



Clinical practice guideline “preconception care”

B. Krischer^{1,2} · R. Bürki^{2,3} · I. Hösl^{2,4} · S. Renteria^{2,5} · I. Streuli^{2,6} · D. Surbek^{2,7}

Received: 5 November 2025 / Accepted: 3 May 2026
© The Author(s) 2026

Abstract

The Swiss Society of Gynecology and Obstetrics recently issued a Clinical Practice Guideline “Preconception Care”. In the German-speaking countries, this constitutes the first guideline of its kind and one of the few for Europe. The authors present the guideline, adapted for an international audience. Preconception care (PCC) is a dynamic, process-oriented approach aimed at improving maternal and neonatal health outcomes by reducing risks before conception occurs. Central to PCC is comprehensive counseling that enables women and couples to make informed decisions regarding their reproductive health. This involves the early identification of potential medical, lifestyle, or environmental risk factors, alongside the provision of targeted advice and timely interventions. Preconception care should not be regarded as a single consultation but rather as an ongoing component of routine gynecological care that is adapted to individual needs. By focusing on health optimization—such as managing chronic conditions, encouraging healthy nutrition and physical activity, and avoiding substance use—PCC lays the foundation for safer pregnancies and healthier offspring. Equally, the intentional planning of pregnancy is emphasized, given that planned pregnancies are associated with lower maternal and fetal morbidity compared to unplanned ones. Since many beneficial interventions require weeks or months to exert their effects, counseling should ideally begin well before the discontinuation of contraception. This clinical practice guideline of PCC provides a comprehensive and structured framework for anticipatory guidance, enabling risk minimization and improved health trajectories for both mother and child.

Keywords Preconception care · Counseling · Reproductive planning · Risk reduction · Maternal health · Neonatal outcomes · Preventive health · Fertility · Health promotion · Pregnancy planning

Introduction

Preconception care offers a key opportunity to identify and modify risk factors before pregnancy, thereby improving maternal, fetal, and neonatal outcomes [1, 2]. Many adverse pregnancy outcomes are linked to modifiable conditions or behaviors present prior to conception, such as chronic medical conditions, nutritional deficiencies, lifestyle factors, medication exposure, and infectious risks [3]. Despite growing evidence for effective preconception interventions, their implementation in routine clinical practice remains inconsistent [4, 5]. The aim of preconception counseling, therefore, is the timely preparation of optimal conditions for pregnancy through the identification of risk constellations and the provision of targeted counseling to reduce maternal and child risks [5].

A growing body of literature on preconception care from various perspectives already addresses important aspects of the field, including a global framework by the World Health Organization (WHO) from 2012 [5] or recommendations by

✉ B. Krischer
benedict.krischer@luks.ch

¹ Department of Obstetrics and Gynecology, Cantonal Hospital Lucerne, Lucerne, Switzerland

² Swiss Society of Gynecology and Obstetrics SSGO (Gynécologie Suisse), Quality Assurance Committee, Sursee, Switzerland

³ Schönbürg Medical Center, Bern, Switzerland

⁴ Department of Obstetrics and Gynecology, University Hospital Basel, Basel, Switzerland

⁵ Centre Hospitalier Universitaire Vaudois Et, Université de Lausanne, Lausanne, Switzerland

⁶ Unité de Médecine de La Reproduction Et Endocrinologie Gynécologique/Département de Gynécologie Et d'obstétrique, Hôpitaux Universitaires de Genève, Geneva, Switzerland

⁷ Department of Obstetrics and Gynecology, University Hospital Bern, University of Bern, Bern, Switzerland

the International Federation of Gynecology and Obstetrics (FIGO) focused on domains, such as non-communicable diseases [6] or nutrition [7, 8].

In the United Kingdom, the National Institute for Health and Care Excellence (NICE) addresses various preconception issues in different publications, such as the Guideline on Diabetes in Pregnancy [9], the guideline on Fertility Problems and the guideline on maternal and child nutrition [10, 11]. The ACOG Committee Opinion on Prepregnancy Counseling [12] concisely summarizes key areas; it does so, however, within the U.S. healthcare context, and the Royal Australian College of General Practitioners also published an overview article about Preconception Care [4], focusing on primary care.

All of the above-mentioned resources are valuable in their own context. They differ, however, in scope and purpose, ranging from public health strategies to selected clinical topics, and do not provide a consistently structured approach for routine clinical implementation. In addition, preconception care is often addressed in a fragmented manner across multiple documents rather than within a single integrated framework. This is exemplified in the NICE guidelines, where preconception care is covered across several documents rather than one unified, clinically oriented pathway, potentially limiting its clinical applicability. Consequently, there remains a lack of a clinically oriented guideline that consolidates the available evidence into a coherent and practical approach for everyday obstetric and gynecological care in the European healthcare context.

This clinical practice guideline provides evidence-based, clinically applicable recommendations to support healthcare professionals in systematically identifying risks, optimizing maternal health and health-related knowledge, and planning necessary medical examinations and interventions sufficiently in advance of pregnancy.

The scope of this guideline is the preconception period, defined as the time before conception in individuals of reproductive age who are planning a pregnancy or may become pregnant. It addresses medical, nutritional, lifestyle, infectious, and reproductive factors relevant to preconception counseling and care, while management during pregnancy and postpartum is only included where necessary for context.

This guideline is intended for a broad clinical audience involved in reproductive healthcare, including obstetricians and gynecologists, general practitioners and midwives. By providing structured recommendations grounded in current evidence, this guideline seeks to promote consistent, high-quality preconception care across different healthcare settings.

Methods

This guideline represents an expert consensus-based practice guideline informed by a critical appraisal of the available literature. The guideline development process followed the principles of the AGREE II framework: the scope and target population were predefined (Domain 1), a multidisciplinary expert panel was involved (Domain 2), recommendations were based on structured literature review and graded evidence (Domain 3), the guideline was designed for clinical applicability in routine preconception care (Domains 4–5), and editorial independence and conflict of interest management were ensured (Domain 6).

The guideline followed a structured and transparent consensus process grounded in evidence-based guideline methodology. It was developed under the auspices of the Swiss Society of Gynecology and Obstetrics (SSGO) Quality Assurance Committee. The guideline panel comprised 20 clinical experts representing all major gynecological sub-specialties, as well as a representative of a patient organization.

The coordinating authors defined the scope, objectives, and key clinical domains of the guideline. For each thematic section, a designated lead author drafted the content based on a critical appraisal of the relevant medical literature, including international guidelines, systematic reviews, meta-analyses, and key original studies. All co-authors reviewed each section, provided substantive input, and critically assessed the underlying evidence.

An iterative consensus process was used to agree on the wording of recommendations, their clinical relevance, and their grading. Levels of evidence were assigned according to the Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence [13]. The strength of recommendations was graded using a standardized A–D recommendation scheme, reflecting the quality, consistency, and applicability of the available evidence [14] (see Appendix A).

The complete draft guideline underwent repeated review and discussion within the expert panel with regard to clinical accuracy, completeness, internal consistency, and practical applicability. Feedback was incorporated into the final version once consensus was achieved.

All authors disclosed potential financial and non-financial conflicts of interest prior to guideline development. No relevant conflicts were identified. The guideline was developed independently and without influence from any external funding body or commercial entity.

Evidence summary

The recommendations in this guideline are based on a structured review of the available evidence, including international clinical practice guidelines, systematic reviews, meta-analyses, and large observational studies. Evidence quality and recommendation strength were assessed using predefined levels of evidence and Grade methodology. Where high-quality evidence was available, strong recommendations were formulated. In areas with limited or heterogeneous evidence, recommendations were issued as conditional recommendations or good practice points based on expert consensus, clinical relevance, and consistency with existing international guidelines (see also Appendix B).

Optimizing health before pregnancy

Preconception counseling should be seen as a multi-stage process and not as a single appointment. Ideally, it should take place as part of regular gynecological check-ups and be extended as required.

The key points of preconception counseling are an evaluation of the general health status and associated risks to fertility and pregnancy, advice on reducing or eliminating risks, optimizing health and initiating interventions to achieve the above-mentioned goals.

Planning a pregnancy

Preconception counseling ideally takes place before the couple is planning a pregnancy and, for example, stops using contraception. However, almost half of all pregnancies are unplanned [15].

[LoE: IIb, Grade C].

In a large meta-analysis of over 500,000 pregnancies, Nelson et al. were able to show that unplanned pregnancies have higher fetal and maternal morbidity than planned pregnancies [16].

[LoE: IIa].

Some interventions and behavioral changes to optimize pregnancy outcomes take several weeks to months before the onset of pregnancy to take effect—so they need to be started with adequate lead time.

One possible approach could be to use the simple question: "Would you like to get pregnant in the coming year?" as a pivotal point for further advice [17].

Age

There is no standard definition of an "ideal age" for pregnancy, but the risk of infertility and morbidity during pregnancy generally increases from age 30 onward:

- Decreasing pregnancy rate: the rate of pregnancies gradually decreases from the age of 32 [18]. Dunson et al. showed that the pregnancy rate at the age of 19–26 is twice as high as at the age of 35–39 [19] [LoE: IIb].
- Increased risk of miscarriage: the association between maternal age and miscarriage risk is well-documented. Magnus et al. showed in a Norwegian registry study that the risk of miscarriage is lowest in the 25–29 age group and increases from then on [20]. Andersen et al. showed in a Danish registry study that the risk of spontaneous miscarriage is 12% in this age group, 15% up to the age of 35, 25% up to the age of 39 and even 51% at the age of 40–44 [21] [LoE: IIb].
- Increase in the frequency of aneuploidies (numeric chromosomal abnormalities): due to oocyte aging, the risk of aneuploidies increases with maternal age; it is in the range of 2.6 per 1000 live births at 30 years, 5.6 per 1000 live births at 35 years, 15.6 per 1000 live births at 40 years and 53.7 per 1000 live births at 45 years [22]. The number of aneuploidies in early pregnancy that do not survive to birth is much higher [LoE: IIb].

Paternal age should also be considered: increased paternal age, above 40 years [23], has been associated with increased risk of miscarriage, prolonged time to conception, increased rate of single-gene mutations and lower birth weight [23–26] [LoE: IIb; Grade B].

In general, a woman should be informed, regardless of her current desire to have children that fertility decreases after the age of 30 and especially after the age of 35 and that pregnancy complications increase with increasing age after the age of 35. In the case of infertility, further evaluation is recommended after 12 months up to the age of 35, and after 6 months after the age of 35 [10, 27] [LoE V; Grade D].

If the woman is under the age of 40 and the couple has regular unprotected sex, 80% of all couples become pregnant within a year [10] [LoE: IIb].

Body weight

Before pregnancy, the best possible approximation of body weight to a normal weight is desirable [Grade D].

