

Vitamin D

Selected References:

- Achkar M, et al. 2015. Vitamin D status in early pregnancy and risk of preeclampsia. *Am J Obstet Gynecol*; 212:511.e1-7.
- Adrien N, et al. 2023. Early pregnancy vitamin D status and risk of select congenital anomalies in the National Birth Defects Prevention Study. *Birth Defects Res*; 115:290-301.
- Akhavizadegan H, Karbakhsh M. 2017. Comparison of serum vitamin D between fertile and infertile men in a vitamin D deficient endemic area: a case-control study. *Urologia*; 84(4):218-220.
- Allan KM, et al. 2015. Maternal vitamin D and E intakes during pregnancy are associated with asthma in children. *Eur Respir J*; 45(4):1027-1036.
- American College of Obstetricians and Gynecologists (ACOG). 2024. Committee Opinion No. 495: Vitamin D: screening and supplementation during pregnancy. Committee on Obstetric Practice.
- Andersen LB, et al. 2015. Vitamin D insufficiency is associated with increased risk of first-trimester miscarriage in the Odense Child Cohort. *Am J Clin Nutr*. 102(3):633-638.
- Bodnar LM, et al. 2007. Maternal vitamin D deficiency increases the risk of preeclampsia. *J Clin Endocrinol Metab* 92(9):3517-3522.
- Bodnar LM, et al. 2014. Maternal vitamin D status and spontaneous preterm birth by placental histology in the US Collaborative Perinatal Project. *Am J Epidemiol* 179(2): 168-176.
- Brooke OG, et al. 1980. Vitamin D supplements in pregnant Asian women: effects on calcium status and fetal growth. *Br Med J* 280:751-754.
- Camargo CA Jr, et al. 2007. Maternal intake of vitamin D during pregnancy and risk of recurrent wheeze in children at 3 y of age. *Am J Clin Nutr*; 85:788-795.
- Caplan RH & Beguin EA. 1990. Hypercalcemia in a calcitriol-treated hypoparathyroid woman during lactation. *Obstet Gynecol* 76:485-489.
- Caretta N, et al. 2016. Hypovitaminosis D is associated with erectile dysfunction in type 2 diabetes. *Endocrine*; 53(3):831-838.
- Chen C, et al. 2022. Association between serum vitamin D level during pregnancy and recurrent spontaneous abortion: a systematic review and meta-analysis. *Am J Reprod Immunol*; 88(3):e13582.
- Chen YH, et al. 2015. Maternal vitamin D deficiency during pregnancy elevates the risks of small for gestational age and low birth weight infants in Chinese population. *J Clin Endocrinol Metab*; 100(5):1912-1919.
- Cockburn F, et al. 1980. Maternal vitamin D intake and mineral metabolism in mothers and newborn infants. *Br Med J*; 281:11-13.
- Correa P, et al. 2025. Vitamin D Deficiency and Risk of Gestational Diabetes Mellitus in Western Countries: A Scoping Review. *Nutrients*; 17(15):2429.
- Cundy T, et al. 1987. Remission of hypoparathyroidism during lactation: evidence for a physiological role for prolactin in the regulation of vitamin D metabolism. *Clin Endocrinol (Oxf)*; 26:667-674.
- Daglar K, et al. 2016. Maternal serum vitamin D levels in pregnancies complicated by neural tube defects. *J Matern Fetal Neonatal Med*; 29(2):298-302.
- De-Regil LM, et al. 2016. Vitamin D supplementation for women during pregnancy. *Cochrane Database of Systematic Reviews*; 1: CD008873.
- Delvin EE, et al. 1986. Vitamin D supplementation during pregnancy: effect on neonatal calcium homeostasis. *J Pediatr*; 109:328-334.
- Demay MB, et al. 2024. Vitamin D for the prevention of disease: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab*; 109:1907-1947.
- Devereux G, et al. 2007. Maternal vitamin D intake during pregnancy and early childhood wheezing. *Am J Clin*

Nutr; 85:853-859.

