



HEALTH HARMS CAUSED BY PREGNANT WOMEN SMOKING OR BEING EXPOSED TO SECONDHAND SMOKE

Numerous research studies in the United States and overseas have found that smoking and exposure to secondhand smoke among pregnant women is a major cause of spontaneous abortions, premature births, stillbirths, and many other complications such as placenta previa, placental abruption, and a shorter gestation period.¹ Both smoking during pregnancy and secondhand smoke exposure by the pregnant mother increases the risk of sudden infant death syndrome (SIDS).² According to a meta-analysis of published studies, tobacco use is responsible each year for 19,000 to 141,000 spontaneous abortions; 1,900 to 4,800 infant deaths caused by perinatal or pre-birth disorders; and 1,200 to 2,200 deaths from SIDS.³ A more recent comprehensive study found that parental smoking causes 2,800 deaths at birth and 2,000 deaths from SIDS.⁴ Almost one quarter of all SIDS deaths have been attributed to prenatal maternal smoking; and fetal mortality rates are 35 percent higher among pregnant women who smoke than among nonsmokers.⁵

Smoking during pregnancy creates a more serious risk of spontaneous abortion and a greater threat to the survival and health of newborns and children than using cocaine during pregnancy.⁶ Of the top 15 causes of infant mortality identified by the National Center for Health Statistics for 2005 (the most recent data available), smoking during pregnancy contributes to five.⁷ It is also a much more pervasive problem. Roughly one out of every ten pregnant women smoke, accounting for half a million births per year – and many more non-smoking pregnant women are regularly exposed to secondhand smoke.⁸ And the problem is likely larger because some pregnant women do not report their tobacco use or exposure.⁹

Besides the risks listed above, smoking and exposure to secondhand smoke during pregnancy directly increases the risk of each of the following:¹⁰

- ectopic pregnancies
- other birth and delivery problems
- brain damage during gestation
- growth retardation/low birth weight
- later overweight in children
- abnormal blood pressure in infants + kids
- problems requiring neonatal intensive care
- infant death from perinatal disorders
- cleft palates and lips
- cancer-causing agents in infants' blood
- potentially carcinogenic genetic mutations
- childhood leukemia
- infantile colic
- childhood wheezing
- respiratory disorders in childhood
- eye problems during childhood
- mental retardation
- attention deficit disorder
- other learning & developmental problems
- behavioral problems
- youth and adult violence and criminality
- smoking during adolescence
- various health problems in adulthood

Smoking by fathers prior to conception and while the mother is pregnant (exposing her to secondhand smoke) may also increase the risk of childhood cancers, mental retardation, and respiratory problems among offspring, even when the mother does not smoke.¹¹

Research studies estimate that the direct additional health care costs in the United States associated just with the birth complications caused by pregnant women smoking or being exposed to secondhand smoke could be as high as \$2 billion per year.¹² The medical condition with the highest average hospital charges nationwide is infant respiratory distress syndrome (\$68,000 per episode), which can be caused by pregnant women smoking or being exposed to secondhand smoke; and the third highest is for premature and low-birthweight birth (\$50,000), which can also be smoking caused.¹³ More broadly, parental smoking has been estimated to cause direct medical expenditures of more than \$4.5 billion per year to care for smoking-caused problems of exposed newborns, infants, and children, as well as to treat pregnancy and birth complications.¹⁴ These estimates do not include the enormous smoking-and-pregnancy costs associated with the physical, developmental, and behavioral problems of affected offspring that can extend throughout their entire lives.

