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Lean, Rachel E.; Pritchard, Verena E.; Woodward, Lianne J.

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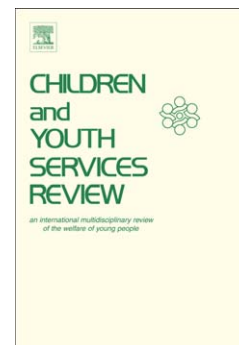
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**Child Protection and Out-of-Home Placement Experiences of Preschool Children
Born to Mothers Enrolled in Methadone Maintenance Treatment during Pregnancy**

Rachel E. Lean, MSc. ¹

Verena E. Pritchard, Ph.D. ²

&

Lianne J. Woodward, Ph.D. ^{1,3}

¹ Department of Psychology, University of Canterbury, Christchurch, New Zealand

² Department of Psychology, University of Aberystwyth, Wales, United Kingdom

³ Departments of Pediatrics and Psychology, Washington University in St. Louis, Missouri, USA

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Corresponding Author: Professor Lianne Woodward, Department of Pediatrics, Washington University School of Medicine, 660 South Euclid, Campus Box 8116, St Louis, Missouri 63110, USA. Phone: +1 (314) 7474149 Email: Woodward_L@kids.wustl.edu

Internationally, continued and severe maternal illicit substance use during pregnancy, either alone or in conjunction with other risk factors, represent grounds for child protection concern and/or the placement of a child in out-of-home care (Bada, Langer, Twomey, *et al.*, 2008; Brooks-Gunn, McCarton, & Hawley, 1994; Usher, Randolph, & Gogan, 1999). Thus, as rates of opiate use in pregnancy increase, so too does the burden of these families on health care, social welfare and foster care services (Hunt, Tzioumi, Collins & Jeffery, 2008; McGlade, Ware, & Crawford, 2009; Patrick, Schumacher, Benneyworth, Krand, McAllister, Davis, 2012). In New Zealand, rates of child foster care placement have increased 10–12% per year, with an estimated 3,885 children in care during 2011 (Maharey, 2000; Ministry of Social Development, 2012). Similarly, the number of Australian children placed in out-of-home care increased from 5.8 to 7.3 per 1,000 between 2007 and 2011 (Australian Institute of Health and Welfare, 2012), with these rates being generally comparable with other industrialised countries.

Children born to opiate-dependent mothers may be particularly susceptible to child protection concern and out-of-home placement (Hunt *et al.*, 2008; McGlade *et al.*, 2009) given their parents' complex personal and psychiatric needs, as well as their high levels of clinical surveillance during drug treatment. Around 50% of mothers entering substance disorder treatment programmes have a history of child protection service (CPS) contact (Connors, Bradley, & Mansell, 2004; Grella, Scott, & Foss, 2003). For example, Bada *et al.*, (2008) reported that 61% of cocaine/opiate-dependent American mothers ($n = 1,092$) had been involved with CPS at least once, with 35% of these mothers losing custody of their child before age 3-years. Ornoy, Segal, Bar-Hamburger, & Greenbaum (2001) also reported that 53% of a sample of Israeli children born to heroin-dependent mothers ($n = 339$) had been placed in out-of-home care by age 5- to 6-years. However, despite the over-representation of children born to opiate-dependent mothers within the social welfare and foster care system (Cash & Wilke, 2003; Luthar, D'Avanzo & Hites, 2003), little is known about the extent of CPS involvement and risks of out-of-home placement for these children, especially in countries without mandatory reporting of substance abuse in pregnancy. Even more importantly,

the maternal risk factors that place opiate dependent mothers engaged in methadone maintenance therapy at increased risk of CPS involvement remain poorly understood. This in large part reflects the methodological challenges associated with engaging and following up these high risk families. As a result, existing studies of the child protection contacts of substance-dependent mothers are typically complicated by a range of methodological limitations, including the use of small selected samples (Cash & Wilke, 2003; Fernandez, 2008; Moe, 2002; Seuss, Newlin & Porges, 1997), low recruitment rates due to maternal fear of mandatory reporting (Crea, Barth, Guo & Brooks, 2008), high sample attrition (Cash & Wilke, 2003; Crea *et al.*, 2008; Ehrensaft, Wasserman, Verdelli *et al.*, 2003; Hunt *et al.*, 2008), and limited documentation of maternal mental health and other illicit substance use during pregnancy (Bada *et al.* 2008; Cash & Wilke, 2003; Crea *et al.*, 2008; Ehrensaft *et al.*, 2003; Moe, 2002; Ornoy, Michailevskaya, Lukashov, *et al.*, 1996; Seuss, Newlin & Porges, 1997; Soeptami, 1994).

Thus, the goal of this study was to address these methodological issues drawing on data from a prospective longitudinal study of methadone maintained and comparison mothers and children born in the Canterbury region of New Zealand. Although there is no mandatory legal requirement in New Zealand to report maternal drug use in pregnancy, child welfare investigation occurs if a health/clinical practitioner or community member believes that the health, safety or wellbeing of a child may be adversely affected. These concerns are typically reported, either directly or anonymously, to the police or the Department of Child Youth and Family Services. Pending investigation, this can lead to either no action, a family systems intervention and/or placement of the child in out-of-home care as early as the child's birth (Ministry of Health, 2002; Children's Commissioner, 2008). If serious concerns exist or an agreement cannot be reached, Child Youth and Family Services may seek a Custody/Guardianship Order through the courts. In this case, the child will usually be placed in out-of-home care with Child, Youth and Family Services, Iwi (social or tribal unit within Māori culture) or other cultural social service provider, or an alternative suitable legal guardian. The specific aims of this study were as follows:

- 1) To document rates of child protection service contact and out-of-home placement from birth to child age 4.5 years in a cohort of mothers maintained on methadone during pregnancy ($n = 73$) compared to a randomly identified comparison group of non-methadone maintained mothers and their infants ($n = 54$).
- 2) To describe the nature of children's out-of-home placement experiences as a result of child protection concern.
- 3) To identify psychosocial risk factors that may place methadone maintained mothers at increased risk of having their child placed in out-of-home care.