- Dvornik A, Mujezinović F. 2018. The Association of Vitamin D Levels with common pregnancy complications. *Nutrients*; 10:867.
- Dror DK. 2011. Vitamin D status during pregnancy: maternal, fetal, and postnatal outcomes. *Curr Opin Obstet Gynecol*; 23:422-426.
- Durá-Travé T, Gallinas-Victoriano F. 2025. Vitamin D and Intrauterine Growth Restriction (IUGR). *Int J Mol Sci*; 26(23):11422.
- Goodenday LS & Gordan GS. 1971. Fetal safety of vitamin D during pregnancy. *Clin Res*; 19:200.
- Goodenday LS & Gordan GS. 1971. No risk from vitamin D during pregnancy. *Ann Intern Med*; 75:807-808.
- Fung JL, et al. 2017. Association of vitamin D intake and serum levels with fertility: Results from the Lifestyle and Fertility Study. *Fertil Steril*; 108(2):L302-311.
- Handel MN, et al. 2017. Prenatal exposure to vitamin D from fortified margarine and risk of fractures in late childhood: period and cohort results from 222 000 subjects in the D-TECT observational study. *Br J Nutr*; 117(6):872-881.
- Hansen S, et al. 2015. The long-term programming effect of maternal 25-hydroxyvitamin D in pregnancy on allergic airway disease and lung function in offspring after 20 to 25 years of follow-up. *J Allergy Clin Immunol*; 136(1):169-176.e2.
- Harvey NC, et al. 2014. Vitamin D supplementation in pregnancy: a systematic review. *Health Technol Assess*; 18(45):1-190.
- Haugen M, et al. 2009. Vitamin D supplementation and reduced risk of preeclampsia in nulliparous women. *Epidemiology*; 20(5):720-726.
- Haussler MR & McCain TA. 1977. Basic and clinical concepts related to vitamin D metabolism and action. *N Engl J Med* 297:1041-1050.
- Heckmatt JZ, et al. 1979. Plasma 25-hydroxyvitamin D in pregnant Asian women and their babies. *Lancet*; 2:546-548.
- Holick MF, et al. 2012. Guidelines for preventing and treating vitamin D deficiency and insufficiency revisited. *The Journal of Clinical Endocrinology & Metabolism*; 97(4): 1153-1158.
- Hollis BW. 2005. Circulating 25-hydroxyvitamin D levels indicative of vitamin D sufficiency: implications for establishing a new effective dietary intake recommendation for vitamin D. *J Nutr*; 135(2):317-322.
- Hollis BW & Wagner CL. 2004. Assessment of dietary vitamin D requirements during pregnancy and lactation. *Am J Clin Nutr*; 79(5):717-726.
- Hollis BW, et al. 2015. Maternal versus infant vitamin D supplementation during lactation: A randomized controlled trial. *Pediatrics*; 136(4): 625-634.
- Institute of Medicine, 2011. Dietary Reference Intakes for Calcium and Vitamin D. Washington, DC: The National Academies Press. Available at <https://www.nationalacademies.org/read/13050/chapter/1>.
- Institute of Medicine, Food and Nutrition Board. 1997. Dietary Reference Intakes: Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride. National Academy Press, Washington, DC.
- Jensen MB. 2014. Vitamin D and male reproduction. *Nature Reviews Endocrinology*; 10: 175-186.
- Krysiak R, et al. 2011. Hypoparathyroidism in pregnancy. *Gynecol Endocrinol*; 27:529-32.
- Lawlor DA, et al. 2013. Association of maternal vitamin D status during pregnancy with bone-mineral content in offspring: a prospective cohort study. *Lancet*; 381(9884):2176-2183.
- Lerchbaum E & Rabe T. 2014. Vitamin D and female fertility. *Curr Opin Obstet Gynecol*; 26: 145-150.
- Lu M, et al. 2021. Effect of early and late prenatal vitamin D and maternal asthma status on offspring asthma or recurrent wheeze. *J Allergy Clin Immunol*; 147(4):1234-1241.e3.
- Mather KJ, et al. 1999. Maintenance of serum calcium by parathyroid hormone-related peptide during lactation in a hypoparathyroid patient. *J Clin Endocrinol Metab*; 84:424-427.
- Maxwell JD, et al. 1981. Vitamin D supplements enhance weight gain and nutritional status in pregnant Asians. *Br J Obstet Gynecol*; 88:987-991.

