

# A PRECONCEPTION CARE STRATEGY

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## **INTRODUCTION: Time to act**

**Eric A. P. Steegers, gynaecologist, professor and chair Obstetrics & Gynaecology, Erasmus MC, Rotterdam, The Netherlands**

Parental preconception health and the first 1,000 days of a child's antenatal and postnatal life are main determinants of one's later health, wellbeing and social opportunities.

Fifteen years ago in the Dutch city of Rotterdam, poverty, deprivation and related toxic stress were identified, next to medical risks, as drivers of early life initiation of health inequities. Perinatal health heatmaps on a neighbourhood level in Dutch cities were then shared with local counsellors and subsequent national ministers of Health. This created a sense of urgency and resulted in the taking up of responsibility by local and national governments recognizing the public health importance of preconception and antenatal care and the opportunity to prevent further impact of the 'poverty trap' on future generations.

During the next twenty years local programs in Rotterdam such as 'Ready for a baby' and the 'Healthy Pregnancy for All' program in seventeen other cities were initiated. The shared ambition was to combine efforts from the medical and social health domains. This was labelled as 'social obstetrics'. Programs included pre- and interconception care and multidisciplinary risk assessment at pregnancy booking not only focused on medical risks but also at those related to lifestyle and nutrition, mental health and the social environment. Care pathways were developed tailored to the individual and neighbourhood.

After the local counsellor of Rotterdam became national minister of Health in 2017, the Netherlands Ministry of Health, Welfare, and Sport launched a nationwide action program entitled 'Solid Start'. Building on the principles and know-how acquired through the previously mentioned programs, 'Solid Start' currently supports 285 out of the 340 Dutch municipalities in addressing health inequities before, during, and after pregnancy.

Next to 'social obstetrics', preconception health is a key component of this Solid Start program. Small multi-agency conferences with professional organizations are being set up to tackle perceived barriers to implementing preconception health and care. They all gave their dedicated support to a pledge of the Ministry of Health on the importance of preconception health entitled 'little effort, great impact'. Key is the One Key Question® approach (Stranger Hunter, 2017) at every available opportunity to improve both preconception care and contraceptive counselling by asking the question, 'Do you plan to become pregnant in the next year?'

Lessons learned during this period of transitions were, among others, the need; a. to create a sense of urgency to improve preconception health as prevailing antenatal care systems do not optimise early development, b. that universities take up their responsibility for the 'societal valorization of new knowledge' for the benefit of the welfare, health and opportunities of the

general population, c. to acknowledge the massive existing evidence of associations between preconception risks and adverse pregnancy outcomes and the (cost-) effectiveness of many related interventions available, d. to also tackle preconception non-medical risks in a context based manner, often related to poverty and e. that, in order to do so, new local and national governmental public health policies must be developed.

Genuine partnership and communication are essential, both within and between countries. It is time to act.

# BENEFITS FOR PARENTS

## Chapter 1



### Chapter 1: Benefits for Parents

A strong national policy focus on the antenatal period and the first 1001 days of a child's life, succeeded by the early years, is perceived as integral to personal health and wellbeing, but public and policy awareness of the value of preconception care to population health and the wider economy sits firmly beneath the radar.

Defined by the World Health Organisation as:

*'The provision of biomedical, behavioural and social health interventions to women and couples before conception occurs, aimed at improving their health status, and reducing behaviours and individual and environmental factors that could contribute to poor maternal and child health outcomes,'*  
([https://apps.who.int/iris/bitstream/handle/10665/78067/9789241505000\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/78067/9789241505000_eng.pdf))

preconception care aims to boost short and long-term parental and child health, thereby affording the next generation the optimum start in life. Supporting people of reproductive age to achieve better health in this way remains an untapped opportunity to reduce disparities in life chances and enhance the health of the population.

It is now recognised that improving preconception care requires a dual strategy targeting health improvement in both men and women planning a pregnancy, and in the general population of reproductive age (*Barker M et al. intervention strategies to improve nutrition and health behaviours before conception. Lancet 1998; 391:1853-1864*).

Preconception care introduces health-promoting understanding and behaviour to those who are planning a pregnancy, and to those with no intention to conceive. It also offers a unique incentive to address disease prevention and general health promotion among men of reproductive age; a group historically

hard to interest in safeguarding their own health (Guo DP. *Preconception Considerations for Male Fertility. RI Med J* (2013). 2022; 105(5):29-34).

Preconception care runs parallel along the reproductive life course, involving the entire health system and necessitating a 'whole system' approach (*Preconception Care. Making the Case 2018* <https://www.gov.uk/government/publications/preconception-care-making-the-case> ). Consistent and effective delivery is essential, with additional support guaranteed for groups that need it most. Implementing a multi-agency life-course strategy would surmount care barriers; making appropriate preconception care universally accessible. Increasing knowledge and understanding of what those of reproductive age can do before conception to improve fertility, wellness in pregnancy and a baby's future health should begin with school-based education and be reinforced by media campaigns (including social platforms) and trusted familiar sources such as the NHS and healthcare system (Schoenaker D et al *Informing public health messages and strategies to raise awareness of pre-conception health: a public consultation. Lancet.* 2021; 398(2):S77. Doi: 10.1016/S0140-6736(21)02620-9) and (McGowan L et al. *Exploring preconception health beliefs amongst adults of childbearing age in the UK: a qualitative analysis. BMC Pregnancy Childbirth.* 2020; 20(1):41. Doi: 10.1186/s12884-020-2722-5).

The ideal approach would prioritise awareness-raising initiatives directed at both the general public and health professionals and aim to encourage young people to consider how their wellbeing now could contribute to the manifold benefits that a well-prepared parenthood can offer (Waelput AJM, Rijlaarsdam CM, Steegers EAP. *Preconception health and choices: tailored solutions for prospective parents. International Journal of Birth and Parent Education* 2022; 9 (2).

Few pregnant women in England today seek preconception care because they are neither identified nor supported in preparation for pregnancy and do not realise that improved health beforehand increases the likelihood of a healthy outcome. This has particular significance for under-served groups. (M'hamdi HI, van Voorst SF, Pinxten W, Hilhorst MT, Steegers EA. *Barriers in the uptake and delivery of preconception care; exploring the views of care providers. Matern Child Health.* 2017; 21(1):21-28. doi: 10.1007/s10995-016-2089-7).

General practice teams have a key role in providing preconception care (Hall J et al. *Addressing reproductive health needs across the life course; an integrated, community-based model combining contraception and preconception care. Lancet Public Health.* 2023; 8(1):e76-e84. Doi: 10.1016/S2468-2667(22)00254-7; Daly M et al. *Women's knowledge, attitudes and views of preconception health and intervention delivery methods; a cross-sectional survey. BMC Pregnancy Childbirth.* 2022; 22(1):729. Doi: 10.1186/s12884-022-05058-3).

being uniquely positioned at the heart of local communities and (unlike any other health service) in contact with >70% of women aged 15-49 in the UK at least once a year (Eurostat. *Persons visiting a doctor in the last 12 months by*

medical speciality, number of visits, educational attainment level, sex and age. 2017 <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190225-1>).

A large mixed-methods study conducted in England (Obiamaka Ojukwu et al 2016 *General practitioners' knowledge, attitudes and views of providing preconception care: a qualitative investigation*, *Uppsala Journal of Medical Sciences*, 121:4,256-263, DOI: 10.1080/03009734.2016.1215853) examined GPs' knowledge, attitudes and opinions of preconception health and care in the general practice setting, surveying 1,173 women presenting at maternity units and GP services in London. Women and health professionals interviewed revealed a lack of knowledge of, and demand for, preconception care. Specialist services were not provided at most GP surgeries.

