

Research Bulletin 12/4

Maternal Smoking During Pregnancy and Child Well-Being: A Burning Issue

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It is well established that smoking can damage your health. Nonetheless, around one third of the Irish population continue to smoke. Irish research (Brugha *et al.*, 2009) suggests that most smokers want to give up and half will have tried in the last year but nicotine is a notoriously addictive substance. One measure of its addictiveness can be gleaned from the fact that around 18 per cent of pregnant women smoke at some point during their pregnancy and 13 per cent continue to smoke right through. A positive message to emerge from recent research is that the rate of smoking in pregnancy in Ireland has fallen over time. Data from the *Growing Up in Ireland* study show that whilst 28 per cent of mothers whose children were born between 1997 and 1998 reported that they smoked during pregnancy, this had fallen to 18 per cent of mothers whose children were born in 2007. This is a decrease of over 35 per cent in the proportion of women smoking during pregnancy. Evidence from the Slán Survey (Brugha *et al.*, 2009) suggests that smoking rates among women under 45 have declined by less than 5 per cent over the same period, suggesting an increasing sensitivity to the dangers of smoking during pregnancy.

Cigarettes contain a harmful cocktail of compounds including nicotine, sulphides, cyanide, cadmium and a host of carcinogenic hydrocarbons that are known to be toxic to foetal development. Smoking in pregnancy is the most important determinant of low birth weight in developed countries but there is now increasing evidence that it is also associated with longer term physical and neurobehavioral development. A number of international studies have suggested that smoking in pregnancy is associated with an increased risk of childhood behavioral problems, particularly externalizing disorders such as conduct problems and attention deficit and hyperactivity disorder. Evidence had already shown that exposure to nicotine led to heightened tremors and startles and to more irritability in early infancy and results from the Millennium Cohort Study in the UK (Hutchinson *et al.*, 2010) and the Early Childhood Longitudinal Study in the US (Boutwell & Beaver 2010) have also found that foetal exposure to cigarette smoke is associated with a significantly higher risk of behavioral problems in later childhood.

An obvious challenge for research in this area is that smoking during pregnancy is also strongly associated with social disadvantage and deprivation, which are themselves independently associated with behavioral problems among children. It is not ethical to expose children to cigarette smoke in pregnancy to test this relationship as part of a scientific experiment so the UK and US research studies mentioned above followed a sample of children over time to observe whether externalizing problems are more likely to emerge after exposure to cigarette smoke whilst statistically adjusting for measures of social disadvantage.

The *Growing Up in Ireland* study provides an excellent opportunity to look at this relationship for Ireland as it has information on maternal smoking in pregnancy as well as a wide range of other measures. These allow us to examine whether smoking conveys an increased risk for behavioral problems when we take account of these social factors. Importantly, the study collected information on the mother's level of smoking in pregnancy and this provides us with an important additional tool with which to corroborate the causal relationship between exposure to cigarette smoke in the womb and behavioral problems at age 9. If the strength of the relationship between smoking and behavioral problems increases with the level of maternal smoking, this is more persuasive than a simple association.

