

:Selected References

- Abe S, et al. 2016. Supplementation with multiple micronutrients for breastfeeding women for improving outcomes for the mother and baby. *Cochrane database of systematic reviews*; 2
- Adams JB, et al. 2021. Evidence-Based Recommendations for an Optimal Prenatal Supplement for Women in the U.S., Part Two: Minerals. *Nutrients*; 13(6):1849
- Aničić R, et al. 2025. Levels of Cu, Zn, and Se in Maternal and Cord Blood in Normal and Pathological Pregnancies: A Narrative Review. *International Journal of Molecular Sciences*; 27.1: 161
- Apgar J. 1985. Zinc and reproduction. *Ann Rev Nutr*; 5:43-68
- Aumeistere L, et al. 2018. Zinc Content in Breast Milk and Its Association with Maternal Diet. *Nutrients*. 10(10):1438
- Berger P. et al. 2025. Associations of maternal prenatal zinc consumption with infant brain tissue organization and neurodevelopmental outcomes. *Nutrients*; 17.2: 303
- Bower C, et al. 1992. Maternal hair zinc and neural tube defects: no evidence of an association from a case-control study in Western Australia. *Asia Pac J Public Health*; 6(3):156-158
- Bzikowska-Jura A, et al. 2021. Investigation of iron and zinc concentrations in human milk in correlation to maternal factors: an observational pilot study in Poland. *Nutrients*; 13(2): 303
- Ceballos-Rasgado M. et al. 2022. Adverse effects of excessive zinc intake in infants and children aged 0–3 years: a systematic review and meta-analysis. *Advances in Nutrition*; 13.6: 2488-2519
- Carducci B, et al. 2021. Zinc supplementation for improving pregnancy and infant outcome. *Cochrane Database Syst Rev*; 3(3):CD000230
- Carrillo-Ponce M, et al. 2004. Serum lead, cadmium, and zinc levels in newborns with neural tube defects from a polluted zone in Mexico. *Reproductive Toxicology (Elmsford, NY)*, 19(2): 149-154
- Casey CE, et al. 1989. Studies in human lactation: secretion of zinc, copper, and manganese in human milk. *Am J Clin Nutr*; 49:773-785
- Caulfield LE, et al. 1999. Maternal zinc supplementation does not affect size at birth or pregnancy duration in Peru. *J Nutr*, 129:1563-1568
- Cheng Q, Gao L. 2022. Maternal serum zinc concentration and neural tube defects in offspring: a meta-analysis. *J Matern Fetal Neonatal Med*. 35(24):4644-4652
- Colagar AH, et al. 2009. Zinc levels in seminal plasma are associated with sperm quality in fertile and infertile men. *Nutr Res*. 29(2):82-8
- Costa MM, et al. 2018. Pregnancy after bariatric surgery: Maternal and fetal outcomes of 39 pregnancies and a literature review. *J Obstet Gynaecol Res*; 44(4):681-690
- Diao S. et al. 2025. The Efficacy of Zinc Supplementation Alone or in Combination for Improving Pregnancy and Infant Outcomes: A Systematic Review and Meta-Analysis. *Journal of Evidence-Based Medicine*; 18.3: e70061.
- Djurović D, et al. 2017. Zinc concentrations in human milk and infant serum during the first six months of lactation. *Journal of Trace Elements in Medicine and Biology*; 41: 75-8
- Garner TB, et al. 2021. Role of zinc in female reproduction. *Biol Reprod* ;104(5):976-994
- Golan Y, et al. 2017. The role of the zinc transporter SLC30A2/ZnT2 in transient neonatal zinc deficiency. *Metallomics*; 9:1352-66
- Goldenberg R, et al. 1995. The effect of zinc supplementation on pregnancy outcome. *JAMA*; (274):463-468
- Hamadani JD, et al. 2002. Zinc supplementation during pregnancy and effects on mental development and behavior of infants: a follow-up study. *Lancet*, 360:290-294
- Hambidge K, et al. 1983. Zinc nutritional status during pregnancy: A longitudinal study. *Am. J. Clin. Nutr*; (37):429-442