However, there are many routine face-to-face and online interactions when conversations about pregnancy intentions are acceptable (e.g. during visits for contraception, cervical screening, long-term conditions, medication reviews and after a miscarriage). The experiences in the USA, Australia and Scotland are illustrative (*Stranger Hunter, Michelle; Hammarberg, Karin and Sher, Jonathan, 2022, Ask women what they want: Integrating pregnancy desire screening into routine primary care. International Journal of Birth and Parent Education, vol. 10, issue 1. <https://www.qnis.org/wp-content/uploads/2022/11/1JBPE-Vol-10-Issue-1-Hammarburg.pdf>*)

It is essential to 'make every contact count' but of equal weight is the standard of training for health care professionals who are responsible for the delivery of memorable reproductive messages (Hopper H et al 2022 *Preconception Care for People with Health Conditions: What Approaches Work, for Whom, and in What circumstances? A Realist Review*, *Women's Reproductive Health*, DOI: 10.1080/23293691.2022.2132841). A Government-supported 'preconception pathway' for general practice use could enable healthcare professionals to offer improved support to their patients in readying themselves for a pregnancy when this becomes relevant; regardless of geographical or socioeconomic status.

According to the Royal College of General Practitioners Research and Surveillance Centre database more than nine in 10 women (91%) have potentially modifiable preconception behavioural or medical risk factors for pregnancy (Stephenson J, et al. *A wake-up call for preconception health: a clinical review. Br J Gen Pract. 2021; 71(706); 233-236*).

Good health and wellbeing during the preconception period is particularly important for people with pre-existing chronic physical and mental health conditions (Hammarberg Karin 2022 <https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-022-04498-1>) . Such conditions are more common in minority groups and those living in less advantaged areas, and improved preconception care could make an important contribution to reducing the transmission of disparities across generations.

Preconception health should be intrinsic to a broader sexual and reproductive continuum of care with evidence-based recommendations for those with chronic health conditions denoting a partnership approach, in which non-judgemental, knowledgeable healthcare professionals provide relational continuity alongside the use of digital technology where available.

The psychological impact of pregnancy planning for people with health conditions must be evaluated. Some experience anxiety occasioned by previous experience of pregnancy loss, or even guilt because they have a health condition (*Murphy et al 2010 Effectiveness of a Regional Pre-pregnancy Care Program in Women with Type 1 and Type 2 Diabetes; benefits beyond glycaemic control. Diabetes Care, 33(12), 2514-2520*) Steele A et al (2015) *The prevalence and nature of the use of preconception services by women with chronic health conditions; an integrated review. BMC Women's Health, 15, 14*).

In England, 9 in 10 women of reproductive age carry at least one common risk factor (e.g. obesity, high blood pressure) or adopt an adverse health behaviour (e.g. smoking, excessive alcohol consumption) that could be optimised through integrated preconception care (*Stephenson J et al. Awake-up call to improve preconception health; a clinical review. Br J Gen Pract 2021; 71(7060):233-236. Doi: 10.3399/bjgp21X715733*).

In addition, one in four adults fail to meet global guidance for engagement in physical activity although established patterns of regular exercise help pregnant women with back pain, maintain healthy bowel function and reduce the risk of gestational diabetes, gestational hypertension, pre-eclampsia and birth via caesarean. The World Health Organisation (WHO) Physical Activity Fact sheet, October 5<sup>th</sup> 2022 (<https://www.who.int/news-room/fact-sheets/detail/physical-activity>) cites the role of education in disrupting established sedentary behaviour patterns (alongside information on viable physical engagement guidance).

Increasing the availability of preconception care for men introduces an opportunity for improved family planning, better pregnancy outcomes and preparation for fatherhood (*Frey KA et al The clinical content of preconception care: preconception care for men. Am J Obstet Gynecol. 2008; 199(6 Suppl 2):S389-95. doi: 10.1016/j.ajog.2008.10.024*). More research into the health of prospective fathers is needed but current evidence suggests that a paternal age of >40 may increase the risk of miscarriage (*Daly et al Preconception exposures and adverse pregnancy, birth and postpartum outcomes: Umbrella review of systematic reviews. Paediatr Perinat Epidemiol. 2022; 36(2):288-299. Doi; 10.1111/ppe.12855*). Existing paternal health conditions including hypertension, diabetes and obesity may also increase the risk of maternal morbidity from complications such as pre-eclampsia.

Some interventions that are available prior to conception are not possible after conception has occurred.



The trend (particularly amongst women in middle/upper income levels) to delay parenthood until the age of 30+ has stimulated an increased need for assistance in preparation for pregnancy. Maternal age is widely held to be an independent indicator for various obstetric complications with increased age a risk factor for most systematic health problems. Older women who become pregnant are more likely to have pre-existing health conditions. There is no separate, structured guidance on preconception tests at advanced maternal age but the preconception period is an ideal window in which to ascertain and address underlying maternal health concerns together with social issues and harmful lifestyle behaviours; thereby in some instances, reducing the incidence of infertility, perinatal morbidity and mortality.

Preconception screening should be clinically relevant and aimed at identifying risk factors (*Elpiniki Chronopoulou et al, Preconception tests at advanced maternal age, Best Practise & Research Clinical Obstetrics & Gynaecology, Vol 70, 2021 p 28-50, ISSN 1521-6934, <https://doi.org/10.1016/j.bpobgyn.2020.11.003> in <https://www.sciencedirect.com/science/article/pii/S1521693420301723>*).

A rudimentary improvement in the provision of universal (as well as targeted) services such as timely pre-pregnancy counselling, and availability of safe and effective contraceptive advice has potential for significant impact. The Royal College of Obstetricians and Gynaecologists advise that women of 35 plus years of age should be counselled about the increased risks of a pregnancy (<https://www.bmj.com/content/338/bmj.b2486>).

However, early childbearing or pregnancy and delivery during adolescence can derail girls' healthy transition into adulthood and impact negatively upon their education, livelihoods and health. UNICEF (2022) found maternal conditions to be amongst the top causes of global disability and mortality in adolescent girls (*Early childbearing can have severe consequences for adolescent girls* <https://data.unicef.org/topic/child-health/adolescent-health/>).

As a natural phase of the life course continuum, adolescence brings increased risks for young women where unhealthy behaviours are related to non-communicable diseases, substance use, injuries and increased sexual activity. These may have lifelong implications and a preconception care strategy can form part of a programme of intervention at a key life stage, delivered from the twin perspective of educational and primary health care settings (<https://data.unicef.org/resources/countdown-2030-ttracking-progress-towards-universal-coverage-women's-childrens-adolescents-health/>).

The Domestic Abuse Act (2021) defines domestic abuse as abusive behaviour perpetrated by an adult (over the age of 16) towards another adult, where the two are personally connected (partners, ex-partners or relatives).

It includes physical/sexual abuse, threatening behaviours, economic abuse, psychological/emotional abuse and coercive or controlling behaviour. Domestic abuse can affect and limit a woman's agency with respect to her

reproduction health and choices and school-based interventions which address masculinity, gendered attitudes and gender inequality show promise as measures to prevent domestic abuse.

Preconception strategies which support women during child-bearing years to form relationships in which they are supported to plan pregnancies could also assist them in identifying and resisting reproductive coercion (*UN Women. Global guidance on addressing school-related gender-based violence: UNESCO Publishing; 2016*).

In England and Wales, about 1.7 million women experienced domestic abuse between 2021-2022 ; the majority aged between 20-24 years old (*Office of National Statistics (ONS) 2022 Domestic Violence Characteristics, In England and Wales: Year ending March 2022* <https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/domesticabusevictimcharacteristicsenglandandwales/yearendingmarch2022>).

It is important to develop trauma-informed preconception care, support and counselling for women who have experienced domestic abuse; it should not be assumed that victims/survivors of domestic abuse are not planning pregnancies, for example.

However, while welcoming initiatives to increase the consideration of male partners in a future preconception care strategy, it is essential to ensure that this does not inadvertently result in greater harm. Safeguards should be in place so that fathers/partners are not automatically included in preconception care; operating on the assumption that **all** partners are safe, supportive and not causing harm.

The impact of domestic abuse on preconception care strategies should be assessed.

For example, decisions to share information with partners and family members are likely to be strongly affected by whether domestic abuse is a factor and future strategies designed to improve preconception health should therefore be evaluated for inadvertent harms. Women with lived experience of domestic abuse, prior to and during pregnancy should therefore be included in the development of strategic responses in preconception care. Interventions which support the identification and cessation of abuse before pregnancy could limit its impact on the unborn child as well as reducing the impact of domestic abuse on population health.

