

## HOW MANY CHILDREN SMOKE AND DRINK BEFORE THEY ARE BORN?

by Richard E. Tremblay

**John Brown, who practiced medicine in Scotland 150 years ago, realized the importance of prevention and gave talks to poor women with young children. In one talk, he attempted to convince them that whisky was not good for their infants' stomachs: "You will I am sure listen good-naturedly to me, when I go over some plain and simple things about the health of your children. No baby should ever get a drop of whisky, or any strong drink, unless by the doctor's orders. Whisky to the soft, tender stomach of an infant is like vitriol to ours. As you value your children's health of body, and salvation of their souls, never give them a drop of whisky; and let mothers, above all others, beware of drinking when nursing. The whisky passes from their stomach into their milk, and poisons their own child. This is a positive fact." (Brown, 1861)**

To well-educated people today, it seems strange that 19<sup>th</sup> century mothers would give whisky to their infants, and stranger still that doctors would prescribe whisky for infants. However, as recently as 1975 nurses at University College Hospital in London, England, were recommending beer to mothers who were breastfeeding. If Dr. John Brown were alive today and kept up-to-date with research on child development,



he would be trying to convince pregnant women not to drink and smoke because the nicotine and alcohol pass from their lungs and stomach and poison the brain of their babies.

In this issue, we present examples and a summary of the best research on the long-term effects of nicotine and alcohol consumption during pregnancy. The evidence that the use of these two "luxuries" has long-term impacts on the health, brain function and behaviour of children is such that it is difficult to understand why so little is done to prevent these high-risk behaviours. And this is not a problem that affects only a small fraction of the population.

Data from two large-scale Canadian longitudinal studies (NLSCY and LSCDQ)<sup>1</sup> of newborn children indicate that at least 30% were exposed to nicotine, alcohol or both during fetal life.

This appears to be at least as serious as SARS, which gets massive media coverage and mobilizes a huge amount of resources. Not much is done, possibly because no one has found effective ways to convince young women who become pregnant or plan to do so to stop smoking and drinking. While this may be true, the natural reaction to epidemics such as SARS is to invest energy and resources in identifying

causes and experimenting with prevention schemes. It has become commonplace to prohibit smoking in offices, restaurants and public places, but I still hear professionals who work with poor young pregnant women say that we should not prevent them from smoking because it is the best way for them to cope with stress! **Clearly, we need to disseminate what we know about the effects of smoking and drinking, but we also need many more experiments to find effective prevention programs.**

<sup>1</sup> National Longitudinal Survey of Children and Youth (NLSCY) and The Longitudinal Study of Child Development in Quebec (LSCDQ)

**For more information about these topics, visit our Website: [www.excellence-earlychildhood.ca/themes.asp?lang=EN](http://www.excellence-earlychildhood.ca/themes.asp?lang=EN)**

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# NO SMOKING, NO DRINKING: A HEALTHY START TO A HEALTHY LIFE

Over the past decade, health-care providers, public-health officials and governments have hammered home a message: alcohol, tobacco and babies—unborn and born—don't belong together. Despite warning labels, media campaigns and growing social disapproval directed at pregnant women who drink or smoke, the prenatal use of alcohol and tobacco remains a serious concern. Almost 20 percent of pregnant women report drinking alcohol; one quarter of women smoke during their pregnancy. Each year, thousands of babies are born suffering from physical, cognitive and social deficiencies caused by *in utero* exposure to these substances. As researchers discover the long-term consequences of prenatal alcohol and tobacco use, the need for more effective programs and policies becomes ever more evident. The future of the world's youngest citizens depends on it.



## PRENATAL EXPOSURE TO SMOKING

Smoking has also been shown to have serious, lifelong consequences for children exposed prenatally. "There is generally consistent evidence to suggest that increased prenatal exposure to smoking is associated with higher rates of conduct problems, hyperactivity and juvenile crime in offspring," says David Fergusson of Christchurch University in New Zealand. "These associations have been found in childhood, adolescence and adulthood."