- Hambidge M, et al. 1993. Neural tube defects and serum zinc. *Br J Obstet Gynaecol*, 100:746-749
- He L, et al. 2016. Comparison of serum zinc, calcium, and magnesium concentrations in women with pregnancy-induced hypertension and healthy pregnant women: A meta-analysis. *Hypertens. Pregnancy*; (35):202-209
- Hunt I, et al. 1983. Zinc supplementation during pregnancy: Zinc concentration of serum and hair from low-income women of Mexican descent. *Am. J. Clin. Nutr*; (37):572-582
- Hunt I, et al. 1985. Zinc supplementation during pregnancy in low-income teenagers of Mexican descent: Effects on selected blood constituents and on progress and outcome of pregnancy. *Am. J. Clin. Nutr*; (42):815-828
- Institute of Medicine US Panel on Micronutrients. 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, DC: National Academies Press. <https://www.ncbi.nlm.nih.gov/books/NBK222317/> [Accessed 07/2023]
- Jameson S. 1993. Zinc status in pregnancy: the effect of zinc therapy on perinatal mortality, prematurity, and placental ablation. *Ann N Y Acad Sci*; 678:178-92
- Karim S, et al. 2023. Frequency of low birth weight and its relationship with maternal serum zinc: a cross-sectional study. *Annals of Medicine and Surgery*, 85(6):2469-2473
- Kienast A, et al. 2007. Zinc-deficiency dermatitis in breast-fed infants. *Eur J Pediatr*; 166:189-94
- Krebs NF et al. 1996. Zinc homeostasis in breast-fed infants. *Pediatr Res*, 39:661-665
- Lazebnik N, et al. 1988. Zinc status, pregnancy complications, and labor abnormalities. *Am. J. Obstet. Gynecol*; (158):161-166
- Mahomed K, et al. 1989. Zinc supplementation during pregnancy: a double blind randomized controlled trial. *BMJ (Clinical research ed.)*, 299(6703):826-830
- Ma Y, et al. 2015. The Relationship between Serum Zinc Level and Preeclampsia: A Meta-Analysis. *Nutrients*; (7):7806-7820
- McMichael AJ, et al. 1994. Neural tube defects and maternal serum zinc and copper concentrations in mid-pregnancy: a case-control study. *The Medical Journal of Australia*, 161 (8):478-482
- Mori R, et al. 2012. Zinc supplementation for improving pregnancy and infant outcome. *The Cochrane Database of Systematic Reviews*, 7:CD000230
- Moser-Veillon PB, & Reynolds RD. 1990. A longitudinal study of pyridoxine and zinc supplementation of lactating women. *Am J Clin Nutr*; 52:135-41
- Munger RG, et al. 2009. Plasma zinc concentrations of mothers and the risk of oral clefts in their children in Utah. *Birth Defects Res A Clin Mol Teratol*; 85(2):151-5
- National Institutes of Health (NIH) Office of Dietary Supplements. Nutrient Recommendations and Databases. <https://ods.od.nih.gov/HealthInformation/nutrientrecommendations.aspx> [Accessed 09/2023]
- National Institutes of Health (NIH) Office of Dietary Supplements. 2022. Zinc Fact Sheet. Available at: <https://ods.od.nih.gov/factsheets/zinc-healthprofessional/> and <https://ods.od.nih.gov/factsheets/Zinc-Consumer/> [Accessed 07/2023]
- Nurlianto Y, et al. 2024. Maternal Serum Zinc Levels and Their Relationship with Preeclampsia Risk: A Comprehensive Systematic Review. *The Medical Journal of Obstetrics and Gynaecology*; 1.1: 1-14
- Özgan Ç, et al. 2018. A multilateral investigation of the effects of zinc level on pregnancy. *J Clin Lab Anal*; 32(5):e22398
- Ren M, et al. 2023. Association between female circulating heavy metal concentration and abortion: a systematic review and meta-analysis. *Frontiers in Endocrinology*; 14: 1216507
- Parkinson C, et al. 1982. Amniotic fluid zinc and copper and neural tube defects. *J Obstet Gynecol*, 1:207
- Saaka M, et al. 2009. Effect of prenatal zinc supplementation on birthweight. *J Health Popul Nutr*, 27(5):619-631
- Schisterman EF, et al. 2020. Effect of folic acid and zinc supplementation in men on semen quality and live birth among couples undergoing infertility treatment: a randomized clinical trial. *JAMA*, 323(1):35-48
- Sun J, et al. 2017. Heavy Metal Level in Human Semen with Different Fertility: a Meta-Analysis. *Biological Trace Element Research*, 176(1):27-36