In addition, the impact of migration and the complexities of war on women prior to (or in) the preconception period merit consideration and further research (*World Health Organisation (WHO) 2022 Violence Against Children* <https://www.who.int/news-room/fact-sheets/detail/violence-against-children> *United Nations International Children's Emergency Fund (UNICEF) 2018 UNICEF Humanitarian Action for Children*

[https://www.unicef.org/media/48156/file/UNICEF\\_Humanitarian\\_Action\\_for\\_Children\\_2018\\_Overview\\_ENG.pdf](https://www.unicef.org/media/48156/file/UNICEF_Humanitarian_Action_for_Children_2018_Overview_ENG.pdf)).

Collaborative development of preconception care strategies 'from the bottom up' must also include accessibility of services to women who are currently excluded for various reasons. These may be socioeconomic, involving those living in the most deprived areas and would also include those with special needs, or low health literacy, asylum seekers and new immigrants (*Waelput AJM, Rijlararsdem CM, Steegers EAP. Preconception health and choices; tailored solutions for prospective parents. International Journal of Birth and Parent Education 2022; 9 (20).*

Preconception care can improve fertility and optimise pregnancy and infant outcomes but can also be beneficial for those who choose not to conceive.

A spotlight should now be shone on the urgency of improving the population's health during the time leading up to conception, focusing on prevention of risk and increasing the chances for lifelong health. Priority should be given to easing the challenges future parents face; implementing and promoting beneficial initiatives and affording preconception strategy its rightful place at the forefront of preventative care and Government spending priorities (*Goodfellow A et al improving preconception health and care: a situation analysis. BMC Health Serv Res. 2017; 23; 17(1):595.doi:10.1186/s12913-017-2544-10*). The interconception period should also be seen as a further opportunity to make beneficial change; a window in which to improve preconception care (*Taylor EJ et al. Change in modifiable maternal characteristics and behaviours between consecutive pregnancies and offspring adiposity; A systematic review. Obes Rev. 2020 Nov; 21(11):e13048*).

### Action points

- **Preconception health and care to be embedded in every relevant Government policy, including those promoting mental wellbeing and that address the prevention of obesity, smoking substance and alcohol-related harm and illness**
- **Government recognition of the role of maternal and paternal preconception health and care in the success and healthy outcome of a pregnancy; expansion of the 'Red Book' (given to all new parents) to contain information and signposting to sources of information about good diet for parents, physical exercise and mental wellbeing**
- **School Personal Social Health and Economic curricula to be adapted to teach adolescents about the significance of good health and healthy behaviours in planning for parenthood, including the health benefit for their future offspring. Health screening at school is carried out for a variety of issues, mainly in**

**primary school; opportunities when a child is in contact with a health specialist could also be used to increase awareness of sensible eating and healthy exercise**

- **Government to support techno-development, implementation and national scale-up of a preconception care pathway for general practice that enables healthcare professionals to better support their patients to prepare for pregnancy if and when this is relevant and regardless of geographical location or socioeconomic background**
- **Provide access to support in large workplaces for all employees, particularly in government employers such as the NHS, for improving health and wellbeing before conception.**

# BENEFITS FOR CHILDREN

## Chapter 2



### Chapter Two: Benefits for Children

A substantial body of evidence confirms that improving preconception health and care would enhance children's subsequent physical and mental health, aptitude for learning and eventual capacity for future economic activity. Making it a key component of preparation for pregnancy and parenthood would be an important and currently neglected opportunity to benefit children and wider society.

The preconception health and behaviour of both parents influences a range of outcomes for children at birth, during the early years and throughout the life course.

A woman who is healthy at the time of conception is more likely to have a successful pregnancy and a healthy child. For example, an umbrella review of systematic reviews of observational studies found maternal and paternal preconception smoking to be associated respectively with increased risk of preterm birth and small-for-gestational age (*Caut C et al Relationships between Women's and Men's modifiable Preconception Risks and Health Behaviours and Maternal and Offspring Health Outcomes; An Umbrella Review. Semin Reprod Med. 2022; 40(3-04):170-183. Doi: 10.1055/s-0042-1744257*).

Stopping smoking before pregnancy, regardless of intensity, has been found to carry comparable risk of preterm birth as not smoking (*Liu B et al Maternal cigarette smoking before and during pregnancy and the risk of preterm birth; A dose-response analysis of 25 million moth-infant pairs, Stock SJ editor. PLOS Med [internet]. 2020 Aug; 17(8):e1003158 <https://dx.plos.org/10.1371/journal.pmed.1003158>*).

Partner smoking may affect whether or not a woman stops smoking before pregnancy and cessation strategies should target men as well as women

(Scheffers-van-Schayck T et al *Smoking Behaviour of Women Before, During and After Pregnancy: indicators of Smoking, Quitting and Relapse*. *Eur Addict Res* [internet]. 2019; 25(3):132-44  
<https://www.karger.com/Article/FullText/498988>).

A recent US study found that smoking even 1-5 cigarettes per day raised the risk of some birth congenital anomalies (Yang et al *Maternal smoking before or during pregnancy increases the risk of birth congenital anomalies: a population-based retrospective cohort study of 12 million mother-infant pairs*. *BMC Med*. 2022;20(1): 1-7) but public health initiatives are also important: smoke-free legislation is linked with reductions in preterm birth rates of 10.4% (Faber T et al. *Effect of tobacco control policies on perinatal and child health; a systematic review and meta analysis*. *Lancet Public Health* [internet]. 2017 Sep; 2(9):e420-37  
<https://linkinghub.elsevier.com/retrieve/pii/S2468266717301445>).

Population level data also demonstrate that stopping smoking prior to conception has an additional benefit of reducing the child's risk of obesity (Taylor EJ, et al 2020. *Change in modifiable maternal characteristics and behaviours between consecutive pregnancies and offspring adiposity; A systematic review*. *Obesity Reviews* 21; e13048).

In 2022, NICE guidelines for Fetal Alcohol Spectrum Disorders (FASD) were published:

*'This is an important topic in the field of preconception health, education and care for one simple reason: FASD is potentially 100% preventable. The fact that nearly half of all pregnancies are still 'mistimed' or 'accidental' significantly reduces the efficacy of preconception preparation. Still, there are two guaranteed ways to prevent FASD: No alcohol any time during pregnancy or No pregnancy while continuing to consume alcohol,'* (Sher Jonathan (2022) *Preconception health, education and care: making and celebrating progress*. *International Journal of Birth and Parent Education*;  
[https://www.qnis.org.uk/wp-content/uploads/2022/01/IJbpE\\_Vol\\_9\\_Issue\\_2\\_Guest-Editorial\\_Sher.pdf](https://www.qnis.org.uk/wp-content/uploads/2022/01/IJbpE_Vol_9_Issue_2_Guest-Editorial_Sher.pdf)).

FASD is the most common neuro developmental condition in the UK and internationally and the Scottish Government recently estimated that a total of 172,000 children, young people and adults from a population of 5.5 million have been adversely affected by in utero exposure to alcohol. However, in the UK, FASD is largely unacknowledged and under-funded and policies, research and actions designed to address it lag behind those of other OECD countries.

Drinking at any stage in pregnancy risks precipitating a child's life-long, life-limiting neuro developmental condition. NHS Education Scotland's eLearning resource on FASD provides a comprehensive overview and is available free to anyone anywhere. However, it does require registering, which can be done here: *NES/TURAS Dashboard* (to register from outside Scotland, please select 'International' in the Sectors drop down menu.

Amongst primary consequences are impaired executive functioning, learning difficulties and behavioural problems as well as damage to physical health. Secondary (no less serious and frequently overlapping) outcomes include school under-performance, mental health illness, over-representation in the criminal justice system, substance misuse, unemployment and lower life expectancy (*Plant M (2022) Women, Alcohol, Pregnancy and FASD. Edinburgh: Queen's Nursing Institute Scotland*).

Recent years have brought increased understanding throughout the UK (particularly by the Scottish Government) of the extent of FASD but other countries; notably Australia (*FARE Australia, 2022, <https://everymomentmatters.org.au/>*) have set a standard for the UK to emulate by devising its own culturally and contextually appropriate ways of combating the problem. The devolved UK nations should now address FASD prevention via preconception/interconception programmes within accessible health and education settings.

