

CAMPAIGN For TOBACCO-FREE Kids®

HARM 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, stillbirths, and sudden infant death syndrome (SIDS) after birth.¹ 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 1200 to 2200 deaths from SIDS.² A more recent comprehensive study found that parental smoking causes 2,800 deaths at birth and 2,000 deaths from SIDS.³ 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.⁴

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.⁵ 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.⁶ And the problem is likely larger because some pregnant women do not report their tobacco use or exposure.⁷

Besides spontaneous abortions, stillbirths and SIDS deaths, smoking and exposure to secondhand smoke during pregnancy directly increases the risk of each of the following:

- ectopic pregnancies
- other birth and delivery problems
- brain damage during gestation
- growth retardation/low birth weight
- 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 adulthood⁸

Smoking by fathers prior to conception may also increase the risk of childhood cancers and mental retardation among offspring, even when the mother does not smoke.⁹

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.¹⁰ 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.¹¹ 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.¹² 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.¹³ 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.¹⁴ Smoking-caused fires kill another 200 children each year, and as many as 10,000 more suffer from fire-caused injuries.¹⁵ 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 tympanotomies (middle ear operations).¹⁶ 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.¹⁷

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¹ On spontaneous abortions, see, e.g., Mendola, P., et al., "Risk of Recurrent Spontaneous Abortion, Cigarette Smoking, and Genetic Polymorphisms in NAT2 and GSTM1," *Epidemiology* 9(6): 666-668 (November 1999); Shiverick, K.T. & C. Salafia, "Cigarette Smoking and Pregnancy I: Ovarian, Uterine and Placental Effects," *Placenta* 20(4): 265-272 (May 1999); Ness, R. B., et al., "Cocaine and Tobacco Use and the Risk of Spontaneous Abortion," *New England Journal of Medicine* 340(5): 333-339 (February 4, 1999); Chatenoud, L., et al., "Paternal and Maternal Smoking Habits Before Conception and During the First Trimester: Relation to Spontaneous Abortions," *Annals of Epidemiology* 8(8): 520-26 (November 1998); Dominguez-Rojas, V., et al., "Spontaneous Abortion in a Hospital Population: Are Tobacco and Coffee Intake Risk Factors?," *European Journal of Epidemiology* 10(6): 665-668 (December 1994); Walsh, R.A., "Effects of Maternal Smoking on Adverse Pregnancy Outcomes: Examination of the Criteria for Causation," *Human Biology* 66(6): 1059-1092 (December 1994); Windham, G.C., et al., "Parental Cigarette Smoking and the Risk of Spontaneous Abortion," *American Journal of Epidemiology* 135(12): 1394-403 (June 15, 1992); Armstrong, B.G. et al., "Cigarette, Alcohol, and Coffee Consumption and Spontaneous Abortion," *American Journal of Public Health* 82(1): 85-87 (January 1992); Pattinson, H.A. et al., "The Effect of Cigarette Smoking on Ovarian Function and Early Pregnancy Outcome Of In Vitro Fertilization Treatment," *Fertility and Sterility* 55(4): 780-783 (April 1991); Himmelberger, D. U., et al., "Cigarette Smoking During Pregnancy and the Occurrence of Spontaneous Abortion and Congenital Abnormality," *American Journal of Epidemiology* 108(6): 470-479 (December 1978); Kline, J., et al., "Smoking: A Risk Factor for Spontaneous Abortions," *New England Journal of Medicine* 291(15): 793-96 (October 1977). See, also, Kline, J. et al., "Cigarette Smoking and Spontaneous Abortion of Known Karyotype: Precise Data But Uncertain Inferences," *American Journal of Epidemiology* 141(5): 417-427 (March 1995); Economides, D. & J. Braithwaite, "Smoking, Pregnancy, and the Fetus," *Journal of the Royal Society of Health* 114(4): 198-201 (August 1994); Fredricsson, B. & H. Gilljam, "Smoking and Reproduction: Short and Long Term Effects and Benefits of Smoking Cessation," *Acta Obstetrica Gynecologica Scandinavica* 71(8): 580-592 (December 1992). But see, also, Windham, G.C. et al., "Exposure to Environmental and Mainstream Tobacco Smoke and Risk of Spontaneous Abortion," *American Journal of Epidemiology* 149(3): 243-247 (February 1, 1999); Sandahl, B. "Smoking Habits and Spontaneous Abortion," *European Journal of Obstetric Gynecology and Reproductive Biology* 31(1): 23-31 (April 1989).

