

ACAM2000® Smallpox Vaccine

Selected References:

- ACAM2000® Product Insert. Revised 08/2024. Available at URL: <https://www.fda.gov/media/75792/download>.
- Centers for Disease Control and Prevention. 2016. Contraindications to vaccination: nonemergency use of smallpox vaccine. Available at URL: <https://www.cdc.gov/smallpox/clinicians/vaccination-contraindications1.html>.
- Meaney-Delman, DM, et al. 2022. A primer on monkeypox virus for obstetrician-gynecologists, Obstetrics & Gynecology. Published online July 11, 2022. DOI: <https://doi.org/10.1097/AOG.0000000000004909>.
- Ryan MD, et al. 2003. Women with smallpox vaccine exposure during pregnancy reported to the national smallpox vaccine in pregnancy registry — United States, 2003. MMWR Morb Mortal Wkly Rep 2003;52(17):386-388.

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Selected References:

- Repatha® Prescribing Information. Available online at https://www.pi.amgen.com/-/media/Project/Amgen/Repository/pi-amgen-com/Repatha/repatha_pi_hcp_english.pdf accessed on October 17, 2024.

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ACAM2000® Smallpox Vaccine

Selected References:

- Bayliss H, et al. 2002. Anti-hypertensive drugs in pregnancy and fetal growth: evidence for “pharmacological programming” in the first trimester? *Hypertens Pregnancy*; 21:161-74.
- Bratton S, et al. 2024. Does atenolol use during pregnancy cause small for gestational age neonates? A meta-analysis. *Journal of Perinatal Medicine*, 52(8), 858-862.
- Caton AR, et al. 2009. Antihypertensive medication use during pregnancy and the risk of cardiovascular malformations. *Hypertension*; 54(1):63-70.
- Easterling TR, et al. 1999. Prevention of preeclampsia: a randomized trial of atenolol in hyperdynamic patients before onset of hypertension. *Obstet Gynecol*; 93(5 Pt 1):725-733.
- Eyal S, et al. 2010. Atenolol pharmacokinetics and excretion in breast milk during the first 6 to 8 months postpartum. *J Clin Pharmacol*; 50:1301-9.
- Fogari R, et al. 1998. Sexual function in hypertensive males treated with lisinopril or atenolol: a cross-over study. *American journal of hypertension*. 11(10): 1244-47.
- Fogari R, et al. 2002. Effect of antihypertensive treatment with valsartan or atenolol on sexual activity and plasma testosterone in hypertensive men. *Eur J Clin Pharmacol*; 58: 177-80.
- Guo D, et al. 2017. Hypertension and male fertility. *The world journal of men’s health*; 35.2: 59-64.
- Kirch W & Görg KG. 1982. Clinical pharmacokinetics of atenolol—a *Circ J*. 80(10): 2221-6.
- Lip GY, et al. 1997. Effect of atenolol on birth weight. *Am J Cardiol*; 79: 1436-8.
- Lwin EMP, et al. 2018. Estimation of atenolol transfer into milk and infant exposure during its use in lactating women. *J Hum Lact*; 34(3):592-599.
- Lydakis C, et al. 1999. Atenolol and fetal growth in pregnancies complicated by hypertension. *Am J Hypertens*; 12:541-7.
- Mayo Foundation for Medical Education and Research, 2022, Atenolol (Oral Route), Mayo 1: 1-10
- Montan S, et al. 1987. Fetal and uteroplacental haemodynamics during short term atenolol treatment of hypertension in pregnancy. *Br J Obstet Gynaecol*; 94:312-317.
- Orbach H, et al. 2013. Hypertension and antihypertensive drugs in pregnancy and perinatal outcomes. *Am J Obstet Gynecol*; 208(4): 301.e1-301.e6.