Public Health England data shows that one in five women (21.6%) is affected by preconception maternal obesity with clear links to adverse pregnancy outcomes and a heightened risk of obesity in the offspring (*Public Health England (2019). Health of women before and during pregnancy: health behaviours, risk factors and inequalities [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_datafile/844210/Health\\_of\\_women\\_before-and\\_during-pregnancy\\_2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_datafile/844210/Health_of_women_before-and_during-pregnancy_2019.pdf)*).

Analysis of 160,757 mothers and children across 37 cohorts found pre-pregnancy maternal obesity to be associated with more than a four-fold increase in late childhood overweight or obesity in the offspring (*Voerman E et al (2019) Maternal body mass index, gestational weight gain, and the risk of overweight and obesity across childhood: An individual participant data meta-analysis. PloS Medicine 16; e1002744*).

However, strategies adopted during pregnancy have had limited impact on the transmission of obesity risk to the child (*Louise J, et al(2021). The effects of dietary and lifestyle interventions among pregnant women with overweight or obesity on early childhood outcomes; an individual participant data meta-analysis from randomised trials. BMC Medicine 19; 128*) making it preferable to concentrate on weight management and other related issues prior to conception.

A preconception strategy aimed at addressing maternal obesity and lessening obesity risk to the child has wider benefits. Research based on the Swedish Medical Birth Register found connections between severe maternal obesity and an increased risk of stroke in childhood and early adulthood (*Razaz N et al (2020). Maternal obesity and risk of cardiovascular diseases in offspring: a population-based cohort and sibling-controlled study. Lancet Diabetes Endocrinal 8; 572-581*)

Further Swedish research identified a link between maternal overweight and obesity and the risk of future non-alcoholic fatty liver disease in the offspring in early adulthood (*Hagstrom H et al (2021). Maternal obesity increases the risks and severity of NAFLD in offspring. J Hepatol 75; 1042-1048*).

Preconception maternal obesity and overweight are also associated with increased risks of asthma and wheeze in the child, as confirmed by meta-analysis of 22 observational studies involving 145,574 mother/child pairs (*Lui S, et al, 2020Pre-pregnancy maternal weight and gestational weight gain increase the risk for childhood asthma and wheeze, an updated meta-analysis. Front. Pediatr 8; 134*).

Beyond weight management and smoking cessation, recent evidence from the NiPPeR preconception randomised trial in the UK, Singapore and New Zealand has shown that the risk of obesity for the children of mothers who took an enriched nutritional supplement from preconception was reduced by half (*Lyons-Reid et al (2023). The effect of a preconception and antenatal nutritional supplement on children's BMI and weight gain over the first 2 years of life; findings from the NiPPeR randomised controlled trial. The Lancet Global Health – in press*).

These and other findings marry with a World Health Organisation Review which concluded that improving preconception health and care are critical to lowering the child's risk of developing type 2 diabetes and cardiovascular disease in later life (*World Health Organisation, 2013. Preconception care to reduce maternal and childhood mortality and morbidity <https://www.who.int/publications/i/item/97892415050000>*).

Taking a folic acid supplement from 3 months before to 3 months after conception to prevent neural tube defects in the child is the most well known and evidence-based pregnancy preparation behaviour. The definitive international research study was led by Professor Sir Nicholas Wald (*Wald NJ (2022) Folic acid and neural tube defects; Discovery, debate and the need for policy change. Journal of Medical Screening <https://doi.org/10.1177%2F09691413221102321> Postscript <https://journals.sagepub.com/doi/10.1177/09691413221117464>*)

Neural tube defects (NTDs) cause the lifelong disabilities spina bifida and hydrocephalus and other adverse consequences include miscarriages, stillbirths, neonatal deaths and therapeutic terminations (after pregnancy screening reveals an NTD). However, despite the fact that if taken early enough (as mentioned above) the supplement prevents up to 80% of NTDs, in England, only 27% of pregnant women report taking a folic acid supplement before conception (*Schoenaker D et al. Women's preconception health in England; A report card based on cross-sectional analysis of national maternity services data 2019/19. BJOG.2023. Doit:10.1111/1471-0528.17436*).

It is not commonly known that the neural tubes are completely formed (or malformed) by the end of the fourth **week** of pregnancy (and thus, before most pregnancies are known). It takes a substantial amount of time – and



consistent consumption of sufficient amounts of folic acid - to develop a high enough blood folate level to prevent NTDs. That is the crucial advantage of fully effective fortification over supplementation.

While the Government has now agreed to implement mandatory folic acid fortification as a public health measure to prevent neural tube defects (<https://www.gov.uk/government/news/folic-acid-added-to-flour-to-prevent-spinal-conditions-in-babies>) the proposed fortification level is too low and restricted to non-wholemeal wheat flour. It will prevent only 20% of neural tube defects, rather than 80% with appropriate fortification for all flour and rice. Over 80 countries have implemented folic acid fortification; all have seen reduced incidence of neural tube defects and none has reversed the policy at a later stage.

The UK's longstanding stance has been to advise people who can become pregnant to take folic acid supplements and while this has benefited those who did regularly take sufficiently strong supplements *in advance* of pregnancy, most people who could have benefited did not take them. Those who did tended to be of higher socioeconomic status and therefore the unintended consequence is that this long-awaited supplementation policy has served to widen UK health inequalities.

The World Health Organisation has stated that '*iodine deficiency is the world's most prevalent, yet easily preventable cause of brain damage,*' and it is widely recognised that iodine deficiency affects a significant proportion of the UK population. This is because the UK is one of the few European countries without regulations on salt iodisation (*WHO UNICEF 2007 Iodine Deficiency in Europe. World Health Organisation, Switzerland*).

Iodine deficiency has strong implications for neurodevelopment and one extra IQ point per person increases Gross Domestic Product (GDP) per capita by £175 each year. Addressing this at a population level (as with the above recommended changes to folic acid fortification) could therefore increase UK GDP by £7 billion per year in addition to reducing the need for costly childhood educational and social support.

The UK situation is compounded by a long-term decline in dairy consumption as the major source of dietary iodine. In the Southampton Women's Survey, 9% of mothers were found to be iodine deficient prior to conception and a follow-up survey of offspring at age 7 years found a 7-point lower IQ in children whose mothers had a preconception iodine deficiency (*Robinson SM et al (2018). Preconception micronutrient supplementation positively affects child intellectual functioning at 6 y of age: a randomised controlled trial in Vietnam. American Journal of Clinical Nutrition 113; 1199-1208*).

Maternal mental and psychological problems in the preconception period have significant impact on the outcome of a pregnancy and future life course of the child.

Magnetic resource imaging (MRI) studies are characterising brain structural changes *at birth* that are associated with maternal prenatal stress and likely precede and underlie mental health and behavioural disorders (*Lautaresco A et al 2020 Maternal prenatal stress is associated with altered uncinate fasciculus microstructure in premature neonates. Biological Psychiatry 87; 559-569*).

A national study of over 1 million infants born in Denmark from 1987-2001 found that bereavement stress in the 6 months prior to pregnancy was associated with an increased risk of attention deficit disorder in the children (*Li J et al 2010 Attention deficit/hyperactivity disorder in the offspring following prenatal maternal bereavement: a nationwide follow-up study in Denmark. European Child & Adolescent Psychiatry 19; 747-753*).

It is now recognised that improved preconception care for women with serious mental illness is important in promoting children's mental health and wellbeing and averting their mental health problems (*Maternal Mental Health Alliance, 2021 <https://maternalmentalhealthalliance.org/news/new-preconception-resources-for-women-with-serious-mental-illness/>*) however, persuasive evidence also indicates that less severe maternal mental illness has adverse consequences for the child's mental health (*Wen DJ et al 2017. Influences of prenatal and postnatal maternal depression on amygdale volume and microstructure in young children. Transl Psychiatry 7:e1103*).

Compelling recent evidence demonstrating a need for preconception public health interventions derives from infant MRI studies showing that prenatal exposure to maternal social disadvantage is associated with altered structure of the brain pathways that are important for socio emotional development (*Lean RE, et al, 2022 Prenatal exposure to maternal social disadvantage and psychosocial stress and neonatal white matter connectivity at birth. Proc Natl Acad Sci USA 119; e2204135119*.)