- Takiara H, et al. 1987. Zinc sulfate therapy for infertile male with or without varicocele. Urology, 29:638-641
- Tikkiwal M et al. 1987. Effect of zinc administration on seminal zinc and fertility of oligospermic males. Ind J Physiol Pharmacol, 31:30-34
- Tousizadeh S, et al 2024. Comparison of zinc levels in mothers with and without abortion: A systematic review and meta-analysis. Heliyon; 10.9
- Türk S, et al. 2014. Male infertility: decreased levels of selenium, zinc and antioxidants. J Trace Elem Med Biol. 28(2):179-185
- USDA. 2018. National Nutrient Database for Standard Reference Legacy, Nutrients: Zinc, [Zn(mg)]. <https://www.nal.usda.gov/sites/default/files/page-files/zinc.pdf> [Accessed 07/2023]
- Velie EM, et al. 1999. Maternal Supplemental and Dietary Zinc Intake and the Occurrence of Neural Tube Defects in California. American Journal of Epidemiology, 150(6):605-616
- Zhao J, et al. 2016. Zinc levels in seminal plasma and their correlation with male infertility: A systematic review and meta-analysis. Sci Rep. 6:22386
- Zimmerman AW. 1984. Hyperzincemia in anencephaly and spina bifida: a clue to the pathogenesis of neural tube defects? Neurology, 34(4):443-450

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Zinc

:Selected References

- Klebanoff MA, et al., 2023. Antibiotic treatment of bacterial vaginosis to prevent preterm delivery: Systematic review and individual participant data meta-analysis. Paediatr Perinat Epidemiol, 37(3):239-251
- Lamont RF, et al. 2003. The efficacy of vaginal clindamycin for the treatment of abnormal genital tract flora in pregnancy. Infect Dis Obstet Gynecol, 11(4):181-189
- Mackeen AD, et al. 2015. Antibiotic regimens for postpartum endometritis. Cochrane Database Syst Rev,

- .20(2):CD001067
- Mann CF. 1980. Clindamycin and breast-feeding. *Pediatrics*, 66:1030-1031
 - McCormack WM, et al. 1987. Effect on birth weight of erythromycin treatment of pregnant women. *Obstet Gynecol*, 69:202-207
 - McGready R, et al. 2001. Randomized comparison of quinine-clindamycin versus artesunate in treatment of falciparum malaria in pregnancy. *Trans R Soc Trop Med Hyg*, 95:651-656
 - Mitrano JA, et al. 2009. Excretion of antimicrobials used to treat methicillin-resistant *Staphylococcus aureus* infections during lactation: safety in breastfeeding infants. *Pharmacotherapy*, 29(9):1103-1109
 - Muanda F, et al. 2017. Use of antibiotics during pregnancy and the risk of major congenital malformations: a population based cohort study. *Br J Clin Pharmacol*, 83:2557-2571
 - Nahum GG, et al. 2006. Antibiotic use in pregnancy and lactation: what is and is not known about teratogenic and toxic risks. *Obstet Gynecol*, 107(5):1120-1138
 - Ou MC, et al. 2001. Antibiotic treatment for threatened abortion during the early first trimester in women with previous spontaneous abortion. *Acta Obstet Gynecol Scand*, 80(8):753-756
 - Reboucas KF, et al. 2019. Treatment of bacterial vaginosis before 28 weeks of pregnancy to reduce the incidence of preterm labor. *Int J Gynecol Obstet*, 146(3):271-276
 - Smith JA, et al. 1975. Clindamycin in human breast milk. *Can Med Assoc J*, 112:806
 - Steen B, Rane A. 1982. Clindamycin passage into human milk. *Br J Clin Pharmacol*, 13:661-664
 - Subtil D, et al. 2018. Early clindamycin for bacterial vaginosis in pregnancy (PREMEVA): a multicentre, double-blind, randomised controlled trial. *Lancet*, 392(10160):2171-2179
 - Ugwumadu A, et al. 2003. Effect of early oral clindamycin on late miscarriage and preterm delivery in asymptomatic women with abnormal vaginal flora and bacterial vaginosis: a randomised controlled trial. *Lancet*, 361:983-988
 - Weinstein AJ et al. 1976. Placental transfer of clindamycin and gentamicin in term pregnancy. *Am J Obstet Gynecol*, 124:688-691

