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Preconception care policy, guidelines, recommendations and services across six European countries: Belgium (Flanders), Denmark, Italy, the Netherlands, Sweden and the United Kingdom

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ABSTRACT

Objectives Preconception care is important for the screening, prevention and management of risk factors that affect pregnancy outcomes. We aimed to investigate pre-pregnancy care policies, guidelines, recommendations and services in six European countries.

Methods In 2013, an electronic search and investigation was undertaken of preconception policy, guidelines, recommendations and services available to healthcare professionals and the general public in six European countries: Belgium (Flanders), Denmark, Italy, the Netherlands, Sweden and the United Kingdom. Findings were compared within five categories: Governmental policy and legislation; Professional bodies and organisations; Healthcare providers; Charitable organisations; Web-based public information and internet sites.

Results All countries had preconception recommendations for women with chronic diseases, such as diabetes and epilepsy. Recommendations for healthy women and men were fragmented and inconsistent. Preconception guidance was often included in antenatal and pregnancy guidelines. Differences between countries were seen with regard to nutritional and lifestyle advice particularly in relation to fish, caffeine and alcohol consumption, and vitamin supplementation.

Conclusions Current guidelines are heterogeneous. Collaborative research across Europe is required in order to develop evidence-based guidelines for preconception health and care. There is a need to establish a clear strategy for promoting advice and guidance within the European childbearing population.

KEYWORDS Preconception care; Pre-pregnancy health and care; Pregnancy; Policy; Guidelines; Europe

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INTRODUCTION

Preconception care is important for screening, prevention and management of risk factors that affect pregnancy outcomes and the health of future generations[1]. Evidence from embryonic development studies[2], the fetal origins of adult disease (FOAD)[3,4] and developing work in epigenetics[5] indicate that preconception care for both women and men, before and between pregnancies, could have significant long-term benefit. Across Europe, demographic and epidemiological trends show rising levels of obesity, development of type 2 diabetes and delayed childbearing[6,7] all of which can lead to increased complications in pregnancy and poor outcomes[8].

The Center for Disease Control and Prevention (CDC) in the USA has developed a programme of preconception care interventions and information sources[9] with recommendations for women planning pregnancy. These include supplementation with folic acid to prevent neural tube defects, reduce preterm birth and congenital heart defects; smoking cessation; reduction in alcohol consumption; screening and immunisation to prevent infection and disease; environmental and occupational hazard assessment to prevent potential fetal DNA damage; and review of medications that are potentially teratogenic. Discussion of fertility issues is also recommended.

In Europe preconception care is emerging as a developing field of research. The current review was undertaken within the PrePreg Network, founded in 2010 after the first Preconception Health and Care congress in Brussels. The PrePreg Network brings together a group of researchers and clinicians who have developed a programme of research to enable better understanding of the bio-psychosocial, cultural and economic factors affecting preconception health and care across Europe. This review provides a baseline comparison of current policies, guidelines, recommendations and services for preconception care in six European countries.

METHODS

In 2013, we carried out a systematic search and investigation of preconception policy, guidelines, recommendations and service provision available to healthcare professionals (HCPs) and the general public in six European countries Belgium (Flanders), Denmark, Italy, the Netherlands, Sweden and the United Kingdom (UK).

Electronic searches were performed by each country in Google search using the country syntax and the following individual terms and key words: Preconception care; Pre-pregnancy care; Before pregnancy; Conception; Pregnancy planning; Preconceptual and variations AND Policy; Guidelines, Recommendations and services. Results from this initial search were compared, discussed and organised into categories (Table 1) of Governmental policy and legislation; Professional bodies and organisations; Healthcare providers and organisations (both information and service provision); Charitable organisations and associations; Web-based information and internet sites aimed at the public. Each country then undertook electronic and hand searches for each category using the key words.