- Meek JY, et al. 2022. Policy Statement: Breastfeeding and the Use of Human Milk. *Pediatrics*; 150(1).
- Melough MM, et al. 2021. Maternal plasma 25-hydroxyvitamin D during gestation is positively associated with neurocognitive development in offspring at age 4-6 years. *J Nutr*; 151(1):132-139.
- Mirzaei F, et al. 2011. Gestational vitamin D and the risk of multiple sclerosis in offspring. *Ann Neurol*; 70(1):30-40.
- Mohaghegh Z, et al. 2015. The relation of preeclampsia and serum level of 25-hydroxyvitamin D in mothers and their neonates: a case control study in Iran. *Horm Metab Res*; 47(4):284-288.
- Morales E, et al. 2012. Maternal Vitamin D Status in Pregnancy and Risk of Lower Respiratory Tract Infections, Wheezing, and Asthma in Offspring. *Epidemiology*; 23(1):64-71.
- Mulligan ML, et al. 2010. Implications of vitamin D deficiency in pregnancy and lactation. *Am J Obstet Gynecol*; 202:429.e1-9.
- Mumford SL, et al. 2018. Association of preconception serum 25-hydroxyvitamin D concentrations with livebirth and pregnancy loss: A prospective cohort study. *Lancet Diabetes Endocrinol*; 6(9):725-732.
- Murphy PK, et al. 2010. An exploratory study of postpartum depression and vitamin D. *J Am Psychiatr Nurses Assoc*; 16(3): 170-177.
- Nasri K, et al. 2016. Maternal 25-hydroxyvitamin D level and the occurrence of neural tube defects in Tunisia. *Int J Gynaecol Obstet*; 134(2):131-134.
- Norman AW. 2008. From vitamin D to hormone D: fundamentals of the vitamin D endocrine system essential for good health. *Am J Clin Nutr*; 88(2):491S-499S.
- Oken E, et al. 2007. Diet during pregnancy and risk of preeclampsia or gestational hypertension. *Ann Epidemiol*. 17:663-668.
- Paffoni A, et al. 2014. Vitamin D deficiency and infertility: insights from in vitro fertilization cycles. *J Clin Endocrinol Metab*; 99(11):E2372-2376.
- Palacios C, et al. 2019. Vitamin D supplementation for women during pregnancy. *Cochrane Database of Systematic Reviews*; 7:CD008873.
- Palacios C, et al. 2024. Vitamin D supplementation for women during pregnancy. *Cochrane Database Syst Rev*; 7(7):CD008873.
- Perez-Lopez F, et al. 2015. Effect of vitamin D supplementation during pregnancy on maternal and neonatal outcomes: a systematic review and meta-analysis of randomized controlled trials. *Fertil Steril*; 103(5): 1278-1288e4.
- Piekoszewska-Ziętek P, et al. 2025. Influence of Vitamin D on Developmental Defects of Enamel (DDE) in Children and Adolescents: A Systematic Review. *Nutrients*; 17(8):1317.
- Raia-Barjat T, et al. 2021. Vitamin D deficiency during late pregnancy mediates placenta-associated complications. *Sci Rep*; 11(1):20708.
- Ramagopalan SV, et al. 2011. Relationship of UV exposure to prevalence of multiple sclerosis in England. *Neurology*. 76(16):1410-1414.
- Ribamar A, et al. 2020. Relationship between vitamin D deficiency and both gestational and postpartum depression. *Nutr Hosp* 37(6):1238-1245.
- Robinson M, et al. 2014. Low maternal serum vitamin D during pregnancy and the risk for postpartum depression symptoms. *Arch Womens Ment Health* 17(3): 213-219.
- Rude RK, et al. 1984. Postpartum resolution of hypocalcemia in a lactating hypoparathyroid patient. *Endocrinol Jpn*. 31:227-233.
- Sadegi-Nejad A, et al. 1980. Hypoparathyroidism and pregnancy: treatment with calcitriol. *JAMA* 243:254-255.
- Schneuer FJ, et al. 2014. Effects of maternal serum 25-hydroxyvitamin D concentrations in the first trimester on subsequent pregnancy outcomes in an Australian population. *Am J Clin Nutr* 99: 287-295.
- Singla R, et al. 2015. Vitamin-D deficiency is associated with gallbladder stasis among pregnant women. *Dig Dis Sci*. 60(9):2793-2799.
- Singla R, et al. 2015. Relationship between preeclampsia and vitamin D deficiency: a case control study. *Arch Gynecol Obstet*. 291(6):1247-1251.