Poor socio emotional development and internalising disorders such as anxiety have life course implications including poor academic outcomes, reduced working capacity, substance abuse and other addictive behaviours. New findings point to the merits of a strong focus on the preconception period. Supporting a woman's preconception mental health can also be of physical benefit to children. Maternal stress and psychological distress prior to conception have, for example, been associated with an increased risk of infantile atopic eczema in the child (*El-Heis S, et al 2017 Maternal stress and psychological distress preconception: association with offspring atopic eczema at age 12 months. Clin Exp Allergy 47; 760-769*).

At population level in England, there are substantial inequalities in women's preconception risk factors that may subsequently result in disadvantageous birth and childhood outcomes, creating and perpetuating a trans generational cycle of disadvantage.

England's first national-level report card on women's preconception health found that 9 in 10 women enter pregnancy carrying one or more potentially

modifiable risk factor for adverse pregnancy and birth outcomes, and that multiple preconception risk factors are frequently to be found among women from more disadvantaged socio demographic backgrounds (<https://www.gov.uk/government/publications/report-card-indicators-of-womens-preconception-health> ; Schoenaker D et al. *Women's preconception health in England: A report card based on cross-sectional analysis of national maternity services data 2018/19*.BJOG. 2023. Doi: 10.1111/1471-0528.17436).

For example, national data from England indicate that women from black ethnic backgrounds are 1.5-times more likely to have obesity when becoming pregnant, compared with white women (34% vs 23%). Women living in the most deprived areas are nearly 2-times more likely to have a pre-existent mental health condition compared with women living in the least deprived areas (11% vs 6%) and 3-times more likely to smoke around the time of conception (30% vs 10%). These socio demographic characteristics are risk factors for adverse pregnancy and birth outcomes.

Population–level data in England have shown that 24% of stillbirths, 19% of preterm births and 31% of births with fetal growth restriction were attributable to socioeconomic deprivation, while 12% of stillbirths, 1% of preterm birth and 17% of births with some fetal growth restriction would not have occurred if all women carried the same level of risk as white women (*Jardine J et al Adverse pregnancy outcomes attributable to socio economic and ethnic inequalities in England a national cohort study. Lancet. 2021; 398 (10314): 1905-1912. Doi: 10.1016/S0140-6736(21) 01595-6*).

In 2018, Public Health England identified factors that can lead to infant mortality/impact on children's health and wellbeing across the life course. (*Public Health England 2018 Making the Case for Preconception Care: Planning and Preparation for pregnancy to Improve Maternal and Child Health outcomes*

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/729018/Making\\_the\\_case\\_for-preconception-care.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729018/Making_the_case_for-preconception-care.pdf))

Factors such as drug and alcohol abuse, domestic abuse, smoking, mental and physical health, age at pregnancy and obesity tend to be more influential in areas of deprivation.

Rates of poverty in England vary across the country; reinforcing that both geography and financial security impact on preconception health and subsequently outcomes for children (*Joseph Rowntree Foundation 2022 UK Poverty 2022: The Essential Guide to Understating Poverty in the UK* <https://www.jrf.org.uk/report/uk-poverty-2022>). Figures in the Guide reinforce the impact Covid has had on health and finances and there continues to be a year on year rise in the number of children living in poverty. Furthermore, inequalities in income and the standard of living continue to rise (*Marmot M et al 2020 Build Back Fairer; The cOVID-19 Marmot Review. The Pandemic, Socioeconomic and Health inequalities in England. London: institute of Health Equity*).

Contributing to a joint study by the University of Southampton and University College London, Professor Mary Barker said:

*'Current preconception health interventions may be limited by their focus on individual responsibility..... Improving the overall health of the population, as well as raising awareness of the importance of the preconception period could help improve the health of future generations. It is everyone's responsibility to support our young adults become successful parents of healthy, long-lived children. We have the infrastructure to do this in our existing health and education platforms and a global food system, but must now prioritise improving preconception health,' (UCL 2019 Preconception diet plays key role in health of offspring UCL News*

<https://www.ucl.ac.uk/news/2018/apr/preconception-diet-plays-key-role-health-offspring>).

### **Action points**

- **The UK four nation Governments to make Fetal Alcohol Spectrum Disorders (FASD) a priority within pre-conception/inter-conception health, education and care**
- **UK Government to implement fully effective and safe folic acid fortification by adopting a starting level of 1mg folic acid per 100mg for all flour and rice**
- **The Government to introduce statutory iodisation of salt in accordance with WHO recommendation and guidance**
- **Government to ensure that maternal and paternal smoking cessation is an integral part of all pre-conception and inter-conception programmes**
- **Maternal and paternal good mental health to be intrinsic to all preconception programmes and interventions to be devised with sensitivity and consultation with service users**
- **Government to consult with people of reproductive age from disadvantaged backgrounds to develop effective and appropriate preconception interventions**
- **National strategy driven by the Government to address the broader social, structural and economic determinants of preconception health, for example by ensuring that all potential parents can access a healthy food environment and safe and affordable housing**
- **Government to guarantee sufficient financial investment to ensure that the right services are provided for a population approach to a preconception care strategy**

- **Government to adopt the UNICEF National Baby and toddler Guarantee ([https://www.unicef.org.uk/wp-content/uploads/2022/10/EarlyMomentsMatter\\_UNICEFUK\\_2022\\_POLICYREPORT.pdf](https://www.unicef.org.uk/wp-content/uploads/2022/10/EarlyMomentsMatter_UNICEFUK_2022_POLICYREPORT.pdf))**

## CASE STUDIES

### Chapter 3



#### Chapter Three: Case Studies

Preconception care is not an intrinsic component of current UK health and wellbeing policy but examples of local action, individual experience and research findings are listed below. They illustrate the advantages that would accrue from the incorporation of preconception care into a whole population strategy for health and wellbeing.

**Betsi Cadwaladr University Health Board (BCUHB)** spanning the six North Wales counties, seeks to improve preconception care and normalise the importance of preparing for a healthy pregnancy.

BCUHB recognises the challenging nature of its area of responsibility; compounded by rurality with local residents vulnerable to various types of poverty including poverty of participation and access to vital services.

Current statistics include:

- Around 6% of babies in North Wales born with a low birth rate (*BCUC Review of Low Birth Weight data, 2020*)
- Proportion of women smoking during pregnancy in North Wales for the year ending September 2020 was 18.7% (*North Wales Social Care and Well-being Improvement Collaborative, 2022*  
<https://www.northwalescollaborative.wales/north-wales-population-assessment/>)
- 30.7% of women residing in the BCUHB area recorded as living with obesity at their initial 14 weeks or under pregnancy assessment (*Welsh Government maternity and birth statistics 2021*)

The BCUHB Public Health Team is developing a local preconception strategy wherein a whole system approach is aimed at eliminating harmful behaviours, reducing risk and addressing inequalities across the population of North Wales.

Adverse Childhood Experiences (ACEs) have the power to blight long term health and wellbeing but physical and mental health across the life course can be improved by understanding their impact and reducing their occurrence. Preconception care offers an opportunity to address the social determinants of health that influence preconception and pregnancy (*Adverse Childhood Experiences and their impact on health-harming behaviours in the Welsh adult population PHW 2017*).

<https://phw.nhs.wales/files/aces/aces-and-their-impact-on-health-harming-behaviours-in-the-welsh-adult-population-pdf/>).

The Welsh Government has pledged that:

*'All women will be supported to maximise health and wellbeing across their life,' (Welsh Government Maternity Care in Wales; A five year vision of the future (2019-2024) <https://gov.wales/sites/default/files/publications/2019-06/maternity-care-in-wales-a-five-year-vision-for-the-future-2019-2024.pdf>).*

Public Health programmes such as First 1001 Days, the Welsh Network of Healthy School Schemes (WNHSS) Healthy and Sustainable Pre-School Scheme (HSPSS) and Every Child Wales promote healthy behaviours to encourage the best start in life and their delivery would benefit from the addition of preconception health and care. The BCUHB Preconception Strategy and Action Plan will aim to scope the gaps and opportunities in current provision to create a system that delivers on the commitment to support women and families to have equitable access to preconception care. In order to reduce disparity and inequality across the generations, BCUHB advocates a shared national preconception health and care strategy.

