

Carbon Monoxide

Selected References:

- Aubard Y and Magne I. 2000. Carbon monoxide poisoning in pregnancy. BJOG. 107(7):833-838.
- Arslan A. 2021. Hyperbaric oxygen therapy in carbon monoxide poisoning in pregnancy: Maternal and fetal outcome. Am J Emerg Med.43:41-45.
- Ernst A and Zibrack J. 1998. Carbon monoxide poisoning. New Engl J Med. 339:1603-1608.
- Friedman P, et al. 2015 Carbon Monoxide Exposure During Pregnancy. Obstet Gynecol Surv.70(11):705-12.
- Longo L. 1977. The biological effects of carbon monoxide on the pregnant woman, fetus, and newborn infant. Am J Obstet Gynecol. 129:69-103.
- McElhatton PR, Easton T: 2003. Carbon Monoxide (CO) Poisoning in Pregnancy. J Toxicol Clin Toxicol. 41:552.
- Norman C and Halton D. 1990. Is Carbon Monoxide a Workplace Teratogen? A Review and Evaluation of the Literature. Ann Occup Hyg. 34(4)335-347.
- Nowadly C, et al. 2018. Severe unintentional first trimester carbon monoxide poisoning: case report. Undersea Hyperb Med. 45(4):453-456.
- Palmer J, et al. 2015. Carbon Monoxide Poisoning and Pregnancy: Critical Nursing Interventions. J Emerg Nurs.
- Pietrus M, et al. 2015. [Carbon monoxide poisoning in pregnant woman]. Przegl Lek. 72(9): 482-484.
- Quinn AK, et al. 2021. Prenatal household air pollutant exposure is associated with reduced size and gestational age at birth among a cohort of Ghanaian infants. Environ Int. 155:106659.
- Reynolds CME, et al. 2019. The implications of high carbon monoxide levels in early pregnancy for neonatal outcomes. Eur J Obstet Gynecol Reprod Biol. 233:6-11.
- Salam M, et al. 2005. Birth outcomes and prenatal exposure to ozone, carbon monoxide, and particulate matter: results from the Children's Health Study. Environ Health Perspect. 113:1638-1644.
- Seeni I, et al. 2018. Air pollution exposure during pregnancy: maternal asthma and neonatal respiratory outcomes. Ann Epidemiol. 28(9):612-618.
- Sexton M, et al. 1986. The effect of maternal smoking on the cognitive development of three year old children. Teratology. 33:31c-32c.
- Singh, J. 1986. Early behavioral alterations in mice following prenatal carbon monoxide exposure. Neurotoxicology. 7:475-482.
- Yildiz H, et al. 2010. A rare case of perinatal asphyxia: maternal carbon monoxide poisoning. Arch Gynecol Obstet. 281(2):251-4.

Câu hỏi? Gọi 866.626.6847 | Gửi tin nhắn đến 855.999.3525 | Gửi email hoặc trò chuyện tại [MotherToBaby.org](https://www.MotherToBaby.org).

Disclaimer: MotherToBaby Fact Sheets are meant for general information purposes and should not replace the advice of your health care provider. MotherToBaby is a service of the non-profit Organization of Teratology Information Specialists (OTIS). Copyright by OTIS, May 1, 2025.

Carbon Monoxide

Selected References:

- Aichhorn, Wolfgang et al. 2014. Mirtazapine and breast-feeding. *The American journal of psychiatry* vol. 161,12 (2004): 2325.
- Biswas PN, et al. 2003. The pharmacovigilance of mirtazapine: results of a prescription event monitoring study on 13,554 patients in England. *J Psychopharmacol* 17:121-6.
- Carvalho, André F et al. 2016. The Safety, Tolerability and Risks Associated with the Use of Newer Generation Antidepressant Drugs: A Critical Review of the Literature. *Psychotherapy and psychosomatics* vol. 85,5 (2016): 270-88.
- Djulus J, et al. 2006. Exposure to mirtazapine during pregnancy: a prospective, comparative study of birth outcomes. *J Clin Psychiatry* 67(8):1280-4.
- Einarson A, et al. 2009. Incidence of major malformations in infants following antidepressant exposure in pregnancy: results of a large prospective cohort study. *Can J Psychiatry* 54(4): 242-246.
- Grigoriadis S, et al. 2013. The effect of prenatal antidepressant exposure on neonatal adaptation: a systematic review and meta-analysis. *J Clin Psychiatry*. 74(4):e309-20.
- Goracci, Arianna et al. 2015. Benefici e potenziali rischi dell'utilizzo di antidepressivi in gravidanza: una revisione della letteratura [Antidepressant use in pregnancy: a critical review of the risk and benefits]. *Rivista di psichiatria* vol. 50,3 (2015): 118-26.
- Guclu S, et al. 2005. Mirtazapine use in resistant hyperemesis gravidarum: report of three cases and review of the literature. *Arch Gynecol Obstet* 272(4):298-300
- Kiević N, et al. 2015. Risk factors for poor neonatal adaptation after exposure to antidepressants in utero. *Acta Paediatr* 104(4):384-91.
- Kjaersgaard MI, et al. 2013. Prenatal antidepressant exposure and risk of spontaneous abortion – a population-based study. *PLoS One* 8(8):e72095.
- Klier C, et al. 2007. Mirtazapine and breastfeeding: maternal and infant plasma levels. *Am J Psychiatry* 164:2: 348-349.
- Kristensen JH, et al. 2007. Transfer of the antidepressant mirtazapine into breast milk. *Br J Clin Pharmacol* 63:322-7.
- Lennestål R. 2007. Delivery outcome in relation to maternal use of some recently introduced antidepressants. *J Clin Psychopharmacology* 27(6):607-613.
- Milosavljević, Jovana Z et al. 2022. The effects of selective serotonin reuptake inhibitors on male and female fertility: a brief literature review. *International journal of psychiatry in clinical practice* vol. 26(1): 43-49.
- Ostenfeld, Anne et al. 2022. Mirtazapine exposure in pregnancy and fetal safety: A nationwide cohort study. *Acta Psychiatr Scand* 145(6): 557-567.
- Ostenfeld A, et al. 2025. Mirtazapine in pregnancy and lactation: A systematic review of adverse outcomes. *Acta Psychiatr Scand* 151(1):6-32.

- Saks BR. 2001. Mirtazapine: treatment of depression, anxiety, and hyperemesis gravidarum in the pregnant patient: A report of 7 cases. Arch Womens Ment Health 3(4):165-170.
- Schwarzer V, et al. 2008. Treatment resistant hyperemesis gravidarum in a patient with type I diabetes mellitus: neonatal withdrawal symptoms after successful antiemetic therapy with mirtazapine. Arch Gynecol Obstet 277:67-69.
- Smit M, et al. 2016. Mirtazapine in pregnancy and lactation: A systemic review. European Neuropsychopharmacology 26:126-135.
- Smit M, et al. 2015 Mirtazapine in pregnancy and lactation: Data from a case series. J Clin Psychopharmacol 35:163-7.
- Sokolover N, et al. 2008. Neonatal recurrent prolonged hypothermia associated with maternal mirtazapine treatment during pregnancy. Can J Clin Pharmacol 15(2):e188-190.
- Sołek, Przemysław et al. 2021. Molecular Consequences of Depression Treatment: A Potential In Vitro Mechanism for Antidepressants-Induced Reprotoxic Side Effects. International journal of molecular sciences. 22(21):11855.
- Solek, P et al. 2021. Toxic effect of antidepressants on male reproductive system cells: evaluation of possible fertility reduction mechanism. J Physiol Pharmacol; 72(3).
- Tonn P, et al. 2009. High mirtazapine plasma levels in infant after breastfeeding: case report and review of the literature. J Clin Psychopharmacol; 29(2):191-192.
- Winterfeld U, et al. 2015. Pregnancy outcome following maternal exposure to mirtazapine: a multicenter, prospective study. J Clin Psychopharmacol; 35(3):25.

Câu hỏi? Gọi 866.626.6847 | Gửi tin nhắn đến 855.999.3525 | Gửi email hoặc trò chuyện tại [MotherToBaby.org](https://www.MotherToBaby.org).

