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## The Fertility Education Initiative: responding to the need for enhanced fertility and reproductive health awareness amongst young people in the United Kingdom

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### ABSTRACT

The need for fertility education arises from changing patterns of family formation in recent times. Young people feel unprepared for how best to plan their career and family and have little idea of the various factors that may influence their fertility later in their life. Research shows young people would like to know more and need the information to be conveyed in a way that is engaging and helps them to integrate it at their current life stage. The Fertility Education Initiative (FEI) was founded in 2016 to address the need for improved fertility and reproductive health awareness and ensure young people are equipped with the relevant information to meet their reproductive and family building needs. This paper serves as a historical record of the genesis of the FEI and its impact to date.

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Fertility; fertility awareness; reproductive health; education; fertility education

### Introduction

The Fertility Education Initiative (FEI) is a group of senior professionals from health, education and government who want to improve people's knowledge of fertility and reproductive health in the UK. It was founded as a special interest group of the British Fertility Society. Fertility awareness is defined as '*The understanding of reproduction, fecundity, fecundability, and related individual risk factors ... and non-individual risk factors ...; including the awareness of societal and cultural factors affecting options to meet reproductive family planning, as well as family building needs*' (Zegers-Hochschild et al., 2017).

The need for fertility education arises from changing patterns of family formation in recent times, including starting families at an older age and changing dynamics of 'modern families', for example, same sex female and male parenting, parent families with donor gametes, surrogacy, transgender parenting and fertility preservation. Young people feel unprepared for how best to plan their career and family. While they feel they have control over contraception, they have little idea of the various factors that may influence their fertility later in

their life – whether related to lifestyle, diet, smoking and recreational drugs or the natural biological changes associated with getting older. Studies have found that adolescents do not know much about this, would like to know more and need the information to be conveyed in a way that is engaging and helps them to integrate it at their current life stage.

The overall vision is to ensure that people have a greater understanding and awareness about fertility and reproductive health, so they can make an informed choice about their own fertility journey, or that of others they may have an impact on. This paper gives a brief introductory overview of factors that are known to affect fertility and highlights gaps in individuals' knowledge of these factors. It outlines the need for and subsequent genesis of the FEI which serves as an historical record for this important initiative.

### Known factors that reduce fertility

Globally the age at which couples are having their first child is rising (Organisation for Economic Cooperation and Development (OECD), 2024b). In the UK, the mean age of mothers has risen from 26.7 years in

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1970 to 30.9 years in 2022, with a similar trend observed in fathers (mean age 29.7 years vs. 33.7 years) (Office for National Statistics (ONS), 2024a). Compared to their mothers' and grandmothers' generations, women born in 1993 are less likely to have had a child before age of 30 years: 44% of women born in 1993 vs. 58% of women in their mothers' generation vs. 81% of women in the grandmothers' generation (Office for National Statistics (ONS), 2024b).

Both male and female fertility declines with age (Horta et al., 2019; van Noord-Zaadstra et al., 1991). Females are born with a finite number of oocytes which decline in both number and quality with time. Typically, oocyte quality starts to decline around 30 years of age with a more significant decline after 35 years (van Noord-Zaadstra et al., 1991). Advancing female age (typically > 35 years of age) is closely linked with an increase in oocyte aneuploidy rate during oogenesis (Cimadomo et al., 2018), resulting in the production of genetically abnormal embryos which have a significantly lower chance of a successful pregnancy and an increased risk of miscarriage (Magnus et al., 2019). In assisted reproductive technology, advanced female age is one of the strongest predictors of low success (Tan et al., 2014). This is due to decline in ovarian reserve and oocyte quality. Male age-related decline in fertility potential is argued to be more significant from the age of 40 years onwards (Horta et al., 2019). Several mechanisms for the observed age-related decline in spermatozoa function and quality have been suggested (Jimbo et al., 2022). After controlling for female age, advanced male age is associated with worse clinical pregnancy outcomes in couples undergoing assisted reproductive technology (Horta et al., 2019) and an increased risk of miscarriage in pregnancies achieved without medical assistance (du Fossé et al., 2020).

