reproductive technologies, women are seen as primary responsible for reproduction and
3 family life in general (Asch and Geller forthcoming). Although whether men and women have
4 equal responsibilities and tasks in raising children is an old question that has not been settled
5 (Rothman 1989), it is odd to assume that both would have different responsibilities when their
6 actions or decisions directly affect the *health* of their offspring. Such assumption would
7 probably not be accepted in other circumstances, for example one would not assume that
8 fathers are less obliged to refrain from smoking near their baby's crib than mothers, and
9 campaigns specifically targeted at mothers about this behavior while ignoring fathers would
10 indeed seem odd. I contend that, given the current scientific knowledge and technologies, the
11 same goes for paternal age effects on potential future offspring. A disproportionate stress on
12 the effects of the age of the mother is gender biased, and possibly even sexist, as it may
13 convey the hidden message that the health of offspring is solely her responsibility, and that
14 she is in need of being policed in order to avoid harm.

15 Epigenetics also demonstrate a different issue. Many of the detrimental influences
16 happen outside of the control of the individual, even if the behavior of the individual is the
17 direct cause of the influence. Environmental pollution affects the quality of germ cells and
18 cannot be controlled by individual behavior. Moreover, who is really responsible that fifteen-
19 year-olds engage in binge drinking or that women feel compelled to postpone the fulfillment
20 of their desire to have children? Research has shown that many people postpone parenthood
21 because of the incompatibility with employment and economic uncertainty. A study by the
22 European Society of Human Reproduction and Embryology (ESHRE) Reproduction and
23 Society task force (2011) states that “female employment and childrearing can be combined
24 when the reduction in work–family conflict is facilitated by policy intervention”, hence they
25 stress the collective responsibility towards enabling parenthood at a younger age (M. Mills et

1 al. 2011). Indeed, an emphasis on women’s reproductive age may cover up other potential
2 factors that influence health of offspring and that are equally important, and may suggest that
3 such policies target women because they are easiest to target. The discussion about the extent
4 of individual and collective responsibility is outside the scope of this paper. I admit that the
5 question about the balance of individual and collective responsibility is as of yet unsolved.
6 Moreover, today it is not yet universally recognized that men and women are equally (and
7 individually) responsible for offspring. I have demonstrated, however, that in some respects at
8 least, the effects of both sexes’ choices have an impact on the health of offspring. Hence, I
9 hope to have demonstrated that, assuming that health of offspring is accepted as a core value
10 in reproduction, responsible reproduction cannot solely be constructed as an obligation of
11 women alone to make the right choices at the right time. Policies and professionals that advice
12 women to reproduce at an early age should equally consider paternal and collective
13 responsibilities, otherwise they risk being discriminatory.

14 **5. Conclusion**

15 “Women, have your children early!” is advice that is often heard in the popular media
16 and in fertility consultations, with a reference to risks associated with older motherhood, for
17 the woman and for her fetus.⁴ In very few occasions is this advice accompanied by
18 suggestions as to how this advice can be followed in practice. With my analysis of the
19 scientific data related to older fatherhood I hope to have demonstrated that at least the aspect
20 of risk for the health of the future fetus is also in the hands of the father. Indeed,
21 acknowledging these facts shows that the stress on maternal age may be disproportionate. If
22 all risks should be avoided, and pregnant women and their partners should be offered optimal
23 reproductive choice, embryos and fetuses should equally be screened for de novo DNA
24 mutations associated with older paternal age. Sperm of young adults could be frozen and

1 prospective reproducers could be counseled to do so at a younger age. Some, if not all of these
2 measures may seem farfetched to many readers, and they may consider these suggestions as
3 too much an interference with people's reproductive lives and choices. If so, this would imply
4 that the focus on maternal age must be reconsidered as well, as a disproportionate emphasis
5 on the responsibility of one gender may carry a message that is biased towards that one
6 gender and may suggest that one gender is more in need of advice or policing than another.

7 A criticism of my argumentation could be that either one of these principles,
8 procreative autonomy and procreative beneficence, are overly stressed in reproductive ethics.
9 Indeed, having children and the effects of reproductive decisions cannot be completely
10 grasped in ethical principles and we are never completely in control of how our life will turn
11 out after having reproduced. This critique is warranted. However it is even more a
12 demonstration of the fact that the stress on the effects of maternal age on a (future) child's
13 health in current reproductive medicine and counseling is disproportionate with the attention
14 given to the effects of paternal age and should be reassessed.

15

1 **Acknowledgements**

2 This paper is based on a presentation I gave at the colloquium “Postponed Motherhood
3 and the Ethics of the Family”, organized by Stephanie Bernstein and Claudia Wiesemann in
4 Göttingen. I would like to thank the participants, whose comments on my talk were
5 instrumental in making this a better paper. I would like to thank Daniela Cutas and the
6 anonymous reviewers for their useful comments on earlier drafts of this paper.

7 **Notes**

8

1. Advanced maternal age is commonly considered age 35 and older, as this is the age when the risk increases that oocytes become aneuploid, leading potentially to infertility or chromosomal abnormalities in women. For men, there is not such cut-off point, as age effects are different when referring to dwindling fertility or to genetic mutations. Moreover, epigenetic changes to primordial sperm cells accumulate over time starting from adolescence .

2. See for example: <http://www.expressandstar.com/news/uk-news/2015/06/25/young-men-urged-to-freeze-sperm/>

3. <http://impactethics.ca/2014/10/16/left-out-in-the-cold-seven-reasons-not-to-freeze-your-eggs/>

4. ‘Een slimme meid krijgt haar kind op tijd’ (a smart girl has her child on time), is a Dutch saying that is used in the media and on websites of fertility clinics to urge women to start thinking about having children while they are still relatively young.

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