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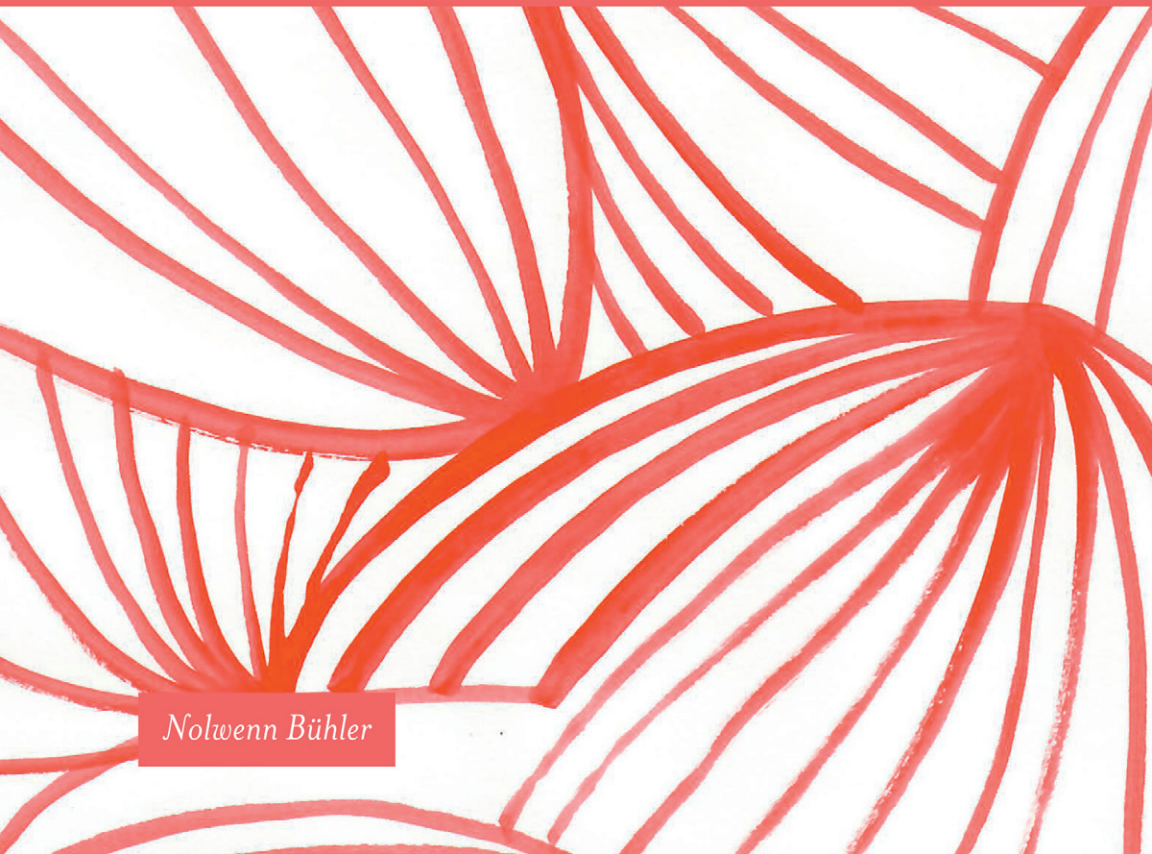
When Reproduction meets Ageing

The Science and Medicine of the Fertility Decline



Nolwenn Bühler

When Reproduction Meets Ageing

Emerald Studies in Reproduction, Culture and Society

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When Reproduction Meets Ageing: The Science and Medicine of the Fertility Decline

By

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About the Author

Nolwenn Bühler is an Anthropologist specialised in the social study of science, biomedicine, and health, and in gender studies. She currently works as a Senior Researcher, at the University of Lausanne (UNIL), in the SNSF Sinergia project 'Development of Personalized Health in Switzerland: Social Sciences Perspectives', where she investigates the implementation of a public health and biomonitoring national cohort. She also works as a Senior Lecturer at the University of Neuchâtel (UniNE) where she teaches gender studies. She holds a PhD in Social and Cultural Anthropology from the University of Zurich. In her doctoral thesis she explored how the ontological status of reproductive ageing is produced, shifts and materialises in the scientific and clinical settings of reproductive biomedicine. She also analysed the sociopolitical implications of extending fertility medically in Switzerland and highlighted the need for rethinking the ontology of age when it gets technologised. Before joining UniNE and the Institute of Social Sciences of UNIL, she spent a year as a visiting scholar at the Gender and Women's Studies Department of the University of California Berkeley, followed by a year as a research fellow in the Reproduction Research Group of De Montfort University, Leicester, and two years as a senior research fellow at the science-society Interface of UNIL.