Exposure to parental smoking after birth can exacerbate all of these problems and increase related costs. For example, parental or other household smoking after birth further increases the chances that children will suffer from smoke-caused coughs and wheezing, bronchitis, asthma, pneumonia, potentially fatal lower respiratory tract infections, meningitis, SIDS, eye and ear problems, or injury or death from cigarette-caused fires.¹⁵ Each year, more than 20,000 children are hospitalized for respiratory illnesses caused by their parents' tobacco use and over 1,000 die from them.¹⁶ Smoking-caused fires kill another 200 children each year, and as many as 10,000 more suffer from fire-caused injuries.¹⁷ According to a 1997 study, kids' exposure to secondhand smoke leads to over 500,000 physician visits for asthma and 1.3 million visits for coughs, and to more than 115,000 episodes of pneumonia, 14,000 tonsillectomies or adenoidectomies, 260,000 episodes of bronchitis, two million cases of otitis media among children (an acute or chronic inflammation of the middle ear), and 5,200 tympanostomies (middle ear operations).¹⁸ In addition, poison control centers annually receive thousands of reports of young children ingesting cigarettes, cigarette butts, and other tobacco products that they find around the house, in ashtrays, or in the garbage.¹⁹

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¹ U.S. Department of Health and Human Services (HHS), *The health consequences of smoking: a report of the Surgeon General*, Atlanta, GA: HHS, Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004, http://www.cdc.gov/tobacco/data_statistics/sgr/2004/complete_report/index.htm.

² HHS, *The health consequences of smoking: a report of the Surgeon General*, Atlanta, GA: HHS, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004, http://www.cdc.gov/tobacco/data_statistics/sgr/2004/complete_report/index.htm; HHS, *The health consequences of involuntary exposure to tobacco smoke : a report of the Surgeon General*, Atlanta, GA: HHS, CDC, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006, <http://www.surgeongeneral.gov/library/secondhandsmoke/report/>.

³ DiFranza, JR & Lew, RA, "Effect of Maternal Cigarette Smoking on Pregnancy Complications and Sudden Infant Death Syndrome," *Journal of Family Practice* 40(4):385-94, April 1995.

⁴ Aligne, CA & Stoddard, JJ, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine* 151(7):648-53, July 1997.

⁵ Pollack, H, "Sudden Infant Death Syndrome, Maternal Smoking During Pregnancy, and the Cost-Effectiveness of Smoking Cessation Intervention," *American Journal of Public Health (AJPH)* 91(3):432-36, March 2001; National Center for Health Statistics (NCHS), "Medical and Life-Style Risk Factors Affecting Fetal Mortality, 1989-90," *Vital and Health Statistics* 20(31), August 1996.

⁶ Slotkin, TA, "Fetal Nicotine or Cocaine Exposure: Which is Worse?" *Journal of Pharmacology and Experimental Therapeutics* 285(3):931-45, June 1998; Ness, RB, et al., "Cocaine and Tobacco Use and the Risk of Spontaneous Abortion," *New England Journal of Medicine* 340(5):333-339, February 4, 1999.

⁷ Kung, HC, et al., "Table C. Infant deaths and infant mortality rates for the 10 leading causes of infant death: United States, preliminary 2005," *Health E-Stats*, NCHS, September 2007.

⁸ See, e.g., Matthews, TJ, "Smoking During Pregnancy in the 1990s," *National Vital Statistics Report* 49(7), August 28, 2001; NCHS, "Births: Final Data for 2002," *National Vital Statistics Report* 52 (10), December 17, 2003; Rebagliato, M, et al., "Assessments of Exposure to Environmental Tobacco Smoke in Nonsmoking Pregnant Women in Different Environments of Daily Living," *American Journal of Epidemiology (AJE)* 142(5):525-30, September 1995. A 2010 study found that smoking during mid to late pregnancy may actually reduce preeclampsia risk, however the multiple other harms from smoking during pregnancy vastly outweigh this one possible benefit. Wikstrom, Anna-Karin, et al., "Tobacco Use During Pregnancy and Preeclampsia Risk: Effects of Cigarette Smoking and Snuff" *Hypertension* 55(5) 1110-101.

⁹ See, e.g., Markovic, R, et al., "Substance Use Measures Among Women in Early Pregnancy," *American Journal of Obstetrics & Gynecology* 183:627-32, September 2000.

