



TITLE: Second Hand Smoke and Pregnant Women: Clinical Evidence

DATE: 07 February 2012

RESEARCH QUESTION

What is the clinical evidence regarding the effect of second hand smoke on the health of pregnant women and their unborn children?

KEY MESSAGE

The evidence identified suggests maternal exposure to second hand smoke may result in negative outcomes for both mothers and their unborn children.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2012, Issue 1), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials and non-randomized studies containing safety data. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2007 and January 25, 2012. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

Three systematic reviews and ten non-randomized studies were identified regarding the effect of second hand smoke on the health of pregnant women and their unborn children. No health technology assessment reports or randomized controlled trials were identified. Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One systematic review¹ sought to determine the risk of adverse fetal outcomes of secondhand smoke exposure in nonsmoking pregnant women. The authors found that nonsmoking pregnant women's exposure to secondhand smoke significantly increased the risk of stillbirth and congenital malformation; however, it was not significantly associated with elevated risk of spontaneous abortion. A second systematic review² investigated the effect of environmental tobacco smoke exposure (ETS) on perinatal outcomes. It was found that pregnant women exposed to ETS had an increased risk of having infants with lower birthweight, congenital anomalies, longer newborn lengths, and trends towards smaller head circumferences and lower birth weight (LBW). A third systematic review³ examined the effects of ETS during pregnancy and birth outcomes. Nonsmoking pregnant women exposed to ETS experienced reduced mean birth weight and increase in the risk of LBW, however, exposure did not have an effect on size for gestational age.

The ten non-randomized studies⁴⁻¹³ identified varied in terms of objectives, methods, and results. All studies⁴⁻¹³ found associations between maternal exposure to ETS and adverse birth outcomes. A summary of study characteristics and key findings can be found in Table 1.

Table 1: Characteristics and key findings of identified non-randomized studies		
Author and Date	Objective	Results and Conclusions
Benedict et al. 2011 ⁴	Determine the rate of ova implantation and IVF success in nonsmoking women exposed to STS	STS exposure significantly increased the risk of implantation failure and decreased the odds for a live birth
Ben-Haroush et al. 2011 ⁵	Assess the effect of passive and active smoking on pregnancy rates after IVF transfer of embryos	Active smoking significantly decreased pregnancy rates (i.e. transfer of embryos); however, no difference was observed in pregnancy rates by passive smoking women
Crane et al. 2011 ⁶	Assess the effects of ETS on perinatal outcomes in nonsmoking pregnant women	ETS exposure was associated with LBW, smaller head circumference, shorter birth length, stillbirth, and a trend towards preterm birth and neonatal sepsis
Ashford et al. 2010 ⁷	Examine the relationship between maternal exposure to prenatal STS, preterm birth, and immediate neonatal outcomes	STS exposure was associated with increased risk for preterm birth, respiratory distress syndrome, immediate newborn complications, and

Table 1: Characteristics and key findings of identified non-randomized studies

Author and Date	Objective	Results and Conclusions
		admission to NICU when compared to infants of smoking mothers
Khader et al. 2010 ⁸	Determine the association between maternal exposure to STS and preterm birth and LBW	STS exposure was associated with increased odds of LBW and preterm birth compared to non-exposed women
Zhang et al. 2010 ⁹	Determine the risk factors for RSA in women	ETS exposure, BMI and a family history of RSA was associated with increased risk of RSA; however, active smoking, alcohol consumption, and coffee consumption were not associated with increased risk of RSA
de Assis et al. 2009 ¹⁰	Assess the level of DNA damage in lymphocytes of active and passive smoking mothers and in their newborns	Active smoking women and their newborns showed significant increases of DNA damage compared to passive and nonsmokers
Leite & Koifman 2009 ¹¹	Investigated the associations between family history of malformations, parental consanguinity, smoking and alcohol drinking and nonsyndromic orofacial cleft	STS exposure to nonsmoking pregnant women was associated with cleft lip (with or without cleft palate) but not with cleft palate alone
Tsui et al. 2008 ¹²	Investigated whether prenatal ETS exposure to pregnant women increased newborn genetic damage and adverse birth outcomes	Newborns of ETS exposed mothers had the highest cord blood DNA scores and was associated with decreased birth weight, shorter birth length, and decreased head circumference compared to newborns with no smoking exposure
Wu et al. 2007 ¹³	Determine the effect of ETS on maternal DNA damage	Smokers and ETA exposed subjects had significantly higher levels of DNA damage compared to nonsmokers. In addition, there was greater risk of DNA damage to ETS exposed subjects compared to non-exposed subjects

BMI = Body Mass Index; ETS = environmental tobacco smoke; LBW = lower birth weight; NICU = Neonatal Intensive Care Unit; RSA = recurrent spontaneous abortion; STS = secondhand tobacco smoke

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

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Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

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PREPARED BY:

Canadian Agency for Drugs and Technologies in Health

Tel: 1-866-898-8439

www.cadth.ca

APPENDIX – FURTHER INFORMATION:**Non-randomized controlled studies - qualitative methodology**

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