Obesity: Women with a BMI (body mass index) > 30 have a higher risk of nutritional deficiencies than non-obese women [28] (LoE IIa, Grade B) as well as increased risks of infertility, miscarriage and unfavorable pregnancy outcome [8, 28, 29] (LoE Ia, Grade A). In addition, they have an increased risk of contraceptive failure, so there is a risk of unplanned pregnancies (LoE III, Grade B). It is advisable to take a BMI at every medical consultation and, in the case of obesity, to point out the benefits of even minor weight loss before pregnancy to women who are potentially planning a pregnancy [30] (LoE III, Grade B). If the BMI is very

high, treatment methods such as bariatric surgery or GLP-1 receptor agonists can also be considered. However, GLP-1 receptor agonists are currently contraindicated in pregnancy, so contraception is necessary when using them. As there is an increased risk of undiagnosed diabetes, it may be useful to screen for it using HbA1c ($\text{HbA1c} < 5.7$) [30] (LoE IV, Grade C).

Women who are already overweight (BMI 25–30 kg/m^2) and obese (BMI $> 30 \text{ kg/m}^2$) have an increased risk of macrosomia, gestational diabetes, pre-eclampsia, premature birth and associated birth complications (LoE Ia, Grade A).

A Canadian population-based study showed that reducing preconception BMI by 10% reduces the risk of gestational diabetes, pre-eclampsia, macrosomia and fetal demise by 10% [31] (LoE IIa, Grade B).

Post-bariatric surgery: After bariatric surgery, a pregnancy should be delayed by at least 12 months, as otherwise there is a risk of fetal malnutrition and postoperative complications [28, 32, 33] (LoE IIb, Grade B). Interdisciplinary care in a center is strongly recommended (Grade D).

Underweight: Women with a BMI < 18.5 also have an increased risk of nutritional deficiencies, infertility, miscarriage and unfavorable pregnancy outcomes [8] (LoE IIa, Grade B). Even if the BMI alone does not fully reflect the nutritional situation, women with a BMI < 18.5 should carefully be evaluated for eating disorders and a BMI > 18.5 should be aimed for if they are planning a pregnancy [6] (LoE III, Grade C).

Physical activity and sport

A meta-analysis of physical activity showed 7 studies in which the risk of gestational diabetes was reduced by 55% in pregnant women with the highest activity compared to those with the lowest (LoE Ia, Grade A). The physical activities consisted of walking and stair climbing; high intensities were more effective than low intensities. Physical activity to prevent gestational diabetes before pregnancy was more effective than during pregnancy. The available evidence suggests that lifestyle changes, especially increased physical activity, reduce the risk of developing gestational diabetes (LoE Ia, Grade A).

The WHO recommends at least 150 min of moderate-intensity exercise per week for adults [34] (LoE Ia, Grade A). This can be continued during pregnancy. Sports with a high injury potential (contact sports or risk of falling) or diving is not recommended during pregnancy [35] (LoE IIIa, Grade B).

Oral and dental health

Women who are planning a pregnancy should undergo a dental health check and, if necessary, be treated. Untreated

periodontitis is associated with an increased risk of premature birth and FGR [36] (LoE IIa, Grade B).

Nutrition

Folic acid

- Folic acid is the synthetic form of the naturally occurring vitamin B9 = folate. The connection between folic acid and neural tube defects has been known since the 1970 s. Preconceptional intake of folic acid can reduce the incidence of neural tube defects by up to 70% [37] [LoE Ib, Grade A]. While a large proportion of women are aware of the link between folic acid and neural tube defects, only a fraction take the supplement correctly and timely; this applies in particular to women with a migration background and unplanned pregnancies [38] (LoE III, Grade C).
- A dose of at least 400 mcg folic acid per day for at least 1 month before conception has been established (LoE Ia, Grade A), possibly as a combination preparation with other vitamins
- A dose of 800mcg folic acid per day is recommended in the following situations (LoE IIa, Grade A):
 - After bariatric surgery [32, 39].
- A higher dose of 5 mg folic acid per day is recommended in the following situations [LoE IIa A]:
 - after a child with a neural tube defect [8, 12, 32, 40, 41].
 - First-degree relatives of a child with a neural tube defect [8, 12, 32, 40, 41].
 - Antiepileptic drug therapy [8, 12, 42].
 - Pre-existing diabetes [9].
 - BMI > 35 [8].
 - MTHFR mutation [43].
- The 5 mg dose for increased risk is recommended from 3-month preconception up to the 12th week of pregnancy, then reduced to 400 or 800 mcg per day
- Naturally occurring folate can be found in leafy vegetables, tomatoes, pulses, nuts, oranges, sprouts, wholegrain products, potatoes and eggs [44], although the intestinal absorption of folate is poorer than that of folic acid and folate is largely destroyed when food is heated. In principle, however, it is also possible to cover the requirement with natural folate. Countries with folic acid enrichment in flour show a 30–46% reduction in cases of neural tube defects [38, 42] [LoE IIb, Grade B].

Calcium: There is no convincing evidence that calcium supplementation initiated preconceptionally beyond the

recommended dietary intake provides additional benefits for neonatal outcomes, as shown in guideline-level reviews and systematic analyses [7, 45]. Evidence on calcium supplementation started before or very early in pregnancy for prevention of hypertensive disorders is limited to a single small trial, suggesting a possible reduction in a composite outcome, including pre-eclampsia and pregnancy loss, but results are inconclusive and insufficient to support routine use [46].

Women planning pregnancy should aim to meet the recommended daily calcium intake of 1000mg [47] through diet, with supplementation considered only if dietary intake is clearly insufficient or if they are in populations with endemic low calcium intake [LoE IIB, Grade B].

Omega-3 fatty acids: Docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are two so-called omega-3 fatty acids. Omega-3 supplementation during pregnancy has been shown to reduce preterm birth [48]. There might also be a possible beneficial effect on neurodevelopment, although the evidence is limited. Women planning pregnancy should be encouraged to ensure a regular dietary supply of omega-3 fatty acids primarily via omega-3-rich foods (e.g., fish/seafood). A pragmatic preconception target is ≥ 250 mg/day EPA + DHA (European reference intake for adults) [49] to enter pregnancy with adequate baseline status.

Where dietary intake is insufficient, omega-3 supplementation can be used to meet the above intake target [LoE Ia, Grade B].

Vitamin B12: It is primarily found in animal products and is, therefore, deficient in vegetarian and vegan diets. As folic acid and vitamin B12 metabolism are interlinked, attention should also be paid to an adequate intake, supplemented if necessary, of vitamin B12 to avoid neural tube defects [8, 40] (LoE IIa, Grade B). Outside of pregnancy, the recommended daily intake is 4.0 mcg for adults and 4.5 mcg for pregnant women in Germany, Austria and Switzerland [50], while the NHS (National Health Service) recommends 1,5mcg [51] and the NIH (National Institute of Health) at least 2,4mcg for adults and 2,6mcg for pregnant women [52]. Information on the vitamin B12 content of various foods can be found here: <https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/#h4>. If a vitamin B12 deficiency is suspected (due to diet and/or macrocytic anemia), holotranscobalamin (active vitamin B12, which is bound to transcobalamin) should be checked and, if necessary, substituted [LoE IIB, Grade B].

Vitamin D: A woman's vitamin D requirement increases during pregnancy, as the fetus is completely dependent on the mother's vitamin D supply for growth and development (LoE IIa, Grade B). It is, therefore, important to achieve and maintain adequate vitamin D levels before conception. The European recommendation for Vitamin D uptake is 15mcg or 600 IE per day for adults [53]. A study from Switzerland,

however, showed that a large number of pregnant women have a severe vitamin D deficiency at the beginning of pregnancy [54], suggesting that even a higher vitamin D dose, e.g., 800 IE per day, is already indicated preconceptionally. The requirement may be even higher for vegetarians, people of color or those who live in environments with limited sun exposure [8] (LoE IIB, Grade B).

Iodine: From a global perspective, iodine recommendations depend on a country's proximity to the sea and national food fortification policies. Recommendations, therefore, vary. While in the USA, Canada and Australia, 150mcg of daily iodine intake is recommended for pregnant women, the recommendation from the European Food Safety Authority EFSA gives 200mcg daily as a recommendation for pregnant women and in Germany, Austria and Switzerland the recommendation ranges from 200 to 250mcg per day [55]. It is reasonable to preconceptionally replenish iodine stores sufficiently to cover the increased requirement during pregnancy [8] (LoE IIa, Grade A). According to a recent cross-sectional study from Switzerland, iodine intake among pregnant women was too low despite a national iodization program [56]. Processed foods usually contain iodine-free salt [56], so it is essential to ensure sufficient intake by means of iodized table salt or dietary supplements (LoE IIB, Grade B).

Vegan and vegetarian diets: A vegetarian or vegan diet during preconception and pregnancy is generally feasible and not associated with increased maternal or fetal morbidity, provided that adequate nutrient intake is explicitly ensured [57, 58].

Special attention should be given to folate, vitamin B12, and iron status, as well as to docosahexaenoic acid (DHA, omega-3 fatty acid), calcium, iodine, and zinc [59] (see above) (LoE III, Grade C).

Ketogenic diet: A ketogenic diet is characterized by high fat and very low carbohydrate intake. Evidence from animal models indicates potential adverse effects on fetal development and offspring neuroanatomy, while human data remain limited and inconsistent (LoE IIIB–IV, Grade C). Potential mechanisms include maternal glucose deprivation, elevated ketone bodies, oxidative stress, epigenetic alterations, and micronutrient shortfalls that may impair fetal organ and brain development. In view of insufficient and conflicting human data and concerning animal findings, ketogenic diets are not recommended during pregnancy (LoE IV, Grade D). To meet maternal–fetal glucose needs, a minimum carbohydrate intake of 175 g/day is advised (based on Dietary Reference Intakes), with clinical nutrition management individualized as needed [60, 61] (LoE IV, Grade C).

Intermittent fasting: Periods of fasting may increase cortisol levels; therefore, intermittent fasting is not recommended during preconception and pregnancy. Extended fasting intervals may compromise a constant supply of nutrients and

energy, potentially destabilizing maternal blood glucose levels (LoE IIIb, C). National societies provide practical resources: the German Nutrition Society (DGE) [59], the British Dietetic Association (BDA) [62], or the American College of Obstetricians and Gynecologists (ACOG) [63] offer comprehensive information sheets that can be referred to women planning pregnancy or those with special dietary needs. Current reference values are country specific. For women with specific dietary practices or those at increased risk of malnutrition, professional nutrition counseling is recommended to optimize diet in the preconception period [7]. Iron deficiency and exclusion of anemia: iron deficiency and anemia should be excluded preconceptionally, as iron deficiency with or without anemia at the beginning of pregnancy is associated with maternal complications and anemia with fetal complications (low birth weight, premature birth) [36, 64, 65] (LoE Ia, Grade A). However, undirected iron supplementation should generally be avoided, as a high hemoglobin level in pregnancy is also associated with an increased risk of low birth weight [36] (LoE IIb, Grade B).