RESULTS

In all countries, antenatal care and pregnancy guidelines were found which alluded to the requirement for good health before pregnancy and included advice about folic acid supplementation before conception. Only Italy[10], the Netherlands[11] and the UK[12] had definitive preconception national guidelines available via the web to HCPs for women without pre-existing medical conditions. The guideline in Flanders (the northern part of Belgium)[13] included some information for healthy women; the southern part of Belgium, which is not taken into consideration in this paper, has its own guidelines and practices which can be accessed from: http://www.one.be/fileadmin/user_upload/accomp/coordination_medicale/Sante_preconceptionnelle.pdf. No country had specific guidelines published for men alone. Recommendations regarding alcohol and smoking addressing men were included with information for women.

In Italy guidance was compiled by the Alessandra Lisi International Centre on Birth Defects and Prematurity (ICBD) following consensus of 21 professional bodies from obstetrics, gynaecology, paediatrics and genetics, sanctioned by the Minister for Health[10].

Guidance from the Netherlands in 2007[11] includes a summary of the current level of knowledge at that time, concerning the various components of preconception health care including (i) food, alcohol, tobacco and recreational drugs; (ii) working conditions; (iii) illness; (iv) genetic factors, and (v) ethical and legal aspects.

Table 1 Electronic websites searched using key terms: Preconception care; Pre-pregnancy care; Before pregnancy; Conception; Pregnancy planning, Preconceptual and variations AND Policy; Guidelines, Recommendations and Services.

Government and national organisations:
Including Departments of Health, Food security and Employment.
Professional bodies & organisations:
Allied health professionals: psychologists; pharmacists; physiotherapists; dieticians/nutritionists; dental hygienists.
Dentists.
Medical specialties: anaesthesia; cardiology; endocrinology; family planning/contraception/sexual health; general practice; genetics; genito-urinary medicine; haematology; nephrology; neurology; obstetrics and gynaecology; paediatrics/neonatology; public health medicine; psychiatry; radiology; rheumatology; surgical specialties.
Midwives; nurses and specialist nurses.
Health care organisations:
Child health services; Family planning clinics; Fertility/infertility services; Maternity services; Nutritional services; Occupational health/companies/work places; Pharmacy services; Physiotherapist services; Preconception clinics.
Charitable organisations/associations:
Asthma; blood disorders; childbirth; cystic fibrosis; diabetes; Down's syndrome; epilepsy; family planning/contraception/sexual health; fetal alcohol syndrome; genetics; heart disease; kidney disease; mental health; metabolic disease; neural tube defects/hydrocephalus; nutrition; paediatrics; population health; rheumatoid arthritis; weight loss.
Other web-based information and internet sites for the general public.

The UK guidance is produced by a systematic process summarising clinical evidence (NICE 2013) which includes case scenarios[12].

For all six countries information was found concerning women having diabetes, epilepsy and conditions where specific screening or management is required prior to a pregnancy. This included women with metabolic and endocrine disease, haemoglobinopathies, previous neural tube defect (NTD)-affected pregnancy, and genetic disorders. Guidance was also available for conditions where potentially teratogenic medication requires review and management including epilepsy, cardiac disease, renal disease, asthma, mental health disorders and rheumatoid arthritis[10–15].

Differences were seen between the countries with regard to nutritional and lifestyle advice. A summary of recommendations and their sources for each country are presented for commonly shared topics including folic acid supplementation (Table 2); vitamin D and other supplements (Table 3); nutrition (Table 4); smoking and alcohol (Table 5); infections and immunisations (Table 6).

In Flanders (Belgium) 'Domus Medica' guidelines[13] for general practitioners (GPs) provide similar guidance with, in addition, information for women about toxoplasmosis. The Flemish government has spread information among women and the public about the need to take folic acid before conception and during pregnancy. The 'Superior Health Council' (2011)[14] has produced guidance for HCPs recommending folic acid advice for those planning pregnancy.

In Denmark the Health and Medicines Authority which focuses on health and prevention was the main source of information[15]. The Authority advises preconception counselling on a range of issues to detect threatening factors for pregnancy such as genetic conditions, chronic conditions, medicine intake, unfavourable lifestyle factors and working environments, and to prevent the effects the aforementioned conditions might elicit in the embryo and fetus. In addition, folic acid supplementation and a review of vaccination status is recommended. The GP with prior knowledge of the woman is stated as a key stakeholder in any consultation prior to a planned pregnancy and furthermore the eight week postpartum examination is targeted as an opportunity for interconception care.