Animal studies show that nicotine affects the central nervous system, resulting in problems with learning, memory and problem-solving. In humans, smoking in pregnancy has been linked to a decrease in auditory orientation and responsiveness in infants, as well as lowered general cognitive functioning in preschoolers. Children of smokers show lags in language development, reduced verbal IQ, and significant problems with the auditory aspects of reading. These children tend to be more impulsive, inattentive and hyperactive. Recent research suggests that as they develop, children of smokers are at increased risk for oppositional and aggressive behaviour, conduct disorders, substance abuse, anti-social behaviour and juvenile crime.

## PREVENTION DURING PREGNANCY

For prenatal use of both alcohol and tobacco, prevention is a key goal, followed by significantly reducing the effects found in children exposed *in utero*. Helping pregnant women who smoke remains challenging, in

malies, low birth weight or growth retardation, as well as developmental and intellectual deficiencies. As many as one in 100 suffers milder effects called Fetal Alcohol Effects (FAE). Rates of FAS and FAE in Aboriginal

can maintain focus over time (sustained attention), they have difficulty staying focused when there are distractions (focused attention). Some studies have suggested that FAS/FAE children are more likely to suffer

*"Prenatal alcohol exposure is a significant problem, owing both to its worldwide frequency and the severity of its developmental effects on children."*

- Claire Coles

communities appear to be significantly higher. Sadly, FAS, which is completely preventable, is the leading cause of mental retardation in the Western world.

Researchers have identified specific, long-term behavioural and cognitive deficits in FAS/FAE children. Many will have trouble planning actions and may struggle with executive functions, the ability to modify behaviour based on feedback. While these children

from hyperactivity, but that link has been challenged.

Parents and teachers of FAS/FAE children report that they are more aggressive and show poor social skills. These deficits continue into the teenage years, when researchers have found these young people fail to consider the consequences of their actions, are not responsive to social cues and may have poor interpersonal relationships.

part because of the social stigma involved. Few women will admit to smoking, with studies showing that 28 to 35 percent lie when asked to self-report tobacco use. Thus, assessing the problem of prenatal smoking becomes a major challenge. However, researchers have found that a structured, multiple-choice question that includes

## HELP FOR FAS/FAE CHILDREN

Until recently, health-care providers have had to depend on a less reliable "gestalt" approach to FAS/FAE diagnosis, using various clinical impressions to make an assessment. A promising new 4-Digit Diagnostic Code has been developed that better expresses the continuum of disabilities

dysfunction and prenatal alcohol exposure.

*"The most challenging problem in the field of fetal alcohol syndrome remains the identification of alcohol-exposed children with no dysmorphia (the majority of alcohol-exposed children),"* says Piyadasa Kodituwakku of the University of New Mexico's Center on Alcoholism, Substance Abuse, and Addictions.

Once a diagnosis has been made, early intervention becomes critical. Unfortunately, there are significant gaps in terms of programs and services. There are no standards of care for FAS and its related disorders. Specialized programs and services are rare and their effectiveness has not been rigorously evaluated. There is also a significant lack of services, both in identification and intervention, for children

under age five, who are most likely to benefit from early, intensive efforts to offset the debilitating effects of FAS/FAE.

As a result of these gaps, researchers are now calling for a comprehensive needs assessment of FAS/FAE children and their families in order to guide the development of new services, programs and treatments.

The list of serious, even debilitating consequences from prenatal alcohol and tobacco use continues to grow. It also provides evidence of the need for a concerted and coordinated set of services and programs to help parents and their young children. Prevention, coupled with early, intensive intervention for babies affected by their mother's smoking and drinking, will make a difference for future generations. 🦋

*"There is generally consistent evidence to suggest that increased prenatal exposure to smoking is associated with higher rates of conduct problems, hyperactivity and juvenile crime in offspring."*

- David Fergusson

the options "never smoke," "recently quit" and "continue to smoke" increases the likelihood of accurate self-reporting.

