# Questions and Answers from British Nutrition Foundation's webinar series: Healthy Beginnings - Understanding why nutrition in pregnancy and weight management matter July 2025

**Some of the most popular questions submitted by delegates during this live webinar event are answered below by Dr Alyson Hill, Prof Javier Gonzales, Dr Kathryn Hart and Sara Stanner**

**Dr Alyson Hill, University of Ulster,**

**Could you comment on the risks associated with pregnancy in women who are living with overweight (Body Mass Index, BMI 25–30), compared to those with obesity? Additionally, how important is it to provide reassurance that the majority of women with overweight go on to have healthy pregnancies?**

Women with overweight or living with obesity are generally at increased risk of pregnancy complications including those such as gestational diabetes (GDM) and pre-eclampsia that pose a significant risk to both mothers and babies. However, a narrative review by Langley-Evans et al. highlights that the majority of women with a BMI> 25 kg/m$^2$ will go on to have normal, uncomplicated pregnancies. The major complications of pregnancy are relatively uncommon events and, whilst there are significant numbers of women affected each year and there are major concerns about their prevalence at population level, the risk faced by individual women living with obesity remains small (Langley Evans et al 2022).
With regards to pre-pregnancy overweight versus obesity, evidence would suggest that risks to maternal and fetal health increase with high pre-pregnancy BMI, high early pregnancy BMI and excessive gestational weight gain. It has been reported, for example, that the risk of GDM rises with increasing BMI (Relph et al. 2021) which suggests that as BMI increases, the risks increase. These findings reinforce the importance of early intervention and appropriate weight management both before and during pregnancy.

Langley-Evans SC, Pearce J, Ellis S. (2022) Overweight, obesity and excessive weight gain in pregnancy as risk factors for adverse pregnancy outcomes: A narrative review. J Hum Nutr Diet. 35(2):250-264
Relph, S., Guo, Y., Harvey, A.L.J. et al. (2021) Characteristics associated with uncomplicated pregnancies in women with obesity: a population-based cohort study. BMC Pregnancy Childbirth 21, 182

**Are there any recommendations for how to best evaluate the effectiveness of a service focused on weight management and healthy eating for perinatal women? How could we better document pregnancy weight?**

Currently, pregnant women in the UK are not routinely weighed during antenatal care and the updated NICE guidelines (NICE 2025) do not recommend weighing during pregnancy unless there are specific clinical concerns. As a result, it is difficult to implement regular weighing in clinical practice and there is limited evidence to guide how best evaluate gestation weight gain, given that weights are typically recorded infrequently and at different time points throughout pregnancy.
However, NICE does suggest that in high risk populations, such as women with a pre-pregnancy BMI >25 kg/m$^2$, guidance from the US Institute of Medicine/National Academy of Medicine (IOM/NAM**)** can be used (IOM 2009). In these cases, it may be beneficial to discuss the value of regular weight checks – not as a weight loss intervention but as a means to support healthy

pregnancy outcomes by tracking weight against recommended targets. I also suggest calculating weight gain per gestational week (rather than total gestational weight gain over the whole pregnancy) which can then consider weight gain in 2nd and 3rd trimesters against the IOM/NAMS guidance.
A small study (Nolan et al 2024) suggested that many mothers report receiving insufficient information around weight management during pregnancy and would welcome more guidance, particularly being informed if they were gaining too much or too little weight. However, many also reported that they did not believe a fixed 'target' weight would be helpful, suggesting that women may prefer personalised, supportive discussions over prescriptive goals.