Addictive substances and drugs

Nicotine: Periconceptional nicotine consumption is associated with an increased rate of miscarriages [66]; this also applies to passive smoking [67]. Nicotine consumption during pregnancy is associated with premature birth, premature rupture of membranes, low birth weight, placenta previa and premature placental abruption as well as intrauterine fetal death (LoE Ia). Stopping smoking can lead to a risk reduction close to the baseline risk [68, 69] (LoE Ib, Grade B). Patients and their partners should, therefore, be encouraged and, if necessary, actively supported with counseling and drug therapy to stop smoking or at least drastically reduce smoking before discontinuing contraception. This recommendation also applies to vaporizers and heated tobacco products, although here, solid data are still lacking (LoE III, Grade C).

Alcohol: Fetal alcohol spectrum disorder (FASD) is among the most common preventable causes of neurodevelopmental disability worldwide, with a global prevalence estimated at 1–5% of live births [70] (LoE Ia). Despite public health efforts, surveys from several countries demonstrate that a substantial proportion of women continue to consume alcohol during pregnancy. In a survey from Switzerland in breastfeeding women, 18% stated that they consumed alcohol at least once a week. 6% stated that they drink "too much" at least occasionally [71]. It is well-established that there is no safe threshold for alcohol intake during pregnancy [72] (LoE Ia, Grade A). Because of the potentially severe and irreversible outcomes, professional societies and international health organizations recommend complete

abstinence from alcohol during the periconceptional period and throughout pregnancy [73] (Grade A).

THC/cannabinoids: In some European populations, cannabis use before pregnancy is reported to be about 4–5% among women of reproductive age [74–77], while during pregnancy, the prevalence tends to drop to around 1–3% in these studies. Due to the potentially harmful effects of cannabis use during pregnancy on child development, cannabis use should be discouraged even before conception and at the latest once pregnancy occurs (LoE IIb, Grade B).

Cocaine: Periconceptional and prenatal cocaine use is associated with significant maternal and fetal risks, including miscarriage, placental abruption, preterm birth, fetal growth restriction, and intrauterine fetal death, largely mediated through potent vasoconstrictive and hypertensive effects. Cocaine readily crosses the placenta, and even intermittent use has been linked to acute placental ischemia and fetal hypoxia. In addition, cocaine use in pregnancy is associated with adverse neonatal outcomes, including neonatal abstinence symptoms and long-term neurodevelopmental impairment [78]. Women planning pregnancy should, therefore, be strongly advised to cease cocaine use before conception, and structured addiction counseling and specialist support should be offered (LoE IIa, Grade B).

Opioids: Use of opioids before and during pregnancy—both illicit opioids (e.g., heroin) and non-medical use of prescription opioids—is associated with increased risks of miscarriage, preterm birth, fetal growth restriction, stillbirth, and neonatal abstinence syndrome (NAS). Abrupt cessation in dependent women may provoke withdrawal, which itself can endanger pregnancy; therefore, preconception identification of opioid use and referral to specialized care are essential. For women with opioid use disorder, opioid agonist therapy (e.g., methadone or buprenorphine) initiated or optimized before conception is associated with improved maternal stability and pregnancy outcomes compared with continued illicit use. Opioid use should be actively addressed already in the preconception period [79, 80] (LoE IIa, Grades A–B).

In general, the 5A method is recommended for the care of patients with substance use [81]:

Ask—Systematically ask about consumption.

Advise—Provide information about the benefits of the stop and give a clear recommendation.

Assess—Determine readiness to suspend.

Assist—providing support with weaning or reduction.

Arrange—Organize follow-up.

Caffeine: According to the European Food Safety Authority (EFSA), 200 mg of caffeine per day is considered a safe dose during pregnancy [82] (LoE IIa, Grade B). It is usually sufficient to reduce caffeine consumption immediately upon becoming pregnant (Table 1).

Table 1 Caffeine content of foods; estimates; table according to www.efsa.europa.eu/en/topics/topic/caffeine

Espresso, 60 ml	80 mg caffeine
Filter coffee, 200 ml	90 mg
Black tea, 220 ml	50 mg
Green tea, 220 ml	33 mg
Can of cola, 255 ml	40 mg
“Standard Energy Drink” can, 250 ml	80 mg
Dark chocolate, 50 g	25 mg
Milk chocolate, 50 g	10 mg

Vaccination status

As live vaccinations should be avoided during and for at least a month before pregnancy, it is recommended that the vaccination status should be checked before a planned pregnancy to ensure that all vaccinations are up to date. Recommendations might vary slightly according to country guidelines, but usually contain:

- Measles, rubella: at least one (usually 2) documented vaccination [83] [LoE Ia, Grade A].
- Varicella: documented past disease or immunity (IgG) or 2 documented vaccinations, at least 4 weeks apart [84] [LoE Ia, Grade A].

Infections

Cytomegalovirus (CMV): Preconceptional CMV serology can help to interpret unclear findings in early pregnancy [85]. This is particularly useful for women in at-risk populations, i.e., with close contact with children under the age of four (mothers and child carers). These women should also be made aware of the hygiene recommendations for transmission prophylaxis prior to conception [LoE III, Grade C].

Chagas disease: Chagas is a disease prevalent in Mexico and Central and South America. Women with a sociocultural background in these countries, have an increased risk for Chagas, and are often unaware of their infection. As treatment in pregnancy is contraindicated, prepregnancy screening and treatment are useful in preventing vertical transmission [86] [LoE III, Grade B].

Toxoplasmosis: Toxoplasmosis should be addressed in a limited and targeted manner within preconception care, focusing on risk-mitigation counseling rather than screening. Women planning pregnancy, particularly those with potential exposure (e.g., consumption of raw or undercooked meat, soil contact, or cat litter), should be advised on basic hygiene measures to reduce the risk of primary infection [87] [LoE IV, Grade D].

Listeria: Women planning pregnancy should be advised to avoid foods with an increased risk of *Listeria*

monocytogenes and other foodborne bacterial infections that are particularly harmful in early pregnancy. These include unpasteurized milk and dairy products, especially soft cheeses (e.g., Brie, Camembert and blue-veined cheeses), as well as ready-to-eat refrigerated foods, such as deli meats, pâtés, meat spreads, smoked fish, and pre-prepared salads, unless they are reheated until steaming hot. In addition, raw or undercooked meat, raw fish (e.g., sushi and sashimi), and raw or lightly cooked eggs (e.g., soft-boiled eggs, homemade mayonnaise, or desserts) should be avoided [88]. Because *Listeria* can multiply at refrigerator temperatures and early pregnancy is often unrecognized, establishing safe dietary habits before conception is a simple and effective preventive measure.

[LoE IIa–IIb, Grade B].

Pre-existing medical problems

These are usually cardiovascular, nephrological, hematological, rheumatological, endocrinological, psychiatric or neurological problems. Preconception counseling should be carried out on an interdisciplinary basis as early as possible. The aim must be to recognize the risks and to inform and advise the patient about them and, if necessary, to carry out a specific intervention. The following questions are important:

- What risks does the health issue itself pose for the pregnancy? (Examples: fetal heart defects due to periconceptional poorly controlled diabetes)
- How does pregnancy influence the medium and long-term course of the disease? (Examples: pre-existing renal insufficiency worsening during pregnancy and subsequent need for dialysis).
- What risks for the pregnancy are associated with drug therapy for the disease (Examples: antiepileptic drugs and risk of neural tube defects)?

The following table provides an overview of the most common maternal health problems, the associated maternal and fetal risks, treatments and goals (Table 2).

Special situation: retinoids

The teratogenic risk of oral and topical retinoids is well-known. It should be noted, however, that retinoids and products containing isotretinoin are becoming increasingly popular as “beauty products”. Some of the products are purchased via the internet in an uncontrolled manner, meaning that in individual cases the levels of active ingredients and thus teratogenic damage cannot be predicted. They are also not always prescribed according to a medical indication or by a doctor. Ideally, therefore, a patient should be warned

Table 2 Maternal health problems and approach options

Pre-existing conditions	Associated maternal and fetal risk	Treatment	Goal
Diabetes mellitus (LoE Ia, Grade A)	pregnancy associated complications, malformations, miscarriage, neonatal adaptation disorders [12]	Euglycemic control, weight control, vascularathy clarification (retinopathy, nephropathy, ECG), thyroid function	HbA1c < 6.5% (below 48 mmol/mol) to reduce the risk of malformations Morning fasting glucose 5–7 mmol/L, 4–7 mmol/l preprandial [9]
Chronic hypertension (LoE Ib, Grade A)	Pre-eclampsia and growth restriction	Teratogenic risk due to antihypertensive drugs (ACE inhibitors, angiotensin receptor blockers); switch to pregnancy-compatible medication Examination for end organ damage: ventricular hypertrophy (ECG), retinopathy and kidney disease (proteinuria) in the case of long-standing, not well-controlled hypertension Screening for risk factors (e.g., > 30 yrs, obesity, recurrent abortions, premature birth, infertility)	Switch to medication that has a better safety profile during pregnancy. examples for initial dosage: Methyldopa: 2–3 × 250 mg/d max. 2g/d Labetolol: 2 × 100–200 mg/d, max 4 × 300mg/d Nifedipine retard: 30–60 mg/d, max. 120 mg/d Metoprolol 25–100mg/d max. 200 mg/d [89]
Hypothyroidism (LoE IIa, Grade B)	Miscarriages, pre-eclampsia, premature births, premature placental abruption, fetal demise		Treatment, if TSH > upper limit value
Hyperthyroidism (LoE IIb, Grade B)	Miscarriages, premature birth, fetal demise, low birth weight	Differential diagnosis and treatment	Euthyroid metabolic state
Psychiatric illnesses (LoE IIb, Grade B)	Disturbed mother–child bonding, antidepressants and antipsychotics increase the risk of anovulation and reduce fertility	Counseling for depression, anxiety disorders regarding risks and benefits of treatment. Risk of relapse higher in bipolar disorder during pregnancy. Strategy planning for management. Advise on risks and treatment plan for schizophrenia	Psychiatric medication should not be discontinued before conception or at the beginning of a pregnancy to reduce the risk of relapse. If necessary, it should be switched to a medication compatible with pregnancy
Epilepsy [90] (LoE Ia, Grade A)	Teratogenic and long-term risk due to specific antiepileptic drugs when taken by the mother or possibly the father (for Valproate, see [91, 92]). medication switch usually over 3 months	Advice on the impact of pregnancy on seizure frequency	Switch to lamotrigine, levetiracetam, carbamazepine Folic acid prophylaxis 5mg/d Avoidance of Valproate-containing preparations
HIV (LoE Ia, Grade A)	See separate Practice Guideline 60 [93]		
Thrombophilia (LoE Ia, Grade A)	Deep vein thrombosis or pulmonary embolism during pregnancy or postpartum, frequent occurrence in the family	Advice on the need for thromboprophylaxis during pregnancy/postpartum [94]	
Complications during previous pregnancy (LoE IIb, Grade B)	Risk of recurrence in further pregnancies	Survey and advice on the risk of recurrence (see below)	
Hemoglobinopathy (LoE IIa, Grade B)	Miscarriage, fetal anemia	Genetic counseling for couples at risk of thalassemia or sickle cell anemia	

