

# FERTILITY AND PRECONCEPTION HEALTH

## Background Paper

This paper provides background information to the PHAA Fertility and Preconception Health Policy Position Statement, providing evidence and justification for the public health policy position adopted by Public Health Association of Australia and for use by other organisations, including governments and the general public.

## Contents

Contents .....	2
Summary.....	3
Public health issue .....	4
Background and priority.....	4
Current situation .....	6
Policy options .....	7
Recommended action.....	7
References.....	8

## Summary

1. Healthy preconception behaviours can have impacts across multiple generations, with recognised effects on the parent, their child and their grandchild.
2. Preconception health can be defined as the months to years before pregnancy needed to address risk factors for couples and optimise health behaviours that may affect the future pregnancy and child.
3. The far-reaching effects, and therefore importance, of optimal preconception health is explained in part by the theory of the Developmental Origins of Health and Disease (DOHaD).
4. There are a range of modifiable and non-modifiable preconception health risk factors that should be considered.
5. Preconception health is supported by interventions, known as *preconception care (PCC)*, aimed at improving a couple's health status, health behaviours and their wider determinants before pregnancy.
6. Individuals in-between pregnancies also benefit from PCC, or *interconception care*.
7. Health systems involving pregnancy, birth and parenting are often women- or mother-centred and as such healthcare in these areas often ignores the roles of fathers, and caters in language and advice towards women.
8. Preconception health encompasses, but is not restricted to, fertility which is defined as the ability to become pregnant and maintain pregnancy to achieve a live birth.
9. Causes of infertility can relate to female factors (age, tubal disease, endometriosis, PCOS), male factors (idiopathic, genetic, testis damage, obstruction, erectile and ejaculatory issues), both partners could have contributing factors or infertility may be unexplained.
10. Cancer and its treatment can affect a patient's fertility and so fertility counselling at the time of cancer diagnosis can be an important support for cancer patients seeking to understand their fertility preservation options.
11. Australian research suggests approximately three quarters of women who continue with a pregnancy report having planned to become pregnant and this presents a substantial opportunity for improved health and health behaviours among reproductive partners through the delivery of effective preconception public health and primary care interventions.
12. Access to fertility support in Australia is also limited both in scope and in access, and there is a dearth in national guidance on safe and effective fertility treatment in Australia with only hospital-level clinical care guidelines available.
13. Despite a high rate of uptake, same-sex couples can be denied fertility services or government rebates for those services in some Australian states.
14. There are a number of important policy changes which, if implemented, could significantly strengthen the delivery of preconception care and fertility treatment in Australia.

## Public health issue

Preventive health is a cornerstone of effective public health approaches, and primary prevention is recognised as the most impactful level of preventive health interventions.<sup>1</sup> Healthy preconception behaviours can have impacts across multiple generations, with recognised effects on the parent, their child and their grandchild.<sup>2</sup> The importance of healthy preconception behaviours applies to all individuals during the reproductive life phase and requires coordinated efforts from policymakers, health promotion initiatives, and health professionals. For these reasons among others, the preconception period is a critical life stage requiring public health attention.

## Background and priority

Preconception health can be defined as the months to years before pregnancy needed to address risk factors for couples and optimise health behaviours that may affect the future pregnancy and child.<sup>3</sup> Improvements in preconception health can impact;<sup>4</sup>

- A couple's ability to achieve pregnancy.
- The health of the mother during the pregnancy.
- The development and viability of the embryo and foetus.
- The health of the child at birth.
- The health of the child later in life.