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:Selected References

- Clowse M, et al. 2016. Pregnancy outcomes in the tofacitinib safety databases for rheumatoid arthritis and psoriasis. *Drug Saf*; 39(8):755-762
- Fernández-Sánchez M, et al. 2021. Fetal exposure to tofacitinib during the first trimester: A healthy newborn case report. *Birth Defects Res*; 113(17):1275-1279
- Julsgaard M, et al. 2023. Tofacitinib concentrations in plasma and breastmilk of a lactating woman with ulcerative colitis. *Lancet Gastroenterol Hepatol*; 8:695-697
- Mahadevan U, et al. 2018. Outcomes of pregnancies with maternal/paternal exposure in the tofacitinib safety databases for ulcerative colitis. *Inflammatory Bowel Diseases* 24(12):2494-2500
- Mahadevan U, et al. 2019. Inflammatory bowel disease in pregnancy clinical care pathway: A report from the American Gastroenterological Association IBD Parenthood Project Working Group. *Gastroenterology* 156(5):1508-1524
- Mahadevan U, et al. 2025. Pregnancy Outcomes After Maternal or Paternal Exposure to Tofacitinib Across Clinical Programs. *Am J Gastroenterol*. Epub ahead of print. PMID: 4100213
- Merren A, et al. 2015. THU0173 Pregnancy outcomes in the tofacitinib RA study database through April 2014. *Annals of the Rheumatic Diseases* 74:256-257
- Mitrova K, et al. 2025. Assessing pregnancy and infant outcomes, cord blood and breast milk concentrations. *Clin Gastroenterol Hepatol*; 23:163-5.e3
- Picardo S, Seow CH. 2019. A pharmacological approach to managing inflammatory bowel disease during conception, pregnancy and breastfeeding: Biologic and oral small molecule therapy. *Drugs* 79(10):1053-1063
- Rüegg L, et al. 2025. EULAR recommendations for use of antirheumatic drugs in reproduction, pregnancy, and lactation: 2024 update. *Ann Rheum Dis* 84:910-926
- Selinger C, et al. 2024. Appropriateness of small molecule agents for patients with IBD of childbearing age - a RAND/UCLA appropriateness panel. *Therap Adv Gastroenterol* 2024;17:17562848241299737
- U.S. Pharmaceuticals. Xeljanz/Xeljanz XR Prescribing Information. 2025. Available online at: <https://dailymed.nlm.nih.gov/dailymed/getFile.cfm?setid=68e3d6b2-7838-4d2d-a417-09d919b43e13&type=.pdf> Accessed 27 January 2026