**The University of Southampton LifeLab** is an educational engagement programme with the premise that health and wellbeing are socio-scientific issues.

Lifelong health behaviours can become embedded during adolescence and targeted interventions in the preconception period are considered to be critical drivers of healthy diet and lifestyle (*Barker M et al. Intervention strategies to improve nutrition and health behaviours before conception. Lancet. 2018 May 5; 391(10132):1853-1864*). There is growing awareness of the profound ways in which the diet and general health of future mothers will impact the development and lifelong health of their offspring but the fact that future fathers' diet and lifestyle choices may influence not only the behaviour of their female partners but also the biological outcomes of the offspring is less well known (*Fleming TP et al. Origins of lifetime health around the time of conception: causes and consequences. Lancet. 2018 May5; 391(10132):1853-1864*).

LifeLab aims to encourage an understanding of socio-scientific knowledge alongside the development of decision-making skills; thus promoting the

adolescents' sense of control over their lives and futures. Evaluation of a cluster of randomised trials found that engagement with the programme led to improved health literacy in the adolescents who demonstrated more critically nuanced judgement of health behaviours 12 months after the intervention (*Woods-Townsend K, et al. A cluster-randomised controlled trial of the LifeLab education intervention to improve health literacy in adolescents. PLoS one. 2021 May 5, 16(5):e0250545*).

**Epilepsy is the second most common cause of death in pregnancy** and deaths related to a sudden unexpected death in epilepsy (SUDEP) have almost doubled compared to previous Confidential Enquiry reports. Few of the women who died had received preconception care, had prevention measures discussed with them or a medication review, despite apparent risk factors for SUDEP.

Key recommendations include preconception interventions to raise awareness of SUDEP; advising the importance of care for women with active seizures and minimising the time they are unobserved with 'red flag' for women experiencing tonic clonic seizures in sleep because unwitnessed seizures carry high risk of Sudden Unexpected Death in Epilepsy (*Marian Knight et al on behalf of the MBRRACE-UK neurology chapter-writing group. Learning from neurological complications. In Knight et al on behalf of MBRRACE-UK Saving Lives, Improving Mothers' Care - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2016-18. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2020:p36-42 [https://www.npeu.ox.ac.uk/assets/downloads/mbrance-uk/reports/maternal-report-2020/MBRRACE-UK Maternal Report Dec 2020 v10 ONLINE VERSION 1404.pdf](https://www.npeu.ox.ac.uk/assets/downloads/mbrance-uk/reports/maternal-report-2020/MBRRACE-UK%20Maternal%20Report%20Dec%202020%20v10%20ONLINE%20VERSION%201404.pdf)*).

Factors associated with increased rates of SUDEP are the changes in prescribing of high-risk drug valproate (*MBRRACE report, Marian Knight*) and the need to balance the competing interests of women with epilepsy and the unborn baby. The impact of changing from valproate to other medications, or avoiding valproate, was surveyed with clinical specialists in epilepsy throughout the UK by Angus-Leppan et al (2020) finding 33%-43% reported a deterioration in seizure control in their female patients because of changing alternatives to valproate raising concerns for these risks to be included in the informed consent of women counselled about valproate (*Angus et al 2020 Valproate Risk Form – Surveying 215 Clinicians Involving 4775 Encounters, Acta Neurologica Scandinavica 141(6): 483-90 doi:10.1111/ane.13231*.)

The implications on reproductive decision-making of not receiving warnings about the adverse effects of in utero valproate to the future child's development was addressed in the medicine's safety review led by Baroness Julia Cumberlege, (*First Do No Harm 2020 The Report of the Independent Medicines and Medical Devices Safety Review ISBN 978-1-5272-6567-7*



<https://www.webarchive.org.uk/wayback/archive/20200805110914/https://www.immdsreview.org.uk/Report.html>).

On 12<sup>th</sup> December 2022, the most recent iteration of valproate guidance announced a new phased strengthening of prescribing and new restrictions and safety warnings applicable to both men and women (<https://www.gov.uk/drug-safety-update/valproate-reminder-of-current-pregnancy-prevention-programme-requirements-information-on-new-safety-measures-to-be-introduced-in-the-coming-months>).

'Emily' (identity anonymised) aged 29 and recently married, reflects on her formation of reproductive decisions:

*'It's just unfortunate for me that I think my neurologist when I was younger, the sort of lasting impression I've had is, 'it's just a bad idea, just don't do it,' to get pregnant, and it's put the fear of God into me.....And any other experience of pregnancy without sodium valproate has been so utterly terrible that I'm very reluctant, or I just don't want to come off it because why would I put myself through that? So that's sort of my overall feeling of it.'*

The quandary of decision-making has the potential to be supported through targeted preconception health care interventions.

Preconception care for parent and future child should be a life course approach; incorporating the value of contraception, acknowledging mental health, fears and worries, through a balanced presentation of risk to support decision-making and manage risks from seizures, whilst planning personal safety in the interest of mother, future parenting and children born to mothers with epilepsy. SUDEP communication is vital in the balance of information influencing decisions to undertake a medicine switch from valproate. It is unsafe to stop taking valproate suddenly (as is the case with other teratogenic medications) during pregnancy (<https://www.gov.uk/guidance/valproate-pregnancy-prevention-programme-temporary-advice-for-management-during-coronavirus-covid-19>). Research is also warranted into how to support men with epilepsy as part of preconception care.

**National surveillance of preconception health** can inform and evaluate preconception health and care policies; holding relevant organisations to account for improving the nation's preconception health and reducing health inequalities.

To this end, the UK Preconception Partnership's (UK PP) first national level report card was based on data from pregnant women who attended a first antenatal appointment in 2018/19. In collaboration with the UK Government Office for Health Improvement and Disparities (OHID) the UK PP analysed data on preconception indicators that are routinely recorded in the national Maternity Service Dataset and findings demonstrated that most women are ill-prepared for pregnancy (<https://www.gov.uk/government/publications/report-card-indicators-of-womens-preconception-health> : Schoenaker D et al

*Women's preconception health in England; A report card based on cross-sectional analysis of national maternity services data 2018/19. BJOG. 2023. Doi:10.1111/1471-0528.17436).*

Findings identified key opportunities to improve the state of preconception health and reduce socio demographic inequalities for women in England and key outcomes included:

- 3 in 4 women do not take a folic acid supplement before pregnancy
- 1 in 2 women live with overweight or obesity
- About 1 in 4 women enter pregnancy with a previous obstetric complication or a pre-existing physical and/or mental health condition
- There are substantial differences in the above among women from socio demographic sub groups.

UK PP and OHID are now working to establish a platform for ongoing national surveillance via a Preconception Health Profile on the Government's public health surveillance dashboard (*Fingertips*: <https://fingertips.phe.org.uk>).

**#Readyforpregnancy** is a social media campaign launched by NHS South East Clinical Delivery and Networks (SECDN) from July 2020 – June 2021 with a reach across South East England (<https://www.southeastclinicalnetworks.nhs.uk/readyforpregnancy>).

For a year, the campaign aimed to support the goal of the National Maternity Transformation Programme (Better Births) to reduce stillbirth, neonatal and maternal deaths. The public were provided with monthly information together with signposted sources of additional support concerning a preconception modifiable risk factor to encourage women and their partners to optimise them.

Monthly topics based on preventive interventions from the Maternity Transformation Programme included physical activity, healthy eating and healthy weight management, mental health, smoking, immunisation, alcohol, folic acid, long-term conditions management and contraception. SECDN, Public Health England, NHS Creative, Local Maternity Systems and Maternity Voices Partnerships developed campaign messages.

Publicity tools for the campaign were posted to social media by over 70 organisations across the South East and 76-86% of the feedback from professionals and Maternity Voice Partnerships reported that the campaign had covered key preconception health topic areas by means of appropriate and engaging messaging (<https://www.southeastclinicalnetworks.nhs.uk/readyforpregnancy>).