The Health Council of the Netherlands advises all women contemplating pregnancy in the near future to take daily an additional 400 μg of folic acid from at least four weeks before conception until eight weeks afterwards[16]. In 2012 the Health Council recommended that women contemplating pregnancy should also take 10 μg (400 IU) of vitamin D daily starting before conception since bone development in the fetus

Table 2 Folic acid: daily dosage to be taken before and during pregnancy.

Country	*Healthy women*	*High-risk women (Previous NTD pregnancy, NTD in family history, diabetes, epilepsy, BMI > 30 kg/m²)*
Belgium	400 μg one month before until week 12. From pharmacy.	4 mg one month before until week 12. Prescription only.
Denmark	400 μg when planning pregnancy until week 12.	5 mg when planning pregnancy until week 8. Prescription only.
Italy	All women of childbearing age capable of becoming pregnant should take a daily supplement of 400 μg until week 12 and Mediterranean diet. Prescription (free of charge) or at pharmacy.	4 mg or 5 mg when planning pregnancy or if pregnancy is a possibility and to be continued until week 12 of pregnancy. Prescription only.
The Netherlands	400 μg from at least four weeks before conception until eight weeks after (ten weeks of amenorrhoea). Pharmacy and supermarkets.	Only for women with previous NTD pregnancy: 5 mg from at least four weeks before conception until eight weeks after. Prescription only.
Sweden	400 μg when planning pregnancy or if pregnancy is a possibility and to be continued until week 12 of pregnancy. Pharmacy and supermarkets.	5 mg when planning pregnancy or if pregnancy is a possibility and to be continued until week 12 of pregnancy. Prescription only.
United Kingdom	400 μg before pregnancy until week 12 and eat folate-rich foods. Prescription (free of charge) or at pharmacy.	5 mg before pregnancy until week 12. Prescription only.

NTD, neural tube defect; BMI, body mass index

commences during the first trimester[17]. The Council advises women to refrain from consuming any alcoholic beverage from the moment they attempt to become pregnant until the moment they stop breastfeeding the baby. Men are advised to refrain from drinking alcohol from the moment the woman attempts to become pregnant until pregnancy has been confirmed[18].

Table 3 Vitamin and mineral supplement recommendations when planning pregnancy.

Country	*Vitamin D*	*Other*
Belgium	No guideline	No guideline.
Denmark	No guideline	Local hospital websites advise taking a multivitamin supplement before pregnancy
Italy	Not routine – Generic assessment	Avoid vitamin A > 700 μg (2300 IU) Iron supplements if required on assessment
The Netherlands	Vitamin D supplements may be considered prior to pregnancy	Avoid vitamin A > 3,000 μg (10,000 IU)
Sweden	No guideline	No guideline
United Kingdom	No guideline	Avoid vitamin A > 10,000 IU

IU, international unit. The maximum dosages mentioned in the last column pertain to daily intake

Table 4 Nutritional recommendations when planning pregnancy.

Country	*General advice*	*Specific advice*
Belgium	No guideline – Healthy eating recommendation	No guideline
Denmark	No guideline	No more than one portion of Baltic salmon per month and a maximum of 100 g of predator fish per week Local hospital web sites advise < 5 cups of coffee a day to avoid high caffeine intake
Italy	Mediterranean diet – 5 portions of fruit or vegetables per day, 2–3 portions of fish per week	< 2–3 coffees per day Avoid liver, blue cheese, pâté. Restrict swordfish and tuna
The Netherlands	A varied healthy diet	No guideline
Sweden	Varied diet with a lot of fruits and vegetables	Restrict intake of fish from the Baltic sea for women of reproductive age
United Kingdom	No guideline – healthy eating recommendations	No guideline

In Sweden it is the National Food Agency which provides formal guidance to both HCPs and the public[19]. It recommends that folic acid supplements be taken daily one month prior to conception until the twelfth week of pregnancy. Women of reproductive age are advised to limit their intake of fish caught in the Baltic Sea due to its increased content in mercury, dioxin and PCB. The Swedish Healthcare Direct, 1177, recommends those who want to become pregnant to live healthily, which includes a varied diet with a lot of fruit and vegetables, daily physical activity, folic acid supplements, smoking cessation, reduced or no alcohol consumption, and maintenance of normal weight[20].