On still births, see, e.g., Raymond, E.G. et al., "Effects of Maternal Age, Parity, and Smoking on the Risk of Stillbirth," *British Journal of Obstetric Gynaecology* 101(4): 301-306 (April 1994); Ahlborg, G. Jr. & L. Bodin, "Tobacco Smoke Exposure and Pregnancy Outcome Among Working Women: A Prospective Study At Prenatal Care Centers In Orebro County, Sweden," *American Journal of Epidemiology* 133(4): 338-347 (February 1991).

On sudden infant death syndrome, see, e.g., Cooke, R.W., "Smoking, Intra-Uterine Growth Retardation and Sudden Infant Death Syndrome," *International Journal of Epidemiology* 27(2): 238-41 (April 1998).

² DiFranza, J.R. & R.A. Lew, "Effect of Maternal Cigarette Smoking on Pregnancy Complications and Sudden Infant Death Syndrome," *Journal of Family Practice* 40(4): 385-94 (April 1995).

³ Aligne, C.A. & J.J. Stoddard, "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).

⁴ Pollack, H., "Sudden Infant Death Syndrome, Maternal Smoking During Pregnancy, and the Cost-Effectiveness of Smoking Cessation Intervention," *American Journal of Public Health* 91(3): 432-36 (March 2001); National Center for Health Statistics, "Medical and Life-Style Risk Factors Affecting Fetal Mortality, 1989-90," *Vital and Health Statistics* 20(31), August 1996.

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

⁶ See, e.g., Matthews, T.J., "Smoking During Pregnancy in the 1990s," *National Vital Statistics Report* 49(7) (August 28, 2001); 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* 142(5): 525-30 (September 1995).

⁷ 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).

⁸ On ectopic pregnancies and other pregnancy complications, see, e.g., Andres, R.L. & M-C Day, "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* 16(3): 201-215 (April 1999); Ahluwalia, I.B., et al., "Exposure to Environmental Tobacco Smoke and Birth Outcome: Increased Effects on Pregnant Women Aged 30 Years or Older," *American Journal of Epidemiology* 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, C.V., et al., "Maternal Cigarette Smoking as a Risk Factor for Placental Abruption, Placenta Previa, and Uterine Bleeding in Pregnancy," *American Journal of Epidemiology* 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).

On early delivery, low birth-weight babies, and growth problems after birth, see, e.g., 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?," *American Journal of Public Health* 88(1): 1523-27 (October 1998); Martin, T.R. & M.B. Bracken, "Association of Low Birth Weight with Passive Smoke Exposure in Pregnancy," *American Journal of Epidemiology* 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. & J.J. Bergmann, "Passive and Active Maternal Smoking During Pregnancy, as Measured by Serum Cotinine, and Postnatal Smoke Exposure. I. Effects on Physical Growth at 5 Years," *American Journal of Epidemiology* 142(9 Supplement): S10-18 (November 1995); Elwood, P.C., 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 (Nov. -Dec. 1987).

On abnormal blood pressure in infants and children, see, e.g., 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, K.V. et al., "Maternal Cigarette Smoking During Pregnancy, Low Birth Weight and Subsequent Blood Pressure in Early Childhood," *Early Human Development* 57: 137-147 (2000).

On cleft palates and lips, see Eric's Nagourney, "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].

On links with carcinogens and cancer, see, e.g., Lackmann, G.M., et al., "Metabolites of a Tobacco-Specific Carcinogen in Urine from Newborns," *Journal of the National Cancer Institute* 91(5): 459-65 (March 1999); Finette, B.A., 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* 317(7158): 555 (August 29, 1998); Crawford, F.G., et al., "Biomarkers of Environmental Tobacco Smoke in Preschool Children and Their Mothers," *Journal of National Cancer Institute* 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).

On birth defects, see, e.g., Kallen, K., "Maternal Smoking During Pregnancy and Limb Reduction Malformations in Sweden," *American Journal of Public Health* 87(1): 29-32 (January 1997); Czeizel, A.E., et al., "Smoking During Pregnancy and Congenital Limb Deficiency," *British Medical Journal* 308(6942): 1473-76 (June 1994); Drews, C.D., et al., "The Relationship Between Idiopathic Mental Retardation and Maternal Smoking During Pregnancy," *Pediatrics* 97(4): 547-53 (April 1997).