Pregnancy offers a unique window of opportunity to help women quit smoking, as they tend to have more contact with the health-care system and to be more receptive to the idea of stopping. While quitting in the first trimester seems to provide the greatest benefits, stopping anytime during pregnancy has positive effects. Therefore, pregnant women should be offered cessation help throughout their pregnancy.

A number of well-established, clinically proven smoking cessation programs exist, but researchers suggest pregnant women may benefit from specific interventions that include self-help materials focusing on pregnancy issues. A five-step counselling approach entitled *"The Five As"* shows promise in helping women of various ethnic and racial groups stop smoking. *"The Five As"* system helps care providers assess a woman's smoking and her commitment to stopping, assists her with cessation and arranges for follow-up support.

associated with exposure to alcohol *in utero*. The code asks providers to evaluate the child in four areas: growth deficiency, FAS facial phenotype, brain damage/

*"It is time to touch the minds and hearts of parents to encourage them to stay away from alcohol and tobacco for the sake of their babies. We have to reach the people. We have to go into the communities and make those mothers decide not to smoke and not to drink*

*when they are carrying their baby, either in their tummies, in their arms or with them in their families",* says the Honourable Ethel Blondin-Andrew, Secretary of State (Children and Youth). Canada's future depends on a wholehearted commitment to ensuring that every child has a healthy start in life. *"Child*



photo: Health Canada

## HOW TO AVOID TOXIC SUBSTANCES DURING PREGNANCY?

*development experts have consistently made the case that children who get off to a good start participate actively in society and the economy,"* she says. *"Nothing will do more to maximize the potential of our country than the development of our children."*

The Canadian government has made significant investments through programs such as the National Child Benefit, the National Children's Agenda and the Early Childhood Development Agreement, but challenges remain, Blondin-Andrew adds. *"As promising as the progress is, money alone is only part of the answer.*

*What we need to do is get to the root causes of the problems plaguing children's health, such as the low birth weight of a baby born to a smoking mother or the preventable disabilities from FAS and FAE."*

Blondin-Andrew is a First Nations person and has taught in communities. She has seen firsthand the devastating effects alcohol and tobacco have had in communities. She encourages researchers, service providers and government officials to work collaboratively to develop a standardized diagnosis for FAS and new programs to help those affected. *"We need to know how to reach out to prospective parents and support them in their decision to avoid these toxic substances during their pregnancies,"* she concludes. 🦋

## COGNITIVE CONSEQUENCES OF PRENATAL ALCOHOL EXPOSURE

by Luc Dupont

**Although we are becoming increasingly knowledgeable about the signs of fetal alcohol exposure (FAE), there are as yet no specific, unique markers that can be used to detect whether a person was exposed to alcohol in the womb, unless physical signs are present. This means that thousands of children with FAE fail to be diagnosed every year.**



A group of researchers therefore took on the task of setting a range of neurocognitive and neurobehavioural symptoms that could be linked to FAE and are likely to be present in affected individuals. They studied a sample of 500 children born to women who, for the most part, had significant alcohol and tobacco intake during pregnancy. The children, in the sample since 1974, under-

went a number of medical and academic tests from birth through to the age of 14.

Analysis of the data showed a meaningful correlation between mothers' alcohol intake and children's attention, cognitive and memory problems. As early as

days 1 and 2 of life, researchers found that newborns had difficulty reacting to stimuli and had weaker suckling capacity.

Researchers found that at eight months, there were motor and intellectual abnormalities, which were also present at the age of four in the form of a decrease in fine motor skills. At the age of seven, the children in the study had memory problems linked to space perception. A year later, the researchers found that the children in the sample were having learning problems at school and showing a higher risk of being placed in special programs. Finally, at age 14 the adolescents in the study suffered from attention deficits, memory lapses and problems with verbal expression.