- Sourander A, et al. 2021. Maternal vitamin D levels during pregnancy and offspring autism spectrum disorder. *Biol Psychiatry*. 90(11):790-797.
- Stafne, SN. 2020. Vitamin D and stress urinary incontinence in pregnancy: a cross-sectional study. *BJOG* 127(13):1704-1711.
- Staples J, et al. 2010. Low maternal exposure to ultraviolet radiation in pregnancy, month of birth, and risk of multiple sclerosis in offspring: longitudinal analysis. *BMJ*. 340:c1640.
- Sucksdorff M, et al. 2021. Maternal vitamin D levels and the risk of offspring attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry*. 2021 Jan;60(1):142-151.e2.
- Sweeney LL, et al. 2010. Decreased calcitriol requirements during pregnancy and lactation, with a window of increased requirements immediately postpartum. *Endocr Pract*. 1-11.
- US Department of Health and Human Services National Institutes of Health. 2024. Vitamin D. Office of Dietary Supplements Dietary Supplement Fact Sheets. <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>. Accessed July 2026.
- van Tienhoven et al. 2025. Vitamin D in Reproductive Health Disorders: A Narrative Review Focusing on Infertility, Endometriosis, and Polycystic Ovarian Syndrome. *Int J Mol Sci*; 26(5):2256.
- Veena SR, et al. 2017. Association between maternal vitamin D status during pregnancy and offspring cognitive function during childhood and adolescence. *Asia Pac J Clin Nutr* 26(3): 438-449.
- Vieth R & Holick MF. 2018. Chapter 57B – The IOM—Endocrine Society Controversy on Recommended Vitamin D Targets: In Support of the Endocrine Society Position. *Vitamin D (Fourth Edition)*. D. Feldman, Academic Press: 1091-1107.
- Vinkhuyzen AAE, et al. 2017. Gestational vitamin D deficiency and autism spectrum disorder. *BJPsych Open* 3(2): 85-90.
- Visness CM, et al. 2015. Cord blood vitamin D concentrations are unrelated to atopy and wheeze in 2 diverse birth cohort studies. *J Allergy Clin Immunol*. 136(4):1108-10.e2.
- Vollú AL, et al. 2024. Are low serum levels of Vitamin D associated with dental developmental defects in primary teeth? A systematic review. *Evid Based Dent*; 25(2):110.
- Voltas N, et al. 2020. Effect of vitamin D status during pregnancy on infant neurodevelopment: The ECLIPSES Study. *Nutrients*. 12(10):3196.
- Wadhwa L, et al. 2020. Impact of Vitamin D Supplementation on Semen Quality in Vitamin D-Deficient Infertile Males with Oligoasthenozoospermia. *J Obstet Gynaecol India*; 70(1):44-49.
- Wagner CL, et al. 2013. A randomized trial of vitamin D supplementation in 2 community health center networks in South Carolina. *Am J Obstet Gynecol* 208(2):137.e1-13.
- Whitehouse AJ, et al. 2012. Maternal Serum Vitamin D Levels During Pregnancy and Offspring Neurocognitive Development. *Pediatrics* 129:485-493.
- World Health Organization. 2023. Vitamin D supplementation during pregnancy. E-library of evidence for nutrition actions (eLENA). <https://www.who.int/tools/elena/interventions/vitamind-supp-pregnancy>. Accessed June 6 2024.
- Xu N, et al. 2025. Vitamin D Levels During Pregnancy and Dental Caries in Offspring. *JAMA Netw Open*; 8(12):e2546166.
- Zhang C, et al. 2008. Maternal plasma 25-hydroxyvitamin D concentrations and the risk for gestational diabetes mellitus. *PLoS One*; 3(11):e3753.
- Zhang P, et al. 2024. Causal association between vitamin D and gestational diabetes mellitus: a two-sample Mendelian randomization study. *J Matern Fetal Neonatal Med*; 37(1):2427760.

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Vitamin D

Selected References:

- Adams J, et al. 2022. Neuropsychological effects in children exposed to anticonvulsant monotherapy during gestation: Phenobarbital, carbamazepine, and phenytoin. *Epilepsy Behav*; 127:108533.
- Antonucci R, et al. 2018. Maternal carbamazepine therapy and unusual adverse effects in a breastfed infant. *Breastfeed Med*; 13(2):155-157.
- Baker GA, et al. 2015. IQ at 6 years after in utero exposure to antiepileptic drugs: a controlled cohort study. *Neurology*; 84(4):382-390.
- Battino D, et al. 2024. Risk of major congenital malformations and exposure to antiseizure medication monotherapy. *JAMA Neurol*; 81(5):481-489.
- Bech BH, et al. 2014. Use of antiepileptic drugs during pregnancy and risk of spontaneous abortion and stillbirth: population based cohort study. *BMJ*; 349:g5159.
- Birnbaum AK, et al. 2020. Antiepileptic Drug Exposure in Infants of Breastfeeding Mothers With Epilepsy. *JAMA Neurol*; 77(4):441-450.
- Bjork M-H, et al. 2022. Association of prenatal exposure to antiseizure medication with risk of autism and intellectual disability. *JAMA Neurol*. 79(7):672-681.
- Blotiere PO, et al. 2020. Risk of early neurodevelopmental outcomes associated with prenatal exposure to the antiepileptic drugs most commonly used during pregnancy: a French nationwide population-based cohort study. *BMJ Open*. 7;10(6):e034829.
- Bromley RL, et al. 2013. The prevalence of neurodevelopmental disorders in children prenatally exposed to antiepileptic drugs. *J Neurol Neurosurg Psychiatry*. 84(6):637-643.
- Bromley R, et al. 2023. Monotherapy treatment of epilepsy in pregnancy: congenital malformation outcomes in the child. *Cochrane Database Syst Rev*; 29;8(8):CD010224.
- Campbell E, et al. 2014. Malformation risks of antiepileptic drug monotherapies in pregnancy: updated results from the UK and Ireland Epilepsy and Pregnancy Registers. *J Neurol Neurosurg Psychiatry*; 85(9):1029-1034.
- Canger R, et al. 1999. Malformations in offspring of women with epilepsy: a prospective study. *Epilepsia*; 40(9):1231-1236.
- Craig JJ, et al. 2022. Epilepsy and pregnancy: identifying risks. *Pract Neurol*; 22(2):98-106.
- Daugaard CA, et al. 2020. Association of prenatal exposure to valproate and other antiepileptic drugs with intellectual disability and delayed childhood milestones. *JAMA Netw Open*; 3(11):e2025570.
- Cohen JM, et al. 2023. Comparative safety of antiseizure medication monotherapy for major malformations. *Ann Neurol*; 93(3):551-562.
- Cummings C, et al. 2011. Neurodevelopment of children exposed in utero to lamotrigine, sodium valproate and carbamazepine. *Arch Dis Child*; 96(7):643-647.
- Davanzo R, et al. 2013. *Italian Journal of Pediatrics*; 39:50-61.