Valuable lessons from the campaign; a need to involve a wider range of stakeholders including Local Authorities and support groups to promote the campaign and more emphasis on paternal preconception health – can be used to inform future public awareness campaigns.

**The Healthy Life Trajectories Initiative (HeLTI)** collaboration between researchers in Canada, China, India and South Africa has technical support from the World Health Organisation ([www.//.https://helti.org](http://www.//.https://helti.org); [https://www.who.int/publications/m/item/healthy-life-trajectories-initiative-\(helti\)](https://www.who.int/publications/m/item/healthy-life-trajectories-initiative-(helti))).

The four-phase intervention in four diverse settings starts preconceptually, progressing through pregnancy, infancy and early childhood and is delivered via data collection, harmonised tools, protocols and analysis plans. The Initiative is designed to improve development in early childhood, curtail adiposity/overweight and child obesity; also reduce risk factors for non-communicable diseases. Interventions are integrated into packages based on the principles of nurturing care, covering health, nutrition, education, child protection and social protection. The recruitment goal is set at 20,000 among the designated countries and over 10,000 pregnancies with the children to be followed up until the age of five.

The package is aimed to address maternal health behaviours, nutrition and weight and to provide psychosocial support to reduce maternal stress and promote mental health. Mothers are supported to optimise their infant feeding practice and promote parenting skills to include responsive care-giving (*Kumaran K et al Protocol for a cluster randomised trial evaluating multifaceted intervention starting preconceptually – Early Interventions to Support Trajectories for Healthy Life in India (EINSTEIN): a Healthy Life Trajectories Initiative (HeLTI) Study. BMJ Open 2021; 11:e045862*).

Funding for this 10 year Initiative is provided by the Canadian Institutes of Health Research (CIHR), the Department of Biotechnology (DBT –India), the national Natural Science Foundation of China (NSFC) and the South African Medical Research Council (SAMRC). HeLTI has been designed to assess the effectiveness and cost of preconception interventions to inform national policy and decision-making.

**Preconception care is important for those with mental illness** because those affected (especially if in contact with mental health services) are at increased risk of adverse pregnancy outcomes. Supporting them to plan for healthy pregnancy could benefit the health of future generations and that of the reproductive age population, regardless of their eventual pregnancy outcomes.

Domestic abuse, unplanned pregnancy, substance misuse, poor nutrition and obesity are potentially modifiable risk factors that are more likely to be experienced by those living with mental illness (*Catalao et al 2020. Preconception care in mental health services: planning for a better future. The British Journal of Psychiatry, 216(4), 180-181* <https://www.cambridge.org/core/article/preconception-care-in-mental-health-services-planning-for-a-better-future/12AF5FE4DA3B2605A9EACFA45B8301DD>).

Evidence suggests that smoking (more common in those with mental illness) is the leading factor influencing poorer outcomes in this group (*Vigod et al 2020 Maternal schizophrenia and adverse birth outcomes: what mediates the risk? Soc Psychiatry Psychiatr Epidemiol, 55(5), 561-570. doi:10.1007/s00127-019-01814-7*) and medication prescribed for mental illness necessitates a balancing of potential negative impact on the developing baby against the protective effects of medication in maintaining maternal mental stability during a pregnancy.

Ethnic inequalities in health amongst those of reproductive age with mental illness make it important that preconception care is tailored to individual and cultural need. Culturally sensitive digital tools can provide preconception information at a population level and facilitate individualised access to health care; there is a corresponding need also to equip and train professionals in providing holistic pregnancy planning support.

**Key policy interventions to improve preconception nutrition** align well with approaches aimed at addressing other health and societal issues such as obesity, poverty and climate emergency.

The independent National Food Strategy (*Dimbleby, H, The National Food Strategy Independent Review: The Plan 2021*) contains key proposals within a suite of recommendations to the Government that provide a firm foundation for altering environments to support preconception nutrition. These include:

- A £3/kg tax on sugar
- A £6/kg tax on salt sold for use in processed foods.

The aim is to incentivise manufacturers to reduce sugar and salt levels in their products while raising around £3.5 billion per year for the Treasury. Revenue raised in this way could be used to support food insecure families to buy fresh food through targeted programmes such as social prescribing in primary care settings and an expansion of the Healthy Start scheme; thereby enabling more parents to eat healthily between pregnancies.

Action to address the commercial and environmental drivers of poor preconception nutrition for women and men is likely to be triggered by public support – yet public awareness of this important life stage is low (*Stephenson, J et al Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health. Lancet, 2018*).

A new and persuasive message about preconception nutrition could be developed, encompassing not only the health benefits for parents and their children but also the wellbeing of future families and the wider society (*Vogel, C et al, preconception nutrition; building advocacy and social movements to stimulate action. J Dev Orig Health Dis, 2020: p1-60*).

The aim should be to stimulate a collective desire for the creation of environments that deliver the human right of adolescents and those of childbearing age, across the socioeconomic spectrum, to eat a healthy diet

(Ayala A and B.M. Meier, *A human rights approach to the health implications of food and nutrition insecurity. Public Health Rev, 2017. 38:p. 10.*)

Preconception nutrition and its contribution to good health should thus be reframed as a societal, rather than purely individual responsibility, with key roles for policy makers, commercial companies and the broader community.

**Tommy's Planning for Pregnancy tool** was developed by the pregnancy charity Tommy's to deliver personalised recommendations to women about any risk factors that they had, alongside signposting to sources of support to address any modifiable risks. The content was designed for direct marketing to women aged 18-45 and the aim was to:

- Raise awareness of the key steps that a woman can take in the pre-conception period to reduce her individual risk of complications during pregnancy
- Encourage behaviour change by supporting women with tailored advice in the prelude to discontinuing contraception or in the time span between stopping contraception and becoming pregnant

A public-facing digital campaign disseminated via social channels and asking 'Are You Ready?' features a pregnancy test as a visual aid and has proved very successful at directing people to the tool itself; thus reaching the target audience in a cost-effective and scalable way. The rate of conversion through the numerous questions asked of people as they progress through the tool is high at just under 60% (*Google analytics*). Around half of the participants request further supportive emails about the topic.

Significant data statistics show:

- 24% of users with mental health issues
- 8% of tool users have a serious mental illness (SMI)
- 58% of those tool users with an SMI have not talked to a health professional about their pregnancy plans
- 22% of tool users are Black or from other minority ethnicities.

The results page lists the topics most engaged with as BMI (55%), folic acid (33%), caffeine (29%) and mental health (24%).

The content has been extended to formulate a detailed pathway to identify and support women with pre-existing diabetes and to improve the support available to women with a serious mental illness who are planning a pregnancy. The tool was launched in 2018 and has since been used by over half a million women.

### **Action Points**

- **Government to support the standardisation, quality improvement and scope of routinely collected data to improve comprehensive national surveillance of preconception health**

- **Inclusion of mental health within a comprehensive Preconception Care Strategy**
- **As highlighted by the NHS Race and Health Observatory, a consensus on baseline measures of risk factors for inequalities in adverse perinatal outcomes as agreed by the Maternal Medicine Networks should be adopted when designing and evaluating interventions**
- **Training on preconception care to be incorporated into the training requirements for Family Hub staff, to promote preconception health for the next pregnancy among those with young children**
- **Implement the national food strategy. This would improve the nutritional status of the whole population including young people before conception and provide a sustainable platform to reducing obesity and improving broader nutritional health and wellbeing**
- **Government to identify and produce definitive policy on teratogenic medications (and other teratogens, including environmental ones :**  
<https://onlinelibrary.wiley.com/doi/10.1111/joim.13611#ZAX5uBLm6UA.twitter>) *well before pregnancy*

# THE LONG VIEW

## Chapter 4



### Chapter Four: The Long View

Preconception health, education and care are compelling examples of primary prevention in policy and practice (*Shaw, J, Steegers, EAP, Verbiest S 2020 Preconception Health and Care: A life course approach, Switzerland; Springer Nature*). The aim of a preconception care strategy is to intervene before pregnancy to improve short and long term health and wellbeing, at the same time making an important contribution to reducing transmission of disparities in life chances across generations.

Research over recent decades in the field of Developmental Origins of Health and Disease (DOHaD) demonstrates that the predominant causes in the UK of adult death and disability are the non-communicable diseases (NCDs).