Disclaimer: MotherToBaby Fact Sheets are meant for general information purposes and should not replace the advice of your health care provider. MotherToBaby is a service of the non-profit Organization of Teratology Information Specialists (OTIS). Copyright by OTIS, May 1, 2025.

Carbon Monoxide

Selected References:

- Broussard CS, et al. 2011. National Birth Defects Prevention Study: Maternal treatment with opioid analgesics

and risk for birth defects. Am J Obstet Gynecol. 204(4):314.e1-11.

- Cohen RS. 2009. Fentanyl transdermal analgesia during pregnancy and lactation. J Hum Lact. 25(3):359-361.
- Fishman B, et al. 2019. Pregnancy outcome following opioid exposure: A cohort study. PLoS One 14(7): e0219061.
- Fleet JA, et al. 2020. Fentanyl concentration in maternal and umbilical cord plasma following intranasal or subcutaneous administration in labour. Int J Obstet Anesth. 42:34-38.
- Larson JJ, et al. 2019. Cognitive and behavioral impact on children exposed to opioids during pregnancy. Pediatrics. 144(2): e20190514.
- Lind JN, et al. 2017. Maternal use of opioids during pregnancy and congenital malformations: A systemic review. Pediatrics. 139(6):e20164131.
- Mahomed K, et al. 2019. Does fentanyl epidural analgesia affect breastfeeding: A prospective cohort study. Aust N Z J Obstet Gynaecol. 59(6):819-824.
- Moore A, et al. 2016. Maternal Epidural Fentanyl Administered for Labor Analgesia Is Found in Neonatal Urine 24 Hours After Birth. Breastfeed Med. 11(1):40-1.
- Nitsun M, et al. 2006. Pharmacokinetics of midazolam, propofol, and fentanyl transfer to human breast milk. Clin Pharmacol Ther. 79(6):549-557.
- Rana D, et al. 2025. Illicit Fentanyl in the Prenatal Period: A Significant Emerging Risk for Neonatal Opioid Withdrawal Syndrome. American journal of perinatology, 42(7):891-898.
- Regan J, et al. 2000. Neonatal abstinence syndrome due to prolonged administration of fentanyl in pregnancy. Br J Obstet Gynecol. 107:570-572.
- Väänänen A, et al. 2019. Spinal and epidural sufentanil and fentanyl in early labour. Acta Anaesthesiol Scand. 63(10):1413-1418.
- Wadman E, et al. 2023. A novel syndrome associated with prenatal fentanyl exposure. Genetics in Medicine Open; 1, 100834.
- Yazdy MM, et al. 2013. Periconceptional use of opioids and the risk of neural tube defects. Obstetrics and Gynecology. 122(4):838-844.

Câu hỏi? Gọi 866.626.6847 | Gửi tin nhắn đến 855.999.3525 | Gửi email hoặc trò chuyện tại [MotherToBaby.org](https://www.MotherToBaby.org).

Disclaimer: MotherToBaby Fact Sheets are meant for general information purposes and should not replace the advice of your health care provider. MotherToBaby is a service of the non-profit Organization of Teratology Information Specialists (OTIS). Copyright by OTIS, May 1, 2025.