On colic, see Reijneveld, S.A., et al., "Infantile Colic: Maternal Smoking As Potential Risk Factor," *Archives of Disease in Childhood* 83:302-303 (October 2000).

On wheezing and respiratory problems, see, e.g., Hu, F.B., 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, I.B., 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, A.L., et al., "Wheeze Associated with Prenatal Tobacco Smoke Exposure: A Prospective, Longitudinal Study," *Archives of Disease in Childhood* 83: 307-12 (October 2000)

On eye problems, see, e.g., Hakim, R.B. & J.M. Tielsch, "Maternal Cigarette Smoking During Pregnancy: A Risk Factor for Childhood Stabismus," *Archives of Ophthalmology* 110(10): 1459-62 (October 1992).

On impaired intellectual development, see, e.g., 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, D.L., 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)].

On developmental and behavioral problems, including criminality, see, e.g., 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, J.F., et al., "Child Behavior Problems Increased By Maternal Smoking During Pregnancy," *Archives of Environmental Health* 54(1): 15-19 (Jan-Feb 1999) ; Fergusson, DM & Horwood, L.J., "Prospective Childhood Predictors of Deviant Peer Affiliations in Adolescence," *Journal of Child Psychology and Psychiatry* 40(4): 581-92 (May 1999); Orlebeke, J.F., 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, D.M., et al., "Maternal Smoking During Pregnancy and Psychiatric Adjustment in Late Adolescence," *Archives of General Psychiatry* 55(8): 721-27 (August 1998); Wakschlag, L.S., 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, P.A., et al., "Maternal Smoking During Pregnancy and Adult Male Criminal Outcomes," *Archives of General Psychiatry* 56(3): 215-19 (March 1999).

On future smoking by offspring, see, e.g., Kandel, D.B., et al., "Maternal Smoking During Pregnancy and Smoking by Adolescent Daughters," *American Journal of Public Health* 84(9): 1407-13 (September 1994).

On various future adult health problems, see, e.g., 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).

⁹ Ji, B.T., et al., "Paternal Cigarette Smoking and the Risk of Childhood Cancer Among Offspring of Nonsmoking Mothers," *Journal of the National Cancer Institute* 89(3): 238-44 (February 1997); 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).

¹⁰ U.S. Centers for Disease Control and Prevention (CDC), "Medical Care Expenditures Attributable to Cigarette Smoking During Pregnancy – United States, 1995," *MMWR* 46(44): 1048-1050 (November 7, 1997). See, also, Adams, E.K. & C.L. Melvin, "Costs of Maternal Conditions Attributable to Smoking During Pregnancy," *American Journal of Preventive Medicine* 15(3): 212-219 (October 1998); Lightwood, J.M, 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).

¹¹ U.S. Agency for Healthcare Research & Quality, *Hospitalization in the United States, 1997* (2000).

¹² Aligne, C.A. & J.J. Stoddard, "Tobacco and Children: An Economic Evaluation of the Medical Effects of Parental Smoking," *Archives of Pediatric and Adolescent Medicine*, 151: 648-653 (July 1997).

¹³ See, e.g., Li, J.S. 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, J.R. & R.A. Lew, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4): 560-68 (April 1997); Adair-Bischoff, C.E. & R.S. Sauve, "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, D.M., 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), <http://news.bbc.co.uk/>; Anderson H.R. & D.G. Cook, "Passive Smoking and Sudden Infant Death Syndrome: Review of the Epidemiological Evidence," *Thorax* 52(11): 1003-09 (November 1997); Hall, J.R., Jr., *The U.S. Smoking-Material Fire Problem Through 1995*, National Fire Protection Association (September 1997).

¹⁴ Aligne, C. & J. Stoddard, "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, J. & R. Lew, "Morbidity & Mortality in Children Associated with the Use of Tobacco Products By Other People," *Pediatrics* 97(4): 560-68 (April 1997).

¹⁵ Aligne, & Stoddard (July 1997). See, also, Hall, J.R., Jr. (September 1997); DiFranza & Lew, (April 1997).

¹⁶ DiFranza, & Lew (April 1997). For even larger totals, see Aligne & Stoddard (July 1997).

¹⁷ CDC, "Ingestion of Cigarettes and Cigarette Butts by Children -- Rhode Island, January 1994--July 1996," *MMWR* 46(6): 125-128 (February 14, 1997).