¹⁰ **Ectopic pregnancies and other pregnancy complications:** Andres, RL & Day, M-C, "Perinatal Complications Associated with Maternal Tobacco Use," *Seminars in Neonatology* 5(3):231-41, August 2000; Castles, A, et al., "Effects of Smoking During Pregnancy: Five Meta-Analyses," *American Journal of Preventive Medicine (AJPM)* 16(3): 201-215, April 1999; Ahluwalia, IB, et al., "Exposure to Environmental Tobacco Smoke and Birth Outcome: Increased Effects on Pregnant Women Aged 30 Years or Older," *AJE* 146(1):42-47, July 1997; Witschi, H, et al., "Effects of Exposure to Nicotine and to Sidestream Smoke on Pregnancy Outcome in Rats," *Toxicology Letters* 71(3):279-86, May 1994; Saraaiya, M, et al., "Cigarette Smoking As a Risk Factor for Ectopic Pregnancy," *American Journal of Obstetric Gynecology* 178(3):493-98, March 1998; Annath, CV, et al., "Maternal Cigarette Smoking as a Risk Factor for Placental Abruption, Placenta Previa, and Uterine Bleeding in Pregnancy," *AJE* 144(9):881-89, November 1, 1996; Spinillo, A, et al., "Epidemiologic Association Between Maternal Smoking During Pregnancy and Intracranial