- Deshmukh U, et al. 2016. Behavioral outcomes in children exposed prenatally to lamotrigine, valproate, or carbamazepine. *Neurotoxicol Teratol*; 54:5-14.
- Fried S, et al. 2004. Malformation rates in children of women with untreated epilepsy: a meta-analysis. *Drug Saf*; 27(3):197-202.
- Gaily E, et al. 2004. Normal intelligence in children with prenatal exposure to carbamazepine. *Neurology* 62:28-32.
- Gladstone DJ, et al. 1992. Course of pregnancy and fetal outcome following maternal exposure to carbamazepine and phenytoin: a prospective study. *Reprod Toxicol*; 6:257-261.
- Harden CL. 2008. Antiepileptic drug teratogenesis: what are the risks for congenital malformations and adverse cognitive outcomes? *Int Rev Neurobiol*; 83:205-213.
- Hernandez-Diaz S, et al. 2000. Folic acid antagonists during pregnancy and the risk of birth defects. *N Engl J Med*; 343(22):1608-1614.
- Hernandez-Diaz S, et al. 2025. Use of Antiseizure Medications Early in Pregnancy and the Risk of Major Malformations in the Newborn. *Neurology*; 105(3):e213786.
- Holmes LB, et al. 2024. Facial dysmorphology in children exposed in pregnancy to anticonvulsant medications correlates with deficits in IQ. *Am J Med Genet*; 2024;194A:e63511.
- Honybun E, et al. 2026. Neurocognitive Outcomes of In Utero Exposure to Antiseizure Medication: An Australian Cohort Study. *Neurology*; 107(1):e218122
- Huber-Mollema Y, et al. 2020. Neurocognition after prenatal levetiracetam, lamotrigine, carbamazepine, or valproate exposure. *J Neurol*; 267(6):1724-1736.
- Husebye E, et al. 2020. Language impairment in children aged 5 and 8 years after antiepileptic drug exposure in utero – the Norwegian Mother and Child Cohort Study. *European Journal of Neurology*; 27.3:667-675.
- Li Y, Meador KJ. 2022. Epilepsy and Pregnancy. *Continuum (Minneap Minn)*; 28(1):34-54.
- Jones KL, et al. 1989. Patterns of malformations in the children treated with carbamazepine during pregnancy. *N Engl J Med*; 320(25):1661-1666.
- Kacirova I, et al. 2021. Therapeutic monitoring of carbamazepine and its active metabolite during the 1st postnatal month: Influence of drug interactions. *Biomed Pharmacother*; 137:111412.
- Kacirova I, et al. 2022. Carbamazepine and carbamazepine-epoxide concentrations in mothers, colostrum, and breastfed newborns: Comparison with concentrations determined during delivery and in the mature milk period. *Biomedicine & Pharmacotherapy*; 151:113176.
- Kallen AJB. 1994. Maternal carbamazepine and infant spina bifida. *Reprod Toxicol* 8(3):203-205.
- Kaplan YC, et al. 2021. Use of phenytoin, phenobarbital carbamazepine, levetiracetam lamotrigine and valproate in pregnancy and breastfeeding: risk of major malformations, dose-dependency, monotherapy vs polytherapy, pharmacokinetics and clinical implications. *Curr Neuropharmacol*; 19(11):1805-1824.
- Karain A, et al. 2025. Educational outcomes associated with prenatal exposure to antiseizure medications: A systematic literature review and meta-Analysis. *Seizure*; 32:37-45.
- Leite ML, et al. 2024. Obstetric and neonatal outcomes, antiseizure medication profile, and seizure types in pregnant women in a vulnerability state from Brazil. *PLoS One*; 1;19(4):e0291190.
- Meador KJ, et al. 2009. Cognitive function at 3 years of age after fetal exposure to antiepileptic drugs. *N Engl J Med*; 360(16):1597-1605.
- Margulis A, et al. 2019. Relation of in-utero exposure to antiepileptic drugs to pregnancy during and size at birth. *PLoS One*; 14(8):e0214180.
- Mazzone PP, et al. 2023. Comparison of perinatal outcomes for women with and without epilepsy: a systematic review and meta-analysis. *JAMA Neurol*; 80(5):484-494.
- Meador KJ, et al. 2014. Breastfeeding in children of women taking antiepileptic drugs cognitive outcomes at age 6 years. *JAMA Pediatr*; 168(8):729-736.
- Morrell M. 1996. The new antiepileptic drugs and women: efficacy, reproductive health, pregnancy and fetal outcome. *Epilepsia* 37(Suppl. 6):S34-S44.
- Novartis. (n.d.). Tegretol – Food and Drug Administration.

https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/018927Orig1s061;016608Orig1s122;020234Orig1s055lbl.pdf. Accessed July 2026.