Table 2 (continued)

Pre-existing conditions	Associated maternal and fetal risk	Treatment	Goal
Cardiovascular diseases, aortic diseases, pulmonary hypertension [95] (LoE IIa, Grade B)	Maternal mortality, myocardial infarction, pericardial myopathy, aortic dissection, premature birth	Risk assessment and counseling for all women with known or suspected congenital or acquired cardiovascular and aortic disease or pulmonary hypertension. Echocardiography is recommended for all pregnant patients with unexplained or new cardiovascular signs or symptoms	
Multiple sclerosis [96] (LoE IIb, Grade B)	Teratogenic or long-term risk due to specific immunotherapies; this may also apply if taken by the partner. Effective contraception recommended for at least 6 months [96]	Advise and planning of pregnancy, adjustment of medication [97]	
Asthma [98] (LoE Ia, Grade A)	Uncontrolled asthma and an exacerbation increase the risk of pre-eclampsia, growth restriction, preterm birth	Advice and information to women that well-controlled asthma has no negative effect on pregnancy. Adjustment of medication and no abrupt discontinuation	Short-term β -agonists Long-term β -agonists (LABA—salmeterol, Inhaled corticosteroids (alone or in combination with LABA)
Autoimmune rheumatic diseases [99], e.g., rheumatoid arthritis, spondyloarthritis, systemic lupus erythematosus, antiphospholipid tissue) (LoE IIa, Grade B)	Pre-eclampsia, hypertension, growth restriction	Consultation and risk stratification; Adjustment to medication suitable for pregnancy, stable situation during 6–12 mo before pregnancy, check for anti Ro/SSA $\pm$ anti La/SSB, aPL profile (lupus anticoagulans, anti-Cardiolipin AK, anti b2 glycoproteins) no cyclophosphamide, methotrexate, thalidomide, mycophenolate mofetil	
Solid organ transplantation [100] (LoE IIb, Grade B)	Increased risk of rejection reaction, deterioration of organ function, premature birth, growth restriction, teratogenic risk due to specific drugs	-Checking the kidney function -Assessment of the function of the transplanted organ (e.g., echocardiogram, lung function test -Determination of HLA antibodies -Upper abdominal sonography and liver function tests Patients should be vaccinated against influenza, pneumococci, varicella zoster, COVID 19 (hepatitis A/B, diphtheria, polio, pertussis and tetanus, optionally against meningococci and human papillomaviruses before a planned pregnancy [101]	

about the use of retinoid-containing preparations or adequate contraception should be ensured [Grade D].

Pregnancy history

Inter-pregnancy interval: a short interval, especially < 12 months, is associated with unfavorable outcomes, including fetal growth restriction, preterm birth, neonatal morbidity and maternal morbidity, such as gestational diabetes and uterine rupture (after cesarean section) [102]. An interval of 1–2 years is recommended, although national guidelines vary [LoE IIa, Grade C].

Pre-eclampsia: The risk of pre-eclampsia in a subsequent pregnancy is around 15% and is very high (up to 50%) if the pre-eclampsia occurred before 28-week gestation (LoE IIa). In the long term, there is a three–fourfold risk of hypertension, coronary heart disease or cerebrovascular insults [89]. National societies like the German AWMF (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften) [89], ACOG (American College of Obstetricians and Gynecologists) [103] and NICE (National Institute for Health and Care Excellence) [104] recommend counseling and clarification, especially for women who have had pre-eclampsia before 34-week gestation or after a severe course; (Grade B) the corresponding recommendations regarding clarifications are listed in the respective guidelines. Of particular relevance is the exclusion of Antiphospholipid Syndrome, as this has therapeutic consequences for the next pregnancy (LoE IIb, Grade B).

The AWMF guideline recommends prophylaxis with aspirin in a subsequent pregnancy if there are risk factors, or screening for pre-eclampsia according to the FMF UK algorithm [89].

Gestational diabetes: The greatest risk factor for the development of gestational diabetes (GDM) is GDM in the previous pregnancy; the risk is up to 48% in the subsequent pregnancy [30]. In women at high risk, early screening in the first trimester aims to detect previously undiagnosed overt diabetes and is, therefore, performed using fasting plasma glucose and/or HbA1c, rather than an oral glucose tolerance test (GTT). The GTT remains the diagnostic standard for routine gestational diabetes screening at 24–28-week gestation (LoE IIa, Grade B).

Late miscarriage: Vaginal progesterone can potentially increase the probability of a live birth after a late miscarriage [105] (LoE III, Grade C). In recurring pregnancy loss, there is currently no consistent evidence [105] (LoE Ia, Grade B). Prophylactic cerclage after McDonald or Shirodkar in the next pregnancy should be discussed with the patient after late miscarriage or early preterm birth (“history-indicated”), as this can reduce the risk of preterm birth [106, 107] (LoE Ia, Grade A).

Recurrent pregnancy loss: Recurrent pregnancy loss (RPL) was first defined by the WHO in 1977 as three or more consecutive miscarriages before the 20th week of gestation [108]. More recent definitions by the WHO [109] and the ASRM [110] lowered this threshold to two consecutive losses. The 2017 guideline of the European Society of Human Reproduction and Embryology (ESHRE) further broadened the definition by including non-consecutive miscarriages and considering RPL present from two pregnancy losses onward [111] (LoE V). 1–3% of all couples suffer from three “recurrent” miscarriages, up to 5% suffer from two habitual miscarriages [112] (LoE IIb). Balanced chromosomal abnormalities are present in 2–5% of all couples with at least 2 miscarriages [112] (LoE IIb).

The AWMF S2k guideline 2022 states that under special circumstances further investigations are granted after 2, in any case after 3 miscarriages [112] (LoE III–IV, Grade C). The diagnostic recommendations are outlined in the guideline; in brief, both partners should undergo genetic testing and an anatomical evaluation for uterine malformations. Endocrinological diagnostics for PCO and thyroid function testing should be performed [112] (LoE III–IV, Grade C).

The data on the relationship between RPL and genetic thrombophilia is inconclusive; therefore, general coagulation testing is not recommended [112] (LoE IIa, Grade B). Aspirin and heparins should not be used as *the sole* prophylaxis for idiopathic RPL [112] (LoE Ia, Grade A). Although the incidence of antiphospholipid antibody syndrome (APS) is probably lower than previously thought, it is clinically relevant and should, therefore, be investigated; *in the case of APS*, prophylaxis with aspirin and low-dose low-molecular-weight heparin is recommended from early pregnancy on (LoE Ia, Grade A) (Table 3). Clinical and two laboratory tests at 12-week intervals are required to confirm the diagnosis:

Further consultation in the event of abnormal findings and, if necessary, therapy should be carried out in a center or by a specialist with appropriate expertise.

Fetal growth restriction: After a pregnancy with fetal growth restriction, the risk of recurrence is 20–30% [113] (LoE IIa). Pre-eclampsia screening as developed by the FMF (Fetal Medicine Foundation) should be performed in the subsequent pregnancy; if this is abnormal (i.e., uterine perfusion is impaired), prophylaxis with 100–150 mg aspirin should be given before 16 weeks of gestation to reduce the risk of recurrent growth restriction [113] (LoE Ia, Grade A).

Late fetal demise: In addition to searching for the cause of intrauterine fetal death (IUFD), it may be important to reduce the risk before the next pregnancy occurs. Similar to the recommendations for recurrent pregnancy loss, screening for APS and thyroid function testing are recommended, while a general coagulation assessment is not [114] (LoE III, Grade C). Again, heparin and aspirin

Table 3 Antiphospholipid antibody syndrome criteria—table according to [112]

Clinical criteria	Laboratory criteria
≥ 1 venous or arterial thrombosis	Anti-Cardiolipin— Ac (IgM, IgG) medium to high titers
1 or 2 unexplained miscarriages in morphologically unremarkable fetuses > 10 weeks' gestation	Anti-β2-glycoprotein-1-Ac (IgM, IgG) high titers
≥ 3 abortions < 10th week of pregnancy	Lupus anticoagulant
≥ 1 late miscarriage or premature birth < 34 weeks' gestation due to placental insufficiency or pre-eclampsia	

for general prevention of IUFD are not evidence-based, except in the case of APS (LoE Ia, Grade A). As with all pregnant women, FMF pre-eclampsia screening should be performed in the 1st trimester (LoE IIb, Grade B).

Fetal malformation, chromosomal abnormalities or genetic conditions: Precise knowledge of a previous child's condition is essential for counseling regarding a future pregnancy (LoE III). Interdisciplinary collaboration with pediatricians and medical genetics is recommended, and genetic counseling should always be offered before pregnancy (Grade C). With regard to prevention, a detailed medical history and, if necessary, folic acid prophylaxis should be considered (LoE III, Grade C). The risk of recurrence is highly dependent on the etiology; a so-called "mixed risk" of 5–9% is often cited if the etiology is unknown (LoE III, Grade C). In the case of a known genetic condition, both pre-implantation genetic testing and invasive prenatal testing (e.g., in the form of chorionic villus sampling at the end of the first trimester) may be possible (LoE IIb, Grade B).

Previous preterm birth: The risk of recurrence after a spontaneous preterm birth is approx. 30%, and approx. 57% for ≥ 2 previous spontaneous preterm births < 32-week gestation [115] (LoE IIa). It is, therefore, important to reduce risk factors. While there is evidence for the use of vaginal progesterone in pregnancies with a short cervix after previous preterm birth, general use of vaginal progesterone without short cervix is not supported by current evidence [115, 116]. The potential role of cervical cerclage as an alternative or adjunct to progesterone therapy should be discussed (LoE Ia, Grade A). Current evidence does not support the use of cervical pessaries, as multiple randomized controlled trials and meta-analyses could not show a benefit in different settings, including singleton and twin pregnancies with short cervix [117–120]. Numerous guidelines, therefore, advise against the use of cervical pessaries for the prevention of preterm birth [121, 122] (LoE Ia, Grade B).

Pre-existing gynecological conditions

Genital malformation: Uterine malformations, genital septa, duplications or unilateral/asymmetric abnormalities are often asymptomatic, but are usually associated with early and late miscarriage, premature delivery and intrauterine growth retardation (LoE IIa). Surgical treatment in asymptomatic patients without miscarriages is not initially recommended, as many remain asymptomatic [123] (LoE III). The evidence for septal resection in cases of RPL with septate uterus is unclear; therefore, there is no recommendation for surgical management in the AWMF guideline in these cases [112] (LoE IIb–III, Grade C).

Depending on their size and location (submucosal/intramural/submucosal), *fibroids* can have a negative impact on both fertility and the course of pregnancy. This also applies to initially asymptomatic fibroids (LoE IIa). Drug or surgical treatment prior to pregnancy is only recommended for symptomatic (menometrorrhagia, pain) or intracavitary fibroids and for submucosal fibroids with infertility or miscarriage [124] (LoE IIa, Grade B).