The far-reaching effects, and therefore importance, of optimal preconception health is explained in part by the theory of the Developmental Original of Health and Disease (DOHaD),<sup>5</sup> which explains the development and evolution of an organism by understanding the interaction between its genetics and the environment, and more recently integrates understanding from the developing field of epigenetics. It applies a truly 'life-course approach' to preventive health by acknowledging that an individual's health prior to pregnancy can not only impact the health of the child arising from that pregnancy, but the genetic programming of any future children that child may have.<sup>6</sup> DOHaD also recognises that the health of *both* reproductive partners has a critical role in healthy conception, pregnancy and birth outcomes.<sup>7</sup>

### *Preconception health risk factors*

There are a range of modifiable and non-modifiable preconception health risk factors that should be considered. They can be broadly categorised as parental age, body composition (e.g. underweight, overweight, obesity), health behaviours (e.g. alcohol intake, tobacco use, caffeine intake, recreational drug use), physical activity, nutrition (e.g. micronutrient intake, dietary habits), environmental exposures (e.g. radiation, chemicals, ambient temperature and gases), and birth spacing (e.g., short interpregnancy intervals).<sup>8,9</sup> Other factors, albeit potentially less modifiable, considered relevant to preconception health includes genetics and family history, risky sexual behaviours, neighbourhood, and chronic diseases. The ability to effectively address preconception risk factors is constrained, like all areas of health, by a range of social determinants such as socioeconomic status, cultural and linguistic diversity, health literacy, and access to health services.<sup>10,11</sup>

### *Preconception care*

Preconception health is supported by interventions, known as *preconception care (PCC)*, aimed at improving a couple's health status, health behaviours and their wider determinants before pregnancy.<sup>4</sup> PCC involves counselling and health interventions to optimise the health of women and their partners before

pregnancy to improve health-related outcomes for themselves and their children. Individuals in-between pregnancies also benefit from PCC, or *interconception care*.<sup>12</sup>

PCC involves a range of strategies including reproductive planning and the use of effective contraception before conception is desired; counselling and education regarding substance use in pregnancy, including avoidance of smoking and alcohol consumption; folic acid and iodine supplementation; weight reduction in those overweight or obese and medication adjustments.<sup>13</sup>

PCC can be delivered as primary care or public health interventions and studies have found that women and their partners who receive PCC are more likely to have improved knowledge and demonstrate protective health behaviours<sup>14</sup> There are efforts internationally to integrate the delivery of preconception care into existing primary care services through the ‘One Key Question’<sup>®</sup> initiative – developed by the Oregon Foundation for Reproductive Health - which encourages primary care health professionals to ask women of reproductive age, “would you like to become pregnant in the next year?”.<sup>15</sup> However, international research frequently identifies barriers to the delivery of preconception care by primary care practitioners such as restricted available time, absence of available funding, and gaps in the practitioner’s preconception health knowledge.<sup>16</sup> Research focusing specifically on the ‘One Key Question’ has also highlighted potential issues with the transferability of the tone and language of such a context across geographical and social boundaries.<sup>17,18</sup>

Preconception care is also affected by society’s gendered view towards reproductive health. Health systems involving pregnancy, birth and parenting are often women- or mother-centred. Healthcare in these areas often ignores the roles of fathers and caters in language and advice towards women. The result of this woman/mother orientation is men can be ignorant of their contribution to the birth outcome and feel discouraged from engaging in preconception health behaviour change.<sup>19,20</sup> This is despite established evidence that men’s health before conception can also impact on a couple’s fertility and the physical, mental and social health of their future child.<sup>7,9,21-23</sup>

### **Fertility support**

Preconception health encompasses, but is not restricted to, fertility which is defined as the ability to become pregnant and maintain pregnancy to achieve a live birth – considered to be a birth event resulting in a live-born baby.<sup>24</sup> Many women are choosing to delay attempts to conceive until their thirties and forties, leading in some cases to childlessness and smaller than desired family sizes.<sup>25</sup> This delay is in part attributable to the broad availability of effective contraception and assisted reproductive treatments, and to the increase in women’s education and career aspirations.<sup>26</sup> Another factor that might contribute to this trend is inaccurate knowledge on age-related fertility decline, which results in both a perception of control over long-lasting fertility, and a positive attitude towards delaying motherhood.<sup>27</sup> Australian research suggests both genders have a poor understanding of age-related decline in both natural and IVF-assisted conception, potentially explaining why many delay starting a family.<sup>28</sup>

