Perinatal Psychiatry & Stress, Psychiatry and Immunology
Institute of Psychiatry, London

Carmine M. Pariante
Twitter: @ParianteSPILab
Facebook: SPlabKCL

Depression in Pregnancy: Molecular, Clinical and Psychosocial Effects
When does it start?

Stress

Stress

Stress

Stress
The Psychiatry Research and Motherhood - Depression (PRAM-D) Study

- Depressed pregnant mothers and healthy control
- Salivary cortisol, CRH, and serum pro-inflammatory cytokines, at 25 and 32 weeks
- Obstetric outcome, gestational age, birth weight
- Neonatal Behaviour Assessment Scale and Baby’s cortisol, at Day 6
- Mother’s and baby’s salivary cortisol response at Week 8 and Year 1, including baby’s response to vaccination
- Child development at Year 1.
Cortisol levels during the day

Awakening: 8:00 PM
Cortisol (nmol/l)

- Depressed Mothers
- Healthy Mothers

p = 0.025
Cytokines levels

![Graph showing cytokine levels for controls and depressed individuals. The graph compares IL-1 alpha and IL-6 levels, with asterisks indicating significant differences.]
**Obstetric Outcomes**

<table>
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<tr>
<th></th>
<th>Control (n=49) Mean (sd)</th>
<th>Case (n=27) Mean (sd)</th>
<th>p</th>
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<td>Gestational age (weeks)</td>
<td>40.3 (1.4)</td>
<td>39.7 (1.3)</td>
<td>.029</td>
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<td>Birth weight</td>
<td>3566 (452)</td>
<td>3328 (499)</td>
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<td>Male sex</td>
<td>55.1 (27)</td>
<td>40.7 (9)</td>
<td>NS</td>
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</table>
Cortisol and response to stress
Cortisol and response to stress

![Graph showing mean cortisol levels pre- and post-immunization for Case and Control groups.](image-url)
When does it start?

Stress  Stress  Stress  Stress
South London Child Development Study (SLCDS) (1986-2013)

Use of a prospective, longitudinal, community study from pregnancy through the next 26 years

- To trace the course of maternal depression throughout the child bearing and child rearing years
- To identify associations between maternal depression and child outcome
- To ascertain the optimal time for detecting maternal depression in order to offer treatment with possible beneficial consequences for the child
When does it start?
Antenatal depression and offspring psychopathology: the influence of childhood maltreatment

Susan Pawlby, Dale Hay, Deborah Sharp, Cerith S. Waters and Carmine M. Pariante

Background
Antenatal depression and childhood maltreatment have each been associated with offspring psychopathology, but have never been examined in the same sample.

Aims
To determine whether childhood maltreatment influences the association between antenatal depression and offspring psychopathology.

Method
Prospectively collected data on antenatal depression, offspring maltreatment (age 11) and offspring psychopathology (age 11 and 16) were analysed in 120 mother–offspring dyads from the community-based South London Child Development Study.

Results
Antenatal depression increased the risk of maltreatment in the offspring by almost four times. Children exposed only to antenatal depression or only to childhood maltreatment were no more at risk of developing psychopathology; however, children exposed to both antenatal depression and childhood maltreatment were at almost 12 times greater risk of developing psychopathology than offspring not so exposed.

Conclusions
Research investigating exposure to adverse events in utero and offspring psychopathology should take account of postnatal adverse events such as maltreatment.

Declaration of interest
None.
Exposure to maternal depression *in utero* on risk of any child and adolescent disorder

<table>
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<th>Predictors</th>
<th>Any offspring disorder</th>
<th>Odds Ratio</th>
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<tr>
<td></td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Exposure to antenatal depression</td>
<td>% (N)</td>
<td>% (N)</td>
</tr>
<tr>
<td>a. No</td>
<td>68% (58)</td>
<td>32% (35)</td>
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<tr>
<td>b. Yes</td>
<td>36% (9)</td>
<td>64% (16)</td>
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Maternal Depression During Pregnancy and the Postnatal Period  

Risks and Possible Mechanisms for Offspring Depression at Age 18 Years

Rebecca M. Pearson, PhD; Jonathan Evans, MD; Daphne Kounali, PhD; Glyn Lewis, PhD; Jon Heron, PhD; Paul G. Ramchandani, DPhil; Tom G. O'Connor, PhD; Alan Stein, FRCPsych

**Importance** Some small studies suggest that maternal postnatal depression is a risk factor for offspring adolescent depression. However, to our knowledge, no large cohort studies have addressed this issue. Furthermore, only 1 small study has examined the association between antenatal depression and later offspring depression. Understanding these associations is important to inform prevention.