According to the scientists

conducting the study, neurocognitive deficits are the most persistent of the various types of damage attributable to FAE. They also highlight the clear finding that there is no "safe" degree of fetal alcohol exposure.

These findings give rise to crucial questions. Will these children develop an addiction to drugs or alcohol, or be prone to mental illness? Will we be able to develop assessment tools that make it possible to recognize the symptoms of exposure to alcohol in the womb in individuals of any age and come up with better treatment strategies?

Ref: Streissguth AP, Barr HM, Bookstein FL, Sampson PD, Olson HC, The Long-Term Neurocognitive Consequences of Prenatal Alcohol Exposure: A 14-year Study, *Psychological Science* 1999; 10(3):186-190. 🦋

## PRENATAL STRESS AND FETAL ALCOHOL EXPOSURE

by Luc Dupont

**There is no longer any doubt that considerable alcohol intake during pregnancy can cause serious damage to the fetus. However, a growing number of scientists believe that prenatal stress (St) or moderate alcohol intake (AI) can cause emotional, behavioural or learning disorders in children.**

Seeking to identify the issue more accurately, a group of researchers conducted three longitudinal studies using female primates born to mothers that had been exposed to prenatal stress and/or moderate alcohol intake. Their objective was to observe whether the disruptive elements might have

harmful side effects not only on the offspring's birth, but also on its development through various stages of life.

The scientists discovered that prenatal stress was linked to lower birth weights than in the control group. They also found that there was a significant association between the disruptions (St) and (AI) and a decrease in attention span and neuromotor skills during the first few months after birth, and that prenatal stress occurring in early pregnancy increased the subject's vulnerability.

Finally, the researchers found a meaningful correlation between prenatal disruptions (St)



and (AI) and difficulties adapting to stressful situations during adolescence and adulthood, such as separation, forming new groups or moving to an unfamiliar environment.

According to the authors, the three studies show that the presence of the disruptive elements

(St) and (AI) during the prenatal period can in fact cause serious disorders in newborns. However, they are not seen as the sole cause but rather as an added risk factor that combines with many others as part of the complex interaction between mother and fetus. In light of their findings, the researchers suggest that these disruptions are strong enough to determine the state of health during adulthood.

Ref.: Schneider ML, Moore CF, Kraemer GW, Roberts AD, DeJesus OT. The Impact of Prenatal Stress, Fetal Alcohol Exposure, or Both on Development: Perspectives from a Primate Model. *Psychoneuroendocrinology* 2002;27(1-2):285-298. 🦋

## PRENATAL SMOKING AND PSYCHIATRIC PROBLEMS

by Hélène Katz

**Children whose mothers smoke during pregnancy seem to have a greater risk of developing behaviour problems such as attention deficit later in their childhood. These negative effects also appear to continue into adolescence. Until recently, researchers had not really looked at whether smoking during pregnancy is related to other childhood and adolescent problems, including depression, generalized anxiety and substance abuse.**

David M. Fergusson and his team wanted to know whether their mother's cigarette-smoking before they were born made children more susceptible to psychiatric problems in late adolescence. They also hoped to rule out the possibility that problems were, in fact, caused by mothers'

social background, behavioural characteristics and childrearing practices, rather than the actual smoking during pregnancy.

During an 18-year longitudinal study, Fergusson and his team collected data on more than 1,000 children born in New Zealand. Looking at whether mothers smoked while they were pregnant, they assessed their children's psychiatric problems between the ages of 16 and 18. The problems they looked at included major depression, anxiety and substance use. They also checked to see whether social and family factors, such as socio-economic status, might play a role in the development of psychiatric problems.

The researchers found that children whose mothers smoked at least a pack of cigarettes a day



ing pregnancy. The effect was more pronounced for male than for female teenagers.

This study suggests that mothers who smoke during pregnancy are increasing their child's risk of acting out during late adolescence, between the ages of 16 and 18. However, prenatal smoking does not appear to cause other problems, such as depression, generalized anxiety or substance abuse.