METHODS

2.1 Sample

The study sample consisted of two groups of women who were recruited during their second/third pregnancy trimester from 2003 to 2006. Exclusion criteria for both groups included: 1) mother non-English speaking or unable to give informed consent; 2) intention to deliver outside of the Canterbury region; 3) infant born prematurely (≤ 32 weeks); 4) infant HIV positive; 5) foetal alcohol syndrome; and 6) congenital abnormality.

The first group consisted of 73 women enrolled in the Christchurch Methadone Programme who gave birth consecutively at Christchurch Women's Hospital. This programme is the sole methadone maintenance therapy provider for the region and is an outpatient-based community psychiatric service offering case management and prescribed oral methadone. During pregnancy, this service works in partnership with the antenatal obstetric team at Christchurch Women's Hospital to offer a multi-disciplinary service catering to the needs of opiate-dependent women in pregnancy, including access to methadone treatment, specialist obstetric care, antenatal education, and follow-up midwifery support. Of the 76 methadone maintained mother-infant dyads successfully

recruited, 3 infants died and the remaining 73 were followed to age 4.5 years (96% retention). Partial data was only available for a further four dyads due to maternal refusal at 18 ($n = 1$) or 24 months ($n = 3$) or maternal death ($n = 1$). Data for these cases was included where appropriate to maximise study numbers.

The second group consisted of 54 mothers randomly selected from the delivery booking schedule of Christchurch Women's Hospital using a random number generator. By randomly selecting a comparison group not matched for social background factors, a priori assumptions are not made about which risk factors would be most salient (See Davie-Gray, Moor, Spencer & Woodward, 2013). Of the 56 successfully recruited mother-child dyads that were eligible for follow-up at 4.5-years, two were lost to follow-up due to the 2010/11 Canterbury Earthquakes. This left a comparison sample of 54 (96% retention). The large size of the comparison group gave adequate statistical power to consider the range of potential covariates using appropriate multivariate analyses (Cohen, 1988).

At each follow-up, caregivers were contacted by telephone approximately two to four weeks prior to the child's due date of assessment and were invited for participation. Considerable effort was invested in developing a trusting and positive relationship with study families by a) assuring confidentiality; b) welcoming families to the research facility; c) offering food to children to optimize performance; and d) engaging with families as part of a clear feedback process. Dyads who initially failed to attend their assessment were rebooked and offered transportation to ensure they were not lost to follow-up. To further minimise sample attrition, caregivers updated their personal and GP contact details. Caregivers also supplied contact details for two non-/relatives that team members had permission to use if caregiver-child contact details became redundant.

2.2 Measures

Around birth, 18 months and 4.5 years, detailed information about family circumstances, child protection issues and child out-of-home placement was collected using a comprehensive

maternal lifestyles interview. In addition, information was also collected about maternal drug use during pregnancy from women's clinical notes and urine toxicology at birth. Detailed information about the perinatal health and development of their infant was collected from hospital records and children assessed developmentally at ages 18 months and 4.5 years. Ethical approval of all study procedures was sought and approved by the Upper South B Regional Ethics Committee, Canterbury, New Zealand (Ref: URB/07/10/042). This committee is accredited by the Health Research Council and operates in accordance with the Operational Standard for Ethics Committees. Written informed consent was also obtained from all parents/guardians. Specific measures included in this analysis are described below.

2.2.1 Maternal Social Background and Family Circumstances

A wide range of maternal social background data was collected at birth from the maternal interview, including maternal age, ethnicity, educational achievement, socioeconomic status (SES), marital status and family composition. SES was assessed using the 6-point Elley-Irving socioeconomic index scale (Elley & Irving, 2003). Marital/partnership status was coded as married, cohabitating, casual relationship or no partner. These measures were then combined to form a composite measure of maternal social risk by summing the following 1) young mother (≤ 21 -years at delivery), 2) low family SES (unskilled/unemployed), 3) single parent family, and 4) no educational qualifications. Higher scores indicated higher social risk. Information about all other pregnancies and children born to the mother was also collected, including their current custody status.

2.2.2 Maternal Mental Health and Substance Use/Abuse

Information about each mother's psychiatric history, current mental health and substance use behaviour during pregnancy and at birth was also collected. Mental health was assessed in two ways. First, mothers were questioned about any previous DSM-IV psychiatric diagnoses. This information was combined with results of a search of their hospital records to provide an overall

measure of any previous psychiatric illness. Second, the Edinburgh Postnatal Depression scale (EPD; Cox, Holden, & Sagovsky, 1987) was used to measure the extent to which mothers experienced depressive symptoms either during their pregnancy or at birth. Items were rated on a four point Likert scale ranging from 1 (often) to 4 (never). Questions focused on activity and motivation levels, eating and sleeping, as well as rumination. Scores above ten on each subscale indicated likely clinically significant depression (Navarro, Ascaso, Garcia-Esteve *et al.*, 2007). The EPD has good internal consistency ($\alpha = 0.87$) and correlates highly with scores from standardised psychiatric interviews (Navarro *et al.*, 2007). Discriminant validity is also high, detecting maternal depression in 86% of cases.

To assess the extent to which mothers engaged in any other licit and illicit substance use during pregnancy, self-reported drug use by pregnancy trimester was recorded for nicotine, cannabis, opiates, benzodiazepines and stimulants. For an unselected sub-sample (61% of methadone maintained women), maternal report was also cross checked against random urine screening results throughout pregnancy with very high concordance for cannabis and benzodiazepines, and reasonable concordance for stimulant and opiate use due to self-reported rates being higher than those based on toxicology screening (Davie-Gray *et al.*, 2013). Finally the Composite International Diagnostic Interview (CIDI: World Health Organisation, 1993) and custom-written items, were used to assess the extent of licit (tobacco, alcohol) and illicit substance dependence (cannabis, benzodiazepines, stimulants, opiates other than prescribed methadone) during pregnancy.

2.2.3 Infant Clinical Characteristics

Clinical data relating to each child's perinatal and postnatal course was collected from the hospital database and infant clinical notes. Measures of interest included infant gender, gestational age at birth, birth weight, and for infants born to MM mothers, any diagnosis of neonatal abstinence syndrome (NAS).