Her research interests focus on reproductive technologies, gender and kinship, body–environment interactions, toxicity and public health. She is dedicated to the promotion of interdisciplinarity and interprofessional dialogue and collaboration in the medical and public health domain through teaching, research and outreach activities. In addition, she has institutional duties as a member of the Ethical and Deontological Think Tank of the Swiss Anthropological Association, of the STS-CH committee and of CUSO graduate programme in gender studies.

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California, Berkeley, to the Centre for Reproduction Research at De Montfort University (Leicester, UK), to the Interface sciences-société at the University of Lausanne, to finally share a full-time position between the MAPS of the University of Neuchâtel and the STS Lab at the University of Lausanne. I have met so many wonderful and inspiring colleagues and friends on this sometime turbulent voyage that I feel unable to name and do justice to all of them. However, some of them really helped me finish the book, and this is the occasion to express to them my gratitude, even though the words are not enough. Firstly, I would like to thank Stine, who has been there since Berkeley and has been such a precious support, personally and intellectually, during the writing phase of the book. I would like to thank Anna who took time to read carefully the manuscript, to give me incisive comments, to help me improve it and make my ideas clearer, for listening to my despair, discouragement and helping me to see the positive side of what I am doing. Thanks to Cathy, for being such a reliable, supportive and understanding friend and colleague, for trusting me in my ability to finish, even when I doubted so much. Thanks to Nicky for being a great role model when I was working at DMU and who helped to make the decisive step of turning the PhD dissertation into a book. To Giada, Luca, Nils, Mélody, Noélie, Séverine, Delphine, Mathilde, Nadja, Véronique, Pablo, Ellen, Marion, Janine, Anne-Sylvie, Aylin, Philip, Morgane for being great colleagues at the Universities of Lausanne and Neuchâtel, for being open, caring, fun and motivating. At a more institutional and editorial level, I would also like to warmly thank the Bureau égalité des chances and the Commission Egalité of the University of Neuchâtel which granted me time off to write this book, as well as the Emerald editorial team for their assistance and support, and Mark Palmer, the language editor, who has been so efficient and helpful in improving the text.

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Chapter 1

Introduction: A Question of Age

During summer 2013, a friend, knowing I was doing research on reproduction, sent me an article published in the *Tages Anzeiger* (Althaus, 2013), a widely read daily newspaper in the German-speaking part of Switzerland. She described it as comforting. Entitled *The Fertility Panic*, it begins with a close-up picture of a smiling woman holding a young baby in her arms. [1] *Late happiness* comments the subtitle, referring to the Australian Anthea Nicolas, reportedly a mother for the first time at 50 without medical assistance.[2] Below the picture, the author counsels against the supposed truth of the fertility decline figures found in the media and the distorted views of reproductive doctors on the topic. Fertility declines, but not as quickly and drastically after 35 as commonly believed. Through reading I discovered that this article was actually drawing on and repeating a highly publicised article published in the American magazine *The Atlantic*. Headed *How long can you wait to have a baby?* (Twenge, 2013), it was circulated and discussed under titles such as *Everything you thought you knew about age and fertility was wrong* (Grose, 2013), *Doctor challenges women and fertility myths* (Boudreau, 2013) or, more critically, *The Atlantic's fertility story just told so many women what they want to hear* (Johnson Wheeler, 2013) and *The inconvenient truth of fertility decline* (Daly, 2013).