Many NCD, including cardiovascular and lung disease, diabetes, some cancers and mental disorders have their origins (at least in part) in pre-natal life (*Poston L, Godfrey K, Gluckman P, Hanson M editors: Developmental origins of health and disease. Cambridge University Press; 2022 Dec 22*) stemming from parental diet, body composition and health behaviours as well as certain environmental factors such as smoke or toxicant exposure (*Godfrey KM, Hanson MA et al Epigenetic mechanisms and the mismatch concept of the developmental origins of health and disease. Pediatric research. 2007 May;61(7):5-10*).

The previous steady rise in life expectancy has stalled and is falling in some parts of the UK. This is in large part due to the increased prevalence of chronic non-communicable diseases. For example, diabetes in the UK has doubled in prevalence over the past 15 years. In 2021 4.9 million people had diabetes with an additional 13.6 million at increased risk of diabetes type two due to overweight and obesity. Over 1 in 5 five year olds and over one in three 11 year olds in England is now living with overweight or obesity.

In 2021, the Government committed to ensuring that all children have the 'Best Start for Life' ([https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/973112/The-best-start-for-life-a-vision-for-the-1-001-critical-days.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/973112/The-best-start-for-life-a-vision-for-the-1-001-critical-days.pdf)).

Whilst the strategy acknowledges the importance of the 'first critical 1001 days,' it does not consider that preconception care is required to ensure that parents have optimum reproductive health for healthy conception and pregnancy. However, for both partners, preparing for pregnancy and parenthood involves having a healthy diet, weight, behaviour and regular physical exercise. This requires promotion of capacity, capability and motivation of future parents in the preconception period of their lives.

There are powerful processes which transmit life course NCD risk across generations, raising ethical and equity issues about health protection for unborn children and young people. When primary prevention is considered, the tendency is to emphasise a need to address the 'social determinants' of both health and inequality. The social inequalities of health are well established in the UK (*Marmot M: Health equity in England; the Marmot review 10 years on. BMJ. 2020 Feb 25; 368*).

The cornerstone is to significantly reduce poverty, discrimination and avoid the adversities they engender. However, this should happen with an awareness that inadequate preconception health, education and care is both a cause and a consequence of inequality, deprivation and diminished lives (*Nolan M and Gore S (Eds) 2022 Contemporary Issues in Perinatal Education; Knowledge into Practice (Section 1, Chapters 1-4) London; Routledge*). Personal actions **and** public policies must be recognised as determinants of health.

Blaming individuals for unhealthy choices and unhealthy behaviours is easy but allows other precipitants such as health-harming industries – e.g. tobacco, alcohol, junk food – to evade responsibility. Some commercial concerns have invested heavily in encouraging and reinforcing harmful 'choices' and behaviours. It therefore falls to the Government to counter such pernicious influence (*Maani N et al (Eds) 2023 The Commercial Determinants of Health. New York; Oxford University Press*).

Individuals have little control over many of the major determinants of health. Although she may opt not to smoke, a pregnant woman is largely impotent over air quality and the public has few ways in which for example, to influence the prevalence of environmental toxins, the discharge of sewage into waterways and seas, the salt and sugar content of foods and the availability of safe cycle lanes and walkways to promote an active lifestyle.

Major challenges to population health such as Covid-19 (*Modi N Hanson M Health of women and children is central to covid-19 recovery BMJ 2021 Apr 14; 373*) and conflict, or climate change affect maternal health, pregnancy outcomes and child development substantially (*Roseboom TJ et al Unheard,*



*unseen and unprotected: DOHaD council's call for action to protect the younger generation from the long-term effects of COVID-19. J Dev Orig Health Dis. 2021 Feb;12(1):3-5) exacerbating pre-existing inequalities in health and increasing gender-based violence (Clark H et al climate change and covid-19 combine to create a breeding ground for sexual and gender based violence. BMJ.2022 Aug 16; 378). In addition as became clear in the aftermath of the 2018 financial crisis, economic recession has substantial impact on maternal and child health (Jacob CM et al Building resilient societies after COVID-19; the case for investing in maternal, neonatal and child health. The Lancet Public Health. 2020 Nov 1; 5(11):e624-7). Addressing this in the preconception period is essential for promoting the resilience of the population to future shocks.*

An understanding of health determinants argues for a 'life course' approach. This would begin with establishing good trajectories in fetal life through a focus on preconception parental health and reinforcing these through optimising the conditions into which people are born, grow up, work, live and age. Healthcare itself accounts for less than half of population health; therefore the direct contributions of health and wellbeing promotion to economic growth are substantial and insufficiently recognised (Modi N, Bhalotra S, Bustreo F, Hanson M We must value and safeguard human health for a sustainable future. BMJ. 2022 Nov 11; 379)

The concept of preconception strategies is embedded in many countries regardless of their particular political or economic structure and a central feature of the approach is the integration of services including education, health and social care. The World Health Organisation estimates that scaling up integrated services in low-middle income countries could increase average life-expectancy by 3.7 years ([https://www.who.int/health-topics/primary-health-care#tab=tab\\_2](https://www.who.int/health-topics/primary-health-care#tab=tab_2)). In developed nations, investment in integrated services has been shown to have significant long term economic benefit as well.

Germany has a structured prenatal strategy that is carefully regulated to ensure maternal health and early identification of psycho-social factors which may impact the wellbeing of mother and child. Over the first 45 years, the programme not only improved short-term mortality but also impacted long term outcomes and reduced the need for costly intervention later in life (<https://pubmed.ncbi.nlm.nih.gov/24337130/>).

One of the most ambitious attempts to achieve a programme of integrated provision and targeted intervention for families was Sure Start, introduced in England in 1999. The programme was originally introduced to promote socioeconomic equity by enhancing children's learning skills, health, wellbeing and social and emotional development. The economic benefits of Sure Start in terms of reduction in government spending on health and social care intervention were evident by the time the first users had reached the age of five.

Evaluation of the health effects of the Sure Start programme showed significant benefits for children's health, preventing hospitalisations throughout

primary school in the most disadvantaged areas (*Cattan A et al The health effects of Sure Start. Institute for Fiscal Studies, <https://ifs.org.uk/publications/health-effects-sure-start>*).

A positive development arising out of the Covid-19 pandemic was to show the potential for politicians to come together across sectoral boundaries. A wider appreciation of the multiple cross-sectoral rewards of improving human health would be beneficial and strategies to embed such understanding include **health in all policies** in which the new policies require prior health impact assessments, cross-departmental frameworks to promote collaborative assessment and action and high-level leadership. The need to involve actors across professional sectors to promote health in the preconception period also accords with addressing the challenges currently faced by the NHS.

Preconception care strategy will only succeed within a truly supportive 'health economy' in which the value of preventative care is recognised and where local and national governments are willing to take policy level action to increase accountability for the structural, social and behavioural factors which influence long term health outcomes ([https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(22\)00254-7/](https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(22)00254-7/)).

At some level, everyone 'knows' that the health, wellbeing and circumstances of the parents will shape (for good or ill) the life and life chances of the baby. Yet, as a society, we are too hesitant and too rarely guided and spurred to action by that knowledge. Good health across the whole of life should be the goal; benefiting individuals, families, societies and national economies.

**The time is long past due to recognise, respect and rally around the power of, and opportunities to improve, preconception health, education and care.** (*Sher, Jonathan 2016, prepared for pregnancy? NHS GG&C: <https://www.nhsqgc.org.uk/media/237841/prepared-for-pregnancy-j-sher-may-2016.pdf>*).

### Action Points

- **Government to adopt a health in all policies approach and reintroduce integrated provision as a means of signposting support, maximising uptake and reducing long term expenditure on public health and social care**
- **Government to ensure that universal and targeted support is made available to address health and social inequality and their impact on long term outcomes**
- **Government to provide adequate funding for education, health and social care as infrastructure for an effective preconception care strategy, to support the future health and wellbeing of the nation**

- **Engage communities and local authorities in dialogue about and planning for ways to support preconception health and wellbeing in their communities and cultures, supporting them to recognise that this involves addressing social determinants of health such as income and housing.**