Endometriosis is a possible cause of infertility and ectopic pregnancies. Symptomatic endometriosis should be diagnosed and treated independently of a current desire to have children [125]. Endometriosis has been associated with a higher risk of preterm birth in observational studies and meta-analyses, although the evidence is inconsistent (LoE IIb, Grade B).

Gynecological infections and sexually transmitted diseases can lead to chronic pain and infertility, late miscarriage and preterm birth (bacterial vaginosis, aerobic vaginitis, abnormal vaginal flora) and long-term maternal and infant complications (Lues, HIV, hepatitis B and C). Screening should be considered as part of normal gynecological check-ups, especially in high-risk patients (LoE IIa, Grade B).

Conization/cervical dysplasia: Since cervical dysplasia caused by HPV (human papilloma virus) infections disappears spontaneously, especially in younger women, and a

history of conization (LEEP, i.e., Loop Electrosurgical Excision Procedure, knife, laser) is one of the important risk factors for preterm birth, it is particularly important that women who have not yet started/completed their family planning are not overtreated. HPV vaccination status should be routinely assessed [126] (LoE IIa, Grade A).

Female genital mutilation and/or cutting (FGM/C) can lead to various obstetric problems and complications depending on the degree of severity or WHO classification type (LoE IIa). This should be discussed openly and in detail with the woman and her partner before pregnancy (Grade D).

Family history

Consanguinity: Consanguinity increases the risk of having a child with a physical or mental disability to around 5–7% compared to the baseline risk [127] (LoE IIb). Consanguinity is a common practice depending on the region of the world, with a prevalence of up to (and over) 50% of all couples [128], so a three-generation pedigree or genetic counseling may be recommended if the cultural background is appropriate [127]. However, this fact alone should not be a reason for genetic testing.

Genetic diseases, malformations, heart defects: If there are any conditions in the family history, the patient should be referred for genetic counseling if possible before a planned pregnancy, so that any risks can be identified with the patient and any necessary clarifications can be made. This aspect should also be discussed with the woman if she has a family history of cancers (e.g., BRCA 1/2 mutation) (LoE III, Grade C).

Carrier status, carrier screening: Genetic testing is developing rapidly and some NIPT (non-invasive prenatal test) are already available to determine prenatal carrier status, i.e., whether a person carries a recessive genetic trait. It is particularly important to discuss the limits of this evolving technology (Grade D). Genetic counseling should be offered for familial genetic conditions (LoE III, Grade C). If there is a known (recessive) disease in the family or a known carrier status and genetic findings are available, it is usually possible to test family members with *unknown* carrier status for this variant before a planned pregnancy.

Pre-eclampsia: A family history of pre-eclampsia is associated with a relative risk of around 3 for the development of pre-eclampsia and is, therefore, comparable to the risk of a multiple pregnancy or kidney disease in terms of risk factors [129] (LoE IIa, Grade B). Like all pregnant women, the patient should be made aware of the possibility of FMF pre-eclampsia screening and the reduction of modifiable risk factors, such as hypertension and BMI > 30 (LoE IIa, Grade B).

α -, β -thalassemia, sickle cell anemia: If there is a corresponding family history and an ethnic group with an

Table 4 Ethnic groups with a clinically relevant prevalence of hemoglobinopathies. Table according to [130]

Hemoglobin S (sickle cell anemia)	Africans including North Africans, African–Caribbean and any other African ethnicity (e.g., Central and South American) with partial African ethnicity, Greeks, southern Italians, including Sicilians, Turks, Arabs, Indians
α^0 -Thalassemia	Chinese, Taiwanese, Southeast Asia (Thai, Laotian, Cambodian, Vietnamese, Burmese, Malaysian, Singaporean, Indonesian, Philippines), Cypriots, Greeks, Turks and Sardinia
β -Thalassemia	All ethnic groups other than Northern Europeans

increased prevalence [130–133] (see below), testing for carrier status can be carried out, especially if the partner comes from the same cultural group [134–136] (LoE IIb, Grade B). The Canadian Society of Obstetrics and Gynecology states in its guideline: "From a pragmatic point of view, all patients who are not of Japanese, Korean, Caucasian or Northern European origin [...] can be screened" [131] (LoE III—Guideline Consensus, Grade C) (Table 4).

A first-line screening for hemoglobinopathies can consist of a full blood count with the respective indices, a hemoglobin analysis and iron parameters [131].

Risks in the workplace

Pregnant women are potentially exposed to a variety of risks in the workplace: physical strain (e.g., heavy lifting), chemical substances (e.g., solvents), infectious agents and, in complex cases, psychosocial stress. The tolerable level, however, is strongly dependent on the social circumstances and national legislation. Gynecologists play a key role by discussing hazards on the basis of a personalized risk analysis and intervening in an advisory and, if necessary, protective capacity (Grade D).

Psychosocial risk situations

Psychosocial problems are often multifactorial and can also have a significant impact on the health of the pregnant woman and the child, both during pregnancy and postpartum. These include violence in partnerships, mental illnesses, such as depression and anxiety disorders, including PMDD (premenstrual dysphoric disorder), substance abuse (see above), but also financial precarity, isolation and the challenges of migration. Vulnerability due to the uncertainty of residence status and language barriers can put a strain on mental health and increase the risk of complications during pregnancy. Early identification of these risks and interdisciplinary support are crucial in order to protect the health

of the mother and child in the best possible way [137] (LoE III, Grade C).

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00404-026-08461-9>.

Author contribution BK drafted the manuscript. All authors reviewed and contributed to and approved the final version. All authors agreed on revisions.

Funding The authors have not disclosed any funding.

Data availability No datasets were generated or analyzed during the current study.

Declarations

Conflict of interest The authors declare no competing interest.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

- Daly M, Kipping RR, Tinner LE, Sanders J, White JW (2022) Preconception exposures and adverse pregnancy, birth and postpartum outcomes: umbrella review of systematic reviews. *Paediatr Perinat Epidemiol* 36(2):288–299. <https://doi.org/10.1111/ppe.12855>
- Stephenson J, Heslehurst N, Hall J, Schoenaker DAJM, Hutchinson J, Cade JE et al (2018) Before the beginning: nutrition and lifestyle in the preconception period and its importance for future health. *The Lancet* 391(10132):1830–1841. [https://doi.org/10.1016/S0140-6736\(18\)30311-8](https://doi.org/10.1016/S0140-6736(18)30311-8)
- Vaivada T, Lassi ZS, Irfan O, Salam RA, Das JK, Oh C et al (2022) What can work and how? An overview of evidence-based interventions and delivery strategies to support health and human development from before conception to 20 years. *The Lancet* 399(10337):1810–1829. [https://doi.org/10.1016/S0140-6736\(21\)02725-2](https://doi.org/10.1016/S0140-6736(21)02725-2)
- Dorney E, Black K (2024) Preconception care. *Aust J Gen Pract* 53(11):805–812. <https://doi.org/10.31128/AJGP-08-23-6927>
- World Health Organisation. Meeting to Develop a Global Consensus on Preconception Care to Reduce Maternal and Childhood Mortality and Morbidity. Geneva; 2012 Feb.
- Jacob CM, Killeen SL, McAuliffe FM, Stephenson J, Hod M, Diaz Yamal I et al (2020) Prevention of noncommunicable diseases by interventions in the preconception period: a FIGO position paper for action by healthcare practitioners. *Int J Gynecol Obstet* 151:6–15. <https://doi.org/10.1002/ijgo.13331>. (PubMed PMID: 32894587.)
- FIGO Working Group on Good Clinical Practice in Maternal–Fetal Medicine (2019) Good clinical practice advice: micronutrients in the periconceptional period and pregnancy. *Int J Gynaecol Obstet* 144(3):317–321. <https://doi.org/10.1002/ijgo.12739>
- Hanson MA, Bardsley A, De-Regil LM, Moore SE, Oken E, Poston L et al (2015) The International Federation of Gynecology and Obstetrics (FIGO) recommendations on adolescent, preconception, and maternal nutrition: “Think Nutrition First.” *Int J Gynecol Obstet* 131(4):213–253. [https://doi.org/10.1016/S0020-7292\(15\)30034-5](https://doi.org/10.1016/S0020-7292(15)30034-5)
- National Institute for Health and Care Excellence (NICE). Diabetes in pregnancy : management from preconception to the postnatal period. NICE guideline 3 [Internet]. 2015. Available from: <http://www.ncbi.nlm.nih.gov.ez.srv.meduniwien.ac.at/pubmed/25950069>
- National Institute for Health and Care Excellence (NICE). Fertility problems: assessment and treatment - NICE Clinical Guidelines, No. 156. London; 2017. PubMed PMID: 32134604.
- National Institute for Health and Care Excellence (NICE). Maternal and child nutrition. Public health guideline 11 [Internet]. London; 2014. Available from: <https://www.nice.org.uk/guidance/ph11>
- American College of Obstetricians and Gynecologists (2019) ACOG committee opinion No. 762: prepregnancy counseling. *Obstet Gynecol* 133(1):e78–89. <https://doi.org/10.1097/AOG.0000000000003013>
- Oxford Centre for Evidence-Based Medicine. Oxford Centre for Evidence-Based Medicine: Levels of Evidence (March 2009) [Internet]. 2009 [cited 2025 Oct 12]. Available from: <https://www.cebm.ox.ac.uk/resources/levels-of-evidence/oxford-centre-for-evidence-based-medicine-levels-of-evidence-march-2009>
- Burns PB, Rohrich RJ, Chung KC (2011) The levels of evidence and their role in evidence-based medicine. *Plast Reconstr Surg* 128(1):305–310. <https://doi.org/10.1097/PRS.0b013e318219c171>
- Finer LB, Zolna MR (2011) Unintended pregnancy in the United States: incidence and disparities, 2006. *Contraception* 84(5):478–485. <https://doi.org/10.1016/j.contraception.2011.07.013>
- Nelson HD, Darney BG, Ahrens K, Burgess A, Jungbauer RM, Cantor A et al (2022) Associations of unintended pregnancy with maternal and infant health outcomes. *JAMA* 328(17):1714. <https://doi.org/10.1001/jama.2022.19097>
- Allen D, Hunter MS, Wood S, Beeson T (2017) One key question@: first things first in reproductive health. *Matern Child Health J* 21(3):387–392. <https://doi.org/10.1007/s10995-017-2283-2>. (PubMed PMID: 28220337.)
- American College of Obstetricians and Gynecologists Committee on Gynecologic Practice PC of the AS for RM (2014) Female age-related fertility decline. *Fertil Steril* 101(3):633–634. <https://doi.org/10.1016/j.fertnstert.2013.12.032>. (PubMed PMID: 24559617.)
- Dunson DB (2002) Changes with age in the level and duration of fertility in the menstrual cycle. *Hum Reprod* 17(5):1399–1403. <https://doi.org/10.1093/humrep/17.5.1399>
- Magnus MC, Wilcox AJ, Morken NH, Weinberg CR, Håberg SE (2019) Role of maternal age and pregnancy history in risk of miscarriage: prospective register-based study. *BMJ* 20:1869. <https://doi.org/10.1136/bmj.1869>
- Andersen AMN (2000) Maternal age and fetal loss: population-based register linkage study. *BMJ* 320(7251):1708–1712. <https://doi.org/10.1136/bmj.320.7251.1708>
- Hook EB (1981) Rates of chromosome abnormalities at different maternal ages. *Obstet Gynecol* 58(3):282–285 (PubMed PMID: 6455611.)