There are many types of fertility treatments available, ranging from simple interventions such as medication to help a person ovulate (timed intercourse or ovulation induction), to more complicated procedures such as intrauterine insemination (IUI) or assisted reproductive treatment (ART) that includes in-vitro fertilisation (IVF), donor conception or surrogacy. Fertility treatments can be used:<sup>29</sup>

- To treat subfertility and infertility.
- To help people who identify as LGBTQIA+, and single people have children.
- For people who are unable to become pregnant, carry a pregnancy or give birth.

- To reduce the chance of a child inheriting a genetic disease or abnormality.
- To preserve fertility.

Causes of infertility can relate to female factors (age, tubal disease, endometriosis, PCOS), male factors (idiopathic, genetic, testis damage, obstruction, erectile and ejaculatory issues), both partners could have contributing factors or infertility may be unexplained. Current Australian data<sup>23</sup> indicates among people undergoing fertility treatment, 36.1% are related to female factors, 20% to male, 11.2% combined male and female factors and 28.7% unexplained.

There is an increasing number of people accessing ART at an older age, with the average age of women or people that menstruate who access ART being 35 years, and one in four (23.9%) aged 40 or older. The average age of men or people with testes is 38 years<sup>23</sup> Live birth rates following IVF vary per age group with women less than 30 years old having 40.8% live birth rate per embryo transfer. The rate declines with advancing age, to 9.4% for females aged 40 to 44 years and 1.2% for females aged 45 years and over.

Across the world, same-sex couples struggle to access ART.<sup>30</sup> In Australia, one in seven ART treatment cycles are for single females or female-female couples. Of the 93,275 autologous and recipient cycles, 10.2% are undertaken by single females and 3.9% by female-female intending parents. Almost one in four (24.9%) oocyte/embryo recipient cycles are in female-female intending parents<sup>23</sup>

### **Fertility preservation in cancer care**

Improvements in cancer diagnosis and treatment have led to significant improvements in survival rates for many people of reproductive age. However, both cancer and its treatment can affect a patient's fertility.<sup>31</sup> For this reason, fertility counselling at the time of cancer diagnosis can be an important support for cancer patients seeking to understand their fertility preservation options.<sup>32</sup> Fertility counselling can help relieve emotional distress associated with a cancer patient's potential infertility and their desire for future family planning. For women or people with ovaries, preservation procedures include cryopreservation of oocytes, embryos, ovarian tissue, ovarian suppression and transposition. For men or people with testes, cryopreservation of semen for post-pubertal patients is routinely undertaken. Fertility preservation for cancer patients represents a significant driver for fertility preservation services with 15.9% of the 3,642 initiated cycles performed for female fertility preservation in Australia and New Zealand undertaken for medical reasons relating to a cancer diagnosis.<sup>23</sup>

## **Current situation**

Australian research suggests approximately three quarters of women who continue with a pregnancy report having planned to become pregnant.<sup>33</sup> This presents a substantial opportunity for improved health and health behaviours among reproductive partners through the delivery of effective preconception public health and primary care interventions. While preconception health is identified as a priority area in both the National Women's Health Strategy (2020 - 2030)<sup>34</sup> and the National Men's Health Strategy (2020-2030),<sup>35</sup> there is currently no co-ordinated and targeted strategy to support the delivery of preconception care in Australia. The RANZCOG and RACGP have published clinical guidelines for preconception care,<sup>36,37</sup> but no other guidelines are in place for primary care practitioners in Australia. Even where these guidelines exist, Australian general practitioners report barriers (e.g., insufficient time and training) to implementing the guidelines.<sup>38</sup> Equally there is no framework for health promotion interventions targeting preconception health and care.