The original piece was written by Jean Twenge, professor of psychology at San Diego State University and author of the book *The impatient woman's guide to getting pregnant* (Twenge, 2012). She presents the results of her research on fertility decline, drawing on her own experience of the pressure brought about by the fear of waiting too long to be able to have children; she does this both as a mother of three children, each conceived without medical assistance within a few months after the age of 35, and as a scholar trained in the reading of scientific articles. Adopting a whistle-blowing tone, she claims that the fertility decline of women in their thirties has been 'oversold' and sets out to present what the 'statistics really tell us'. She points to the fact that the fertility decline figures spread uncritically in the media and in medical discourses are responsible for creating a 'baby panic'. Adopting a critical stance towards scientific knowledge, she insists that this panic is simply unnecessary as these figures are in fact based on questionable data, namely,

[1] Die Fruchtbarkeits-Panik in German.
[2] *Spätes Glück* in German.

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historical data from French birth records from 1670 to 1830 (Twenge, 2013).[3] She also presents more reassuring statistics taken from recent studies (Dunson, Baird, & Colombo, 2004; Rothman et al., 2013) and concludes that couples should not allow themselves to get stressed by a scare-mongering rhetoric about the end of fertility and feel pushed into having a child before they are ready.

After reading this article I could understand why my friend called it 'comforting'; it was offering hope. Hope that knowledge about fertility decline was biased and not so deterministic; hope that women should not be worried about their 'biological clock'; hope that they could have babies when they felt ready, possibly without medical assistance. As Grose and Johnson's comments on Twenge's article conclude: 'It's good to hear that our bodies will cooperate with the way society has changed' (Grose, 2013) and 'there are no three words more seductive to modern women than "You have time"' (Johnson Wheeler, 2013). Somehow Twenge's piece was a breath of empowerment and liberation. On the other hand, I could not help but remain doubtful about the revolutionary aspect of that message. After all, the author was recommending that women started 'stressing' at 40 rather than 35. I also could not but think of the experiences of the women I had met in the clinic, painfully confronting the idea that their 'time was over' and experiencing in their bodies the limits of their fertility as treatment failures and miscarriages. I also thought of the medical practitioners I had interviewed who felt powerless to do anything about age and for whom age-related decline of fertility was a very real and practical component of their daily practice. Did they all have a distorted view of fertility decline? Were the statistics lying? Was scientific knowledge about age-related infertility a big con?

In February 2014, as though an echo to these questions, I received news from the California based Centre for Genetics and Society's blog which brought to my attention a piece publicised on CNN under the title *Women don't need any more big lies* (Selvaratnam, 2014b). This article presents the main ideas of Selvaratnam's new book entitled *The Big Lie: Motherhood, Feminism, and the Reality of the Biological Clock* (Selvaratnam, 2014a). Released in January 2014, the book received wide media coverage, above all in women's magazines such as *Elle*, *Vogue* and *Cosmopolitan* and in various blogs under titles such as *Facing the fertility lie* (Winick, 2013), *Postponing motherhood: when does it become actually too late?* (Selvaratnam, 2014d), *Face it: you can't have a baby whenever you want* (Grigoriadis, 2013). Drawing on her own experience of three miscarriages, the removal of cancerous cysts after pre-IVF (in vitro fertilisation) screening, divorce and childlessness, the American-based film producer, writer and activist Tanya Selvaratnam wants to draw attention to the other side of the success stories of older motherhood. According to the presentation on her blog, her book is intended to be a 'conversation starter' and a 'policy changer'.[4] In interviews, she states that the biggest lie is not about statistical evidence; it is that women believe that they are able to have children whenever they are ready

[3]She does not mention the author of this study in this article, but she is probably referring to the work of Henri Leridon (see Chapter 2).

[4]See her blog: https://www.tanyaturnsup.com/- Accessed on August 23, 2020.

and that if they encounter difficulties, science and medicine will help them. With indignation and resentment, she observes, 'We have been a guinea-pig generation when it comes to delaying fertility' (Selvaratnam, 2014c). She also criticises the lack of public awareness about age-related fertility decline and advocates for better information, for example, in the form of the presentation of fertility charts, routine ovarian reserve testing and egg freezing before the age of 28, along with other social measures, such as making IVF accessible to more people through insurance coverage or improving day-care facilities and other ways of allowing better coordination between motherhood and career (Grigoriadis, 2013; Richards, 2014; Sachs, 2014; Selvaratnam, 2014c; Welch, 2014).