23. du Fossé NA, van der Hoorn MLP, van Lith JMM, le Cessie S, Lashley EELO (2020) Advanced paternal age is associated with an increased risk of spontaneous miscarriage: a systematic review and meta-analysis. *Hum Reprod Update* 26(5):650–669. <https://doi.org/10.1093/humupd/dmaa010>
24. Reichman NE, Teitler JO (2006) Paternal age as a risk factor for low birthweight. *Am J Public Health* 96(5):862–866. <https://doi.org/10.2105/AJPH.2005.066324>
25. Crow JF (2000) The origins, patterns and implications of human spontaneous mutation. *Nat Rev Genet* 1(1):40–47. <https://doi.org/10.1038/35049558>
26. Brandt JS, Cruz Ithier MA, Rosen T, Ashkinadze E (2019) Advanced paternal age, infertility, and reproductive risks: a review of the literature. *Prenat Diagn* 39(2):81–87. <https://doi.org/10.1002/pd.5402>
27. Toth B, Baston-Büst DM, Behre HM, Bielfeld A, Bohlmann M, Bühling K et al (2019) Diagnosis and therapy before assisted reproductive treatments. Guideline of the DGGG, OEGGG and SGGG (S2k level, AWMF register number 015-085, February 2019) – Part 1, basic assessment of the woman. *Geburtshilfe Frauenheilkd* 79(12):1278–1292. <https://doi.org/10.1055/a-1017-3389>
28. McAuliffe FM, Killeen SL, Jacob CM, Hanson MA, Hadar E, McIntyre HD et al (2020) Management of prepregnancy, pregnancy, and postpartum obesity from the FIGO Pregnancy and Non-Communicable Diseases Committee: a FIGO (International Federation of Gynecology and Obstetrics) guideline. *Int J Gynecol Obstet* 151(S1):16–36. <https://doi.org/10.1002/ijgo.13334>. (PubMed PMID: 32894590.)
29. Penzias A, Azziz R, Bendikson K, Falcone T, Hansen K, Hill M et al (2021) Obesity and reproduction: a committee opinion (ASRM). *Fertil Steril* 116(5):1266–1285. <https://doi.org/10.1016/j.fertnstert.2021.08.018>. (PubMed PMID: 34583840)
30. Schäfer-Graf U, Laubner K, Hummel S, Gembruch U, Groten T, Kainer F et al (2018) Gestationsdiabetes mellitus (GDM), Diagnostik, Therapie und Nachsorge – Praxisempfehlung – Kurzfassung der S3-Leitlinie (AWMF-Registernummer: 057–008). *Diabetol Stoffw* 13(S 02):S174–S184. <https://doi.org/10.1055/a-0598-3468>
31. Schummers L, Hutcheon JA, Bodnar LM, Lieberman E, Himes KP (2015) Risk of adverse pregnancy outcomes by prepregnancy body mass index. *Obstet Gynecol* 125(1):133–143. <https://doi.org/10.1097/AOG.0000000000000591>. (PubMed PMID: 1000000221.)
32. Schaefer-Graf U, Ensenauer R, Gembruch U, Groten T, Flothkötter M, Hennicke J et al (2021) Obesity and pregnancy. Guideline of the German Society of Gynecology and Obstetrics (S3-Level, AWMF Registry No. 015-081, June 2019). *Geburtshilfe Frauenheilkd* 81(03):279–303. <https://doi.org/10.1055/a-1330-7466>
33. Dietrich A (2019) S3-Leitlinie: Chirurgie der Adipositas und metabolischer Erkrankungen. *Allg Viszeralchir up2date* 13(02):111–121. <https://doi.org/10.1055/s-0043-109360>
34. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G et al (2020) World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med* 54(24):1451–1462. <https://doi.org/10.1136/bjsports-2020-102955>
35. Bø K, Artal R, Barakat R, Brown WJ, Davies GAL, Dooley M et al (2018) Exercise and pregnancy in recreational and elite athletes: 2016/2017 evidence summary from the IOC expert group meeting, Lausanne. Part 5. Recommendations for health professionals and active women. *Br J Sports Med* 52(17):1080–1085. <https://doi.org/10.1136/bjsports-2018-099351>
36. Koletzko B, Cremer M, Flothkötter M, Graf C, Hauner H, Hellmers C et al (2018) Diet and lifestyle before and during pregnancy – practical recommendations of the Germany-wide Healthy Start – Young Family Network. *Geburtshilfe Frauenheilkd* 78(12):1262–1282. <https://doi.org/10.1055/a-0713-1058>
37. MRC Vitamin Study Research Group (1991) Prevention of neural tube defects: results of the Medical Research Council Vitamin Study. *Lancet* 338(8760):131–137 (PubMed PMID: 1677062)
38. Eichholzer M (2006) Prophylaxe von Neuralrohrdefekten – immer noch ungenügend. *Pädiatrie* 4:22–25. <https://doi.org/10.5167/uzh-18417>
39. Douglas Wilson R, Van Mieghem T, Langlois S, Church P (2021) Guideline No. 410: prevention, screening, diagnosis, and pregnancy management for fetal neural tube defects. *J Obstet Gynaecol Can* 43(1):124–139.e8. <https://doi.org/10.1016/j.jogc.2020.11.003>
40. Stein R, Assion C, Geißler AB, Beetz R, Bürst M, Cremer R, et al. AWMF S2k Leitlinie Diagnostik und Therapie der neurogenen Blasenfunktionsstörungen bei Kindern und Jugendlichen mit spinaler Dysraphie. Mannheim; 2019.
41. Lassi ZS, Salam RA, Haider BA, Bhutta ZA. Folic acid supplementation during pregnancy for maternal health and pregnancy outcomes. *Cochrane Database of Systematic Reviews*. 2013;2013(3). <https://doi.org/10.1002/14651858.CD006896.pub2> PubMed PMID: 23543547.
42. Policy and Practice Guideline Committee of the American College of Medical Genetics (2011) Policy statement on folic acid and neural tube defects. *Genet Med* 13(6):593–596. <https://doi.org/10.1097/GIM.0b013e31821d4188>. (PubMed PMID: 21552133.)
43. Bibbins-Domingo K, Grossman DC, Curry SJ, Davidson KW, Epling JW, Garcia FAR et al (2017) Folic acid supplementation for the prevention of neural tube defects US preventive services task force recommendation statement. *JAMA* 317(2):183–189. <https://doi.org/10.1001/jama.2016.19438>. (PubMed PMID: 28097362.)
44. Deutsche Gesellschaft für Ernährung e.V. FAQ [Internet]. 2018. Ausgewählte Fragen und Antworten zu Folat. Available from: <https://www.dge.de/gesunde-ernaehrung/faq/folat/#c6067>
45. Buppasiri P, Lumbiganon P, Thinkhamrop J, Ngamjaras C, Laopaiboon M, Medley N. Calcium supplementation (other than for preventing or treating hypertension) for improving pregnancy and infant outcomes. *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd; 2015. <https://doi.org/10.1002/14651858.CD007079.pub3> PubMed PMID: 25922862.
46. Cluver CA, Rohwer C, Rohwer A, Puga MEDSS, Torloni MR, Hofmeyr GJ (2025) Calcium supplementation commenced before pregnancy for preventing hypertensive disorders and related problems. *Cochrane Database Syst Rev* 9(9):CD011192. <https://doi.org/10.1002/14651858.CD011192.pub4>
47. EFSA Pane on Dietetic Products Nutrition and Allergies (2015) Scientific Opinion on Dietary Reference Values for calcium. *EFSA J* 13(5):4101. <https://doi.org/10.2903/j.efsa.2015.4101>
48. Middleton P, Gomersall JC, Gould JF, Shepherd E, Olsen SF, Makrides M (2018) Omega-3 fatty acid addition during pregnancy. *Cochrane Database Sys Rev* 2018(11):003402. <https://doi.org/10.1002/14651858.CD003402.pub3>. (PubMed PMID: 30480773)
49. European Food Safety Authority (2009) DHA and support of the visual development of the unborn child and breastfed infant. *EFSA J* 7(4):1007. <https://doi.org/10.2903/j.efsa.2009.1006>
50. Schweizerische Gesellschaft für Ernährung SGE. Merkblätter und Unterlagen [Internet]. 2024. Nährstoffe. Available from: <https://www.sge-ssn.ch/ich-und-du/download/merkblaetter-und-unterlagen/>
51. NHS. B vitamins and folic acid [Internet]. 2020 [cited 2025 Aug 18]. Available from: <https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-b>