IOM. Weight Gain During Pregnancy: Reexamining the Guidelines. Institute of Medicine (US) and National Research Council (US) and Committee to Reexamine IOM Pregnancy Weight Guidelines; 2009
NICE (2025) NICE guideline NG247 Maternal and child nutrition: nutrition and weight management in pregnancy, and nutrition in children up to 5 years
Nolan, R., Gallagher, A.M. & Hill, A.J. (2024). Women's experience of body weight management during and post-pregnancy: a mixed methods approach. BMC Pregnancy Childbirth 24, 823

**Is the increased risk of spina bifida directly associated with higher weight/adipose tissue as a stand-alone risk factor or, is it in addition to associated nutritional deficiencies of folate?**

NICE guidelines (2025) recommend that anyone with a BMI >25 kg/m$^2$ does not need to take a higher dose of folic acid unless other risk factors are present. The guidance advises:

*'Reassure anyone with a body mass index (BMI) of 25 kg/m2 or more who is planning to become pregnant or is in the first 12 weeks of pregnancy that they do not need to take more than 400 micrograms of folic acid a day, unless they have any of the factors listed in recommendation 1.1.5.'* [2025]

A list of the evidence has been made available by NICE which might be useful.
NG247 Maternal and child nutrition: Evidence review B 15/01/2025
The extent to which maternal obesity independently increases the risk of NTDs, above and beyond any risk mediated through folic acid deficiency, has been debated. A 2021 review (Koren & Kaplan, 202) provides a useful summary of the evidence to date. Whilst we do not yet have a definitive answer, there is certainly evidence that obesity may be associated with decreased placental folate transporter expression and activity in the first and second trimesters. This may help explain the increased risk of NTD associated with maternal obesity, particularly since other research has suggested that lower serum folate levels in women with obesity are not a result of lower folic acid supplementation.
More research is needed that includes direct measurement of red blood cell folate, alongside serum folate levels, and fully accounts for potential confounders. This will allow us to unpick the complex relationships between folate status, obesity and NTD risk.

Koren G, Kaplan YC (2021). Obesity, neural tube defects and folic acid—A complex relationship. *Clin. Exp. Obstet. Gynecol.* 48(2), 223–227
NICE guideline NG247 Evidence reviews underpinning recommendation 1.1.6 and 1.1.8 in the NICE guideline January 2025

**What evidence was used in setting the 2009 IOM gestational weight gain guidelines? Do you think they may need revising?**

The NICE 2025 guidelines state that there is a lack of evidence to define the optimal total weight change in pregnancy and therefore advise that women are not routinely weighed throughout pregnancy unless there is a clinical reason to do so. However, the NICE guidelines also stipulate

that if women choose to monitor their own weight, they should be referred to the National Academy of Medicine's (NAM) guidelines (previously known as the Institute of Medicine guidelines) (IOM, 2009), which provide evidence-based recommendations for gestational weight gain based on pre-pregnancy BMI.
IOM/NAM guidelines were established in 2009 over 15 years ago, for a US population, based on the prevention of both large for gestational age and small for gestational age babies and prevention of caesarean-section, and postpartum weight retention. Therefore, they may not be appropriate for all populations.
However, since routine weighing isn't standard practice within the UK and Ireland, there is a lack of robust UK data available to inform appropriate gestational weight gain (GWG) targets. It is important to note that the World Health Organisation (WHO) is currently in the process of developing global GWG guidelines aimed at reducing the risk of adverse maternal and infant outcomes. It is anticipated that these guidelines will help address the challenges and practical considerations identified in this review and may contribute to establishing a uniform gold standard for assessing gestational weight gain worldwide.

IOM. Weight Gain During Pregnancy: Reexamining the Guidelines. Institute of Medicine (US) and National Research Council (US) and Committee to Reexamine IOM Pregnancy Weight Guidelines; 2009

### Prof Javier Gonzales, University of Bath

**1 in 3 women with Gestational Diabetes go on to develop Type 2 Diabetes(T2DM) - do we know how this compares to non pregnant population? Is it pregnancy that increases the risk or does it just provide an early indication of the risk of developing this condition in the future?**

In the general UK population, it is estimated that around 1 in 10 people have type 2 diabetes, so women who have gestational diabetes do have a higher risk than normal for developing type 2 diabetes in the future. It is possible that gestational diabetes provides an early indication for future risk of developing type 2 diabetes and/or that pregnancy increases the risk of diabetes. It is difficult to understand this as there are many factors that influence diabetes risk. Some evidence shows that having more children is associated with increased risk of diabetes, but that may be due to factors associated with childrearing rather than childbearing (pregnancy). Furthermore, other factors are associated with lower risk of future diabetes, such as breastfeeding for more than 1 month.