The symmetry between these two messages struck me. Both authors, adopting a whistle-blowing tone, try to sort out truth from lies in the relationship between age and fertility. Both are smart, well-educated and professionally successful; live in the United States and draw on their own experiences of in/fertility to narrate their stories and defend a more political message regarding other women. Both are criticising the production and circulation of scientific and medical knowledge about the relationship between age and fertility; they both assume that something is wrong with medically assisted reproduction. This is the point where their accounts start diverging. While the former criticises the panic about infertility created by alarming statistics taken from old and biased data, the latter attacks the lack of accurate knowledge about fertility decline and the illusions produced by the development of reproductive technologies. In both cases, the authority of reproductive medicine is questioned in an attempt to empower women, yet in two very different ways. Whilst the message of the first is to not be stressed by false and scaremongering statistics and to have a child whenever you feel ready, the other advocates for the better diffusion of biomedical knowledge about age-related fertility decline, thereby allowing women to make better informed choices and to take their reproductive lives into their own hands, and criticises the very idea of 'waiting to be ready'. The first assumes that statistics are not reliable enough; the second regrets that they are not taken seriously enough.

Their opposing stances apart, these two messages are representative of public discourse on age-related infertility, late motherhood and the role of reproductive biomedicine. Bringing together intimate decisions, statistics, bodily experiences, science, hopes, disappointments, suffering, society, work, politics, couple relationships, family projects, futures, truth and lies, questions about age in relation to fertility and reproduction circulate in the world of the Internet, women's magazines and newspapers under headings such as *parenthood*, *health* or *women*. Science, medicine and individual embodied experiences of in/fertility and ageing emerge from these debates as domains where different, and to some extent conflicting realities of age-related fertility decline, are produced and where its scientific evidence and its credibility seem much contested. During the twentieth century, science and medicine increasingly merged and became areas of authority, domains producing evidence which acquired the status of fact, invested with the power to tell the truth about the reality of the world. However, when scientific evidence leaves the laboratory and starts to circulate in the public sphere, it sometimes becomes much more disputed, as the contrasting narratives and debates on the truth of age statistics and the reality of fertility decline illustrate.

The ambiguous and contested status of age struck me when I entered the world of reproductive medicine in Switzerland in 2011. I found age wherever I turned my attention, whether in women's narratives and experiences, in clinical practices or in the media. This omnipresence revealed to me much more than a question of chronological age or of statistics. From a social science perspective, age can be seen as a social marker used to categorise people and as a principle of social organisation (Bernardi, 2002; Sauvain-Dugerdil, Léridon, & Mascie-Taylor, 2006). In the context of reproductive medicine, however, it was more than that. Age became not only biological, physical and scientific but also social, political, legal and economic. It became individual and singular; yet collective and common at the same time. While commonly taken for granted, it also appeared to disperse in multiple directions to the point that *what age is* seemed to be lost in the mist of these multiple realities and connections. What happens when age enters the domain of reproduction? What does age become when it is the target of reproductive biotechnologies? These are the main questions this book addresses by exploring the multiple realities of age-related fertility decline in the science and medicine of reproduction.

At the beginning of my research, I decided to call the object of my interest 'the question of age', to point to it in the domain of reproductive medicine, as an entity whose status and reality are under interrogation and raise many social, political, biological, medical, ethical and economic questions. Born from empirical observations about the omnipresence and contested reality of age-related fertility decline in reproductive medicine, my interest in this question was additionally triggered and deepened by my review of the scholarship. I soon realised that the connection between age or ageing and reproduction was given scant attention in the social science literature. While ageing studies tend to focus on later life, considered non-reproductive, and give little attention to the transformations of a 'new middle age' (Featherstone & Hepworth, 1996 (1991); Hepworth & Featherstone, 1982), and even less to reproductive issues, studies on assisted reproductive technologies (ARTs) usually fail to take into account age and ageing, although the postponement of childbirth is often presented as one of the main reasons for their increased use.