Ref.: Fergusson DM, Woodward LJ, Horwood LJ. Maternal Smoking

during pregnancy were twice as likely to have behaviour problems in late adolescence as those whose mothers didn't smoke dur-

During Pregnancy and Psychiatric Adjustment in Late Adolescence. *Archives of General Psychiatry*. 1998; 55(8):721-727. 🦋

## PRENATAL SMOKING AND CRIMINAL BEHAVIOUR

by Hélène Katz

**Mothers' smoking during pregnancy has been linked to their children acting out later on, and even participating in criminal behaviour. Acting out behaviour means impulsiveness, truancy and difficulty with level of attention. This can be the case even when other possible factors, such as the child's sex, race, age, birth weight, mother's level of education, family income and parents' childrearing practices, have been eliminated.**

The one study that looked at the relationship between prenatal smoking and the child committing a crime later on failed to distinguish between long-term cri-

minal behaviour and offences that only occur during adolescence.

Patricia Brennan and her team wanted to look at the criminal behaviour of children whose mothers smoked during pregnancy. They examined more than 4,000 34-year-old Danish males whose mothers reported during their third trimester of pregnancy how many cigarettes they had smoked. They also collected other information, such as the mother's socio-economic status, her age and complications during pregnancy and delivery.

They checked the Danish National Criminal Register to see whether the men in their study were listed, whether their



criminal behaviour was ongoing or limited to adolescence, the types of offences they had committed and whether those crimes were considered violent or non-violent offences.

They found that mothers who smoked during pregnancy were

more likely to end up with children who were persistent offenders rather than only being delinquent during their teenage years. When a mother smoked while pregnant and then had complications during delivery, her child seemed to be more prone to criminal violence later on. The results stayed the same even when Brennan and her team looked at whether other factors, such as socio-economic status, might be the cause of the offending behaviour.

Ref.: Brennan PA, Grekin ER, Mednick SA. Maternal Smoking During Pregnancy and Adult Male Criminal Outcomes. *Archives of General Psychiatry*. 1999; 56:215-219. 🦋

## HELPING PREGNANT SMOKERS

**Comments by Michèle Matte, Perinatal and Early Childhood Development Program Manager for the Canadian Institute of Child Health**

Collected by Liz Warwick

Providing health-care services to pregnant women who smoke requires a carefully balanced act. Pregnancy offers a unique opportunity to help women, as they tend to be more receptive to making lifestyle changes. Thanks to structured, multiple-choice questionnaires, women are more likely to self-report tobacco use, opening up an opportunity for health-care workers to intervene. However, practitioners must

guard against making clients feel too guilty about smoking. "You have to encourage women in every effort they make and you have to keep that link with the parent. If you are too confrontational, you will be shut out," says Matte. Practitioners often talk about encouraging "baby steps," small, incremental changes that slowly help a woman reduce or eliminate tobacco use.

New research into the psychosocial effects of prenatal smoking offers health-care workers additional arguments for reducing or stopping tobacco use. While many women will be swayed by discussions of the detrimental physical consequences of smok-



ing (SIDS, low birth weight, increased risks of asthma), others may not. Matte notes, "Talking about learning disabilities and

smoking, for example, might touch something in a woman."

The five-step counselling approach suggested by Melvin ("The Five As") also offers an excellent roadmap for working with tobacco-addicted pregnant women. Yet more research is needed into the role partners and family play in maintaining or breaking a smoking addiction. "Smoking is often a family issue, not just a women's issue," Matte says. "We need research into how to work on the whole family dynamic, the role of fathers and how to work with these men. It would be interesting to assess how much the participation of fathers impacts prenatal outcomes as a whole."