- Räsänen J, Jouppila P. 1995. Uterine and fetal hemodynamics and fetal cardiac function after atenolol and pindolol infusion. A randomized study. Eur J Obstet Gynecol Reprod Biol; 62:195-201.
- Reynolds B, et al. 1984. First year of life after the use of atenolol in pregnancy associated with hypertension. Arch Dis Child; 59(11):1061-1063.
- Rubin PC, et al. 1983. Placebo-controlled trial of atenolol in treatment of pregnancy-associated hypertension. Lancet; 1:431-4.
- Rubin PC, et al. 1984. Obstetric aspects of the use in pregnancy-associated hypertension of the beta-adrenoceptor antagonist atenolol. Am J Obstet Gynecol; 150:389-92.
- Schimmel M, et al. 1989. Toxic effect of atenolol consumed during breast feeding. J Pediatrics; 114:476-8.
- Tabacova S, et al. 2003. Atenolol developmental toxicity: animal-to-human comparisons. Birth Defects Res; 67:181-92.
- Tanaka K, 2016. Beta-blockers and fetal growth restriction in pregnant women with cardiovascular
- Thorley KJ, McAnish J. 1983. Levels of the beta-blockers atenolol and propranolol in the breast milk of women treated for hypertension in pregnancy. Biopharm Drug Dispos; 4:229-301.
- White WB, et al. 1984. Atenolol in human plasma and breast milk. Obstet Gynecol; 63 (S1):42-44. **European journal of drug metabolism and pharmacokinetics**, 7 (2), 81-91. <https://doi.org/10.1007/BF03188723>.

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ACAM2000® Smallpox Vaccine

Selected References:

- Ahmed E, Abdel-Emam R. 2019. The potential impact of 1st and 2nd generation antihistamines on male fertility. Comp Clin Pathol, 28, 1465-1470.
- Einarson A, et al. 1997. Prospective controlled study of hydroxyzine and cetirizine in pregnancy. Annals of Allergy, Asthma & Immunology, 78, 183-186.
- Etwel F, et al. 2014. The fetal safety of cetirizine: an observational cohort study and meta-analysis. Journal of

Obstetrics and Gynaecology. 34(5):392-9.

- Gilbert C, et al. 2005. Fetal safety of drugs used in the treatment of allergic rhinitis. Drug Safety, 28(8), 707-719.
- Andersson N, et al. 2020. Association Between Fexofenadine Use During Pregnancy and Fetal Outcomes. JAMA Pediatr. 174(8):e201316.
- Gilboa S, et al. & The National Birth Defects Prevention Study. 2009. Use of antihistamine medications during early pregnancy and isolated major malformations. Birth Defects Research Part A: Clinical and Molecular Teratology, 85, 137-150.
- Golembesky A, et al. 2018. Safety of cetirizine in pregnancy. Journal of Obstetrics and Gynaecology, 22, 1-6.
- Hayashi T, et al. 2006. Asthenospermia in hay fever patients improved by stopping treatment with histamine H1 receptor antagonists. International Journal of Urology. 13(7):1028-30.
- Powell R, et al. 2007. BSACI guidelines for the management of chronic urticaria and angio-oedema. Clinical and Experimental Allergy, 37, 631-650.
- So M, et al. 2010. Safety of antihistamines during pregnancy and lactation. Canadian Family Physician, 56, 427-429.
- Nordeng, H, et al. 2024. Transfer of cetirizine/levocetirizine into human breast milk and estimation of drug exposure to infants through breastfeeding: A human lactation study from the CONCEPTION project. Basic & clinical pharmacology & toxicology, 134(1), 153-164.
- Weber-Schoendorfer C & Schaefer C. 2008. The safety of cetirizine during pregnancy: A prospective observational cohort study. Reproductive Toxicology, 26(1), 19-23.
- Wegler, C, et al. 2022. Simple and rapid quantification of cetirizine, venlafaxine, and O-desmethylvenlafaxine in human breast milk, and metformin in human milk and plasma with UHPLC-MS/MS. Journal of chromatography. B, Analytical technologies in the biomedical and life sciences, 1205, 123340.
- Wilkerson, H, et al. 2021. Maternal Transfer of Cetirizine Into Human Milk. Journal of human lactation: official journal of International Lactation Consultant Association, 37(1)135-138.
- Wilton L, et al. 1998. The outcomes of pregnancy in women exposed to newly marketed drugs in general practice in England. British Journal of Obstetrics and Gynecology, 105, 882-889.
- Wolfgang P, et al. 2004. Pregnancy outcome after exposure to cetirizine/levocetirizine in the first trimester—a prospective controlled study. Reproductive Toxicology 19(2):258.
- Zyrtec Product Labeling. 09/05/2024.
<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b165db38-b302-4220-8627-77cb07bb078c>.