In the United Kingdom the National Institute of Clinical Excellence (NICE) provides the majority of guidance for HCPs, and information about precon-

Table 5 Smoking and alcohol recommendations when planning pregnancy.

Country	*Smoking*	*Alcohol*
Belgium	Stop smoking	Women: Avoid alcohol or maximum 1 unit a day and < 5 a week
Denmark	Stop smoking – Quit smoking clinics	Women: Avoid alcohol – to be on the safe side
Italy	Stop smoking while trying to conceive – Smoking cessation therapy	Women should refrain from consuming any alcoholic beverages from the moment they try to conceive until stopping breastfeeding
The Netherlands	Women who wish to become pregnant and their partners should be advised 'urgently and personally' to stop smoking prior to conception and, if necessary, that cessation should be supervised	Women should refrain from consuming any alcoholic beverages from the moment they try to conceive until stopping breastfeeding Men should refrain from consuming alcoholic beverages from the moment the woman attempts to conceive until pregnancy has been confirmed
Sweden	Stop smoking whilst trying to conceive	Women and men: abstain or moderate intake whilst trying to become pregnant
United Kingdom	Stop smoking – offer nicotine replacement therapy but not bupropion or varenicline	Women should not drink more than one to two units of alcohol once or twice a week and should not get drunk

Table 6 Infection and immunisation: Recommendations when planning pregnancy.

Country	*Infection and immunisation*
Belgium	Screening for previous substances of abuse or blood transfusion. Test for immunity to toxoplasmosis and rubella
	Vaccination for rubella, if negative. No pregnancy within three months when vaccinated. Hygienic measures in food preparation when toxoplasmosis negative
Denmark	Vaccination status should be followed up, e.g., measles
Italy	Screening by clinical history, documentation and/or lab test for rubella, varicella, hepatitis B. Vaccination if not immune or possibly not immune
The Netherlands	Vaccination status should be discussed with special attention to rubella, measles and whooping cough. Based on individual assessment of antibody titres; (re) vaccinations can be considered
Sweden	No guidelines although girls are vaccinated against rubella in school
United Kingdom	Test for immunity to rubella; vaccinate if negative and avoid pregnancy for one month
	Test for immunity to varicella if no definite history of chickenpox or shingles. Vaccinate if negative. Vaccinate against hepatitis B if at high risk of contracting the disease

ception care is included in the Clinical Knowledge Summary (CKS) web pages[12]. Much of the information has a specific medical focus to identify couples who are at increased risk of genetic or other conditions in order to minimise the latter's impact on a pregnancy. Women planning to become pregnant are advised not to take any over-the-counter medicines or any herbal remedies without consulting a pharmacist to ensure that these products are safe to take if they were to conceive. In contrast, websites aimed at the general public give more general information encouraging women and their partners to prepare actively for pregnancy by taking folic acid and being as healthy as possible prior to conception[21].

Preconception care services were offered in all six countries to high-risk women. For those without pre-existing medical conditions counselling tended to be done on an opportunistic basis at family planning (FP) services and by gynaecologists, GPs and midwives. Only Italy has some preconception clinics accessible to all women. In the United Kingdom, Health Visitors who have a public health role with young families also may give opportunistic interconception advice and in Denmark, interconception care is recommended at the eight-week postnatal visit (Table 7).

The Netherlands were the only country in our review to have a national strategy for preconception care. In 2007, the Dutch Health Council emphasised the importance of providing preconception care in a single package so as to guarantee that no component is neglected, and to provide easily accessible care that can be tailored to individual need[22]. Midwives, GPs and gynaecologists as well as maternal and child health services providing this type of care were identified. The professional bodies concerned (the Royal Dutch Organisation of Midwives [in 2005], the Dutch Society of Obstetrics and Gynaecology [in 2008], and the Dutch College of General Practitioners [in 2011]) published position papers and guidelines on preconception care. In 2012 a Dutch national summit on preconception care was organised by the Erasmus Medisch Centrum in Rotterdam with a view to summarising definitions and recommendations. In 2009, the municipal council of Rotterdam and the aforementioned Erasmus University Medical Centre started a city-wide urban perinatal health programme to improve perinatal health outcomes, including preconception and interconception care[23]. These preconception care strategies are now also being tested in 14 other Dutch cities in the 'Healthy Pregnancy for All' programme.