- Nulman I, et al. 1997. Findings in children exposed in utero to phenytoin and carbamazepine monotherapy: independent effects of epilepsy and medications. *Am J Med Genet*; 68:18-24.
- O'Brien MD and Gilmour-White SK. 2005. Management of epilepsy in women treated with carbamazepine during pregnancy. *Postgrad Med J*; 81(955):278-285.
- Ornoy A and Cohen E. 1996. Outcome of children born to epileptic mothers treated with carbamazepine during pregnancy. *Arc Dis Child*; 75:517-520
- Patel N, et al. 2018. Mood-stabilizing anticonvulsants, spina bifida, and folate supplementation: commentary. *J Clin Psychopharmacol*; 38(1):7-10.
- Rosa FW. 1991. Spina bifida in infants of women treated with carbamazepine during pregnancy. *N Engl J Med*; 324(10):674-677.
- Samren EB, et al. 1999. Antiepileptic drug regimens and major congenital abnormalities in the offspring. *Ann Neurol*; 46(5):739-746.
- Scolnik D, et al. 1994. Neurodevelopment if children exposed in utero to phenytoin and carbamazepine monotherapy. *JAMA*; 271(10):767-770.
- Shawahna R, Zaid L. 2022. Concentrations of antiseizure medications in breast milk of lactating women with epilepsy: A systematic review with qualitative synthesis. *Seizure*; 98:57-70.
- Straub L, et al. 2026. Prenatal antiseizure drug exposure and risk of neurodevelopmental disorders in children: population based cohort study. *BMJ*; 392:e085725.
- Tang W, et al. 2023. Adverse perinatal pregnancy outcomes in women with schizophrenia: A systematic review and meta-analysis. *Schizophr Res*; 262:156-167.
- Tomson T and Barrino D. 2008. Teratogenic effects of antiepileptic drugs. *Seizure*; 17(2):166-171.
- Tomson T and Klein P. 2015. Fine-tuning risk assessment with antiepileptic drug use in pregnancy. *Neurology*; 84(4):339-340.
- Tomson T, et al. 2015. Antiepileptic drugs and intrauterine death: A prospective observational study from EURAP. *Neurology*; 85(7):580-588.
- Tomson T, et al. 2018. Comparative risk of major congenital malformations with eight different antiepileptic drugs: a prospective cohort study of the EURAP registry. *Lancet Neurol*; 17(6):530-538.
- U.S. Centers for Disease Control and Prevention. 2026. Data and statistics on Spina Bifida. <https://www.cdc.gov/spina-bifida/data/>.
- Vajda F. 2014. Epilepsy: Effects of exposure to antiepileptic drugs during development. *Nat Rev Neurol*; 10:11-12.
- Vajda F, et al. 2018. Anti-epileptic drug exposure and risk of foetal death in utero. *Acta Neurol Scand*; 137(1):20-23.
- Wallace H, et al. 1998. Age-specific incidence and prevalence rates of treated epilepsy in an unselected population of 2,052,922 and age-specific fertility rates of women with epilepsy. *Lancet*; 352:1970-1973.
- Weston J, et al. 2016. Monotherapy treatment of epilepsy in pregnancy: congenital malformation outcomes in the child. *Cochrane Database Syst Rev*; 11:Cd010224.
- Wide K, et al. 2000. Psychomotor development and minor anomalies in children exposed to antiepileptic drugs in utero: A prospective population-based study. *Dev Med Child Neurol*; 42:87-92.
- Wiggs K, et al. 2020. Anti-seizure medication use during pregnancy and risk of ASD and ADHD in children. *Neurology*; 95(24):e3232-e3240.

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Selected References:

- Beex-Oosterhuis MM, et al. 2021. Clozapine treatment during pregnancy and the postpartum period: a systematic literature review. *J Clin Psychiatry*; 83(1):21r13952.
- Bolu A, et al. 2018. Low-dose clozapine-induced retrograde ejaculation. *Psychiatry Clin Neurosci*; 72(7):541-542.
- Borisch C, et al. 2012. Severe neutropenia in a newborn after clozapine therapy during pregnancy. *Reprod Toxicol*; 34:158.
- Damkier P & Videbach P. 2018. The safety of second-generation antipsychotics during pregnancy: a clinically focused review. *CNS Drugs*; 32:351-366.
- Dev VJ & Krupp P. 1995. Adverse event profile and safety of clozapine. *Rev Contemp Pharmacother*; 6:197-208.
- Grover S, Gupta S. 2025. Use of clozapine in pregnancy: a retrospective study from North India. *Journal of Clinical Psychopharmacology*; 45(4):353-355.
- Haddad PM, et al. 2004. Antipsychotic-induced hyperprolactinaemia: mechanisms, clinical features and management. *Drugs*; 64(20):2291-2314.
- Husain K, et al. 2025. Limitations in Recent Study of Clozapine Use During Pregnancy. *J Clin Psychopharmacol*; 45(6):688-689.
- Imaz ML, et al. 2018. Clozapine use during pregnancy and lactation: A case-series report. *Front Pharmacol*; 9:264.
- Jing H, Tang X. 2026. Risk factors for drug-related gestational diabetes mellitus: a real-world pharmacovigilance study based on the FAERS database. *BMC Pregnancy Childbirth*; 26(1):687.
- Kulkarni J, et al. 2026. Clozapine safety in pregnancy: a clinical study. *Schizophrenia Bulletin*; 52(2):sbae132.
- Larsen ER, et al. 2015. Use of psychotropic drugs during pregnancy and breast-feeding. *Acta Psychiatr Scand Suppl*; 132 Suppl 445:1-28.
- Mehta TM, et al. 2017. A review of the safety of clozapine during pregnancy and lactation. *Arch Womens Ment Health*; 20(1):1-9.
- Shao P, et al. 2015. Effects of clozapine and other atypical antipsychotics on infants development who were exposed to as fetus: a post-hoc analysis. *PLoS One*; 10(4):e0123373.
- Thanigaivel R, et al. 2022 A systematic review of maternal and infant outcomes after clozapine continuation in pregnancy. *Int J Psychiatry Clin Pract*; 26(2):178-182.
- Tsukiji M, et al. 2025. A Japanese pregnant woman with treatment-resistant schizophrenia who continued clozapine with blood concentration monitoring during the perinatal period and had a healthy baby: a case report. *Neuropsychopharmacology Reports*; 45(4):e70074.
- Uguz F. 2016. Second-generation antipsychotics during the lactation period: a comparative systematic review on infant safety. *J Clin Psychopharmacol*; 36:244-252.

- Uguz F. 2020. The use of clozapine during pregnancy and lactation: a case report. *Psychiat Clin Psychopharmacol*; 30:193-195.
- Uguz F. 2021. A new safety scoring system for the use of psychotropic drugs during lactation. *Am J Ther*; 28:e118-e126.
- Uygun OF, Uygun H. 2019. Neurodevelopmental and growth follow-up of the baby exposed to antipsychotics during pregnancy and lactation: A case report. *Psychiat Clin Psychopharmacol*; 29:744-747.

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Vitamin D

Selected References:

- Aselton P, et al. 1985. First-trimester drug use and congenital disorders. *Obstet Gynecol*; 65(4):451-455.
- Cao Y, et al. 2021. Maternal use of cough medications during early pregnancy and selected birth defects: a US multisite, case-control study. *BMJ Open*; 11:e053604.
- Einarson A, et al. 2001. The safety of dextromethorphan in pregnancy: Results of a controlled study. *Chest*; 119(2):466-469.
- Heinonen OP, et al. 1977. Birth Defects and Drugs in Pregnancy. Littleton, Mass.: John Wright-PSG, page 382.
- Martinez-Frias ML, et al. 2001. Epidemiologic analysis of prenatal exposure to cough medicines containing dextromethorphan: no evidence of human teratogenicity. *Teratology*; 63(1):38-41.
- Shum S, et al. 2022. Infant dextromethorphan and dextrorphan exposure via breast milk from mothers who are CYP2D6 extensive metabolizers. *J Clin Pharmacol*; 62(6):747-755.
- Ward KE. 2005. Can Robitussin DM be used to treat cough during pregnancy? *Med Health R I*; 88(3):99-100.

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Vitamin D

Selected References

- Anderson PO, McGuire GG. 1989. Neonatal alprazolam withdrawal -possible effects of breastfeeding. DICP. 23:614. Letter.
- Andrade C. 2019. Gestational Exposure to Benzodiazepines, 1: The Risk of Spontaneous Abortion Examined Through the Prism of Research Design. J Clin Psychiatry; 80(5):19f13076
- Barry WS, St. Clair SM. 1987. Exposure to benzodiazepines in utero. Lancet; 1:1436-7.
- Browne JL, Hauge KJ. 1986. A review of alprazolam withdrawal. Drug Intell Clin Pharm; 20(11):837-41.
- Eros E, et al. 2002. A population-based case-control teratologic study of nitrazepam, medazepam, tofisopam, alprazolam and clonazepam treatment during pregnancy. Eur J Obstet Gynecol Reprod Biol; 101:147-54.
- Freeman MP, et al. 2018. Obstetrical and neonatal outcomes after benzodiazepine exposure during pregnancy: Results from a prospective registry of women with psychiatric disorders. Gen Hosp Psychiatry; 53:73-79.
- Furugen A, et al. 2019. Quantification of eight benzodiazepines in human breastmilk and plasma by liquid-liquid extraction and liquid-chromatography tandem mass spectrometry: Application to evaluation of alprazolam transfer into breastmilk. J Pharm Biomed Anal. 168:83-93.
- García-Algar O, et al. 2007. Confirmation of gestational exposure to alprazolam by analysis of biological matrices in a newborn with neonatal sepsis. Clin Toxicol (Phila); 45(3):295-8.
- Grigoriadis S, et al. 2019. Benzodiazepine Use During Pregnancy Alone or in Combination With an Antidepressant and Congenital Malformations: Systematic Review and Meta-Analysis. J Clin Psychiatry; 80(4):18r12412.
- Ishikawa T, et al. 2026. Benzodiazepine exposure during early pregnancy and risk of miscarriage: dose-response, half-life classification, and individual agents. Arch Womens Ment Health; 29(3):86.
- Ito S, et al. 1993. Prospective follow-up of adverse reactions in breastfed infants exposed to maternal medication. Am J Obstet Gynecol; 168:1393-9.
- Källén B, et al. 2013. The use of central nervous system active drugs during pregnancy. Pharmaceuticals (Basel); 6(10):1221-86.
- Kelty E, et al. 2023. Safety of alprazolam use in pregnancy in Western Australia: A retrospective cohort study using linked health data. J of Psychoactive Drugs; 1-7.