Historically, however, the science, medicine and technologies of reproduction and ageing have more in common than might be first thought. Although targeting opposite ends of the lifespan, age extension strategies and ARTs are rooted in the same attempts at 'improving the bodily bases of human life' (Squier, 2004, p. 148) through the technological and chemical interventions developed in the first three decades of the twentieth century. This can be illustrated by the experiment of the French-Russian scientist Dr Voronoff on Nora, a mature female chimpanzee who got pregnant with a human child after the sex organs of a human female were grafted within her, as reported by Squier (2004). Interestingly, this experiment was performed within the framework of a larger project on gland grafting, carried out in the 1920s and 1930s, whose goal was to alleviate the symptoms of ageing by grafting chimpanzee ovaries into postmenopausal women as a rejuvenation treatment (Squier, 2004). In this experiment, technologies of both reproduction and rejuvenation combine in a surprising way not only by crossing the boundary between human and animal but also the boundary of the menopause separating the reproductive and non-reproductive parts of women's lives.

The 'postmenopausal mother' is the striking result of this ongoing traffic between reproductive and anti-ageing technologies and illustrates how some ARTs developed much later may play an 'anti-ageing' role and even subvert or 'queer' motherhood (Pridmore-Brown, 2009). It also indicates a shift from the original goal of 'improving the human product' to the broader one of 'reconfiguring the human life span' (Squier, 2004, p. 166), as Susan Squier expresses very well: 'Dedicated to blurring its [the life span's] constitutive categories – those fixed biological life stages of parenthood and generationality – both projects [reproduction and age extension] may now serve a new construction of birth and aging, as exemplified in the notion of the postmenopausal mother' (2004, p. 166). If ARTs, by opening up the prospect of extending fertility, generate new possibilities for subverting motherhood and the strong association between youth and fertility, some sociologists, such as the French Bessin and Levilain (2012), criticise the common understanding that social norms about age and ageing would become looser and give way to more individualised life trajectories. They insist rather that age and gender norms still have a profound impact on the structuring of the lifespan, especially reproductive planning, and point to the triple denial – biological, sociological, anthropological – fed by the false belief that ARTs are all powerful in assisting reproduction beyond any age limits, leading women to have children later in life (Bessin & Levilain, 2012).

For my part, I am less interested in the outcome – late or postmenopausal pregnancies and motherhood – than in the upstream encounter between reproductive and ageing science, medicine and technologies making such transformations possible. I think that it is crucial to question how age, fertility and ARTs relate in the first place, before examining how age norms may change. To do so, I follow on from science and technology studies (STS) approaches investigating the making of science and biomedicine in practices, infrastructures and assemblages (Latour, Woolgar, & Biezunski, 2006; Lock & Nguyen, 2018; Mol, 2002) and showing that 'important sciences and technologies and new social forms are coproduced within biomedicine and its related domain' (Clarke, Shim, Mamo, Fosket, & Fishman, 2003, p. 163; on co-production see the seminal work of Jasanoff, 2006). This biomedical STS literature provides tools to examine the practices and material arrangements leading to possible transformations of age-related fertility decline and to postmenopausal pregnancies leaving the domain of experimental science or science fiction. Moreover, following the STS scholar Landecker, who recalls that before changing social norms and what it is to be human, 'biotechnology changes what is to be biological' (Landecker, 2007, p. 232), I am interested in investigating the biology of reproductive age and its relation to ARTs in order to improve our understanding of the contested evidence and multiple realities of age in the domain of reproduction.

When I started my research, there was scant literature drawing on STS approaches to engage with the biology of age-related infertility in the field of the social studies of reproduction. In early studies of ARTs, age and time were occasionally alluded to. In her work on ARTs, Sarah Franklin highlights, for example, the specific temporality of reproductive treatment understood as an obstacle course, and shows how it puts couples in a temporal limbo, where events cannot be ordered according to a serial sequence (Franklin, 1997). The pressure of time due to the age-related decrease of the chance of getting pregnant was also analysed (Price, 1999), as well

as the disruption in the life course infertility creates (Becker, 1994). However, the biology of fertility decline, its agency and materiality were often taken for granted or not problematised. What was instead mainly explored were the experiences of older mothers with contraception and IVF (Szewczuk, 2012), the reasons why women postpone childbirth (e.g., Alonzo, 2002; Bratti & Tatsiramos, 2012) or how older mothers are portrayed in the media (Campbell, 2011).