**Are there any implications to the fetus and the first 1000 days from the paternal nutritional status and BMI?**

There is some evidence that paternal health status is linked to the health of offspring. However, the limitations to this evidence are that the strongest causal evidence is from rodent studies, and the evidence in humans is observational. Therefore, whether there is a cause-and-effect relationship between human paternal nutritional status/BMI, and offspring health is currently unclear. If this relationship is indeed causal, then there are plausible mechanisms that could explain this, which include epigenetic changes to sperm that then influence offspring health.

**A number of the COMA recommendations (1991) are quite dated. EFSA suggests higher intakes for certain micronutrients during pregnancy (as well as in some other countries) should we consider adopting EFSA's guidance in a UK context?**

There is value to at least consider the EFSA guidance in a UK context. Whether these are then implemented will need to be considered in light of the evidence for potential benefits and risks within the UK context and how this may differ from other countries.

**Are some of the poor outcomes linked to higher weights linked to poor quality diets/poorer nutritional status rather than weight alone?**

It is highly likely that a large part of the relationship between weight status and poor outcomes is explained by factors other than weight alone. In observational studies, it is extremely difficult to isolate the true effect of one factor (such as body weight) from other factors (such as poor quality diets and nutritional status). Whilst randomised experiments can provide the least biased estimates of cause and effect, this is not possible to study with body weight. Therefore, other methods such as genetic epidemiology have been used to better understand cause-and-effect of weight status and health outcomes. These studies have found some evidence that body weight is causally related to health outcomes of offspring. In summary, the relationship between body weight and offspring health is probably partly related to body weight itself and also partly related to other factors including diet and lifestyle.

**Dr Kathryn Hart, University of Surrey.**

**Are there any risks associated with over-supplementation of vitamins/nutrients recommended in pregnancy? What amounts would represent risks of toxicity for these for folic acid, iodine, iron, vitamin D and DHA/EPA?**

Yes – it is important to remember that while ensuring adequate nutrient intake is essential during pre-conception and pregnancy, it's equally important to be aware of the risks associated with excessive intakes; so more is not always better. This is why it is important for people wishing to conceive or already pregnant to review their supplements and diet and ensure they are not 'doubling up' on some nutrients or having excessive doses. The Safe Upper Levels for Vitamins and Minerals report (FSA 2003) is a useful source of information concerning tolerable upper limits for nutrients and their underpinning evidence. For example:

**Folic acid** - is generally considered safe. However, adverse effects may occur in specific groups such as those receiving medications that interact with folic acid metabolism and indirectly via masking B12 deficiency. There is insufficient data to establish a Safe Upper Level for folic acid but it appears that the masking of B12 deficiency is unlikely to occur at intakes up to and including 1mg per day. Intakes of 5mg or more per day may mask B12 deficiency in vulnerable individuals but, in terms of pregnancy, those people at risk of NTDs and therefore prescribed 5mg/d folic acid will gain greater benefit from taking this dose for the first 3 months of pregnancy than not.

**Vitamin D** – the Expert group on Vitamins and Minerals did not establish a safe upper limit for longer term Vitamin D intake although the NHS advises an upper limit for supplements of 100µg (4000 IU) per day, which is 10 times the recommended intake of 10µg/day for all adults, including pregnant women.

**Iodine** – iodine is real example of a 'U shaped curve', where too much can be as detrimental as too little. However, in terms of quantifying excessive intake, the WHO states that the safe upper limit in pregnancy is uncertain and the fetal thyroid is vulnerable to excess iodine. They propose, in line with EFSA, a tolerable upper limit of 500 µg/d in pregnancy. There may be a particular issue in individuals who have had prolonged deficiency and then rapidly increase intake, even within the normal dietary range (e.g. start taking a relatively-low dose supplement) and so people are advised to consult their GP before a supplement is started if deficiency is suspected or proven

(BDA 2022). It is because of concerns over excessive intakes that pregnant women are advised not to consume kelp or brown seaweed or supplements made from these as their iodine contents can be variable and high.