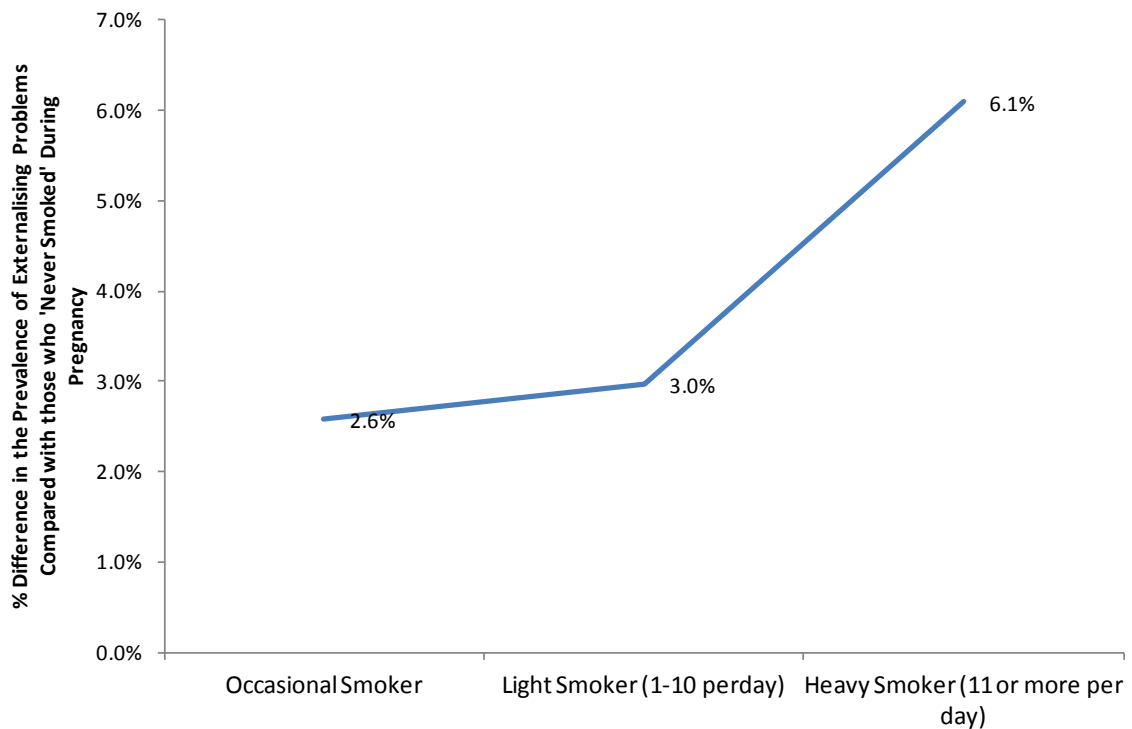
In a paper recently published in the *Journal of Abnormal Child Psychology*, Cathal McCrory and Richard Layte (McCrory & Layte 2012) did just this. They showed that the risk of the child being reported by his/her teacher as having conduct, attention or hyperactivity problems at age 9 was significantly related to whether the mother smoked during pregnancy and, moreover, that the risk increased with the number of cigarettes smoked during pregnancy. The relationship is shown graphically in Figure 1.

This evidence adds further weight to existing findings from both cohort studies of children and from clinical studies of the impact of cigarette smoke on brain development in the womb (Shea & Steiner 2008) and its relationship to child behavioral problems. Smoking is already an important contributor to social inequalities in health and mortality, but this research suggests that it may also damage the life chances of children whose mothers smoked during pregnancy. Research by the same authors (Layte & McCrory 2012) has shown that behavioral problems reduce educational development, which may compromise life-time opportunities open to those children.

The drop in smoking during pregnancy observed over the last decade or so is a positive development for public health policy and reflects growing awareness

among women that smoking is hugely damaging both for the mother and her baby. However, the fall in smoking is not evenly spread and is increasingly heavily concentrated among mothers from more disadvantaged backgrounds. Research shows that these mothers tend to smoke more heavily on average and are more likely to live with other smokers, with the consequence that they find it far harder to quit. Research from the UK also suggests that a complex interplay of factors, including social disadvantage, dysfunctional relationships, and poor maternal mental health is implicated in maternal smoking during pregnancy (Graham *et al.* 2006; Wakefield *et al.* 1993). These factors need to be recognized when designing interventions to help women reduce smoking during pregnancy, perhaps by involving partners and family members in the process of quitting and increasing awareness of the potentially damaging effects of smoking on the psychological health and life chances of children.

FIGURE 1 Difference in the Percentage of 9-year-olds Scoring Above the 90th Percentile on the Externalising Dimension (Conduct problems and Attention problems) of the SDQ by Level of Maternal Smoking during Pregnancy (*Teacher-Report*)



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