All six countries offered a variety of web-based resources about preconception care. In Italy the dedicated web portal endorsed by the Ministry of Health[10] www.pensiamociprima.net provides information to both professionals and those planning pregnancy. In the Netherlands there is a pre-pregnancy checklist on the Internet (www.zwangerwijzer.nl). It is a medically-validated, web-based instrument for self-completion, and freely accessible. It identifies individual risk factors, and provides background information and advice about preventive measures and results may be sent to the caregiver[24].

Table 7 Preconception care services provided to healthy and high risk women.

Country	*Healthy women*	*High-risk women*
Belgium	Opportunistic: GPs Gynaecologists Some midwives	Gynaecologists and other medical specialists caring for women with medical conditions
Denmark	Opportunistic: Family planning clinic GPs 8 weeks postpartum	Obstetricians and medical specialists caring for women with medical conditions
Italy	A few preconception clinics Opportunistic: Health care providers	Medical specialists caring for women with medical conditions
The Netherlands	Perinatal health programme in some cities Opportunistic: GPs Midwives	Gynaecologists and medical specialists caring for women with medical conditions
Sweden	Opportunistic: Family planning services GPs Midwives	Medical specialists caring for women with medical conditions
United Kingdom	Opportunistic: Family planning services GPs Health visitors Midwives	Medical specialists caring for women with medical conditions

GP, general practitioner

DISCUSSION

This study set out to review and compare current policies, guidelines, recommendations and services for preconception care in six European countries. Our review shows that despite a growing body of evidence highlighting the period before conception as critical for both maternal and fetal health[1–4,25], preconception care still is an emerging concept in many European countries. This is in contrast to the US where there is a national agenda for preconception health and health care[9].

Across Europe the numbers of women at high-risk during pregnancy are augmenting due to the trend for delayed childbearing and rising rates of obesity and chronic disease[6]. We found that preconception care recommendations were available for women with chronic disease but guidance for healthy women was fragmented and inconsistent, and there was very little guidance relating to men. The prevalence of alcohol consumption and smoking is high among healthy European women and men; yet, despite strong association between risk factors and poor pregnancy outcomes, currently only few core interventions have a substantial evidence base in the preconception period[1]. Guidelines in some countries were incorporated into formal antenatal guidelines for pregnancy or postpartum care which although too late for the current pregnancy, could be an opportunity to reduce risks before the next pregnancy[26].

Despite robust evidence for folic acid supplementation[27–29], studies continue to find that a majority of women fail to take supplements before conception[30,31]. An alternative strategy aims to ensure women maintain good folate levels by supplementation at population level. Mandatory fortification of flour as in Canada, Chile and the USA, has been shown to reduce the rate of NTDs by up to 50%[32,33]. There are currently no national initiatives for fortification in Europe although fortification of flour is currently under consideration by the UK government.

We found variations in the recommended dose of folic acid for high-risk women. No evidence was found to support the use of the chosen doses which appear to stem from historical agreement during the original trials in the 1970s; further research is required to support evidence-based prescribing.

No guidelines were found with regard to taking other nutritional supplements but, in the Netherlands, vitamin D supplementation was raised as an important issue for discussion in the preconception period. There is growing evidence that vitamin D is crucial for bone health and many women may be deficient, in particular those from ethnic minority groups[34]; women with limited exposure to sunlight; and those with a body mass index exceeding 30 kg/m^2 [35]. The optimal dose of vitamin D for the preconception period is unknown and there is no evidence for supplementation to begin in the preconception period.

Nutritional advice from most countries under consideration followed healthy eating guidelines. Specific advice only from Denmark and Sweden recommended restricting consumption of some fish, before conception, due to the teratogenic concern of high mercury or dioxin contents[15,20]. In the US, the Environmental Protection Agency recommends that eating of predator fish should be restricted[36] as studies have shown that high blood levels of mercury can take up to six months to reverse[37]. It would therefore appear important to review guidance for fish consumption in all European countries.