Delaying the age of starting a family may therefore have consequences on an individual's ability to achieve and maintain a pregnancy (Du Fossé et al., 2020; Magnus et al., 2019) and achieve their desired family size (i.e. number of children). Additionally, once pregnant, advanced female age is associated with both increased obstetric and neonatal morbidity (Vandekerckhove et al., 2021), placing additional risks on the pregnancy and well-being of mother and unborn baby. Currently, it is estimated that 1 in 6 couples experience difficulties achieving pregnancy/fathering a child (Cox et al., 2022) with the number of couples accessing assisted reproductive technology continuing to rise. Nationally, in the UK, the fertility rate, calculated as number of children per woman,

continues to decrease, from 2.43 in 1970 to 1.53 in 2021 (Organisation for Economic Cooperation and Development (OECD), 2024a).

Reasons for decline in fertility rates are multifactorial and complex; in the short term it is being driven by socioeconomic and educational factors with longer term contributions from environmental, lifestyle and genetic factors (Aitken, 2022). With regards to social factors, rising costs of living and costs of raising children are prohibitory for many wishing to start or expand their family. Improved education of women has led to increased autonomy, empowering them to pursue their professional goals and in turn have more say regarding when to start their family (Aitken, 2022). Whilst this is of course welcomed, it can come at a biological cost. Without appropriate financial support such as childcare and adjustments to workplace conditions, many women are being forced to choose between their professional and family goals. It is important to recognise that not all couples or individuals are choosing to delay starting a family. There is increasing recognition that lack of a 'suitable' male partner is an important factor as to why women are sometimes forced to delay starting a family, despite wanting to do so (Baldwin, 2019; Inhorn et al., 2018). Reasons identified include negative attitudes from men with regards to settling down and pursuing parenthood (Baldwin, 2019; Inhorn et al., 2018). This challenges the notion that it is solely due to females prioritising their professional ambition over starting a family. In addition to age-related decline, other modifiable lifestyle related risk factors for reduced fertility include smoking, alcohol and drugs (Anderson et al., 2010; Sharma et al., 2013), obesity (Practice Committee of the American Society for Reproductive Medicine, 2021) and pelvic infections (Pellati et al., 2008). Globally, HIV, genital tuberculosis, pregnancy related infections, unsafe abortions and female genital mutilation can also contribute to a reduction in fertility potential (Bayoumi et al., 2024). Whilst education is an important area to target to affect behaviour change, it is important to recognise that education alone cannot address these issues and a wider multi-faceted approach is needed to address underlying structural inequality.

### Knowledge of risk factors for reduced fertility

Reasons as to why individuals are delaying having children are multifactorial; driven by personal, social and economic factors (Mills et al., 2011). Regardless of individual reasons for delaying having children, there is a recognized lack of awareness of factors that might

impact future fertility (Harper et al., 2017; Pedro et al., 2018) as well as overestimation of their perceived chances of success with assisted reproductive technology (Fauser et al., 2019).

A national survey was conducted in 2016 by the British Fertility Society (BFS) and the Royal College of Obstetricians and Gynaecologists (RCOG), in collaboration with the national marketing agency *Research Now*. The fieldwork was carried out across a balanced sample of 1000 young males and females aged between 16 and 24 years across all regions of the UK (data unpublished). Online interviews were conducted by *Research Now* using their own bespoke panel of respondents. The data analysis was performed by the RCOG.

The findings highlighted concerning gaps in participants' knowledge of fertility and reproductive health. Whilst the majority of those surveyed recognized that both males and females were most fertile before the age of 30 (over 85%), approximately 50% (56% of boys and 46% of girls) believed that female fertility began to decline after 40 years of age. When it came to awareness of male age-related fertility decline, approximately two thirds believed that this only began after 40 years (67% males, 66% females), and one third (33% of males, 32% of females) believing it began after 50 years of age. When asked about factors that might affect their fertility, female responders recognized that their weight (64%), having a sexually transmitted infection (62%), smoking (59%), alcohol (63%) and stress (70%) can all affect their fertility chances. Interestingly male responders were less aware that each of the above factors could affect female fertility. When asked whether they recalled hearing, seeing or talking about the subject of fertility within the last year, 47% of responders said they had not (53% males, 42% females). Of those that responded that they had, they had obtained this information from the internet (38%), news (32%), friends and classmates (30%), parents and guardians (27%) and their General Practitioners (25%). Only 21% of responders recall obtaining this information from sex and relationship education classes.