Zinc

:Selected References

- Alves FRC, et al. 2024. Maternal and long-term offspring outcomes of obesity during pregnancy. Arch Gynecol Obstet. 309(6):2315-2321.
- American College of Obstetricians and Gynecologists. 2021. ACOG Practice Bulletin Number 230: Obesity in Pregnancy. Obstet Gynecol. 137(6):e128-e144
- American College of Obstetricians and Gynecologists. 2013. ACOG Committee opinion no. 548: Weight Gain During Pregnancy. Obstet Gynecol. 121(1):210-212
- Amiri M, et al. 2020. Potential adverse effects of female and male obesity on fertility: A narrative review. Int J Endocrinol Metab. 18(3): e101776
- Andersen CH, et al. 2018. Maternal body mass index before pregnancy as a risk factor for ADHD and autism in children. Eur Child Adolesc Psychiatry. 27: 139-148. Cai GJ, et al. 2014
- Association between maternal body mass index and congenital heart defects in offspring: a systematic review. Am J Obstet Gynecol. 211(2):91-117
- Catalano PM, et al. 2017. Obesity and pregnancy: mechanisms of short term and long term adverse consequences for mother and child. BMJ. 356:j1
- Dong M, et al. 2013. Maternal obesity, lipotoxicity and cardiovascular diseases in offspring. J Mol Cell Cardiol. 55:111-116
- Gilboa SM, et al. 2010. Association between prepregnancy body mass index and congenital heart defects. Am J Obstet Gynecol. 202(1):51:e1-e10
- Giouleka S, et al. 2023. Obesity in pregnancy: A comprehensive review of influential guidelines. Obstet Gynecol Surv. 78(1):50-68
- Gustafson D, et al. 2024. Treatment of obesity before, during, and after pregnancy: Time for obstetricians to get involved. Obstet Gynecol Surv. 79(11):665-672
- Huang I, et al. 2014. Maternal prepregnancy obesity and child neurodevelopment in the Collaborative Perinatal Project. Int J Epidemiol. 43(3):783-792
- Jarlenski M, et al. 2014. Association between support from a health professional and breastfeeding knowledge and practices among obese women: Evidence from the Infant Practices Study II. Womens Health Issues. 24(6):641-648
- Johnson J, et al. 2013. Pregnancy outcomes with weight gain above or below the 2009 Institute of Medicine guidelines. Obstet Gynecol. 121(5):969-975
- Lin J, et al. 2022. Effects of Paternal Obesity on Fetal Development and Pregnancy Complications: A Prospective Clinical Cohort Study. Front Endocrinol (Lausanne). 13:826665
- Lyons S, et al. 2019. Learning from women with a body mass index (Bmi) ≥ 30 kg/m² who have breastfed and/or are breastfeeding: a qualitative interview study. Matern Child Health J. 23(5): 648-656
- Matias SL, et al. 2021. Maternal prepregnancy weight and gestational weight gain in association with autism

- and developmental disorders in offspring. Obesity (Silver Spring). 29(9):1554-1564
- McLean S, et al. 2023. Obesity and miscarriage. Semin Reprod Med. 41(3-04):80-86
- Mohammadbeigi A, et al. 2013. Fetal macrosomia: risk factors, maternal, and perinatal outcome. Ann Med Health Sci Res. 3(4):546-550
- Nohr EA, et al. 2021. Cause-specific stillbirth and neonatal death according to prepregnancy obesity and early gestational weight gain: a study in the Danish National Birth Cohort. Nutrients. 13(5):1676
- Persson M, et al. 2017. Risk of major congenital malformations in relation to maternal overweight and obesity severity: cohort study of 1.2 million singletons. BMJ 357:j2563
- Poniedziałek-Czajkowska E, et al. 2023. Preeclampsia and obesity-The preventive role of exercise. Int J Environ Res Public Health. 20(2):1267
- Sibai BM, et al. 1997. Risk factors associated with preeclampsia in healthy nulliparous women. The Calcium for Preeclampsia Prevention (CPEP) Study Group. Am J Obstet Gynecol. 177(5):1003-1010
- Silvestris E, et al. 2018. Obesity as disruptor of the female fertility. Reprod Biol Endocrinol. 16(1):22
- Schmidt M, et al. 2024. The German guideline "Obesity in pregnancy": comparison with the international approach. Arch Gynecol Obstet. 309(5):1699-1705
- Stothard KJ, et al. 2009. Maternal overweight and obesity and the risk of congenital anomalies: a systematic review and meta-analysis. JAMA 301(6):636-650
- Stubert J, et al. 2018. The risks associated with obesity in pregnancy. Dtsch Arztebl Int. 115(16):276-283
- Tanda L, et al. 2013. The impact of prepregnancy obesity on children's cognitive test scores. Matern Child Health J. 17(2):222-229
- Vats H, et al. 2021. Impact of maternal pre-pregnancy body mass index on maternal, fetal and neonatal adverse outcomes in the worldwide populations: a systematic review and meta-analysis. Obes Res Clin Pract. 15(6):536-545. Wang et al. 2021. Does obesity based on body mass index affect semen quality? -A meta-analysis and systematic review from the general population rather than the infertile population. Andrologia. 53(7):e14099