Access to fertility support in Australia is also limited both in scope and in access. Publicly funded fertility treatments are restricted to a lifetime cycle limit of two stimulated IVF or intracytoplasmic sperm injection ICSI cycles per person and to women under 42 years old.<sup>39-41</sup> While public hospitals do provide fertility preservation clinics they are often burdened by a long wait-list and this can drive those in need of these services to private hospitals, which can be expensive and practice outside of accepted ethical standards<sup>42,43</sup>. There is also a dearth of national guidance on safe and effective fertility treatment in Australia with only hospital-level clinical care guidelines available.

The international focus on women as the prime recipients of preconception and fertility care is also reflected in Australia with the scale and range of male fertility problems only being first described in 2020.<sup>23</sup> Importantly, this report found approximately one-third of all IVF cycles performed in 2020 included a diagnosis of male infertility. The principal cause in the majority of these cycles (77%) was idiopathic (unexplained). Research<sup>23</sup> shows that the perception of fertility as a woman's domain prevents fertility information for reaching men and stops men from seeking out fertility information, particularly in a timely manner<sup>44</sup>. Data related to men's preconception health behaviours and intentions is limited to a focus on fertility rather than the broader benefits of preconception health.<sup>28,40,45</sup>

Despite a high rate of uptake, same-sex couples can be denied fertility services or government rebates for those services in some Australian states. Same-sex couples that have no existing fertility issues are deemed "socially infertile" rather than "medically infertile" and therefore face more difficulty accessing Medicare rebates for ART.<sup>46,47</sup> These financial barriers make it harder for LGBTIQ couples to access the fertility services they require.

## Policy options

There are a number of important policy changes which, if implemented, could significantly strengthen the delivery of preconception care and fertility treatment in Australia. Firstly, while there are some clinical guidelines available for specific health professions, improvements in preconception health at a population level requires a coordinated strategy to achieve preconception health in the Australian population across all levels of the health system including policy, health promotion and primary care (encompassing all points of primary care engagement, not just general practice). This should be driven at a federal level and provide a roadmap for building a comprehensive response to improve Australians' preconception health. This strategy should, among other outcomes, aim to optimise preconception and fertility health literacy as early as possible in an individual's reproductive life. Preconception and fertility education should be integrated into primary and secondary sexual reproductive health education programs and public health campaigns.

Parallel to this broader strategy, and in the context of health professionals' self-reported deficiencies in preconception health knowledge, a set of defined competencies are needed to support health professional training in preconception health and care. Similarly, the clinical complexity of fertility requires more consistent guidelines to drive and inform safe and effective evidence-based practice. These guidelines need to be developed in partnership with the professions and facilities delivering the care, and consumer representatives, but to be independently led by state and federal governments.

## Recommended action

1. Develop and implement a National Preconception Health and Care Strategy.
2. Develop and implement a National Preconception Health Competency Framework.

3. Develop and implement National Clinical Guidelines for Fertility Treatment.
4. Integrate preconception and fertility education into school-based sexual and reproductive health curriculum and public health campaigns.

(Adopted 2024)