Carbon Monoxide

Selected References

- American College of Obstetricians and Gynecologists (ACOG). 2017 (Reaffirmed 2021). Marijuana Use During Pregnancy and Lactation. ACOG Committee Opinion Number. 722. Obstetrics & Gynecology 130(4).
- Arora M, et al. 2025. Cannabis use & female infertility: A cross sectional analysis of the National Health and Nutrition Examination Survey, 2013-2018. Ann Epidemiol. 104:1-7.
- Astley SJ, Little RE. 1990. Maternal marijuana use during lactation and infant development at one year. Neurotoxicol Teratol 12:161-8.
- Avalos LA, et al. 2024. Early maternal prenatal cannabis use and child developmental delays. JAMA Netw Open. 7(10):e2440295.
- Avalos LA, et al. 2024. Neonatal outcomes associated with in utero cannabis exposure: a population-based retrospective cohort study. Am J Obstet Gynecol. 231(1):132.e1-132.e13.
- Bandoli G, et al. Cannabis-related diagnosis in pregnancy and adverse maternal and infant outcomes. **Drug Alcohol Depend** 225:108757.
- Bertrand KA, et al. 2018. Marijuana use by breastfeeding mothers and cannabinoid concentrations in breast milk. Pediatrics 142:e20181076.
- Brik M, et al. 2024. Cannabis exposure during pregnancy and perinatal outcomes: a cohort study. Acta Obstet Gynecol Scand. 103(6):1083-1091.
- Carroll K, et al. 2020. Marijuana use and its influence on sperm morphology and motility: identified risk for fertility among Jamaican men. Andrology 8(1):136-142.
- Chabarria KC, et al. 2016. Marijuana use and its effects in pregnancy. Am J Obstet Gynecol 215(4):506.e1-7.
- Cioffredi LA, et al. 2022. Prenatal cannabis exposure predicts attention problems, without changes on fMRI in adolescents. Neurotoxicology and teratology 91, 107089.
- Coleman-Cowger V, et al. 2018. Prevalence and associated birth outcomes of co-use of cannabis and tobacco cigarettes during pregnancy. Neurotoxicity and Teratology 68:84-90
- Committee on Drugs, American Academy of Pediatrics. 2001. The transfer of drugs and other chemicals into human breast milk. Pediatrics 108:776-89.
- Corsi DJ, et al. 2020. Maternal cannabis use in pregnancy and child neurodevelopmental outcomes. Nat Med; 26, 1536-1540.
- Davis, E, et al. 2020. Cannabis use in pregnancy and breastfeeding: The pharmacist's role. Can Pharm J 153(2):95-100.
- Delker E, et al. 2022. Prenatal exposure to cannabis and risk of major structural birth defects: A systematic review and meta-analysis. Ob Gyn 142(2):269-283
- Delker E, et al. 2024. Prenatal cannabis use disorder and gastroschisis in California, 2007-19. Int J Epidemiol. 53(2):dyae042.
- ElSohly MA, et al. 2016. Changes in cannabis potency over the last 2 decades (1995-2014): Analysis of current data in the united states. biol psychiatry. 79(7):613-9.
- Feinshtein V, et al. 2013. Cannabidiol changes P-gp and BCRP expression in trophoblast cell lines. PeerJ 1:e153.
- Fried PA, Smith AM. 2001. A lit review of the consequences of prenatal marihuana exposure. An emerging theme of a deficiency in aspects of executive function. Neurotoxicol Teratol 23:1-11.
- Fronczak CM, et al. 2012. The insults of illicit drug use on male fertility. J Androl 33(4): 515-528.
- Goldschmidt L, et al. 2004. Prenatal marijuana and alcohol exposure and academic achievement at age 10. Neurotoxicol Teratol 26(4):521-32.
- Goldschmidt L, et al. 2008. Prenatal marijuana and intelligence test performance at age 6. J Am Acad Child Adolesc Psychiatry 47(3):254-263.