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:Selected References

- Aslinia F, et al. 2006. Megaloblastic anemia and other causes of macrocytosis. *Clinical Medicine & Research* 4.3:236-41
- Benjamin RH, et al. 2025. National Birth Defects Prevention Study and the Birth Defects Study to Evaluate Pregnancy Exposures. Maternal folic acid supplement use, folate intake, and preterm birth among infants with spina bifida. *Birth Defects Res.* 117(12):e70008
- Bortolus R., et al. 2021. Efficacy of 4.0 mg versus 0.4 mg folic acid supplementation on the reproductive outcomes: A randomized controlled trial. *Nutrients.* 13(12):4422
- Centers for Disease Control and Prevention (CDC). 2025. Folic Acid Safety, Interactions, and Effects on Other Outcomes. Available at <https://www.cdc.gov/folic-acid/about/safety.html> [Accessed 01/2026]
- Centers for Disease Control and Prevention (CDC). 2025. Folic Acid: Sources and Recommended Intake. Available at <https://www.cdc.gov/folic-acid/about/intake-and-sources.html> [Accessed 01/2026]
- Centers for Disease Control and Prevention (CDC). 2025. MTHFR Gene Variant and Folic Acid Facts. Available at <https://www.cdc.gov/folic-acid/data-research/mthfr/> [Accessed 01/2026]
- Christian P. et al. 2010 Prenatal micronutrient supplementation and intellectual and motor function in early school-aged children in Nepal. *JAMA.* 304:2716-2723
- Crider KS, et al. 2011. Folic acid food fortification-its history, effect, concerns, and future directions. *Nutrients;* 3(3):370-84
- Cui Y, et al. 2021. Association of maternal pre-pregnancy dietary intake with adverse maternal and neonatal outcomes: A systematic review and meta-analysis of prospective studies. *Critical reviews in food science and nutrition,* 1-22
- Dervla K, et al. 2012: Use of folic acid supplements and risk of cleft lip and palate in infants: A population-based cohort study. *Br J Gen Pract British Journal of General Practice* 62.600:466-72
- Gaskins AJ, et al. 2012. The impact of dietary folate intake on reproductive function in premenopausal women: A prospective cohort study. *PLoS One* 7(9):e46276
- Gaskins AJ, et al. 2014. Maternal prepregnancy folate intake and risk of spontaneous abortion and stillbirth. *Obstet Gynecol.* 124(1):23-31
- Gildestad T, et al. 2020. Maternal use of folic acid and multivitamin supplements and infant risk of birth defects in Norway 1999-2013. *Br J Nutr.* 1-38
- Gomez MG, et al. 2024. Global Neurosurgery at the 76th World Health Assembly (2023): First neurosurgery-driven resolution calls for micronutrient fortification to prevent spina bifida. *World Neurosurg.* S1878-8750(24)00101-3
- Hodgetts VA, et al. 2015. Effectiveness of folic acid supplementation in pregnancy on reducing the risk of small-for-gestational age neonates: a population study, systematic review and meta-analysis. *BJOG.* 122:478-490
- Ito K, et al. 2019. Association between maternal serum folate concentrations in the first trimester and the risk of birth defects: The Hokkaido Study of Environment and Children's Health. *J Epidemiol.* 29(4):164-171
- Levine SZ, et al. 2018. Association of maternal use of folic acid and multivitamin supplements in the periods before and during pregnancy with the risk of autism spectrum disorder in offspring. *JAMA Psychiatry.* 75(2):176-184. Liu C, et al. 2018. Supplementation of folic acid in pregnancy and the risk of preeclampsia and gestational hypertension: a meta-analysis. *Arch Gynecol Obstet.;* 298:697-704
- Liu X, et al. 2023. Folic acid supplements and perinatal mortality in China. *Front Nutr.* 10:1281971
- Li X, et al. 2023. Effects of folic acid and folic acid plus zinc supplements on the sperm characteristics and pregnancy outcomes of infertile men: A systematic review and meta-analysis. *Heliyon.* 13;9(7):e18224
- Mohseni GK, et al. 2025. Association of spontaneous abortion with dietary folate intake in individuals with different genotypes of FTO gene. *BMC Pregnancy Childbirth.* 25(1):961