2.2.4 Child Protection Service Involvement and Out-of-Home Placement/s (Birth to 4.5-Years)

Information about maternal CPS involvement during their pregnancy and hospital stay was obtained from their infant's medical records. At their child's 18-month and 4.5-year follow-up evaluation, mothers or primary caregivers were further questioned about any family contacts with Child Youth and Family Services using life history calendar methods. This involved questions about the nature of the contact, reason for the concern, the outcome of any investigations and in particular, any out-of-home placements of the study child. Contacts relating to the care of all children in the family were considered. Based on this detailed information, the following measures were created to describe the nature of study children's out-of-home placement experiences.

Out-of-Home Placement. For caregivers reporting Child Youth and Family Service investigation resulting in child placement outside of the home, details of the child's changes in primary parent-figure were described in each interview using life history calendar methods. The caregiver was asked to report who was acting as the primary parent-figure for the child for each 4-month interval since their last assessment. Responses included natural parent, step-parent, other relative and non-relative.

Age at First Placement. Life history calendar methods were used to determine the age at first placement, with the caregiver retrospectively reporting the timing of the child's placement across four month intervals. Hospital and Child Youth and Family Service reports were used to document any placements planned prior to the child's birth.

Total Number of Placements. The total number of primary caregiver changes from birth to 4.5-years was collated from the life history calendar data obtained from the 18-month and 4.5-year interviews. This was confined to a physical change in primary caregiver ordered by formal CPS intervention.

Child's Living Situation at 4.5 years. At age 4.5 years, detailed information was collected about the child's living situation, including current custodial arrangement. Based on this information, children were classified as either: 1) living in the care of their biological mother, father or both; 2) being cared for by a family relative; or 3) being cared for by a non-relative parent.

2.3 Data Analysis

Data analysis was completed in four steps. First, to provide a descriptive profile of the two study groups, mothers and infants were compared on a range of infant clinical, social background, and maternal characteristics. Between-groups differences for continuously distributed variables were examined using a two tailed independent samples t-test, whereas for dichotomous variables, the chi-squared test of independence was used. Where expected cell counts were less than the minimum required in the chi-square, Fisher's Exact test p-values were reported.

Second, the CPS and out-of-home placement experiences of all children from birth to age 4.5-years were described. Where appropriate, variables were examined for violations in distribution and homogeneity of variance using visual inspections and Levene's tests. Between-groups differences for continuously distributed variables were examined using two tailed independent samples t-tests. For dichotomous variables, chi-square tests of independence were used. As above, where expected cell counts were less than the minimum required in the chi-square, Fisher's Exact test p-values were reported.

Third, one-way ANVOA tests of linearity and chi-square tests of linear-by-linear association were used to describe the relationships between maternal social background characteristics and level of CPS concerns. Then linear regression models were fitted to the data to identify those factors that made a unique independent contribution to the prediction of CPS investigation and/or child out-of-home placement by age 4.5-years. Model fitting was conducted using forward and backward variable selection to identify the best fitting and most parsimonious model. For all descriptive

analyses, $p < .05$ was used as a threshold for significance, and given the small sample, $p < .10$ was used as the criterion for inclusion in regression models.

RESULTS

3.1 Characteristics of the Sample

With respect to social background characteristics, mothers in both groups were a similar age at the time of child birth ($p = .71$), but methadone maintained mothers were somewhat more likely (24%) than comparison mothers (11%) to identify as Māori ($p = .06$). In terms of their educational achievement, methadone maintained mothers were approximately three-times more likely (81%) than comparison mothers (24%) to have no formal educational qualification ($p < .001$). In terms of family socio-economic status, 67% of methadone maintained mothers were unemployed and/or dependent on welfare compared to 17% of comparison mothers ($p < .001$). Overall, methadone maintained mothers had significantly higher mean social risk scores than comparison mothers ($p < .001$) at the time of delivery.

At the time of their child's birth, methadone maintained mothers were somewhat more likely to be single mothers ($p = .11$), and had given birth to more children than comparison mothers ($p < .001$). Furthermore, methadone maintained mothers were around 30-times more likely to have lost custody of one or more of these previously born children compared to women in the control group ($p < .001$). At the 18-month interview, almost 1 in 5 methadone maintained mothers reported exposure to inter-partner violence compared to 1 in 25 comparison women ($p = .04$).

Significant between-group differences were also found with respect to maternal mental health, with methadone maintained mothers being around three-times more likely to have a psychiatric diagnosis ($p < .001$). Nearly half of methadone maintained mothers met EPD clinical criteria for suspected antenatal depression ($p < .001$). In terms of licit and illicit drug use during pregnancy, methadone maintained mothers were more likely to smoke tobacco ($p < .001$), whereas

both groups reported similar rates of alcohol use ($p = .20$). Methadone maintained mothers were approximately 32-times more likely than comparison mothers to report using an illicit psychoactive substance at least monthly while pregnant ($p < .001$). Of the 64% of methadone maintained mothers that reported using at least one illicit substance while pregnant, cannabis (46%) was the most common. This was followed by benzodiazepines (28%), opiates other than prescribed methadone (24%), and lastly, stimulants (18%).

With respect to infant characteristics, both groups had similar proportions of male and female infants ($p = .29$). There was a non-significant tendency for infants born to methadone maintained mothers to be born on average almost a week earlier than full term infants ($p = .06$), and to be born significantly lighter ($p < .001$). After birth, 85% of methadone exposed infants were diagnosed with NAS and received pharmacological treatment with morphine, and in some instances, phenobarbitone ($p < .001$).

[INSERT TABLE 1 HERE]

3.2 Child Protection Service Contact

Table 2 shows the proportions of mothers in the methadone maintained and comparison groups who reported contact with child protection services (CPS) in the first 4.5-years of their child's life. Across all time points, methadone maintained mothers consistently reported higher rates of CPS contact/investigation. At both 18-months and 4.5-years, methadone maintained mothers were ten-times more likely than comparison mothers to have had CPS contact ($ps < .001$). Specifically, 74% of methadone maintained mothers reported a CPS investigation by the 4.5-year follow-up compared to only 7% of comparison mothers ($p < .001$). In terms of child out-of-home placement, 44% of methadone exposed children were removed from the care of their biological mother by age 4.5-years. In contrast, none of the investigations of comparison mothers resulted in child placement ($p <$

.001). This suggests that child protection concerns with methadone maintained mothers were more likely to be serious in nature and substantiated.