While focus on the social dimensions of women's experiences is crucial, I felt dissatisfied with these accounts which tended to leave the 'biological stuff' either to the evidence of the facts of life (after all, menopause seems to be a universal phenomenon) or to the science of reproduction. When the biology of reproductive age or the scientific evidence of fertility decline was explicitly problematised, it was generally to highlight their political use. For example, adopting a feminist critical stance, the science and medicine of reproduction are pointed out for the role they play in making gender differences in age-related reproductive social norms appear natural (Moguérou, Bajos, Ferrand, & Leridon, 2011). While this type of account contains a powerful and needed critique, it also tends to turn the reality of age-related fertility decline into the product of discourses and social norms, as if it was invented or constructed only as the result of political forces. I also felt dissatisfied with this approach. I was thus left with two contrasting narratives: on the one hand, the reality of age-related infertility was left to the natural sciences and not problematised; on the other hand, it was critically problematised, but with the effect of replacing its biological ontology with a social and political one. Although I wanted to keep the latter's critical impact and its focus on the normativity at stake in the uses of scientific evidence and biology of reproductive ageing, I found that it did not engage sufficiently with them. What troubled me was that these mattered significantly both for the women themselves and for the clinicians I met. Assuming that the reality of fertility decline was a pure social construction put me at odds with what I could observe in fieldwork, while at the same time I was very much aware that this scientific evidence and biology are not separable from the social which shapes them in many ways, epistemologically, institutionally, economically, practically and materially.

Yet, I had been immersed just long enough in the field of reproductive medicine to observe how the reality and the frequent evidence of age-related fertility decline were central not only in medical discourse but also in practice, in people's embodied experiences, visions of their pasts and futures, in gynaecologists' clinical decisions or in the daily routines of the reproductive medicine units I was involved with. My question was then how to understand the contested reality of reproductive ageing from a social science perspective? How to account for the dual aspect of this medical category that is 'biased' on the one hand and whose reality is not taken seriously or reliable enough on the other? In other words, how to deal with the two conflicting views that not only the biological reality of age-related fertility decline might be more social than usually assumed, but also that this biology might matter much more than usually thought? How to engage with the biology of this phenomenon without reducing it either to its physical-material dimensions or to its social-discursive ones?

If social science literature on the biology of reproductive ageing in the context of ARTs was lacking, I was not without resources. Indeed, trying to answer

these questions places the discussion in the long-established theoretical debates animating anthropology, gender studies, STS and especially feminist STS on the nature/culture divide, particularly in the recent so-called ontological turn, also referred to as new materialism or post-human approaches (Barad, 2007; Coole & Frost, 2010). Turning to these resources helped me to explore what constitutes the nature of age and account for its materialisation. This book contributes in this way to the social study of reproduction and discussions about sex/gender and nature/culture or the biological/social in gender studies, anthropology and STS (Hird, 2004c; Ingold & Palsson, 2013; Lock, 2013; Meloni, Cromby, Fitzgerald, & Lloyd, 2018) by engaging with the biology of age in the science and medicine of reproduction. The goal is to explore the biological-social entanglements of age-related infertility in various scientific and medical settings, as well as in patients' trajectories. It follows in this way the path of scholars who study ARTS and how they transform the domain of the biological and its relation to the social (Franklin, 2007; Franklin & McKinnon, 2001; Thompson, 2005) and who have started to explore the encounter between age/ing and reproduction (Amir, 2007; Franklin & McKinnon, 2001; Friese, Becker, & Nachtigall, 2006, 2008; Lock, 1995; Lock & Kaufert, 2001; Pridmore-Brown, 2009; Squier, 2004). This provides an original avenue for bringing into the discussion social studies of reproduction with social studies of age, ageism and anti-ageing biomedicine (Katz, 2004; Katz & Gish, 2015; Lafontaine, 2009; Mykytyn, 2008, 2010; Vincent, 2006, 2008). However, in order to explain further why it is important to focus on the biology of age and take it seriously, I want to give some contextual background about the biomedicalisation of reproductive age, and the Swiss context, where I did my research.