The findings from this unpublished national survey demonstrated significant gaps in young people's understanding of their fertility and reproductive health, and are in keeping with findings from similar studies undertaken both within the UK (Biswakarma et al., 2024; Maslowski et al., 2024), and internationally (Delbaere et al., 2020; Ford et al., 2023; García et al., 2018).

### The Fertility Education Initiative

There is a real need for improved fertility and reproductive health awareness to ensure that people are

equipped with relevant information to meet their reproductive and family building needs. They can then make an informed decision regarding both their own fertility journey and the impact that they may have on others. This education should be freely available and delivered in an age-appropriate way from an early stage in their school careers.

To address this, the Fertility Education Initiative (FEI) was established in 2016 after the Fertility Summit, which was held at the RCOG, London, in April of that year after several months of planning (Harper et al., 2017). It was founded on a clear vision to ensure young people within the UK have a greater understanding and awareness of their fertility and reproductive health. The FEI, a Special Interest Group of the British Fertility Society (BFS), consists of a group of senior professionals from health, education and Government. Partners have included: RCOG, Faculty of Sexual and Reproductive Healthcare (FSRH), The Sex Education Forum, Brook, Sexpression UK, Teenage Pregnancy Knowledge Exchange, Fertility Network UK, Marie Stopes and Public Health England.

The aim of the National Summit was to bring together a broad range of fertility specialists and lay people to 'inspire debate and action on how to improve young people's knowledge of fertility and reproductive health within the UK'. The event aimed to kickstart the FEI agenda and received a significant amount of attention from media outlets. During the meeting, strategic goals and objectives were identified and three 'core' education aims were selected. These were, to improve individuals' understanding of:

1. Human fertility, including female and male reproductive health
2. What constitutes modern families and routes to parenthood
3. What assisted reproductive technology is, who it can help, and its limitations?

The FEI believed that this could be achieved by working closely with education providers and lobbying policymakers within the UK government to ensure equal access to sex and relationship education and by providing fertility and reproductive health education resources to those working within schools.

Since the summit, using the above-listed aims, the FEI has developed a series of educational resources, graphics and animations freely available at <https://www.britishfertilitysociety.org.uk/fertility-educational-initiative-fei/> (a satellite site on the main BFS website), which can also be found on YouTube. The resources

have been informed by relevant fertility education literature (Boivin et al., 2018, 2019; Hamilton & Harper, 2024; Harper, Hepburn, et al., 2021; Harrison et al., 2023), and use a range of text, graphics and videos to convey information in a clear, accessible and understandable format. The resources provide a full guide to fertility, information about natural conception, information regarding the importance of lifestyle, fertility treatments and technologies and recently published research and articles about fertility education and awareness. The resources also provide links to several external websites for further information such as the relevant NHS choices pages, HFEA and FertiSTAT websites.

### Supporting policy change

Historically, relationship and sex and health education (RSHE) teaching, typically delivered as part of the personal, social, health and economic (PSHE) module at school, has focused largely around preventing pregnancies and sexually transmitted infections. Until recently, reproductive health and fertility awareness did not feature within the UK Governments' guidance on sex and relationships education, and its omission within the guidance has left many school children unaware of their fertility and reproductive health potential (Maslowski et al., 2023, 2024). Following a large-scale Government-led public consultation, involving parents, young people, schools and experts, including the FEI (which made a detailed submission), Relationships Education is now compulsory in all state-funded English primary schools. Relationships and Sex Education is now also compulsory in all state-funded English secondary schools. Health education is now compulsory in all schools (except independent schools). Through its work lobbying the Department of Education, the FEI has ensured fertility and reproductive health is now embedded within the latest 2019 RSHE national guidance (Department for Education, 2019) which now recognises the need to educate young people about 'the facts about reproductive health, including fertility and the potential impact of lifestyle on fertility for men and women'.

The International Reproductive Health Education Collaboration (IRHEC), formally known as the International Fertility Education Initiative (IFEI), was established in 2020 with an aim to promote fertility awareness and preconception health globally through public education and research (Harper Hammarberg, et al., 2021). Work undertaken by the IRHEC has helped establish country-specific evidence about

young people's fertility and reproductive health awareness and evaluated the effectiveness of existing and emerging fertility education programmes. As a result, there is now clear evidence-based guidance around the recommended use of language and a range of strategies to improve fertility education engagement, fertility literacy and overall empowerment across a range of target ages and population groups (Martins et al., 2024; Mertes et al., 2023).