Hemorrhage in Preterm Infants," *Journal of Pediatrics* 127(3): 472-78, September 1995. **Early delivery, low birth-weight babies, and growth problems after birth:** Wiborg, K, et al., "Smoking During Pregnancy and Pre-term Birth," *British Journal of Obstetrics and Gynaecology* 103(8):800-05, August 1996; Dejin-Karlsson, E, et al., "Does Passive Smoking in Early Pregnancy Increase the Risk of Small-for-Gestational-Age Infants?" *AJPH* 88(1):1523-27, October 1998; Martin, TR & Bracken, MB, "Association of Low Birth Weight with Passive Smoke Exposure in Pregnancy," *AJE* 124(4):633-42, October 1986; Jones, G, et al., "Maternal Smoking During Pregnancy, Growth and Bone Mass in Prepubertal Children," *Journal of Bone and Mineral Research* 14(1):146-51, January 1999; Eskenazi, B & Bergmann, JJ, "Passive and Active Maternal Smoking During Pregnancy, as Measured by Serum Cotinine, and Postnatal Smoke Exposure. I. Effects on Physical Growth at 5 Years," *AJE* 142(9 Supplement):S10-18, November 1995; Elwood, PC, et al., "Growth of Children from 0-5 Years: with Special Reference to Mother's Smoking in Pregnancy," *Annals of Human Biology* 14(6):543-57, November-December 1987. Mendez, M, et al., "Maternal smoking very early in pregnancy is related to child overweight at age 5-7" *Am J Clin Nutr* 87(6):1906-13. **Abnormal blood pressure in infants and children:** Morley, R, et al., "Maternal Smoking and Blood Pressure in 7.5 to 8 Year Old Offspring," *Archives of Disease in Childhood* 72(2):120-24, February 1995; Blake, KV et al., "Maternal Cigarette Smoking During Pregnancy, Low Birth Weight and Subsequent Blood Pressure in Early Childhood," *Early Human Development* 57:137-147, 2000. **Cleft palates and lips:** Nagourney, E, "Consequences: Linking Cleft Palates and Smoking Moms, *New York Times*, April 12, 2000, [citing recent study in *Plastic and Reconstructive Surgery*, the journal of the American Society of Plastic Surgeons]. **Links with carcinogens and cancer:** Lackmann, GM, et al., "Metabolites of a Tobacco-Specific Carcinogen in Urine from Newborns," *Journal of the National Cancer Institute (JNCI)* 91(5):459-65, March 1999; Finette, BA, et al., "Gene Mutations with Characteristic Deletions in Cord Blood T Lymphocytes Associated with Passive Maternal Exposure to Tobacco Smoke," *Nature Medicine* 4(10):1144-51, October 1998; Wise, J, "Carcinogen in Tobacco Smoke Can Be Passed to Fetus," *British Medical Journal (BMJ)* 317(7158):555, August 29, 1998; Crawford, FG, et al., "Biomarkers of Environmental Tobacco Smoke in Preschool Children and Their Mothers," *JNCI* 86(18):1398-402, September 21, 1994; Stjernfeldt, M, et al., "Maternal Smoking and Irradiation During Pregnancy as Risk Factors for Child Leukemia," *Cancer Detection and Prevention* 16(2):129-35, 1992. **Birth defects:** Kallen, K, "Maternal Smoking During Pregnancy and Limb Reduction Malformations in Sweden," *AJPH* 87(1):29-32, January 1997; Czeizel, AE, et al., "Smoking During Pregnancy and Congenital Limb Deficiency," *BMJ* 308(6942):1473-76, June 1994; Drews, CD, et al., "The Relationship Between Idiopathic Mental Retardation and Maternal Smoking During Pregnancy," *Pediatrics* 97(4):547-53, April 1997. **Colic:** Reijneveld, SA, et al., "Infantile Colic: Maternal Smoking As Potential Risk Factor," *Archives of Disease in Childhood* 83:302-303, October 2000. **Wheezing and respiratory problems:** Hu, FB, et al., "Prevalence of Asthma and Wheezing in Public Schoolchildren: Association with Maternal Smoking During Pregnancy," *Annals of Allergy, Asthma, and Immunology* 79(1):80-84, July 1997; Tager, IB, et al., "Maternal Smoking During Pregnancy: Effects on Lung Function During the First 18 Months of Life," *American Journal of Respiratory and Critical Care Medicine* 152(3):977-83, September 1995; Lux, AL, et al., "Wheeze Associated with Prenatal Tobacco Smoke Exposure: A Prospective, Longitudinal Study," *Archives of Disease in Childhood* 83:307-12, October 2000. **Eye problems:** Hakim, RB & Tielsch, JM, "Maternal Cigarette Smoking During Pregnancy: A Risk Factor for Childhood Strabismus," *Archives of Ophthalmology* 110(10):1459-62, October 1992. **Impaired intellectual development:** Frydman, M, "The Smoking Addiction of Pregnant Women and the Consequences on the Offspring's Intellectual Development," *Journal of Environmental Pathology, Toxicology and Oncology* 15(2-4):169-72, 1996; Olds, DL, et al., "Intellectual Impairment in Children of Women Who Smoke During Pregnancy," *Pediatrics* 93(2):221-27, February 1994 [correction published in 93 (6, Pt 1): 973, June 1994]. **Developmental and behavioral problems, including criminality:** Milberger, S, et al., "Further Evidence of an Association Between Maternal Smoking During Pregnancy and Attention Deficit Hyperactivity Disorder: Findings from a High-Risk Sample of Siblings," *Journal of Clinical Child Psychology* 27(3):352-58, October 1998; Orlebeke, JF, et al., "Child Behavior Problems Increased By Maternal Smoking During Pregnancy," *Archives of Environmental Health* 54(1):15-19, January-February 1999; Fergusson, DM & Horwood, LJ, "Prospective Childhood Predictors of Deviant Peer Affiliations in Adolescence," *Journal of Child Psychology and Psychiatry* 40(4):581-92, May 1999; Orlebeke, JF, et al., "Increase in Child Behavior Problems Resulting From Maternal Smoking During Pregnancy," *Archives of Environmental Health* 52(4):317-21, July-August 1997; Fergusson, DM, et al., "Maternal Smoking During Pregnancy and Psychiatric Adjustment in Late Adolescence," *Archives of General Psychiatry* 55(8):721-27, August 1998; Wakschlag, LS, et al., "Maternal Smoking During Pregnancy and the Risk of Conduct Disorder in Boys," *Archives of General Psychiatry* 54(7):670-76, July 1997; Brennan, PA, et al., "Maternal Smoking During Pregnancy and Adult Male Criminal Outcomes," *Archives of General Psychiatry* 56(3):215-19, March 1999. **Future smoking by offspring:** Kandel, DB, et al., "Maternal Smoking During Pregnancy and Smoking by Adolescent Daughters," *AJPH* 84(9):1407-13, September 1994. **Various future adult health problems:** Clemmesen, J, "Is Smoking During Pregnancy a Cause of Testicular Cancer?" *Ugeskrift For Laeger* [Danish] 159(46):6815-19, November 10, 1997; Tredaniel, J, et al., "Exposure to Passive Smoking During Pregnancy and Childhood, and Cancer Risk: The Epidemiological Evidence," *Paediatric and Perinatal Epidemiology* 8(3):233-55, July 1994.