**Objective** To investigate the hypothesis that there are independent associations between antenatal and postnatal depression with offspring depression and that the risk pathways are different, such that the risk is moderated by disadvantage (low maternal education) with postnatal depression but not with antenatal depression.
MAIN OUTCOMES AND MEASURES  Diagnosis of offspring aged 18 years with major depression using the International Classification of Diseases, 10th Revision.

RESULTS  Antenatal depression was an Independent risk factor. Offspring were 1.28 times (95% CI, 1.08-1.51; P = .003) more likely to have depression at age 18 years for each standard deviation increase in maternal depression score antenatally, independent of later maternal depression. Postnatal depression was also a risk factor for mothers with low education, with offspring 1.26 times (95% CI, 1.06-1.50; P = .01) more likely to have depression for each standard deviation increase in postnatal depression score. However, for more educated mothers, there was little association (odds ratio, 1.09; 95% CI, 0.88-1.36; P = .42). Analyses found that maternal education moderated the effects of postnatal but not antenatal depression. Paternal depression antenatally was not associated with offspring depression, while postnatally, paternal depression showed a similar pattern to maternal depression.

CONCLUSIONS AND RELEVANCE  The findings suggest that treating maternal depression antenatally could prevent offspring depression during adulthood and that prioritizing less advantaged mothers postnatally may be most effective.
When does it start?
Exposure to maternal depression in utero and experience of childhood maltreatment

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<th>Antenatal depression</th>
<th>Childhood maltreatment</th>
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<td>No=93</td>
<td>84% (78)</td>
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<td>Yes=25</td>
<td>60% (15)</td>
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OR = 2.5
Prenatal family adversity and maternal mental health and vulnerability to peer victimisation at school

Suzet Tanya Lereya, and Dieter Wolke
Department of Psychology, University of Warwick, Coventry, UK

Background: Prenatal stress has been shown to predict persistent behavioural abnormalities in offspring. Unknown is whether prenatal stress makes children more vulnerable to peer victimisation. Methods: The current study is based on the Avon Longitudinal Study of Parents and Children, a prospective community-based study. Family adversity, maternal anxiety and depression were assessed at repeated intervals in pregnancy and the postnatal period. Parenting, partner conflict and temperament were measured at preschool age. Peer victimisation was assessed using multiple informants (child, parent and teacher) at primary school age (between ages 7 and 10). Results: Severe family adversity and maternal mental health directly increased the risk of victimisation at school even when controlling for child's sex, family adversity and maternal mental health, partner conflict and temperament. Effects were found to be independent of sources of information of peer victimisation. Partner conflict and maladaptive parenting also independently increased the risk of peer victimisation. Conclusions: Experiences in pregnancy may affect the developing foetus and increase vulnerability to be victimised by peers. Conflict between parents and their parenting further increase the risk of being victimised by peers at school. Keywords: Bullying, victimisation, anxiety, depression, prenatal, parenting, ALSPAC.
This confirmed that family adversity and maternal mental health in pregnancy are stressors that increase vulnerability to peer victimisation directly and furthermore indirectly, via partner conflict and maladaptive parenting. This is consistent with previous research that found that parents who experience higher stress are more likely to be exposed to domestic violence (Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010), and to be harsher in the parenting of their children (Lovejoy, Graczyk, O’Hare, & Neuman, 2000). This pattern of findings suggests that prenatal family adversity and maternal mental health stressors that affect the foetus directly and make children more vulnerable to become targets of peer victimisation.
Maternal depression during pregnancy and offspring depression in adulthood: role of child maltreatment

Dominic T. Plant, Carmine M. Pariante, Deborah Sharp and Susan Pawlby

**Background**
Studies have shown that maternal depression during pregnancy predicts offspring depression in adolescence. Child maltreatment is also a risk factor for depression.