### Lesson plans for schools

To help schools develop the fertility and reproductive health content as set out within the new Government legislature, the FEI developed *A Guide to fertility* lesson plan for key stage 4–5 students. The module covers the following core themes 1) reproductive anatomy and physiology, 2) factors impacting fertility potential and 3) a review of different pathways to parenthood. The chosen content aligns with the RSHE guidance as well as aspects of the PSHE curriculum. Through an iterative process involving fertility specialists, educators and resource creators, with further feedback sought from the PHSE association, a lesson plan, teacher guidance and a range of educational materials and resources was developed. The content of the module includes the menstrual cycle in relation to the 'fertile window', relevant fertility-related anatomy, the impact of age and sexually transmitted infections on fertility as well as other lifestyle factors. Case studies are used throughout the module to reiterate key learning concepts and provide real-life examples of fertility-related issues that pupils may experience in the future. The module has since been approved and ratified by the PHSE Association, gaining the quality mark and has since been adopted by the PHSE Association website (freely available to download <https://pshe-association.org.uk/resource/a-guide-to-fertility>) for download by educational institutions. To date it has been downloaded almost 500 times by different educational institutions (including both state and independent schools, religious schools, colleges and universities) across the whole of England.

### Behaviour change strategies for enhanced fertility awareness

Randomized trials have shown that both individualised interventions in the form of counselling and generic education materials can improve fertility knowledge in the short term (Conceição et al., 2017; Wojcieszek & Thompson, 2013). Sustained knowledge retention is



more difficult with participant knowledge tending to return to pre-intervention levels within 6 months (Daniluk & Koert, 2015), echoing findings from other health behaviour interventions (French et al., 2017). More work is needed to better understand how behaviour change can be sustained. One study with a two-year follow-up period following the delivery of generic fertility educational materials, demonstrated limited knowledge retention however, amongst couples, found that the subsequent timing surrounding family planning attempts was accelerated (Maeda et al., 2018). Currently there is an ongoing trial randomizing couples to either targeted fertility education, (FertiSTAT tool) generic information or no intervention and will evaluate change to behaviour over 6 months in an attempt to understand both intervention effectiveness and potential barriers to implementation (Chan et al., 2022).

## Conclusions

Despite only a relatively short amount of time, the FEI has achieved many of the initial goals set out at the Fertility Summit in 2016. Nonetheless, more work is still required to ensure young people have improved access to and knowledge of fertility and reproductive health. Currently, the FEI focus is to promote the uptake of the PHSE Association Guide to Fertility module to ensure widespread UK uptake, and in developing resources that are inclusive and support the needs of its diverse population. Feedback will be sought from schools that have downloaded and used the module in their teaching and the resource will be amended accordingly in an iterative fashion. The BFS will also promote its use on social media to widen uptake. Moving forward the FEI aims to ensure equity in access to fertility and reproductive education with a particular focus on individuals from ethnic minority groups and from the LGBTQ+ community.

## Acknowledgements

The Fertility Education Initiative is a special interest group of the British Fertility Society, which was developed in partnership with the RCOG and the Faculty of Sexual and Reproductive Health (FSRH), Sex Education Forum, Brook, Sexpression UK, Teenage Pregnancy Knowledge Exchange, Infertility Network UK, Marie Stopes and Public Health England. The authors wish to thank all members of the FEI, its partners and sponsors that it has in the past worked with and continues to work with to improve fertility and reproductive health knowledge.

## Declaration of Interests statement

The FEI was founded by Professor Adam Balen, Leeds Teaching Hospitals NHS Trust, who organized the Fertility Summit when Chair of the BFS. Professor Balen was the first chair from 2016 to 2022. The FEI is now chaired by Professor Jacky Boivin, Cardiff University who is also a founding member of the International Reproductive Health Education Collaboration (IRHEC). The deputy Chairs are Mr Justin Chu, TFP Oxford Fertility and University of Birmingham and Professor Joyce Harper, University College London. Professor Harper is a founding member, immediate past chair and UK representative of the IRHEC. Professor Harper gives paid talks on reproductive health education and is author of the book *Your Fertile Years*. James Cheshire has worked on the PHSE educational materials and written the draft of this paper. Grace Dugdale was a founding member of the FEI, produced the animations and worked on the PHSE educational materials.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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