¹¹ HHS, *The health consequences of involuntary exposure to tobacco smoke : a report of the Surgeon General*, Atlanta, GA: HHS, CDC, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006, <http://www.surgeongeneral.gov/library/secondhandsmoke/report/>; Ji, BT, et al., "Paternal Cigarette Smoking and the

Risk of Childhood Cancer Among Offspring of Nonsmoking Mothers," *JNCI* 89(3):238-44, February 1999; Roeleveld, N, et al., "Mental Retardation Associated with Parental Smoking and Alcohol Consumption Before, During, and After Pregnancy," *Preventive Medicine* 21(1):110-19, January 1992.

¹² CDC, "Medical Care Expenditures Attributable to Cigarette Smoking During Pregnancy—United States, 1995,"

Morbidity and Mortality Weekly Report (MMWR) 46(44):1048-1050, November 7, 1997,

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00049800.htm>. See also, Adams, EK & Melvin, CL, "Costs of Maternal Conditions Attributable to Smoking During Pregnancy," *AJPM* 15(3):212-219, October 1998; Lightwood, JM, et al., "Short-Term Health and Economic Benefits of Smoking Cessation: Low Birth Weight," *Pediatrics* 104(6):1312-1320, December 1999; Miller, D, et al., "Birth and first-year costs for mother and infants attributable to maternal smoking," *Nicotine & Tobacco Research* 3:25-35, 2001.

¹³ U.S. Agency for Healthcare Research & Quality, *Hospitalization in the United States, 1997, 2000*.

¹⁴ Aligne, CA & Stoddard, JJ, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine*, 151:648-653, July 1997.

¹⁵ See, e.g., Li, JS, et al., "Meta-Analysis on the Association Between Environmental Tobacco Smoke (ETS) Exposure and the Prevalence of Lower Respiratory Tract Infection in Early Childhood," *Pediatric Pulmonology* 27(1):5-13, January 1999; DiFranza, JR & Lew, RA, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4):560-68, April 1997; Adair-Bischoff, CE & Sauve, RS, "Environmental Tobacco Smoke and Middle Ear Disease in Preschool-Age Children," *Archives of Pediatric and Adolescent Medicine* 52(2):127-33, February 1999; American Academy of Pediatrics Committee on Environmental Health, "Environmental Tobacco Smoke: A Hazard to Children," *Pediatrics* 99(4):639-42, April 1997; Mannino, DM, et al., "Environmental Tobacco Smoke Exposure and Health Effects in Children," *Tobacco Control* 5(1):13-18, Spring 1996; BBC News, Health, "Smokers' Babies 'Risk Meningitis,'" June 11, 2000; Anderson HR & Cook, DG, "Passive Smoking and Sudden Infant Death Syndrome: Review of the Epidemiological Evidence," *Thorax* 52(11):1003-09, November 1997; Hall, JR, Jr., *The U.S. Smoking-Material Fire Problem Through 1995*, National Fire Protection Association, September 1997.

¹⁶ Aligne, C & Stoddard, J, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine* 151(7):648-53, July 1997; DiFranza, JR & Lew, RA, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4):560-68, April 1997.

¹⁷ Aligne, C & Stoddard, J, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine* 151(7):648-53, July 1997; Hall, JR, Jr., *The U.S. Smoking-Material Fire Problem Through 1995*, National Fire Protection Association, September 1997; DiFranza, JR & Lew, RA, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4):560-68, April 1997.

¹⁸ DiFranza, JR & Lew, RA, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4):560-68, April 1997. For even larger totals, see Aligne, C & Stoddard, J, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine* 151(7):648-53, July 1997.

¹⁹ CDC, "Ingestion of Cigarettes and Cigarette Butts by Children—Rhode Island, January 1994-July 1996," *MMWR* 46(6):125-128, February 14, 1997.