**Iron** – again, a safe upper limit for iron could not be established by the Expert group due to a lack of representative data. Side effects of excess iron in iron replete populations tend to be limited to gastrointestinal effects as a result of high supplemental intakes. Iron overload due to diet is very unusual. For the general population a guidance value of 17mg/d from supplements is not expected to be associated with adverse effects but this is not pregnancy specific. Pregnant women prescribed iron to correct a deficiency should continue to follow the advice of their medical professionals (prescribed doses are likely to be much higher than the 17mg/d mentioned previously but remain safe to consume as directed) but it is important that all supplemental sources of iron are declared, i.e. prescribed iron AND any over the counter iron containing supplements, to avoid excessive levels.

DHA/ EPA – whilst DHA is generally considered safe in recommended doses, excessive supplementation may have effects on bleeding time and potentially fetal growth and development (although the latter is based on an animal study, Church et al. 2010). EFSA suggests an upper limit of 5 g/day of EPA and DHA is safe (including for pregnant and lactating women) (EFSA 2012)., although intervention studies in pregnancy propose a lower cut off of 2.7 g/day of EPA and DHA to define a safe and tolerable intake (von Schacky 2020)

BDA (2022) Iodine Food Factsheet

Church MW, Jen KL, Anumba JI, Jackson DA, Adams BR, Hotra JW (2010). Excess omega-3 fatty acid consumption by mothers during pregnancy and lactation caused shorter life span and abnormal ABRs in old adult offspring. Neurotoxicol Teratol. 32(2):171-81

EFSA (2012) Scientific Opinion on the Tolerable Upper Intake Level of eicosapentaenoicacid (EPA), docosahexaenoic acid (DHA) and docosapentaenoic acid(DPA) EFSA Journal 10(7):2815

FSA (Food Standards Agency), 2003. Safe upper levels for vitamins and minerals. Report of Expert Group on Vitamins and Minerals.

von Schacky C. Omega-3 Fatty Acids in Pregnancy-The Case for a Target Omega-3 Index. Nutrients. 2020 Mar 26;12(4):898.

**What time frame do we mean when we are we talking about pre-pregnancy/pre-conception? Would be easier for somebody who is thinking about pregnancy to have a more definitive timeline e.g. know 6 months before trying to conceive they should be concentrating on their folic acid, iodine and vitamin D intakes etc.**

Although we do not have a definite timeframe, as it will be affected by baseline nutritional status, dietary quality and access to supplements plus any conditions or medications that affect the absorption or metabolism of nutrients, it is generally assumed that diet and lifestyle changes should begin a minimum of 3 months prior to conception to cover the period of egg development prior to ovulation. This is not to say that longer term health behaviours and diet do not affect male or female fertility or reproductive outcomes but certainly 3 months gives sufficient time for supplementation and behaviour changes (such as reducing caffeine and cutting out alcohol) to have an impact.

**What would you suggest for pregnant women on a plant based diet to consume if they are not having oily fish or any fish in their diet?**

There are a number of plant sources of long chain fatty acids such as seeds (flax, chia, hemp), vegetable oils (rapeseed and linseed) and walnuts, although it should be noted that these foods provide alpha-linolenic acid (ALA). The conversion of this to EPA and DHA can be variable and limited. Other options for people not consuming fish to meet their DHA needs, include omega-3 enriched eggs and omega-3 fortified foods including spreads and plant-based dairy products.

However, the absolute amounts provided by these foods can be very low. The third option is supplements. These can be fish oil supplements of DHA for people who consume animal products but do not like eating fish or algal-based DHA supplements for vegans. Fish oil supplements should be omega 3 alone NOT fish liver oil as the latter can contain too much vitamin A and this can harm baby's development. It is important to check the labels as the absolute amount of EPA/ DHA can vary substantially between products – an extra 100-200mg/day is recommended on top of the usual adult recommendation of 250mg/d EPA / DHA.