[INSERT TABLE 2 HERE]

3.3 Child Protection Placement Experiences of Children in the MM Group

As described above, 44% of children born to methadone maintained mothers had been removed from their biological mother's custody, either temporarily or permanently, by age 4.5 years. Information was available on the reasons for child's first placement for 23 out of 30 cases. Of these, seven reported one or more reason for child placement. Reasons for the placement included maternal substance abuse and/or mental health issues (61%), followed by child neglect (26%), maternal imprisonment (22%), physical abuse of child (9%), or 'other' (13%). Some cases (7/30) reported more than one reason for child placement. Table 3 provides a descriptive profile of the placement experiences of the 30 methadone exposed children placed in out-of-home care. On average, the mean age of first placement was 17-months ($SD = 18.20$), with almost half of these placements occurring before age 24-months. Over half (53%) of these children were first placed with a relative caregiver as opposed to a non-relative caregiver. In terms the number of placement changes by age 4.5-years, 53% of children exposed to out-of-home care experienced more than one placement change, with one child having seven caregiver changes. By 4.5-years, 28% of all methadone exposed children remained in out-of-home care; with 63% of these children living with relative caregivers and 37% with non-relative caregivers.

[INSERT TABLE 3 HERE]

3.4 Maternal Social Background Characteristics Associated with Child Protection Concern

To identify maternal factors, in addition to methadone maintenance therapy during pregnancy, that might place mother-infant dyads at risk of subsequent child protection concerns during the first 4.5 years of life, all study mothers were stratified into three groups. These groups included: 1) No contact with child protection services (No CPS Contact); 2) child protection service involvement without child removal (Some CPS Concerns); 3) child protection service involvement resulting in child placement with a relative or non-relative caregiver (High CPS Concerns).

As shown in Table 4, individual maternal social background factors (*i.e.*, maternal age and single motherhood) were not significantly related to the degree of CPS involvement. Significant linear relationships were observed between the rate of maternal methadone dependency, ethnicity, no education, welfare dependency, and level of CPS involvement ($p < .05$). There was also evidence to suggest that as the extent of cumulative social risk across these measures increased there was a corresponding increase in the severity of CPS involvement ($p < .001$). Associations were found between maternal psychiatric illness ($p < .001$), antenatal depression ($p < .001$), marijuana ($p < .001$) and other illicit drug use ($p < .001$) and the extent of CPS involvement. No significant associations were found between women's disclosed alcohol use ($p = .91$) or self-disclosed inter-partner violence at 18 months ($p = .80$) and later CPS involvement. Finally, larger family size ($p < .001$) and a history of care removal ($p < .001$) were also associated with an increased risk of CPS concern.

[INSERT TABLE 4 HERE]

3.5 Predictors of Child Protection Concern

To identify the maternal, child and contextual factors which best predicted the extent of CPS involvement by age 4.5-years, the data were analysed using multiple regression methods in which the extent of CPS contact was regressed on the range of parent, child, and contextual factors shown in Table 1. In this analysis, the predictor variables were not scaled dichotomously as in Table 1, but were scaled in the metrics described in the Method section. All independent variables were first

checked for multicollinearity using correlation matrices and inspection of tolerance and VIF collinearity statistics. Model fitting was conducted using both backward and forward variable elimination to identify the best fitting and most parsimonious model. This model fitting procedure was done as follows. First, all of the predictor variables listed in Table 4 were entered into the model. Second, on the basis of these results, a core model was identified containing those variables found to significantly ($p < .10$) predict the extent of CPS involvement. This core model was then extended by individually adding and removing variables from the regression equation to identify further significant predictors.

The results of the regression analysis are summarised in Table 5 which shows the standardised regression coefficients for the significant ($p < .05$) predictors of the extent of CPS involvement and the corresponding tests of significance based on the ratio of the unstandardised regression coefficient to its standard error. Four key predictors of CPS involvement were identified, with these factors spanning a range of parent, child and contextual variables. These factors included maternal enrolment in methadone maintenance therapy during pregnancy ($p < .001$), severity of maternal antenatal depression ($p = .01$) and a prior history of child removal ($p = .02$). Family social adversity approached significance ($p = .06$). These results suggest that the likelihood of a subsequent CPS concern was higher for pregnant women enrolled in methadone maintenance therapy who had comorbid symptoms of depression, with a prior history of childcare concerns and who were raising their children in more socioeconomically disadvantaged and unsupported circumstances. This model accounted for 53% of the variance (adjusted $R^2 = .52$, $p < .001$).

[INSERT TABLE 5 HERE]

DISCUSSION

Despite children born to women engaged in methadone maintenance therapy during pregnancy being at high risk for child protection concern, few studies have documented the CPS

contacts and/or out-of-home placement experiences of these children. This is important to ensure the timely identification of children at potential risk of child protection concern/maltreatment. It is also relevant to understanding how children's placement experiences may impact longer term outcomes. To address this research gap, the present study examined the extent and nature of child protection investigation and intervention for a cohort of methadone maintained and comparison mothers and their infants who were followed prospectively from the third pregnancy trimester to 4.5-years, a period typically marked by high rates of CPS involvement and environmental instability in high-risk families (Bada *et al.*, 2008; Ornoy *et al.*, 1996). Strengths of this prospective longitudinal study included a high rate of sample retention, detailed reporting of the extent of maternal poly-drug use, and consideration of a wide range of social background factors. The main findings and their policy implications are discussed below.

As expected, mothers enrolled in methadone maintenance therapy during pregnancy had significantly higher rates of CPS contact than comparison mothers. Specifically, 74% of mothers in the methadone maintenance group reported that they had been investigated by CPS at least once from birth to 4.5-years compared to 7% of comparison mothers. In over half (59%) of these contacts, the child was removed from the family home, whereas this did not happen for any of the comparison children suggesting much lower levels of child protection concern. These rates of CPS investigation and child placement within the methadone maintenance group are similar to those reported by Bada *et al.* (2008), who found that 61% of their sample of opiate/cocaine-dependent mothers had been involved with child protective services before their child was 3-years old, with 35% resulting in out-of-home care. Connors, Bradley, & Mansell (2004) and Grella, Scott, & Foss (2003) also found that at least half of all American women with children who enter substance disorder treatment programmes have a history of child protection concern. Therefore, rates of contact between current study methadone maintained mothers and CPS in New Zealand are at least consistent with, if not higher, than rates reported internationally. This potentially reflects the high level of multidisciplinary collaboration and monitoring of study women as part of their methadone

maintenance therapy in our region (Canterbury District Health Board, 2007; Deering, Sellman, Adamson & Campbell, 2008).