52. The Office of Dietary Supplements (ODS) of the National Institutes of Health (NIH). NIH Dietary Factsheets - Vitamin B12 [Internet]. 2025 [cited 2025 Aug 18]. Available from: <https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional>
53. Bresson JL, Burlingame B, Dean T, Fairweather-Tait S, Heinonen M, Hirsch-Ernst KI et al (2016) Dietary reference values for vitamin D. *EFSA J* 14(10):04547–10692. <https://doi.org/10.2903/j.efsa.2016.4547>
54. Christoph P, Challande P, Raio L, Surbek D (2020) High prevalence of severe vitamin D deficiency during the first trimester in pregnant women in Switzerland and its potential contributions to adverse outcomes in the pregnancy. *Swiss Med Wkly* 150(2122):w20238. <https://doi.org/10.4414/smw.2020.20238>
55. EFSA Panel on Dietetic Products N and A (NDA) (2014) Scientific Opinion on Dietary Reference Values for iodine. *EFSA J* 12(5):3660. <https://doi.org/10.2903/j.efsa.2014.3660>
56. Fischer L, Andersson M, Braegger C, Herter-Aeberli I (2024) Iodine intake in the Swiss population 100 years after the introduction of iodised salt: a cross-sectional national study in children and pregnant women. *Eur J Nutr* 63(2):573–587. <https://doi.org/10.1007/s00394-023-03287-6>
57. Piccoli GB, Clari R, Vigotti FN, Leone F, Attini R, Cabiddu G et al (2015) Vegan-vegetarian diets in pregnancy: danger or panacea? A systematic narrative review. *BJOG* 122(5):623–633. <https://doi.org/10.1111/1471-0528.13280>
58. Samimisedeh P, Afshar EJ, Ejtahed H, Qorbani M (2024) The impact of vegetarian diet on sperm quality, sex hormone levels and fertility: a systematic review and meta-analysis. *J Hum Nutr Diet* 37(1):57–78. <https://doi.org/10.1111/jhn.13230>
59. Deutsche Gesellschaft für Ernährung e.V. Gesunde Ernährung (Webpage) [Internet]. 2024. Ernährung in Schwangerschaft und Stillzeit. Available from: <https://www.dge.de/gesund-ernaehrung/gezielte-ernaehrung/ernaehrung-in-schwangerschaft-und-stillzeit/>
60. Tanner HL, Dekker Nitert M, Callaway LK, Barrett HL (2021) Ketones in pregnancy: why is it considered necessary to avoid them and what is the evidence behind their perceived risk? *Diabetes Care* 44(1):280–289. <https://doi.org/10.2337/dc20-2008>
61. Sussman D, Ellegood J, Henkelman M (2013) A gestational ketogenic diet alters maternal metabolic status as well as offspring physiological growth and brain structure in the neonatal mouse. *BMC Pregnancy Childbirth* 13(1):198. <https://doi.org/10.1186/1471-2393-13-198>
62. British Dietetic Association. Healthy eating during pregnancy [Internet]. [cited 2025 Sep 15]. Available from: <https://www.bda.uk.com/resource/pregnancy-diet.html>
63. American College of Obstetricians and Gynecologists. Nutrition During Pregnancy [Internet]. 2023 [cited 2025 Sep 15]. Available from: <https://www.acog.org/womens-health/faqs/nutrition-during-pregnancy>
64. Young MF, Oaks BM, Tandon S, Martorell R, Dewey KG, Wendt AS (2019) Maternal hemoglobin concentrations across pregnancy and maternal and child health: a systematic review and meta-analysis. *Ann N Y Acad Sci* 1450(1):47–68. <https://doi.org/10.1111/nyas.14093>. (PubMed PMID: 30994929.)
65. Yi SW, Han YJ, Ohrr H (2013) Anemia before pregnancy and risk of preterm birth, low birth weight and small-for-gestational-age birth in Korean women. *Eur J Clin Nutr* 67(4):337–342. <https://doi.org/10.1038/ejcn.2013.12>
66. Yuan S, Liu J, Larsson SC (2021) Smoking, alcohol and coffee consumption and pregnancy loss: a Mendelian randomization investigation. *Fertil Steril* 116(4):1061–1067. <https://doi.org/10.1016/j.fertnstert.2021.05.103>
67. Pineles BL, Park E, Samet JM (2014) Systematic review and meta-analysis of miscarriage and maternal exposure to tobacco smoke during pregnancy. *Am J Epidemiol* 179(7):807–823. <https://doi.org/10.1093/aje/kwt334>
68. Soneji S, Beltrán-Sánchez H (2019) Association of maternal cigarette smoking and smoking cessation with preterm birth. *JAMA Netw Open* 2(4):e192514. <https://doi.org/10.1001/jamanetworkopen.2019.2514>. (PubMed PMID: 31002320.)
69. Dahlin S, Gunnerbeck A, Wikström AK, Cnattingius S, Edstedt Bonamy AK (2016) Maternal tobacco use and extremely premature birth - a population-based cohort study. *BJOG* 123(12):1938–1946. <https://doi.org/10.1111/1471-0528.14213>. (PubMed PMID: 27411948.)
70. Lange S, Probst C, Gmel G, Rehm J, Burd L, Popova S (2017) Global prevalence of Fetal Alcohol Spectrum Disorder among children and youth. *JAMA Pediatr* 171(10):948. <https://doi.org/10.1001/jamapediatrics.2017.1919>
71. Bundesamt für Gesundheit BAG. Faktenblatt Alkoholkonsum während der Schwangerschaft in der Schweiz [Internet]. Bern; 2018. Available from: https://www.bag.admin.ch/dam/bag/de/dokumente/npp/faktenblaetter/faktenblaetter-alkohol/faktenblatt-alkohol-schwangerschaft.pdf.download.pdf/180816_Faktenblatt_Alkoholkonsum_Schwangerschaft_DE.pdf
72. World Health Organisation. Global status report on alcohol and health 2018. 2018.
73. American College of Obstetricians and Gynecologists (2011) Committee opinion No. 496: at-risk drinking and alcohol dependence: obstetric and gynecologic implications. *Obstet Gynecol* 118(2):383–388. <https://doi.org/10.1097/AOG.0b013e31822c9906>
74. Grob A, Lemola S. Substanzkonsum junger Eltern in der Schweiz [Internet]. Berne; 2005. Available from: https://edoc.unibas.ch/23514/1/Substanzkonsum_Eltern_CH.pdf
75. Wollscheid J, Burke M, Kimmel T, Kaufmann T, Batra A, Binder A (2025) Pregnancy care in times of cannabis legalization: self-rated knowledge, risk perception and communication practices of midwives in Germany. *Healthcare*. <https://doi.org/10.3390/healthcare13111228>. (PubMed PMID: 40508842.)
76. El Marroun H, Brown QL, Lund IO, Coleman-Cowger VH, Loree AM, Chawla D et al (2018) An epidemiological, developmental and clinical overview of cannabis use during pregnancy. *Prev Med (Baltim)* 116:1–5. <https://doi.org/10.1016/j.ypmed.2018.08.036>
77. Corsi DJ, Morris TT, Reed ZE, Davey Smith G (2025) Maternal cannabis use in pregnancy, perinatal outcomes, and cognitive development in offspring: a longitudinal analysis of the ALSPAC cohort using paternal cannabis use as a negative control exposure. *Eur J Epidemiol* 40(5):549–562. <https://doi.org/10.1007/s10654-025-01233-w>
78. Addis A, Moretti ME, Ahmed Syed F, Einarson TR, Koren G (2001) Fetal effects of cocaine: an updated meta-analysis. *Reprod Toxicol* 15(4):341–369. [https://doi.org/10.1016/S0890-6238\(01\)00136-8](https://doi.org/10.1016/S0890-6238(01)00136-8)
79. Vella A, Savona-Ventura C, Mahmood T (2023) Harmful effects of opioid use in pregnancy: a scientific review commissioned by the European Board and College of Obstetrics and Gynaecology (EBCOG). *Eur J Obstet Gynecol Reprod Biol* 286:70–75. <https://doi.org/10.1016/j.ejogrb.2023.05.019>
80. ACOG (2017) Committee opinion No. 711: opioid use and opioid use disorder in pregnancy. *Obstet Gynecol* 130(2):e81–94. <https://doi.org/10.1097/AOG.0000000000002235>
81. Guerby P, Garabedian C, Berveiller P, Legendre G, Grangé G, Berlin I (2020) Tobacco and nicotine cessation during pregnancy. *Obstet Gynecol* 136(2):428–429. <https://doi.org/10.1097/AOG.0000000000004033>. (PubMed PMID: 32732758.)
82. EFSA Panel on Dietetic Products N and A (2015) Scientific Opinion on the safety of caffeine. *EFSA J* 13(5):4102. <https://doi.org/10.2903/j.efsa.2015.4102>

83. McLean HQ, Fiebelkorn AP, Temte JL, Wallace GS, Centers for Disease Control and Prevention (2013) Prevention of measles, rubella, congenital rubella syndrome, and mumps: summary recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 62(RR-4):1–34 (**PubMed PMID: 23760231**)
84. Marin M, Güris D, Chaves SS, Schmid S, Seward JF, Advisory Committee on Immunization Practices C for DC and P (CDC) (2007) Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 56(4):1–40 (**PubMed PMID: 17585291**)
85. Schäffer L, Ochenbein N, Surbek D (2021) Swiss Practice Guideline 73: CMV and pregnancy. Swiss Society of Obstetrics and Gynecology, Swiss Practice Guidelines. Berne
86. Martinez de Tejada B, Velarde M, De Salazar P. Practice Guideline 89: Screening, Prevention and Treatment of Congenital Chagas Disease. Swiss Practice Guidelines. Berne: Swiss Society of Obstetrics and Gynecology; 2024.
87. Ecdc. Congenital toxoplasmosis Annual Epidemiological Report for 2021 Key facts. 2021.
88. Committee Opinion No. 614 (2014) Management of pregnant women with presumptive exposure to *Listeria monocytogenes*. *Obstet Gynecol* 124(6):1241–1244. <https://doi.org/10.1097/01.AOG.0000457501.73326.6c>
89. Pecks U, Baumann M, Binder J, Contini C, Dathan-Stumpf A, Dechend R et al (2025) Hypertensive disorders in pregnancy (HDP): diagnostics and therapy. Guideline of the DGGG, OEGGG and SGGG (S2k-Level, AWMF Registry No.015/018, June 2024). *Geburtshilfe Frauenheilkd* 85(08):810–850. <https://doi.org/10.1055/a-2522-2347>
90. Royal College of Obstetricians & Gynaecologists. Green-Top Guideline 68: Epilepsy in Pregnancy. London; 2016 Jun.
91. European Medicines Agency - Pharmacovigilance Risk Assessment Committee. <https://www.ema.europa.eu/en/news/potential-risk-neurodevelopmental-disorders-children-born-men-treated-valproate-medicines-prac-recommends-precautionary-measures>. 2024. Potential risk of neurodevelopmental disorders in children born to men treated with valproate medicines: PRAC recommends precautionary measures.
92. Karakis I (2025) “In the name of the father: risk to the offspring from paternal exposure to Valproate during conception.” *Epilepsy Curr* 25(2):116–118. <https://doi.org/10.1177/15357597251317286>. (**PubMed PMID: 40046555**.)
93. Martinez de Tejada B, Baumann M, Surbek D. Swiss Practice Guideline 60: Pregnancy and HIV. Swiss Practice Guidelines. Swiss Society of Obstetrics and Gynecology; 2018.
94. Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium Green-top Guideline No. 37a. 2015.
95. Seeland U, Bauersachs J, Roos-Hesselink J, Regitz-Zagrosek V (2018) Update of the ESC guidelines 2018 on cardiovascular diseases during pregnancy: most important facts. *Herz* 43(8):710–718. <https://doi.org/10.1007/s00059-018-4765-4>. (**PubMed PMID: 30456631**.)
96. Graber M, Panchaud A, Legardeur H, Derfuss T, Friedli C, Gobbi C et al (2024) Recommendations for the treatment of Multiple Sclerosis in family planning, pregnancy and lactation in Switzerland: immunotherapy. *Clin Transl Neurosci* 8(3):26. <https://doi.org/10.3390/ctn8030026>
97. Vukusic S, Carra-Dalliere C, Ciron J, Maillart E, Michel L, Leray E et al (2023) Pregnancy and multiple sclerosis: 2022 recommendations from the French multiple sclerosis society. *Mult Scler J*. <https://doi.org/10.1177/13524585221129472>. (**SAGE Publications Ltd**;))
98. Bendien SA, de Kruij MD, Feitsma H, van Hoolwerff-Blikkendaal C, Huurne KKter, Kuiterman A et al (2024) Summary of the Dutch multidisciplinary practice guideline on Asthma and pregnancy. *J Allergy Clin Immunol Pract* 12(7):1751–1762. <https://doi.org/10.1016/j.jaip.2024.03.025>
99. Andreoli L, Chighizola CB, Iaccarino L, Botta A, Gerosa M, Ramoni V et al (2023) Immunology of pregnancy and reproductive health in autoimmune rheumatic diseases. update from the 11th International Conference on Reproduction, Pregnancy and Rheumatic Diseases. *Autoimmun Rev* 22(3):103259. <https://doi.org/10.1016/j.autrev.2022.103259>
100. Costanzo MR, Costanzo MR, Dipchand A, Starling R, Anderson A, Chan M et al (2010) The International Society of Heart and Lung Transplantation guidelines for the care of heart transplant recipients. *J Heart Lung Transplant* 29(8):914–956. <https://doi.org/10.1016/j.healun.2010.05.034>
101. Danziger-Isakov L, Kumar D (2019) Vaccination of solid organ transplant candidates and recipients: guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant*. <https://doi.org/10.1111/ctr.13563>
102. Hutcheon JA, Nelson HD, Stidd R, Moskosky S, Ahrens KA (2019) Short interpregnancy intervals and adverse maternal outcomes in high-resource settings: An updated systematic review. *Paediatr Perinat Epidemiol* 33(1):48–59. <https://doi.org/10.1111/ppe.12518>
103. ACOG Committee Opinion No. 736 (2018) Optimizing postpartum care. *Obstet Gynecol* 131(5):e140–e150. <https://doi.org/10.1097/AOG.0000000000002633>
104. National Institute for Health and Care Excellence. NICE Guideline 133: Hypertension in pregnancy: diagnosis and management [Internet]. 2019. Available from: www.nice.org.uk/guidance/ng133
105. Devall AJ, Papadopoulou A, Podsek M, Haas DM, Price MJ, Coomarasamy A et al (2021) Progestogens for preventing miscarriage: a network meta-analysis. *Cochrane Database Sys Rev* 4(4):013792. <https://doi.org/10.1002/14651858.CD013792.pub2>
106. Giouleka S, Boureka E, Tsakiridis I, Siargkas A, Mamopoulos A, Kalogiannidis I et al (2023) Cervical cerclage: a comprehensive review of major guidelines. *Obstet Gynecol Surv* 78(9):544–553. <https://doi.org/10.1097/OGX.0000000000001182>
107. Alfirevic Z, Stampalija T, Medley N (2017) Cervical stitch (cerclage) for preventing preterm birth in singleton pregnancy. *Cochrane Database Sys Rev*. 6(6):CD008991. <https://doi.org/10.1002/14651858.CD008991.pub3>
108. World Health Organisation (1977) Recommended definitions, terminology and format for statistical tables related to the perinatal period and use of a new certificate for cause of perinatal deaths. modifications recommended by FIGO as amended October 14, 1976. *Acta Obstet Gynecol Scand* 56(3):247–253 (**PubMed PMID: 560099**.)
109. Zegers-Hochschild F, Adamson GD, Dyer S, Racowsky C, de Mouzon J, Sokol R et al (2017) The International Glossary on Infertility and Fertility Care, 2017. *Hum Reprod* 32(9):1786–1801. <https://doi.org/10.1093/humrep/dex234>
110. Definitions of infertility and recurrent pregnancy loss (2020) a committee opinion. *Fertil Steril* 113(3):533–535. <https://doi.org/10.1016/j.fertnstert.2019.11.025>
111. Bender Atik R, Christiansen OB, Elson J, Kolte AM, Lewis S, Middeldorp S et al (2018) ESHRE guideline: recurrent pregnancy loss. *Hum Reprod Open*. <https://doi.org/10.1093/hropen/hoy004>
112. Toth B, Bohlmann M, Hancke K, Kuon R, Nawroth F, von Otte S et al (2023) Recurrent miscarriage: diagnostic and therapeutic procedures. guideline of the DGGG, OEGGG and SGGG (S2k-Level, AWMF Registry No. 015/050, May 2022). *Geburtshilfe Frauenheilkd* 83(01):49–78. <https://doi.org/10.1055/a-1895-9940>
113. Kehl S, Dötsch J, Hecher K, Schlembach D, Schmitz D, Stepan H et al (2017) Intrauterine growth restriction. guideline of the German Society of Gynecology and Obstetrics (S2k-Level, AWMF