- National Institutes of Health (NIH) Office of Dietary Supplements. 2022. Folate Fact Sheet for Consumers. <https://ods.od.nih.gov/factsheets/Folate-Consumer/> [Accessed 01/2026]
- National Institutes of Health (NIH) Office of Dietary Supplements. 2022. Folate Fact Sheet for Health Professionals. <https://ods.od.nih.gov/factsheets/Folate-HealthProfessional/> [Accessed 01/2026]
- Pittschieler S, et al. 2008. Spontaneous abortion and the prophylactic effect of folic acid supplementation in epileptic women undergoing antiepileptic therapy. *J Neurol.* 255(12):1926-31
- Raghavan R, et al. 2018. Maternal multivitamin intake, plasma folate and vitamin B12 levels and autism spectrum disorder risk in offspring. *Paediatr Perinat Epidemiol.* 32(1):100-111
- Schmidt RJ, et al. 2012. Maternal periconceptional folic acid intake and risk of autism spectrum disorders and developmental delay in the CHARGE (CHildhood Autism Risks from Genetics and Environment) case-control study. *Am J Clin Nutr.* 96(1):80-9
- Surén P, et al. 2013. Association between maternal use of folic acid supplements and risk of autism spectrum disorders in children. *JAMA.* 309(6):570-7
- Toriello H. 2011. Policy Statement on Folic Acid and Neural Tube Defects. *Genet Med* 13.6: 593-96
- U.S. Food and Drug Administration (FDA). 2024. Folate and Folic Acid on the Nutrition and Supplement Facts Labels. <https://www.fda.gov/food/nutrition-facts-label/folate-and-folic-acid-nutrition-and-supplement-facts-labels> [Accessed 01/2026]
- Wang G, et al. 2016. Association between maternal pregnancy body mass index and plasma folate concentrations with child metabolic health. *JAMA Pediatr.* 170(8):e160845
- Wantong H, et al. 2024. Periconceptional supplementation with folic acid or multiple micronutrients containing folic acid and the risk for hypertensive disorders in pregnancy. *Med Princ Pract.* 33(6):578-586
- Wen S, et al. 2016. Folic acid supplementation in pregnancy and the risk of pre-eclampsia—A cohort study. *PLoS ONE* 11.2
- Wong W, et al. 2002. Effects of folic acid and zinc sulfate on male factor subfertility: A double-blind, randomized, placebo-controlled trial. *Fertility and Sterility* 77:491-8
- World Health Organization (WHO). 2009. Recommendations on wheat and maize flour fortification: meeting report - interim consensus statement. http://www.who.int/nutrition/publications/micronutrients/wheat_maize_fortification/en/ [Accessed 01/2026]
- Young SS, et al. 2008. The association of folate, zinc and antioxidant intake with sperm aneuploidy in healthy non-smoking men. *Hum. Reprod.* 23(5):1014-1022
- Zhang M, et al. 2025. Duration of folic acid supplementation and adverse pregnancy outcomes: A prospective multicenter cohort study in China. *Nutrients.* 18(1):81

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