With respect to the timing of first placement, over half of those children born to methadone maintained mothers who experienced an out-of-home placement did so in the first year of life. This suggests that the transition to parenthood may pose particular challenges for these women. This finding is similar to Ornoy *et al.* (1996) who also reported that for children born to opiate-dependent mothers, first placement tended to occur at or soon after birth. In addition to the timing of first placement, the current study also reported methadone exposed children's rate of movement between caregivers. Just over half (53%) of placed children were subject to more than one placement. Previous studies of high-risk young children suggest that high levels of movement between caregivers is not uncommon, with placement breakdown occurring due to inadequate biological-relative care, caregiver perceptions of 'difficult to manage' children and poor caregiver-child fit (Fisher, Burraston & Pears, 2005; Hunt *et al.*, 2008; Redding, Fried & Britner, 2000).

Given that a substantial proportion of children born to methadone maintained mothers are likely to be placed either temporarily or permanently in out-of-home care that may have adverse effects on child outcome (Bada *et al.*, 2008), the early identification of those mother-infant dyads at greatest risk is extremely important. The current study identified maternal methadone dependency, depression, previous loss of custody and maternal social risk as the strongest independent predictors of the severity of child protection concern.

Mental Health. A key predictor of CPS concerns was maternal antenatal depression. At term, methadone maintained mothers were approximately eight times more likely than comparison mothers to meet the criteria for depression. This is consistent with previous studies showing that maternal internalising problems are associated with an increased risk of child removal from care for women diagnosed with other substance abuse disorders (Goldstein, 2009; Luthar, D'Avanzo, & Hites, 2003). This may also reflect previous findings linking maternal depression with lower levels of

maternal sensitivity and attachment (Donovan, Leavitt & Walsh, 1998; Mikhail, Youchah, DeVore, *et al.*, 1995).

Previous Loss of Custody. Extending previous findings by Bada *et al.* (2008), Conners, Bradley, & Mansell (2004) and Grella, Scott, & Foss (2003), the current study found that a previous history of child protection concern was a predictor of CPS concern with respect to a subsequently born child. This may reflect ongoing personal and caregiving difficulties of the mother or their being targeted and monitored more closely during pregnancy and after birth to assess their competency than women without a history of child care concern.

Social Risk. The fourth factor strongly associated with CPS concerns was our cumulative measure of maternal social-risk. Together, young and single motherhood, no education and low SES increasingly predicted the extent to which mothers were shown to be of high CPS concerns. This finding highlights that young, poorly educated mothers with few socioeconomic resources are at greatest risk of being unable to meet the immediate needs of their child (Brooks-Gunn *et al.*, 1994; Cash & Wilke, 2003; Hayford, Epps & Dahl-Regis, 1988; Lang, Kirkwood, Bowker, *et al.*, 1999; McGlone *et al.*, 2009; Vuvinovic *et al.*, 2008). These problems may be further compounded by long term methadone dependency. Given how common social adversity is amongst those addicted to illicit opiates (*see* Cash & Wilke, 2003; Davie-Gray *et al.*, 2013; Hunt *et al.*, 2008; McGlade *et al.*, 2009), this finding raises further concern for the vulnerability of these mothers and their infants.

4.1 Implications of Findings

This study confirms that children born to women maintained on methadone during pregnancy due to opiate addiction are at very high risk of child abuse and/or neglect leading to notifiable child protection concern. Furthermore, these concerns were often of a serious nature given their high rates of out-of-home placement relative to the general population. To date, few studies have successfully followed children born to methadone maintained mothers through

multiple placements with excellent sample retention precluding detailed examination of the nature of children's placement experiences over time. The present study indicated considerable variation in the timing and number of placement changes, with a substantial proportion of these children experiencing high levels of caregiver instability during their developmentally important preschool years. Such findings emphasize the need for careful placement of these children and the provision of ongoing psychosocial support (Fernandez, 2008). While Canterbury-based early intervention services such as Early Start, Plunket and Barnardos are available to assist children in foster care, additional specialist agency support may be warranted for these children given their complex needs and high risk of later mental health problems including attachment disorders, ADHD and conduct disorders (Bada *et al.* 2008; Crea *et al.* 2008; Soeptami, 1994; Strijker, Knorth & Knot-Dickscheit, 2008, Ornoy *et al.*, 1996). The extent to which specialist agencies might help to attenuate the adverse socio-emotional and behavioural outcomes of methadone exposed children placed in care should be considered by both future research and social policy makers.

A further somewhat unique finding of our study was the comparatively high rates of child placement with relative caregivers. In terms of first placement, 53% of children removed from maternal care were placed with relative caregivers. In addition, children who remained in out-of-home care by 4.5-years were twice as likely to be placed with a relative caregiver rather than a non-relative caregiver. These rates are higher than those reported by Maharey (2000), who found that of the 3,467 New Zealand children placed in out-of-home care during February 2000, approximately one third were placed with relative caregivers.

A second major focus of this study was to identify those factors that placed children born to methadone maintained mothers at greatest risk of child protection concern. Specifically, maternal opiate-dependency requiring treatment, antenatal depression, previous loss of custody, and the degree of maternal social risk were found to significantly increase the likelihood of CPS investigation and subsequent child placement by age 4.5-years. These findings clearly indicate that methadone

maintained women are a vulnerable group with complex needs spanning psychiatric comorbidity, educational and economic disadvantage, and lower levels of partner support around the time of childbirth (Davie-Gray *et al.*, 2013). It is also not uncommon for drug-addicted women to experience feelings of anxiety and stress concerning their perceived competency as a mother (Grossman & Schottenfeld, 1992). These complex difficulties reinforce the need for wrap-around, multidisciplinary and multiagency care and monitoring during the transition to motherhood, in addition to continued pharmacological support (Berghella, Lim, Hill, *et al.*, 2003; Burns, Mattick, Lim & Wallace, 2007). The provision of on-going home-based intervention through nursing visits and parent training that supports mother-infant attachment, parenting skills and addresses family psychosocial stress (Ingoldsby, Baca, McClatchey, *et al.*, 2013; Luthar & Walsh, 1995) will also be important.