**Aims**
To investigate (a) whether there is an association between offspring exposure to maternal depression in pregnancy and depression in early adulthood, and (b) whether offspring child maltreatment mediates this association.

**Method**
Prospectively collected data on maternal clinical depression in pregnancy, offspring child maltreatment and offspring adulthood (18–25 years) DSM-IV depression were analysed in 103 mother–offspring dyads of the South London Child Development Study.

**Results**
Adult offspring exposed to maternal depression in pregnancy were 3.4 times more likely to have a DSM-IV depressive disorder, and 2.4 times more likely to have experienced child maltreatment, compared with non-exposed offspring. Path analysis revealed that offspring experience of child maltreatment mediated the association between exposure to maternal depression in pregnancy and depression in adulthood.

**Conclusions**
Maternal depression in pregnancy is a key vulnerability factor for offspring depression in early adulthood.

**Declaration of interest**
None.

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Depression in pregnancy and maltreatment/depression in offspring

Fig. 2  Path estimates for the multiple mediation model of the effect of maternal depression in pregnancy on offspring adulthood depression mediated by childhood risks.

Note. Estimates are presented as unstandardised B coefficients. All path estimates were calculated whilst controlling for associated covariates. *P<0.05, **P<0.01.
When does it start?
Intergenerational transmission of maltreatment and psychopathology: the role of antenatal depression

D. T. Plant\textsuperscript{1*}, E. D. Barker\textsuperscript{2}, C. S. Waters\textsuperscript{3}, S. Pawlby\textsuperscript{1} and C. M. Pariante\textsuperscript{1}

\textsuperscript{1} Department of Psychological Medicine, Institute of Psychiatry, King’s College London, UK
\textsuperscript{2} Department of Psychological Sciences, Birkbeck, University of London, UK
\textsuperscript{3} School of Psychology, Cardiff University, UK
**Table 3. Intercorrelations between study variables.** $\kappa$ coefficients are reported for associative coefficients for associations with continuous and dichotomous variables, and Pearson’s $r$ coefficients for associations with continuous variables.

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<thead>
<tr>
<th>(1) Maternal childhood maltreatment</th>
<th>(2) Maternal antenatal depression</th>
<th>(3) Offspring childhood maltreatment</th>
<th>(4) Offspring adolescent antisocial behaviour</th>
<th>(5) Offspring adolescent depression</th>
<th>(6) Maternal juvenile antisocial symptoms</th>
<th>(7) Maternal history of psychiatric problems</th>
<th>(8) Maternal depression from birth to 16</th>
<th>(9) Family stability</th>
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$\dagger p < 0.10$ (trend), $* p < 0.05$, $** p < 0.01$. 

**OR = 10.0**
Association between maternal childhood trauma and offspring childhood psychopathology: mediation analysis from the ALSPAC cohort

Dominic T. Plant, Fergal W. Jones, Carmine M. Pariante* and Susan Pawly*  

Background
Studies have shown that a mother’s history of childhood maltreatment is associated with her child’s experience of internalising and externalising difficulties. Maternal antenatal depression, postnatal depression and offspring child maltreatment were observed to significantly mediate this association independently.

Aims
To characterise the mediating pathways that underpin this association.

Method
Data on a mother’s history of childhood maltreatment, depression during pregnancy, postnatal depression, maladaptive parenting practices and her child’s experience of maltreatment and internalising and externalising difficulties were analysed in an Avon Longitudinal Study of Parents and Children (ALSPAC) sample of 9397 mother–child dyads followed prospectively from pregnancy to age 13.

Results
Maternal history of childhood maltreatment was significantly associated with offspring internalising and externalising

Conclusions
Psychological and psychosocial interventions focused around treating maternal depression, particularly during pregnancy, and safeguarding against adverse childhood experiences could be offered to mothers with traumatic childhood histories to help protect against psychopathology in the next generation.

Declaration of interest
None.

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Fig. 1 Structural regression model for the effect of maternal child maltreatment on child internalising and externalising difficulties mediated by maternal depression, maladaptive parenting and child maltreatment.

Presented estimates are beta coefficients, with only statistically significant paths shown. DBD, disruptive behaviour disorder; SDQ, Strengths and Difficulties Questionnaire.

*P<0.05, **P<0.01.
When does it start?
When does it start?