**Is there any evidence to suggest a combined D3 and K2 vitamin supplement in pregnant women is more effective than vitamin D3 alone?**

There are few, if any, studies that investigate this in pregnant populations specifically – what research there is has focused on placental transfer of Vitamin K. In non-pregnant populations, a synergistic relationship between vitamin K and vitamin D has been shown. Adequate vitamin K is known to be important in the carboxylation of matrix Gla-protein and osteocalcin (two proteins involved in regulating calcium deposition and promoting the transfer to calcium from the blood to the bone), as well as influencing bone metabolism through other mechanisms.
Aaseth et al., in their recent review (Aaseth et al. 2024) suggest that there is an additive benefit for bone health of having adequate vitamin K status alongside vitamin D but note that further research to elucidate the mechanisms underpinning this interaction is needed. One recent study did investigate the relationship between maternal vitamin K status and neonatal bone metabolism, finding maternal vitamin K deficiency in 38.6% of women and suggesting that maternal vitamin K2 and 25-hydroxyvitamin D (25-OHD) levels, and cord blood calcium levels, were all independent risk factors for neonatal 25-OHD insufficiency. (Liu et al. 2025). Whilst the authors state that this supports maternal K2 supplementation, we do not yet have the evidence to underpin specific intake recommendations during pregnancy (whether from diet or supplementation) and to our knowledge there are no K2 supplementation studies in this population. A 2023 scoping review as part of the update of the Nordic Nutrition Recommendations agreed with earlier EFSA guidelines that there was still insufficient data to make recommendations for vitamin K during pregnancy (Lyytinen & Linneberg, 2023).

Aaseth JO, Finnes TE, Askim M, Alexander J. (2024) The Importance of Vitamin K and the Combination of Vitamins K and D for Calcium Metabolism and Bone Health: A Review. Nutrients. 25;16(15):2420.
Liu, X., Wang, S., Chen, H., Qian, N., Wu, L., Liu, Y., Hou, Z., Bai, Y. and Jiang, H. (2025), Association Between Maternal Vitamin K2 Levels in Late Pregnancy and Newborn Bone Metabolism. Food Sci Nutr, 13: e70363.
Lyytinen AT, Linneberg A. (2023) Vitamin K - a scoping review for Nordic Nutrition Recommendations 2023. Food Nutr Res. 23;67

**Sara Stanner, Science Director, British Nutrition Foundation**

**Given that nausea and vomiting can affect up to 90% of pregnancies and can substantially alter eating patterns, how do you integrate this dimension into your nutritional recommendations or research?**

Nausea and vomiting in pregnancy (NVP), particularly in the first trimester, can significantly impact dietary intake and nutrient adequacy. Nutritional recommendations must be flexible and symptom-aware, focusing on what is tolerable rather than ideal. This includes suggesting small, frequent meals; bland or cold foods and using fortified products or supplements to help fill nutritional gaps when intake is compromised. In research, it's important to consider how NVP affects reported intake and dietary patterns. As we discuss in our Briefing Paper (Hart et al. 2025), overlooking the impact of NVP can lead to misinterpretation of dietary adequacy in pregnancy

studies. Integrating symptom assessment into both practice and research ensures more accurate and realistic nutritional support for pregnant individuals.

Hart KH, Hill AJ, Gonzalez JT, de la Hunty A, Gallagher AM, Stanner SA. Diet in Pregnancy: A Review of Current Challenges and Recommendations. A British Nutrition Foundation Briefing Paper. Nutr Bull. 2025 Jul 6. doi: 10.1111/nbu.70016.

## With the high prevalence of low iron intake indicated in NDNS, what can be done to increase awareness of the importance of iron rich foods in these groups?