These findings should be considered in light of study limitations. First, while CPS involvement during the antenatal period was validated with CPS reports, caregiver-report was the primary measure of subsequent CPS involvement. Secondly, while this prospective longitudinal study had a high rate of sample retention, considered a wide range of socio-familial background factors, and was able to report the extent of maternal substance use during pregnancy along with the nature of children's placements in detail; this study could also have considered rates of child protection concerns involving fathers (*e.g.* Koziol-McLain, Gardiner, Batty *et al.*, 2004) and rates of placement relating to temporary respite care. Without including paternal child protection concerns (*i.e.*, other risk factors in the home environment) and intentionally non-permanent child placements, it is possible that the current study has underestimated precise levels of CPS concerns and child placement occurring among methadone exposed families. Nonetheless, this study has highlighted that methadone maintained mothers are around ten-times more likely to be subject to child protection service investigation than mothers from the general obstetric population. In addition to maternal engagement with methadone maintenance therapy, the independent predictors of child protection service involvement included maternal depression, prior history of child removal, and sociofamilial and economic adversity. Ongoing surveillance of this high-risk group will continue to be

important, as will the development of systematic social welfare policies and agencies directed at improving the outcomes of these children in out-of-home care.

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REFERENCES

- Australian Institute of Health and Welfare (2012) *Child Protection Australia 2010 – 2011*, Child Welfare Series No. 53, Canberra
- Bada, H., Langer, J., Twomey, J., Bursi, C., Lagasse, L., Bauer, C., Shankaran, S., Lester, B., Higgins, R. and Maza, P. (2008) Importance of Stability of Early Living Arrangements on Behaviour Outcomes of Children With and Without Prenatal Drug Exposure, *Journal of Developmental and Behavioural Paediatrics*, 29(3), 173 – 182
- Berghella, V., Lim, P., Hill, M., Cherpes, J., Chennat, J. and Kaltenbach, K. (2003) Maternal Methadone Dose and Neonatal Withdrawal, *American Journal of Obstetrics and Gynecology*, 189(2), 312 – 317
- Brooks-Gunn, J., McCarton, C. and Hawley, T. (1994) Effects of in Utero Drug Exposure on Children's Development, *Archives of Pediatrics and Adolescent Medicine*, 148(1), 33 – 39
- Burns, L., Mattick, R., Lim, K., and Wallace, C. (2007) Methadone in Pregnancy: Treatment Retention and Neonatal Outcomes. *Addiction* (102), 264 – 70
- Canterbury District Health Board (2007) *New Zealand Methadone Handbook*, Canterbury: NZ Drug Foundation
- Cash, S. and Wilke, D. (2003) An Ecological Model of Maternal Substance Abuse and Child Neglect: Issues, Analyses and Recommendations, *American Journal of Orthopsychiatry*, 73(4), 392 – 404
- Children's Commissioner (2008) *Child, Youth and Family Services Care and Protection Process*. Retrieved June 2010, from http://www.occ.org.nz/advce/child_youth_and_family_services#CP_Process
- Cohen, J. (1988) *Statistical Power Analysis for the Behavioural Sciences (2nd Edition)* New Jersey: Lawrence Erlbaum.
- Connors, N., Bradley, R., and Mansell, L. (2004) Children of Mothers with Serious Substance Abuse Problems: An Accumulation of Risks, *American Journal of Drug and Alcohol Abuse*, 30(1), 85 - 100
- Cox, J. L., Holden, J. M., and Sagovsky, R. (1987) Detection of Postnatal Depression: Development of the 10-Item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150(6), 782 – 786
- Crea, T., Barth, R., Guo, S. and Brooks, D. (2008) Behavioural Outcomes for Substance-Exposed Children, *American Journal of Orthopsychiatry*, 17(1), 11 – 19
- Davie-Gray, A., Moor, S., Spencer, C. and Woodward, L. (2013) Psychosocial characteristics and poly-drug use of pregnant women enrolled in methadone maintenance treatment, *Neurotoxicology and Teratology*, 38, 46 – 52

- Deering, D., Sellman, D., Adamson, S., and Campbell, S. (2008) *Intravenous Opioid Dependence in New Zealand*, Wellington: Ministry of Health, *Developmental Psychology* 26(1), 24 – 30
- Donovan, W., Leavitt, L. and Walsh, R. (1998) Conflict and Depression Predict Maternal Sensitivity to Infant Cries, *Infant Behaviour and Development*, 21(3), 505 – 517
- Ehrensaft, M., Wasserman, G., Verdelli, L., Greenwald, S., Miller, L., and Davies, M. (2003) Maternal Antisocial Behaviour, Parenting Practices, and Behaviour Problems in Boys at Risk for Antisocial Behaviour, *Journal of Child and Family Studies*, 12(1), 27 – 40
- Elley, W. B., and Irving, J. C. (2003). The Elley-Irving Socio-Economic Index: 2001 Census Revision. *New Zealand Journal of Educational Studies*, 38, 3 – 17
- Fernandez, E. (2008) Unravelling Emotional and Behavioural Outcomes in a Longitudinal Study of Children in Foster Care, *British Journal of Social Work*, 38(7), 1283 – 1301
- Fisher, P., Burraston, B. and Pears, K. (2005) Early Intervention Foster Care Program: Permanent Placement Outcomes from a Randomised Trial, *Child Maltreatment*, 10(1) 61 – 71
- Goldstein, R., Comorbidity of Substance Use with Independent Mood and Anxiety Disorders in Women: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. In: Brady, K., Back, S., Greenfield, S. (ED.) *Women and Addiction: A Comprehensive Handbook*. New York: Guilford Press (2009) 173 – 192
- Grella, C., Scott, C., and Foss, M. (2003) Gender Differences in Drug Treatment Outcomes among Participants in the Chicago Target Cities Study, *Evaluation of Programme Planning*, 26(3), 297 – 310
- Grossman, J., & Schottenfeld, R. (1992) Pregnancy and Women's Issues. In Kosten, T. & Kleber, H. (eds.) *Clinician's Guide to Cocaine Addiction* (pp. 374 – 388). New York: Guilford.
- Hayford, S., Epps, R. and Dahl-Regis, M. (1988) Behaviour and Development Patterns in Children Born to Heroin-Addicted and Methadone-Addicted Mothers, *Journal of the National Medical Association*, 80(11), 1197 – 1200
- Hunt, R., Tzioumi, D., Collins, E. and Jeffery, H. (2008) Adverse Neurodevelopmental Outcomes of Infants Exposed to Opiate In-Utero, *Early Human Development*, 84, 29 – 35
- Ingoldsby, E., Baca, P., McClatchey, M., Luckey, D., Ramsey, M., Loch, J., Lewis, J., Blackaby, T., Petrini, M., Smith, B., McHale, M., Perhacs, M. and Olds, D. (2013) Quasi-Experimental Pilot Study of Intervention to Increase Participant Retention and Completed Home Visits in the Nurse-Family Partnership, *Prevention Science*, Advance online publication. Doi: 10.1007/s11121-013-0410-x
- Koziol-McLain, J., Gardiner, J., Batty, P., Rameka, M., Fyfe, E. and Giddings, L. (2004) Prevalance of Intimate Partner Violence among Women Presenting to an Urban Adult and Paediatric Emergency Care Department, *The New Zealand Medical Journal*, 117(1206), 1 – 8