A Question of Biomedicalisation

The use of ARTs to address age-related infertility difficulties and possibly extend women's fertility time span provides an example of biomedicalisation (Clarke et al., 2003). Medicalisation is usually defined as the 'process by which nonmedical problems become defined and treated as medical problems, usually in terms of illnesses or disorders' (Conrad, 1992, p. 209). This is the case of infertility which, before the rise of modern medicine and the development of ARTs, was generally understood in moral or religious terms, attributed to women and 'solved' by social measures and kinship arrangements, such as adoption (Héritier, 1996). The concept of biomedicalisation has been coined more recently in order to capture

> …the increasingly complex, multisited, multidirectional processes of medicalization that today are being both extended and reconstituted through the emergent social forms and practices of a highly and increasingly technoscientific biomedicine. (Clarke et al., 2003, p. 162)

This conceptual framework insists on the co-constitution of human action and technoscience and aims to explore the 'social' *inside* science, technology and biomedicine, not *outside* of it. With the prefix 'bio', it also draws attention to the transformations

of the biological/social, normal/pathological or human/non-human binaries taking place in biomedicalisation and thus provides a useful framework to investigate what age becomes in reproductive biomedicine and to question its ontology.

The technique of IVF was initially developed in the late 1970s to circumvent the mechanical problem of blocked tubes and was not directed at age-related infertility. However, since then, IVF has been increasingly normalised and standardised to the point that 'conception in vitro is now a normal fact of life' as the socio-anthropologist Sarah Franklin wrote (Franklin, 2013a, p. 1). The number and diversity of associated biotechnologies have expanded, and the frontiers of ART have been pushed both in molecular and global directions. On the one hand, ARTs intervene ever more fundamentally in the biological and genetic mechanisms of fertilisation, as is illustrated by mitochondrial transfer – the 'three-parent IVF' – or preimplantation genetic diagnostic (PGD). On the other hand, ARTs travel the world, following the pathways and logics of a neoliberal globalised system with the creation of hubs according to the supply and demand of reproductive services. Although ARTs are increasingly normalised, each new technological development potentially challenges the stability of their ethical, social, biological and medical boundaries, re-opening in this way the 'closed' public discourse of risk (Campbell, 2011). Their use by 'older mothers' and especially postmenopausal mothers offers such an example.

Although initially it was not developed to intervene in or treat reproductive ageing, several technologies have, over time, been used to circumvent or act on the limits of age-related infertility in women: egg donation and egg freezing especially. The procedure of egg donation consists of an IVF where the oocytes fertilised in vitro come from a donor and not from the intended mother who, however, does carry the pregnancy if the implantation of the embryo succeeds. The first attempts successfully described in the medical literature took place in the early 1980s in Australia (Lutjen et al., 1984; Trounson, Leeton, Besanko, Wood, & Conti, 1983) and were intended for young women with ovarian dysfunction or premature ovarian failure. Its unexpected success in women in their forties and fifties, observed in the 1990s, however, opened the door to its use in overcoming age-related infertility and producing pregnancies in women even after menopause, which symbolically and biologically marks the end of fertility (Sauer & Kavic, 2006).

The procedure of egg vitrification was developed in the 2000s; it consists of an ultra-rapid cooling process where oocytes are put into extremely low temperatures, with chemical products preventing the formation of ice crystals from the high water content of the oocyte (Cobo, Garcia-Velasco, Domingo, Remohí, & Pellicer, 2013). Its goal is to create a state of 'suspended animation' (Franklin & Lock, 2003) or 'latency' (Radin, 2013) in cells, tissues or body samples. By enabling the preservation of oocytes for later use, vitrification represents a new fertility preservation strategy not only for women undergoing anticancer treatment (Martin, 2010b) but also for women anticipating age-related infertility (Cobo et al., 2013) or gamete exhaustion (Stoop et al., 2015). Tested experimentally in a first phase, the procedure gained an increased level of recognition and legitimation in 2013, when the main European and American reproductive medicine societies – ESHRE, ASRM