More data on the safety and effectiveness of nicotine delivery systems for pregnant women are essential. "Should they use the patch? Chew gum?" asks Matte. "There are no clear guidelines for what is best." Overall, health-care workers would benefit from increased research into effective strategies for smoking cessation, both during and after pregnancy. "It's not clear for practitioners what are the best strategies," she adds.

## PRENATAL DRINKING

**Comments by Dr. Gail Andrew, medical director, Glenrose Fetal Alcohol Spectrum Disorder Project Clinic, Glenrose Rehabilitation Hospital, Edmonton**

Collected by Liz Warwick

Preventing Fetal Alcohol Spectrum Disorder (FASD) depends on delivering a simple message: Don't drink while pregnant. "This message must go out to all women, starting around age 10 and regardless of ethnicity or socio-economic background," says Dr. Gail Andrew.

While prenatal alcohol abuse has had a disproportionate effect on Aboriginal communities, suggestions that FASD is primarily an Aboriginal issue not only stigmatize one group but also prevent proper prevention and detection measures for all women. "This is a

women's issue, not an issue for a specific group of women," Dr. Andrew says. "We have to teach physicians to ask the drinking question to all pregnant women they see." However, Aboriginal communities may need "champions" or people willing to openly address the issue of prenatal drinking. These champions can help de-stigmatize the issue and help Aboriginals develop specific strategies for dealing with alcohol abuse in their communities.

"One key problem in addressing FASD has been the lack of accurate diagnostic tools," says Dr. Andrew. At the clinic she directs, they have been using the 4-Digit Diagnostic Code and teaching other health-care workers how to use it. "By standardizing the diagnosis and then building an accurate

and complete database of cases, the Canadian government will be able to assess the true scope and impact of FASD," she adds.

However, "a diagnosis alone is never enough. It must drive something—in this case—services and interventions across the lifespan," says Dr. Andrew. More research is needed into the best ways to help FASD children, both in early childhood and beyond. "There is not one approach to helping these children. They will need significant support in many aspects of learning, planning, generalizing information, using judgment, regulating behaviour and social communication. The key word is support, as many children will continue to have difficulty as FASD represents brain damage," she concludes.

## MARK YOUR CALENDAR: CEECD CONFERENCES 2004-2005



### RESEARCH ON PREVENTION

May 27 to 29, 2004  
Quebec City

In collaboration with the Society for Prevention Research, the CEECD will provide an update on effective assessment and evaluation of prevention programs and the best options for generalizing and replicating programs for young children and their families.



### EFFECTS OF NEUROTOXINS ON EARLY CHILDHOOD DEVELOPMENT

September 2004

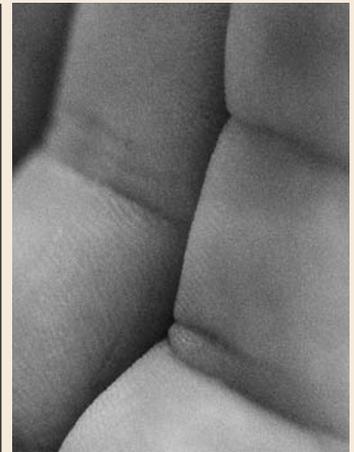
Co-sponsored by the Canadian Institute of Child Health, this conference will focus on current knowledge on the effects of neurotoxins on child social and emotional development. The conference will address the issue of the effects of heavy metals (e.g. lead, mercury and zinc), pesticides, PCB and drugs such as cocaine and methadone.



### CHILD CARE

June 2 to 4, 2005  
Regina

What do we really know now about the impact of child care on child development? The CEECD, in collaboration with the Canadian Child Care Federation, will provide an overview of the topic featuring internationally known experts, as well as a forum for discussion on the organization and quality of Canadian child care services.



### LANGUAGE DEVELOPMENT AND LITERACY

October 2005

In collaboration with the Canadian Language and Literacy Research Network, this conference will present the latest research in the field of language development, an essential basis for the development of reading and writing skills. State-of-the-art programs and practices to enhance this development will also be presented.



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