- Lang, K., Kirkwood, H., Bowker, R., Conradson, V. and Ongley, P. (1999) *New Zealand Now: Children, Statistics New Zealand*: Wellington, New Zealand
- Luthar, S., D'Avanzo, K., and Hites, S. (2003) Maternal Drug Abuse versus other Psychological Disturbances: Risks and resilience among children, In: Luthar, S. (ED.) *Resilience and Vulnerability: Adaptation in the context of childhood adversities*, Cambridge: Cambridge University Press, 104 – 129
- Luthar, S. and Waldh, K. (1995) Treatment Needs of Drug-Addicted Mothers: Integrated Parenting Psychotherapy Interventions, *Journal of Substance Abuse Treatment*, 12(5), 341 – 348
- Maharey, S. (2000) *Address to the New Zealand Family and Foster Care Federation Conference*. Retrieved March 2010, from <http://www.beehive.govt.nz/speech/address+new+zealand+family+foster+care+federation+conference>
- McGlade, A., Ware, R. and Crawford, M. (2009) Child Protection Outcomes for Infants of Substance-Using Mothers: A Matched Cohort Study, *Pediatrics* 124(1), 285 – 293
- McGlone, L., Mactier, H. and Weaver, L. (2009) Drug Misuse in Pregnancy – Losing Sight of the Baby? *Archives of Disease in Childhood*, 94, 708 – 712
- Mikhail, M. S., Youchah, J., DeVore, N., Ho, G. Y., and Anyaegbunam, A. (1995). Decreased Maternal-Foetal Attachment in Methadone-Maintained Pregnant Women: A Preliminary Study. *Journal of the Association for Academic Minority Physicians*, 6(3), 112–114
- Ministry of Health (2002) *Well Child /Tamariki Ora National: Service Specification*. Retrieved June 2010, from <http://www.moh.govt.nz/moh.nsf/0/74f6b2ec0dd5bc23cc256b87007d27d3/%24FILE/WellChildServiceSpec14703.doc>
- Ministry of Social Development (2012) *The Statistical Report for the Year Ending June 2011*, Retrieved February 2013, from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737421014>
- Moe, V. (2002) Foster-Placed and Adopted Children Exposed in Utero to Opiates and other Substances: Prediction and Outcome at Four and a Half Years, *Journal of Developmental Behaviour and Pediatrics*, 23(5), 330 – 339
- Navarro, P., Ascaso, C., Garcia-Esteve, L., Aguado, J., Torres, A., and Martin-Santos, R. (2007) Postnatal Psychiatric Morbidity: A Validation Study of the GHQ-12 and the EPDS as Screening Tools. *General Hospital Psychiatry*, 29(1), 1 – 7
- Ornoy, A., Michailovskaya, V., Lukashov, I., Bar-Hamburger, R. and Harel S. (1996) The Developmental Outcome of Children Born to Mothers with Heroin Dependency: Importance of Environmental Factors. *Developmental Medicine and Child Neurology*, 20(5), 385 – 396

- Ornoy, A., Segal, J., Bar-Hamburger, R. and Greenbaum, C. (2001) Developmental Outcome of School Aged Children Born to Mothers within Heroin-Dependency: Importance of Environmental Factors, *Developmental Medicine and Child Neurology*, 43(10), 668 – 675
- Patrick, S., Schumacher, R., Benneyworth, B., Krans, E., McAllister, J., Davis, M. (2012) Neonatal Abstinence Syndrome and Associated Health Care Expenditures: United States, 2000 – 2009, *Journal of American Medical Association*, 307 (18), 1934 – 1939
- Preston, A. (1999). *The New Zealand Methadone Briefing*. Wellington: Robert Kemp.
- Redding, R., Fried, C., and Britner, P. (2000) Predictors of Placement Outcomes in Treatment Foster Care: Implications for Foster Parent Selection and Service Delivery, *Journal of Child and Family Studies*, 9(4), 425 – 447
- Soepatmi, S. (1994) Developmental Outcomes of Children of Mothers Dependent on Heroin or Heroin/Methadone during Pregnancy, *Acta Paediatrica Supplement*, 404, 36 – 39
- Strijker, J., Knorth, E. and Knot-Dickscheit, J. (2008) Placement History of Foster Children: A study of Placement History and Outcomes in Long-Term Family Foster Care, *Child Welfare*, 87(5), 107 – 124
- Suess, P., Newlin, D. and Porges, S. (1997) Motivation, Sustained Attention, and Autonomic Regulation in School-Aged Boys Exposed in Utero to Opiates and Alcohol, *Experimental and Clinical Psychopharmacology*, 5(4), pp. 375 – 387
- Usher, C., Randolph, K. and Gogan, H. (1999) Placement Patterns in Foster Care, *Social Services Review*, 73(1), 22 – 36
- Vucinovic, M., Roje, D., Vucinovic, Z., Capkun, V., Bucat, M. and Banovic, I. (2008) Maternal and Neonatal Effects of Substance Abuse During Pregnancy: Our Ten-Year Experience, *Yonsei Medical Journal*, 49(5), 705 – 713
- World Health Organization (1993), *Composite International Diagnostic Interview (CIDI)*. Geneva: World Health Organization.