There's a clear need to increase awareness of the importance of iron-rich foods, particularly among women of childbearing age. The NDNS data shows nearly half of girls aged 11–18 and one in four women have iron intakes below the Lower Reference Nutrient Intake (LRNI), putting them at risk of iron deficiency. For those planning a pregnancy, it's especially important to understand the need for iron, including sources of haem iron (such as red meat) and non-haem iron (from foods such as pulses (beans, peas and lentils), tofu, nuts and seeds, leafy greens and fortified breakfast cereals). Certain groups, like teenagers and those following vegetarian or vegan diets, are more vulnerable, so increasing awareness in these populations is vital. As more people shift towards plant-based eating, we need to promote dietary variety and ensure people know how to meet their iron needs through a broader range of foods. This includes simple, practical advice, such as pairing meals with vitamin C-rich foods (like fruit or peppers) to support iron absorption, and being mindful that drinks like tea and coffee can reduce absorption when consumed with meals containing plant-based sources of iron, including iron-fortified foods.
To really make a difference, especially among at-risk groups, this information needs to be part of everyday conversations - shared widely through schools, social media, community initiatives and routine healthcare appointments, including during pregnancy.

## What impact does consumption of UPF (Ultra Processed Foods) have on pregnancy outcome?

We know that the quality of a mother's diet can affect her baby's health in both early and later life. Limited but growing observational cohort evidence suggests that poor diet quality, particularly diets high in ultra-processed foods (UPFs), during pregnancy is associated with a range of adverse maternal, perinatal and neonatal outcomes. These include gestational diabetes mellitus (GDM), excessive gestational weight gain (GWG), pre-eclampsia, low birth weight, large-for-gestational-age infants and increased risk of child adiposity. A systematic review (without meta-analysis, de Oliveira et al 2022) examining UPF intake, defined by the NOVA classification system, highlighted associations between high maternal UPF consumption and third-trimester GWG (reported in 3 prospective cohort studies), as well as increased child adiposity (reported in 2 studies). A separate systematic review with meta-analysis (Paula et al 2022), incorporating data from 10 prospective cohort studies (n = 42,477), used a broader definition of "UPF-rich diets", characterised by high intakes of fast foods, processed meats, soft drinks, confectionery and sweetened beverages, as a proxy for UPF exposure. This analysis found that higher maternal UPF consumption was associated with increased odds of GDM (OR 1.48; 95% CI 1.17–1.87). Another meta-analysis of 4 cohort studies (n = 112,307) reported increased odds of pre-eclampsia with UPF-rich dietary patterns (OR 1.28; 95% CI 1.15–1.42). However, evidence remains limited. A review conducted as part of the 2025 Dietary Guidelines for Americans process (Stanford et al. 2024) found insufficient evidence to draw conclusions about the relationship between UPF consumption during pregnancy and GWG, highlighting the need for further research.
The observed associations between high UPF intake and adverse pregnancy outcomes are concerning, but current evidence does not confirm a *causal* link between food processing *per*

*se* and health risks. Disentangling the effects of UPF consumption from broader unhealthy dietary patterns and related lifestyle factors remains a challenge. Potential confounders, including socioeconomic status, pre-pregnancy BMI and overall nutritional quality, may partly explain the observed associations. Mechanistic understanding of how UPFs might influence maternal and child health is also limited. Despite these uncertainties, there is strong evidence that energy-dense, nutrient-poor diets - especially those high in saturated fat, sugars, and salt (HFSS foods) - are detrimental to health. Conversely, dietary patterns rich in fibre, vitamins, and minerals, and based on whole grains, fruits and vegetables, legumes, fish, nuts, seeds, and lower-fat dairy products, are consistently associated with better health outcomes. These patterns are reflected in national and international dietary guidelines.

de Oliveira PG, de Sousa JM, Assunção DGF, de Araujo EKS, Bezerra DS, Dametto J, et al (2022) Impacts of Consumption of Ultra-Processed Foods on the Maternal Child Health: A Systematic Review. Front Nutr. 9:821657.
Paula WO, Patriota ESO, Goncalves VSS and Pizato N (2022) Maternal Consumption of Ultra-Processed Foods-Rich Diet and Perinatal Outcomes: A Systematic Review and Meta-Analysis. Nutrients. 14(15):08.
Stanford FC, Taylor C, Hoelscher DM, Anderson CAM, Booth S, Deierlein A et al. (2024). Dietary Patterns with Ultra-Processed Foods and Growth, Body Composition, and Risk of Obesity: A Systematic Review. U.S. Department of Agriculture, Food and Nutrition Service, Center for Nutrition Policy and Promotion, Nutrition Evidence Systematic Review.