- Lee H, et al. 2022. Pregnancy and Neonatal Outcomes After Exposure to Alprazolam in Pregnancy. *Front Pharmacol*; 25: 13:854562.
- Mazzilli R, et al. 2021. Psychotropic Drugs Levels in Seminal Fluid: A New Therapeutic Drug Monitoring Analysis?. *Front Endocrinol (Lausanne)*; 12:620936.
- Meng LC, et al. 2024. Benzodiazepine Use During Pregnancy and Risk of Miscarriage. *JAMA Psychiatry*; 81(4):366-373.
- Munjack DJ, Crocker B. 1986. Alprazolam-induced ejaculatory inhibition. *J Clin Psychopharmacol*; 6:57-8.
- Ogawa Y, et al. 2018. Maternal exposure to benzodiazepine and risk of preterm birth and low birth weight: A case-control study using a claims database in Japan. *Asia Pac Psychiatry*; 10(3):e12309
- Nishimura A, et al. 2021. Benzodiazepine Concentrations in the Breast Milk and Plasma of Nursing Mothers: Estimation of Relative Infant Dose. *Breastfeed Med*; 16(5):424-432.
- Noh Y, et al. 2022. First-trimester exposure to benzodiazepines and risk of congenital malformations in offspring: A population-based cohort study in South Korea. *PLoS Med*. 2022; 19(3):e1003945
- Nonacs R. 2020. "Benzodiazepines and Risk of Ectopic Pregnancy". MGH Center for Women's Mental Health. <https://womensmentalhealth.org/posts/benzodiazepine-ectopic/>. Psychiatric Disorder during Pregnancy
- Nonacs R. 2019. "Benzodiazepines During Early Pregnancy and risk of Miscarriage". MGH Center for Women's Mental Health. <https://womensmentalhealth.org/posts/benzodiazepine-during-early-pregnancy-and-risk-of-miscarriage-2/>. Anxiety Disorder, June. Pregnancy Loss, Pregnancy Outcome.
- Nonacs R. 2019. "Interpreting New Data on the Use of Benzodiazepines During Pregnancy. MGH Center for Women's Mental Health. <https://womensmentalhealth.org/posts/interpreting-new-data-on-the-use-of-benzodiazepines-during-pregnancy/>. December. Psychiatric Disorders during Pregnancy
- Oo CY, et al. 1995. Pharmacokinetics in lactating women: prediction of alprazolam transfer into milk. *Br J Clin Pharmacol*; 40:231-6.
- Petric D, et al. 2011. High doses alprazolam induced amenorrhoea and galactorrhoea. *Psychiatr Danub*; 23(1):123-4.
- Sheehy O, et al. 2019. Association Between Incident Exposure to Benzodiazepines in Early Pregnancy and Risk of Spontaneous Abortion. *JAMA Psychiatry*; 76(9):948-957.
- Shyken JM, et. Al. 2019. Benzodiazepines in Pregnancy. *Clin Obstet Gynecol*; 62(1):156-167
- St Clair SM, Schnirmer RG. 1992. First-trimester exposure to alprazolam. *Obstet Gynecol*; 80:843-846.
- Tinker SC, et al; National Birth Defects Prevention Study. 2019. Use of benzodiazepine medications during pregnancy and potential risk for birth defects, National Birth Defects Prevention Study, 1997-2011. *Birth Defects Res*; 111(10):613-620.
- Wall-Wieler et al.. 2020. Benzodiazepine use before conception and risk of ectopic pregnancy. *Human Reproduction*; 35(7):1685-1692.
- Wisner KL, Yonkers KA. 2019. Are Adverse Reproductive Outcomes Associated With the Illness or Its Treatment (or Both)?. *JAMA Psychiatry*. 2019;76(12):1317-1318
- Yamamoto K, et al. 2019. Pharmacokinetic assessment of alprazolam-induced neonatal abstinence syndrome using physiologically based pharmacokinetic model. *Drug Metab Pharmacokinet*; 34(6):400-402.

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