- Registry No. 015/080, October 2016). Geburtshilfe Frauenheilkd 77(11):1157–1173. <https://doi.org/10.1055/s-0043-118908>
114. Management of Stillbirth (2020) *Obstet Gynecol* 135(3):e110–e132. <https://doi.org/10.1097/AOG.0000000000003719>
 115. Berger R, Abele H, Bahlmann F, Bedei I, Doubek K, Felderhoff-Müser U et al (2019) Prevention and therapy of preterm birth. Guideline of the DGGG, OEGGG and SGGG (S2k level, AWMF registry number 015/025, February 2019) – Part 1 with recommendations on the epidemiology, etiology, prediction, primary and secondary prevention of preterm birth. *Geburtshilfe Frauenheilkd* 79(08):800–812. <https://doi.org/10.1055/a-0903-2671>
 116. The American College of Obstetricians and Gynecologists (ACOG). Updated Clinical Guidance for the Use of Progesterone Supplementation for the Prevention of Recurrent Preterm Birth. 2023 Apr.
 117. Conde-Agudelo A, Romero R, Nicolaides KH (2020) Cervical pessary to prevent preterm birth in asymptomatic high-risk women: a systematic review and meta-analysis. *Am J Obstet Gynecol*. <https://doi.org/10.1016/j.ajog.2019.12.266>. (Mosby Inc.;
 118. Nicolaides KH, Syngelaki A, Poon LC, Picciarelli G, Tul N, Zamprakou A et al (2016) A randomized trial of a cervical pessary to prevent preterm singleton birth. *N Engl J Med* 374(11):1044–1052. <https://doi.org/10.1056/nejmoa1511014>. (PubMed PMID: 26981934.)
 119. Van Dijk CE, Van Gils AL, Van Zijl MD, Koullali B, Van Der Weide MC, Van Den Akker ES et al (2024) Cervical pessary versus vaginal progesterone in women with a singleton pregnancy, a short cervix, and no history of spontaneous preterm birth at less than 34 weeks' gestation: open label, multicentre, randomised, controlled trial. *BMJ*. <https://doi.org/10.1136/bmj-2023-077033>. (PubMed PMID: 38471724.)
 120. Hoffman MK, Clifton RG, Biggio JR, Saade GR, Ugwu LG, Longo M et al (2023) Cervical pessary for prevention of preterm birth in individuals with a short cervix. *JAMA* 330(4):340. <https://doi.org/10.1001/jama.2023.10812>
 121. Biggio J (2024) SMFM Consult Series #70: management of short cervix in individuals without a history of spontaneous preterm birth. *Am J Obstet Gynecol* 231(2):B2-13. <https://doi.org/10.1016/j.ajog.2024.05.006>
 122. ACOG (2021) Prediction and prevention of spontaneous preterm birth. *Obstet Gynecol* 138(2):e65-90. <https://doi.org/10.1097/AOG.0000000000004479>
 123. Pfeifer SM, Attaran M, Goldstein J, Lindheim SR, Petrozza JC, Rackow BW et al (2021) ASRM Müllerian anomalies classification 2021. *Fertil Steril* 116(5):1238–1252. <https://doi.org/10.1016/j.fertnstert.2021.09.025>
 124. Coutinho LM, Assis WA, Spagnuolo-Souza A, Reis FM (2022) Uterine fibroids and pregnancy: how do they affect each other? *Reprod Sci* 29(8):2145–2151. <https://doi.org/10.1007/s43032-021-00656-6>
 125. Macer ML, Taylor HS (2012) Endometriosis and infertility. *Obstet Gynecol Clin North Am* 39(4):535–549. <https://doi.org/10.1016/j.ogc.2012.10.002>
 126. Loopik DL, van Drongelen J, Bekkers RLM, Voorham QJM, Melchers WJG, Massuger LFAG et al (2021) Cervical intraepithelial neoplasia and the risk of spontaneous preterm birth: a Dutch population-based cohort study with 45,259 pregnancy outcomes. *PLoS Med* 18(6):e1003665. <https://doi.org/10.1371/journal.pmed.1003665>. (Stock SJ, editor.)
 127. Bennett RL, Malleda NR, Byers PH, Steiner RD, Barr KM (2021) Genetic counseling and screening of consanguineous couples and their offspring practice resource: focused revision. *J Genet Couns* 30(5):1354–1357. <https://doi.org/10.1002/jgc4.1477>
 128. Hamamy H, Antonarakis SE, Cavalli-Sforza LL, Temtamy S, Romeo G, Ten Kate LP et al (2011) Consanguineous marriages, pearls and perils: Geneva International Consanguinity Workshop Report. *Genet Med* 13(9):841–847. <https://doi.org/10.1097/GIM.0b013e318217477f>
 129. Deutsche Gesellschaft für Gynäkologie und Geburtshilfe. S2k-Leitlinie Hypertensive Erkrankungen in der Schwangerschaft (HES) - Diagnostik und Therapie. AWMF online. 2024.
 130. Ryan K, Bain BJ, Worthington D, James J, Plews D, Mason A et al (2010) Significant haemoglobinopathies: guidelines for screening and diagnosis. *Br J Haematol* 149(1):35–49. <https://doi.org/10.1111/j.1365-2141.2009.08054.x>. (PubMed PMID: 20067565.)
 131. Langlois S, Ford JC, Chitayat D, Désilets VA, Farrell SA, Geraghty M et al (2008) Carrier screening for thalassemia and hemoglobinopathies in Canada. *J Obstet Gynaecol Can* 30(10):950–959. [https://doi.org/10.1016/S1701-2163\(16\)32975-9](https://doi.org/10.1016/S1701-2163(16)32975-9)
 132. American College of Obstetricians and Gynecologists. Practice Advisory [Internet]. 2022. Hemoglobinopathies in Pregnancy. Available from: <https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2022/08/hemoglobinopathies-in-pregnancy>
 133. Royal College of Obstetricians & Gynaecologists. Green-top Guideline No. 66: Management of Beta Thalassaemia in Pregnancy. Royal College of Obstetricians and Gynaecologists (RCOG). 2014. 66:1–17.
 134. Oteng-Ntim E, Shangaris P (2022) Evidence-based management of pregnant women with sickle cell disease in high-income countries. *Hematology* 2022(1):408–413. <https://doi.org/10.1182/hematology.2022000378>
 135. Bender M, Carlberg K. GeneReviews® [Internet] [Internet]. 2023. Sickle Cell Disease. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK1377/>
 136. Royal College of Obstetricians and Gynaecologists. Green-top Guideline No. 61: Management of Sickle Cell Disease in Pregnancy [Internet]. 2011. Available from: https://www.rcog.org.uk/media/nyinaztx/gtg_61.pdf
 137. Davis EP, Narayan AJ (2020) Pregnancy as a period of risk, adaptation, and resilience for mothers and infants. *Dev Psychopathol* 32(5):1625–1639. <https://doi.org/10.1017/S0954579420001121>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.