- Goldschmidt L, et al. 2016. Early marijuana initiation: Link between prenatal marijuana exposure, early childhood behavior, and negative adult roles. *Neurotoxicol Teratol* 58:40-45.
- Gray T, et al. 2010. Identifying prenatal cannabis exposure and effects of concurrent tobacco exposure on neonatal growth. *Clin Chem* 56(9):1442-1450.
- Gundersen TD, et al. 2015. Association between use of marijuana and male reproductive hormones and semen quality: A study among 1,215 healthy young men. *Am J Epidemiol.*;182(6):473-481.
- Hale D, Phillips W. 2022. Cannabis withdrawal in two newborns. Abstract published at SHM Converge 2022. Abstract G24 *Journal of Hospital Medicine*.
<https://shmabstracts.org/abstract/cannabis-withdrawal-in-two-newborns/>.
- Harhangi MS, et al. 2025. Placental endocannabinoid system: focus on preeclampsia and cannabis use. *Hypertension*. 82(5):804-815.
- Harris M, et al. 2023. Academy of Breastfeeding Medicine Clinical Protocol #21: Breastfeeding in the Setting of Substance Use and Substance Use Disorder (Revised 2023). *Breastfeed Med*. 18(10):715-733.
- Hayatbakhsh MR, et al. 2012. Birth outcomes associated with cannabis use before and during pregnancy. *Pediatric Res* 71(2): 215-219.
- Hehemann MC, et al. 2021. Evaluation of the impact of marijuana use on semen quality: a prospective analysis. *Therapeutic Advances in Urology* 13:17562872211032484.
- Huizink A. 2009. Moderate use of alcohol, tobacco, and cannabis during pregnancy: New approaches and update on research findings. *Reprod Toxicol* 28:143-151.
- Jones MJ, et al. 2022. Prenatal marijuana exposure and neonatal outcomes: a retrospective cohort study. *BMJ open*, 12(9), e061167.
- Karatayev O, et al. 2024. Neurological disorders induced by drug use: effects of adolescent and embryonic drug exposure on behavioral neurodevelopment. *Int J Mol Sci*. 25(15):8341.
- Keim SA, et al. 2024. Prenatal cannabis exposure and executive function and aggressive behavior at age 5 years. *JAMA Pediatr*. 178(12):1316-1325.
- Lam PK and Torfs CP. 2006. Interaction between maternal smoking and malnutrition in infant risk of gastroschisis. *Birth Defects Res* 76:182-186.
- Leech SL, et al. 1999. Prenatal substance exposure: effects on attention and impulsivity of 6-year-olds. *Neurotoxicol Teratol* 21(2):109-18.
- Leemaqz SY, et al, SCOPE Consortium. 2016. Maternal marijuana use has independent effects on risk for spontaneous preterm birth but not other common later pregnancy complications. *Reprod Toxicol* 62:77-86.
- Liston J. 1998. Breastfeeding and the use of recreational drugs alcohol, caffeine, nicotine and marijuana. *Breastfeed Rev* 6(2):27-30.
- Matrin GI. 2020. Marijuana: The effects on pregnancy, the fetus, and the newborn. *J Perinatology*; 40, 1470-1476.
- Metz TD, et al. 2017. Maternal marijuana use, adverse pregnancy outcomes, and neonatal morbidity. *Am J Obstet Gynecol*; 217:478.e1-8.
- Moore BF, et al. 2025. Impact of prenatal exposure to delta 9-tetrahydrocannabinol and cannabidiol on birth size and postnatal growth trajectories. *Pediatr Obes*. 20(1):e13187.
- Moss MJ, et al. 2021. Cannabis use and measurement of cannabinoids in plasma and breast milk of breastfeeding mothers. *Pediatric research*, 90(4), 861-868.
- Narayanan P, et al. 2025. The effect of cannabis consumption during lactation on the macronutrient concentrations in breast milk. *Breastfeeding Medicine*. 20(1):33-41.
- Neradugomma NK, et al. 2019. Marijuana-derived cannabinoids inhibit uterine endometrial stromal cell decidualization and compromise trophoblast-endometrium cross-talk. *Reprod Toxicol*; 87:100-107.
- Nguyen VH, Harley KG. 2022. Prenatal cannabis use and infant birth outcomes in the Pregnancy Risk Assessment Monitoring System. *The Journal of pediatrics*, 240, 87-93.
- Petersen JM, et al. 2025. An exploration of potential risk factors for gastroschisis using decision tree learning. *Ann Epidemiol*. 101:19-26.