## References

1. Commonwealth of Australia. National Preventive Health Strategy. Canberra, Australia: Department of Health, 2021.
2. Jacob C, Baird J, Barker M, Cooper C, Hanson M. The importance of a life course approach to health: chronic disease risk from preconception through adolescence and adulthood. Geneva: World Health Organisation, 2017.
3. Stephenson J, Heslehurst N, Hall J, et al. Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health. *The Lancet* 2018; **391**(10132): 1830-41.
4. World Health Organization. Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity: World Health Organization Headquarters, Geneva, 6–7 February 2012: Meeting report. 2013.
5. Suzuki K. The developing world of DOHaD. *Journal of Developmental Origins of Health and Disease* 2018; **9**(3): 266-9.
6. Fleming TP, Watkins AJ, Velazquez MA, et al. Origins of lifetime health around the time of conception: causes and consequences. *The Lancet* 2018; **391**(10132): 1842-52.
7. Hur SSJ, Cropley JE, Suter CM. Paternal epigenetic programming: evolving metabolic disease risk. 2017; **58**(3): R159.
8. Caut C, Schoenaker D, McIntyre E, Vilcins D, Gavine A, Steel A. Relationships between women's and men's modifiable preconception risks and health behaviors and maternal and offspring health outcomes: an umbrella review. *Semin Reprod Med* 2022; **40**(3-04): 170-83.
9. Carter T, Schoenaker D, Adams J, Steel A. Paternal preconception modifiable risk factors for adverse pregnancy and offspring outcomes: a review of contemporary evidence from observational studies. *BMC Public Health* 2023; **23**(1): 1-44.
10. Verbiest S, Shawe J, Steegers EA. Advancing Preconception Health Globally: A Way Forward. Preconception Health and Care: A Life Course Approach: Springer; 2020: 299-308.
11. Wilson-Stronks A, Lee KK, Cordero CL, Kopp AL, Galvez E. One size does not fit all: Meeting the health care needs of diverse populations: Joint Commission Oakbrook Terrace, IL; 2008.
12. Wise PH. Transforming Preconceptional, Prenatal, and Interconceptional Care Into A Comprehensive Commitment To Women's Health. *Women's Health Issues* 2008; **18**(6, Supplement): S13-S8.
13. Dorney E, Black KI. Preconception care. *Australian journal of general practice* 2018; **47**(7): 424.
14. Withanage NN, Botfield JR, Srinivasan S, Black KI, Mazza D. Effectiveness of preconception interventions in primary care: a systematic review. *Br J Gen Pract* 2022; **72**(725): e865-e72.
15. Hunter MS, Hammarberg K, Sher J. Ask women what they want: Integrating pregnancy desire screening into routine primary care. *International Journal of Birth & Parent Education* 2022; **10**(1).
16. Steel A, Lucke J, Reid R, Adams J. A systematic review of women's and health professional's attitudes and experience of preconception care service delivery. *Family practice* 2016; **33**(6): 588-95.
17. Fitch J, Dorney E, Tracy M, Black KI. Acceptability and usability of 'One Key Question'® in Australian primary health care. *Australian Journal of Primary Health* 2022.
18. Schoenaker D, Gafari O, Taylor E, et al. Informing public health messages and strategies to raise awareness of pre-conception health: a public consultation. *The Lancet* 2021; **398**.
19. Steen M, Downe S, Bamford N, Edozien L. Not-patient and not-visitor: a metasynthesis fathers' encounters with pregnancy, birth and maternity care. *Midwifery* 2012; **28**(4): 422-31.