Table 1.

Social Background Factors, Family Circumstances, Maternal Psychosocial Wellbeing and Infant Clinical Characteristics for all Study Mothers and Children at Term

	Comparison (n = 54)	Methadone (n = 72)	χ^2/t	p
<u>Social Background Factors</u>				
Mean (SD) maternal age	31.04 (5.1)	30.67 (5.0)	0.38	.71
% Mother Māori ethnicity	11.1	23.6	3.23	.06
% Mother no formal educational qualifications	24.1	80.6	40.02	<.001
% Mother welfare dependent	16.7	66.7	31.14	<.001
<u>Family Circumstances</u>				
% Single parent	5.6	13.9	2.32	.11
% Multiparous mother	61.1	87.5	11.85	.001
% Inter-partner violence at 18-months	3.8	17.2	5.13	.04
<u>Maternal Psychosocial Wellbeing in Pregnancy</u>				
% Psychiatric illness	20.4	63.9	23.59	<.001
% Antenatal depression	5.6	45.8	24.53	<.001
% Tobacco use	20.4	91.7	66.00	<.001
% Alcohol use	25.9	18.1	1.14	.20
% Marijuana use	1.9	45.8	30.30	<.001
% Other illicit drug use ^a	0	47.2	34.92	<.001
% Monthly other illicit drug use	0	31.9	21.10	<.001
<u>Infant Clinical Characteristics</u>				
% Male	51.9	58.3	.53	.29
M (SD) Gestation age (wks)	39.18 (1.47)	38.67(1.53)	-1.87	.06
M (SD) Birth-weight (gms)	3437.59 (519.02)	3080.49 (425.89)	-4.24	<.001
% NAS treatment	0	84.7	88.69	<.001

^a Benzodiazepines, stimulants, opiates other than prescribed methadone

Table 2.

Child Protection Service Involvement for all Study Mothers and Children from Birth to 4.5-Years

	Comparison (<i>n</i> = 54)		Methadone (<i>n</i> = 69)		χ^2/t	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Previous loss of child custody among multiparous MM mothers (<i>n</i> = 63)	0	0	21	33.3	18.9	<.001
CYF contact by 18-months	3	5.7	40	58.8	36.75	<.001
Children placed by 18-months	0	0	16	29.9	13.93	<.001
CYF contact by 4.5-years	4	7.4	51	73.9	54.20	<.001
Children placed by 4.5-years	0	0	30	43.5	31.05	<.001

Note: 1 ME child placed through informal custodial arrangement at 26-months, thus not represented in CYF contact by 4.5-years. Partial placement data only available for 4 ME children

Table 3.

The Placement Experiences of Methadone-Exposed Children by Age 4.5-Years

	Methadone (n = 30)
Age at first placement frequency ^a	
0 - 1	16
1 - 2	2
2 - 3	5
3 - 4	2
4 - 5+	4
Child living situation at first placement	
% Relative care	53.3
% Non-relative care	43.3
Number of caregiver changes by age 4.5-years	
M (SD)	2.10 (1.58)
Mode	1
Range	1 - 7
Frequency of caregiver changes by age 4.5-years	
1	14
2	11
3	2
4+	3
Child living situation at 4.5-years	
% Relative care	40.0
% Non-relative care	23.3
% Reunited with Mother	36.7

^a Age of first placement unknown for one child

Table 4.

Linear Associations between Social Background, Family Circumstances, and Maternal Psychosocial Wellbeing at Term of all Mothers, and Child Protection Service (CPS) Concerns by 4.5-years (n = 123)

	No CPS Concerns (n = 68)	Some CPS Concerns (n = 26)	High CPS Concerns (n = 29)	X ² /F	p
<u>Social Background Factors</u>					
% Mothers methadone maintained	26.5	84.6	100.0	51.44	<.001
M (SD) Maternal age	31.28 (5.5)	30.00 (5.3)	30.69 (5.3)	0.54	.58
% Mother Māori ethnicity	13.2	19.2	31.0	4.10	.04
% Mother no formal educational qualifications	32.4	80.8	89.7	31.9	<.001
% Mother welfare dependent	26.5	73.1	65.5	16.62	<.001
<u>Family Circumstances</u>					
% Single parent	5.9	15.4	17.2	3.25	.07
% Inter-partner violence at 18-months	9.1	21.7	4.0	0.07	.80
M (SD) Social risk index	0.93 (1.1)	2.19 (0.7)	2.55 (0.6)	38.99	<.001
<u>Maternal Psychosocial Wellbeing in Pregnancy</u>					
% Psychiatric illness	22.1	73.1	69.0	23.29	<.001
% Antenatal depression	19.1	46.2	82.8	34.43	<.001
% Tobacco use	39.7	84.6	89.7	25.56	<.001
% Alcohol use	21.1	23.1	20.7	0.01	.91
% Marijuana Use	10.3	42.3	48.3	17.90	<.001
% Other illicit drug use ^a	8.8	42.3	55.2	24.10	<.001
% Monthly other illicit drug use	5.9	26.9	37.9	15.59	<.001
<u>Family Circumstances</u>					
M (SD) Parity	1.53 (0.86)	2.42 (1.47)	2.73 (1.71)	7.76	<.001
Parity range	1 – 4	1 – 4	1 – 7		
% Previous loss of custody	2.9	23.1	44.8	25.81	<.001

^a Benzodiazepines, stimulants, opiates other than prescribed methadone

Table 5. Summary of Standardised Regression Coefficients for the Significant Predictors of Child Protection Involvement and Concern.

Measure	B (SE)	<i>p</i>
MMT group status	-0.59 (0.15)	< .001
Antenatal depression score	0.03 (0.01)	.006
Previous loss of custody	0.38 (0.16)	.017
Maternal social risk score	0.12 (0.07)	.062

F = 33.86, *p* < .001, R² = .53

Highlights:

- Methadone-maintained mothers are at high risk of child protection concern (59% v. 6%).
- Nearly half of all investigations of methadone maintained mothers result in child removal.
- These children are typically placed before age one and experience multiple placement changes.
- Predictors of removal were drug treatment, past concern, depression, and social-risk.

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