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ACAM2000® Smallpox Vaccine

Selected References:

- Alhussien A, et al. 2018. Safety of intranasal corticosteroid sprays during pregnancy: and updated Review. *Eur Arch Otorhinolaryngol.* 275(2):325-333.
- Bakhireva LN, et al. 2005. Asthma medication use in pregnancy and fetal growth. *Allergy Clin Immunol* 116(3):503-509.
- Bay Bjørn AM, et al. 2014. Use of corticosteroids in early pregnancy is not associated with risk of oral clefts and other congenital malformations in offspring. *Am J Ther;* 21(2):73-80.
- Bay Bjørn AM, et al. 2015. Use of Inhaled and Oral Corticosteroids in Pregnancy and the Risk of Malformations or Miscarriage. *Basic Clin Pharmacol Toxicol* 116: 308-314.
- Bérard A, et al. 2016. Intranasal triamcinolone use during pregnancy and the risk of adverse pregnancy outcomes. *J Allergy Clin Immunol* 136(1):97-104.
- Blais L, et al. 2007. Use of inhaled corticosteroids during the first trimester of pregnancy and the risk of congenital malformations among women with asthma. *Thorax* 62:320-328.
- Blais L, et al. 2009. High doses of inhaled corticosteroids during the first trimester of pregnancy and congenital malformations. *J Allergy Clin Immunol* 124(6):1229-1234.
- Charlton RA, et al. 2015. Safety of fluticasone propionate prescribed for asthma during pregnancy: A UK population-based cohort study. *J Allergy Clin Immunol Pract* 3(5):772-9.e3.
- Cossette B, et al. 2013. Impact of maternal use of asthma-controller therapy on perinatal outcomes. *Thorax* 68(8):724-30.
- Ellsworth A. 1994. Pharmacotherapy of asthma while breastfeeding. *J Hum Lact* 10:39-41.
- Fält A, et al. 2007. Exposure of infants to budesonide through breast milk of asthmatic mothers. *J Allergy Clin Immunol* 120(4):798-802.
- Gade EJ, et al. 2022. Challenges in the successful management of asthma during conception, pregnancy and delivery. *Breathe* 18:220013.
- Greenberger PA, Patterson R. 1983. Beclomethasone dipropionate for severe asthma during pregnancy. *Ann Internal Med* 98:478-480.
- Källén B, et al. 1999. Congenital malformations after the use of inhaled budesonide in early pregnancy. *Obstet Gynecol* 93(3):392-395.
- Lee, S, et al. 2024. Impact of Asthma Medications During Pregnancy on Asthma Exacerbation, Maternal, and Neonatal Outcomes. *The journal of allergy and clinical immunology. In practice*, 12(6), 1549-1557.e3.
- Lim AS, et al. 2011. Management of asthma in pregnant women by general practitioners: A cross sectional survey *BMC Family Practice* 12:121
- Namazy J, et al. 2004. Use of inhaled steroids by pregnant asthmatic women does not reduce intrauterine growth. *J Allergy Clin Immunol* 113(3):427-432.
- Norjavaara E and Gerhardsson de Verdier MG. 2003. Normal pregnancy outcomes in a population-based study including 2968 pregnant women exposed to budesonide. *J Allergy Clin Immunol* 111(4):736-742.
- Rocklin RE. 2011. Asthma, asthma medications and their effects on maternal/fetal outcomes during pregnancy. *Reprod Toxicol* 32 (2011) 189-197
- Schatz M, et al. 2004. The relationship of asthma medication use to perinatal outcomes. *J Allergy Clin Immunol* 113(6):1040-1045.
- Steinberg JA. 2015. Perception versus reality: the saga of inhaled asthma controller medication and fetal risk. *J*

Allergy Clin Immunol 135(1):131-2.

- Wei, J, et al. 2023. The risk of congenital heart defects associated with corticosteroids use during the first trimester of pregnancy: a systematic review and meta-analysis. *European journal of clinical pharmacology*, 79(1), 1-11.

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