20. Fenwick J, Bayes S, Johansson M. A qualitative investigation into the pregnancy experiences and childbirth expectations of Australian fathers-to-be. *Sexual & Reproductive Healthcare* 2012; **3**(1): 3-9.
21. Kotelchuck M, Lu M. Father's role in preconception health. *Maternal and child health journal* 2017; **21**(11): 2025-39.
22. O'Brien AP, Hurley J, Linsley P, McNeil KA, Fletcher R, Aitken JR. Men's preconception health: a primary health-care viewpoint. *American journal of men's health* 2018; **12**(5): 1575-81.
23. Newman J, Paul RC, Chambers GM. Assisted reproductive technology in Australia and New Zealand 2020. *Sydney: University of New South Wales* 2022.
24. AIHW. Australia's mothers and babies. Canberra: Australian Institute of Health and Welfare, 2023.
25. Steiner AZ, Jukic AMZ. Impact of female age and nulligravidity on fecundity in an older reproductive age cohort. *Fertility and sterility* 2016; **105**(6): 1584-8. e1.
26. Alteri A, Pisaturo V, Nogueira D, D'Angelo A. Elective egg freezing without medical indications. *Acta obstetrica et gynecologica Scandinavica* 2019; **98**(5): 647-52.
27. Garcia D, Brazal S, Rodriguez A, Prat A, Vassena R. Knowledge of age-related fertility decline in women: A systematic review. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2018; **230**: 109-18.
28. Hammarberg K, Setter T, Norman RJ, Holden CA, Michelmores J, Johnson L. Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey. *Fertility and sterility* 2013; **99**(2): 502-7.
29. VARTA. Fertility treatment explained. 2023. <https://www.varta.org.au/fertility-treatment/fertility-treatment-explained> (accessed 15 Aug 2023).
30. Neyra O. Reproductive ethics and family: an argument to cover access to ART for the LGBTQ community. *Voices in Bioethics* 2021; **7**.
31. Beauchemin MP, Roth ME, Parsons SK. Reducing Adolescent and Young Adult Cancer Outcome Disparities Through Optimized Care Delivery: A Blueprint from the Children's Oncology Group. *J Adolesc Young Adult Oncol* 2023; **12**(3): 314-23.
32. Logan S, Anazodo A. The psychological importance of fertility preservation counseling and support for cancer patients. *Acta Obstetrica et Gynecologica Scandinavica* 2019; **98**(5): 583-97.
33. Lang AY, Harrison CL, Barrett G, Hall JA, Moran LJ, Boyle JA. Opportunities for enhancing pregnancy planning and preconception health behaviours of Australian women. *Women and Birth* 2021; **34**(2): e153-e61.
34. Department of Health. National Women's Health Strategy 2020-2030. <https://bit.ly/3HKuj7U>: Australian Government, 2019.
35. Department of Health. National Men's Health Strategy 2020-2030. Canberra: Australian Government, 2019.
36. Dorney E, Boyle J, Walker R, et al. A Systematic Review of Clinical Guidelines for Preconception Care. *Semin Reprod Med* 2022; **40**(3-04): 157-69.
37. RANZCOG. Pre-pregnancy Counselling. Royal Australian and New Zealand College of Obstetricians and Gynecologists ...; 2017.
38. Mazza D, Chapman A, Michie S. Barriers to the implementation of preconception care guidelines as perceived by general practitioners: a qualitative study. *BMC health services research* 2013; **13**(1): 1-8.
39. Wyndham N, Figueira PGM, Patrizio P. A persistent misperception: assisted reproductive technology can reverse the "aged biological clock". *Fertility and sterility* 2012; **97**(5): 1044-7.
40. Hammarberg K, Collins V, Holden C, Young K, McLachlan R. Men's knowledge, attitudes and behaviours relating to fertility. *Human Reproduction Update* 2017; **23**(4): 458-80.
41. VARTA. Public fertility care services. 2023. <https://www.health.vic.gov.au/public-health/public-fertility-care-services> (accessed 15 August 2023).
42. Perrotta M, Hamper J. The crafting of hope: Contextualising add-ons in the treatment trajectories of IVF patients. *Social Science & Medicine* 2021; **287**: 114317.
43. Bhattacharya S, Evers J, Gameiro S, et al. Towards a more pragmatic and wiser approach to infertility care. *HUMAN REPRODUCTION* 2019; **34**(7): 1165-72.

44. Pearson L, Holton S, McLachlan R, Hammarberg K. Australian men's fertility information seeking attitudes and behaviour: a qualitative investigation. *Sexual & Reproductive Healthcare* 2021; **29**: 100621.
45. Steel A, Carter T. Balancing our gaze on preconception health and care to include men. *Advances in Integrative Medicine* 2021; **8**(2): 79-80.
46. Bellamy R. Fertility treatment is inequitable — and 'socially infertile' couples are worse affected. Crikey. 2023.
47. Irving-Guthrie A. From IVF to surrogacy: How these queer couples are diving into parenthood. ABC Everyday. 2022.