In the light of research linking excessive caffeine levels with miscarriage[38], Denmark and Italy have recommendations for women to reduce coffee consumption prior to pregnancy whilst in other countries this is only included in guidelines concerning women once they have become pregnant. Similarly only Italy advised avoiding liver in the preconception period. Liver contains high levels of vitamin A, a well-known teratogen[39] and it was surprising not to see this recommendation from Nordic countries where there is higher consumption of liver products[40]. These findings confirm the need for development of evidence-based preconception guidelines in all countries.

Guidelines for HCPs and service provision in most countries were primarily aimed at medical specialists caring for women with pre-existing medical conditions. As discussed previously, this approach misses the opportunity for health promoting lifestyle interventions for 'healthy women'.

In the UK and in Flanders (Belgium) guidelines for women planning pregnancy now counsel about the associated risks and recommend structured weight loss programmes for women with a BMI exceeding 30[13,41]. Loss of as little as 5–10% of body weight before pregnancy for those who are obese has been shown to have significant health benefits[41] and HCPs should actively discuss this issue with woman of childbearing age.

In the light of the strong international evidence that smoking prior to pregnancy by women and partners leads to poor birth outcomes and is detrimental to the future health of children[42] all countries advised stopping smoking and referral for cessation therapy. Such interventions take time to establish and add weight to the argument that smoking cessation should also be addressed at every encounter with women and men of reproductive age.

We found two conflicting approaches to alcohol recommendations; no alcohol at all due to uncertainty about safe levels or a moderated approach based on no evidence of harm with one to two units a week. Alcohol is a known toxin which causes the fetal alcohol syndrome and evidence is lacking concerning safe levels of alcohol consumption at conception[43,44]. Current guidance is therefore ambiguous and large studies are required to support evidence-based preconception guidelines.

Preconception counselling was mainly done on an opportunistic basis and through HCPs working in FP settings, General Practice or gynaecology clinics. Research is needed to determine how effective preconception interventions can be delivered and whether specific recommendations can change behaviour. Women and men do not routinely seek preconception care from HCPs and may not disclose that they are planning to become pregnant[45,46], and the challenge is how to best target this population. One option may be to consider discussing preconception health issues routinely in general health care settings. This could start from school health services in sexual health education or when providing medical assessments and immunisations in schools and colleges. Other settings which could target women include FP services and consultations for cervical cancer screening. In the US the CDC recommends the use of the Reproductive Life Plan (RLP), a tool for reproductive health promotion across the lifecycle[47] to increase awareness of preconception health. The RLP aims to encourage both women and men to reflect on their reproductive

intentions. A recent Swedish intervention study[48] evaluating the RLP in contraceptive counselling demonstrated an increase in both knowledge of reproduction and of the need to take folic acid supplements before pregnancy. Nine out of ten women appreciated discussing their RLP.

Women and men like to seek information for themselves and a variety of electronic information was available in all six countries including mobile applications (apps) enabling easy access to preconception information to promote healthy lifestyle change. There is concern that websites are produced by many differing bodies and are not always reliable. We suggest the development of cohesive government preconception websites across Europe presenting clear evidence-based guidance.

Strengths and limitations of the study

To our knowledge this is the first overview of preconception care in six European countries and the first to highlight the care of healthy women. Despite differences in the organisation of health care between countries, a common structure and template for the information search was agreed and executed to enable comparison.

A limitation to the study was that only six countries were involved and we were only able to analyse resources from the Flemish part of Belgium. We recognise that in the south of Belgium the 'Office de la Naissance et de l'Enfance' (O.N.E.) has taken important steps to approach preconception care in a multidisciplinary way.

CONCLUSION

All six European countries in our study have guidelines for women with chronic diseases but guidance for healthy women is fragmented and inconsistent, and there is very little guidance relating to men. Collaborative research across Europe is required in order to develop evidence-based policies and guidelines for implementation of preconception care for healthy women and men.

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