- Pleau J, et al. 2025. Longitudinal associations between cannabis use during pregnancy and child cognitive, motor, and language development at 2 years old. *Matern Child Health J* 29(4):549-562.
- Roca A, et al. 2021. Clinical features and risk factors associated with prenatal exposure to drugs of abuse. *Anales de pediatria*, 95(5), 307-320.
- Ryan SA, et al. 2018. . Marijuana use during pregnancy and breastfeeding: implications for neonatal and childhood outcomes, *Pediatrics*. 142(3):e20181889.
- Sarrafpour S, et. al. 2020. Considerations and Implications of cannabidiol use during pregnancy. *Curr Pain Headache Rep*; 24, 38.
- Sasso EB, et al. 2021. Marijuana use and perinatal outcomes in obstetric patients at a safety net hospital. *European journal of obstetrics, gynecology, and reproductive biology*, 266, 36-41.
- Smith AM, et al. 2004. Effects of prenatal marijuana on response inhibition: an MRI study of young adults *Neurotoxicol Teratol* 26(4):533-42.
- Sonon, KE, et al. 2014. Prenatal marijuana exposure predicts marijuana use in young adulthood. *Neurotoxicol Teratol*. 47:10-15.
- Tadesse AW, et al. 2025. Maternal cannabis use disorder and neonatal health outcomes: a data linkage study. *BJOG*. 132(4):529-538.
- Tadesse AW, et al. 2025. Maternal cannabis use disorder and offspring behavioral outcomes: findings from a linked data cohort study. *Psychiatry Res*. 346:116404.
- Thompson R, et al. 2019. Marijuana use in pregnancy: A review. *Obstet Gynecol Surv*. 74(7):415-428.
- S. Food and Drug Administration (FDA). 2019. What You Should Know About Using Cannabis, Including CBD, When Pregnant or Breastfeeding: Available at: <https://www.fda.gov/consumers/consumer-updates/what-you-should-know-about-using-cannabis-including-cbd-when-pregnant-or-breastfeeding> [Accessed 10/2022].
- Varner MW, et al. 2014. Association between stillbirth and illicit drug use and smoking during pregnancy. *Obstet Gynecol*; 123(1):113-25.
- Weinsheimer RL, et al. 2008. Impact of maternal substance abuse and smoking on children with gastroschisis. *J Pediatr Surg* 43:879-883.
- Williams LJ, et al. 2004. Maternal lifestyle factors and risk for ventricular septal defects. *Birth Defects Res A Clin Mol Teratol* 70:59-64.
- Young-Wolff KC, et al. 2024. Prenatal cannabis use and maternal pregnancy outcomes. *JAMA Intern Med*. 184(9):1083-1093.
- Young-Wolff KC, et al. 2025. Prenatal cannabis use and offspring attention deficit hyperactivity disorder and disruptive behavior disorders: a retrospective cohort study. *J Dev Behav Pediatr*. 46(1):e25-e32.

Câu hỏi? Gọi 866.626.6847 | Gửi tin nhắn đến 855.999.3525 | Gửi email hoặc trò chuyện tại MotherToBaby.org.

Disclaimer: MotherToBaby Fact Sheets are meant for general information purposes and should not replace the advice of your health care provider. MotherToBaby is a service of the non-profit Organization of Teratology Information Specialists (OTIS). Copyright by OTIS, May 1, 2025.

Carbon Monoxide

Selected References:

- Adkoli A, et al. 2022. Access to Family Planning Services Following Natural Disasters and Pandemics: A Review of the English Literature. *Cureus*. 14(7):e26926.
- Atkin K, et al. 2024. Climate-Related Emergencies in Pregnancy. *AACN Adv Crit Care*. 35(4):343-352.
- Ha S. 2022. The Changing Climate and Pregnancy Health. *Curr Environ Health Rep*. 9(2):263-275.
- Pashaei-Asl Y, et al. Consequences of Natural and Man-made Disasters on Pregnancy Outcomes and Complications: A Systematic Review. *Arch Acad Emerg Med*. 12(1):e61.
- Severson E, et al. 2023. Experiencing Trauma During or Before Pregnancy: Qualitative Secondary Analysis After Two Disasters. *Matern Child Health J*. 27(5):944-953.
- Suter MA, et al. 2023. Natural disasters resulting from climate change: The impact of hurricanes and flooding on perinatal outcomes. *Semin Perinatol*. 47(8):151840.

Câu hỏi? Gọi 866.626.6847 | Gửi tin nhắn đến 855.999.3525 | Gửi email hoặc trò chuyện tại MotherToBaby.org.

Disclaimer: MotherToBaby Fact Sheets are meant for general information purposes and should not replace the advice of your health care provider. MotherToBaby is a service of the non-profit Organization of Teratology Information Specialists (OTIS). Copyright by OTIS, May 1, 2025.