Commentary: Maternal smoking during pregnancy: hazard for what?

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More than a dozen years ago, a commentary in the American Journal of Public Health noted that interest in fetal life had broadened remarkably as researchers of more and more areas in adult health searched for the fetal origins of these conditions. The impetus for that commentary was the publication in that issue of the journal of three studies on pre-natal exposure to alcohol, tobacco and nutritional deprivation during WWII. The commentary called for setting a higher bar for admissible scientific evidence on fetal exposure in three ways: (i) disentangling the suspected single exposure from correlated exposures; (ii) bracketing the timing of the suspected exposure to fetal life alone; and (iii) pinpointing its timing to a specific epoch in fetal life. The second side of the fetal exposure—adult health searched for the fetal origins of these conditions. The challenge issued was more than enough for a single commentary.

Interest in fetal origins has continued to grow since then. And the focus on what are believed to be preventable hazards to the fetus is naturally of central public health concern. One conspicuous preventable hazard is maternal smoking during pregnancy. Potential harms to the fetus attributed to maternal smoking during pregnancy are widely publicized. The strongest scientific evidence is for reduced birth weight, an outcome with serious health implications. The list of adverse outcomes of maternal smoking during pregnancy are widely publicized. The strongest scientific evidence is for reduced birth weight, an outcome with serious health implications. The list of adverse outcomes of maternal smoking during pregnancy includes not only offspring’s physical problems and behavioural disturbances, but also reduced cognitive abilities, an outcome that entails long-term social and economic costs.

In this issue of the International Journal of Epidemiology, Jordi Julvez and colleagues report that maternal smoking during pregnancy was associated with a decrease in offspring’s cognitive abilities at age 4, as measured by the McCarthy Scales.
of Children’s Abilities. These findings agree with the findings of some previous studies but conflict with those of other studies that found that the association was entirely confounded. Although the challenges to inference pertaining to exposure raised in the above-cited commentary remain, the high bar here concerns the outcome side, specifically, the evidence on cognitive outcomes. Global cognitive abilities at age 4, even if measured by the best available test, may be inadequate for establishing an effect that makes a difference. The deficit detected in this study at age 4, using the McCarthy scales, must be evaluated in the context of two recent studies that measured children’s IQ repeatedly well into adolescence and used standard IQ tests. These two studies observed an association between maternal smoking during pregnancy and offspring’s IQ, but reached the conclusion that the association was spurious, accounted for entirely by the mother’s IQ and education. It is impossible to determine whether the conflicting findings of Julvez et al. (i.e. that the association was robust to adjustment) were due to other unmeasured confounding variables, especially maternal IQ, which was not included as a covariate. However, even if the findings of Julvez et al. are not due to failure to adequately adjust, the real value of detecting deficits in cognitive scores at age 4 is uncertain. The results of the new study are hard to assess for their magnitude, because there is no direct way to translate the size of the reported deficit into familiar units (e.g. IQ points). The authors do not comment on the size of the difference they detected. One possibility to consider in resolving the conflicting data is that modest differences at age 4 fade with time as children grow-up. In that case, do they matter?

Maternal smoking in pregnancy might have no adverse effects on some important domains of social functioning, while its adverse effects on birth weight and closely related health outcomes are indisputable. These constitute sufficient scientific rationale for a vigorous public health programme to reduce maternal smoking during pregnancy.

References