Substance Use In Pregnancy and Parenting Service (SUPPS)

Preliminary Evaluation Data
Substance Use in Pregnancy and Parenting Service (SUPPS): Preliminary Evaluation Data

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Table of Contents

TABLE OF FIGURES..................................................................................................................III

ACKNOWLEDGEMENTS..............................................................................................................IV

EXECUTIVE SUMMARY..............................................................................................................1

INTRODUCTION..........................................................................................................................4

High Need Population ..............................................................................................................4
Poor Antenatal Care ..................................................................................................................4
Infant Outcomes at Birth .........................................................................................................5
Long-term Infant Outcomes ....................................................................................................9
Methadone Maintenance ..........................................................................................................11
Enhanced Treatment Programs for Substance Using Pregnant Women ..................................15
Maternal Engagement, Retention and Continuity of Care .......................................................16
Development of SUPPS ..........................................................................................................20
  What is SUPPS? .....................................................................................................................20
  Model of Care ........................................................................................................................20
  Staff education and support ..................................................................................................21
  Collaboration with Maternal and Paediatric Services, Wollongong Hospital ...................22
  Existing Services and Programs ............................................................................................23

METHOD.......................................................................................................................................25

Participants and Procedure .....................................................................................................25
Measures .....................................................................................................................................26

RESULTS....................................................................................................................................27

Case Presentation .....................................................................................................................27
Demographics ...........................................................................................................................31
Referral Source ..........................................................................................................................35
Drug Use ....................................................................................................................................36
Maternal Engagement and Compliance ..................................................................................39
Client Satisfaction Survey .......................................................................................................41

DISCUSSION...............................................................................................................................45

Infant Outcomes .......................................................................................................................45
Earlier Engagement ..................................................................................................................45
Maternal Compliance ...............................................................................................................46
Prostitution ...............................................................................................................................46
Social Support ...........................................................................................................................46
Depression ..................................................................................................................................47
Domestic Violence ....................................................................................................................47
Satisfaction Survey ....................................................................................................................48
Limitations .................................................................................................................................50
CONCLUSIONS ................................................................................................................................. 50
RECOMMENDATIONS ......................................................................................................................... 51
REFERENCES ........................................................................................................................................... 52
APPENDIX 1: FLOWCHART OF SUPPS SERVICE DELIVERY ......................................................... 62
APPENDIX 2: NEONATAL ABSTINENCE SCORE SHEET AND GUIDELINES FOR USE .................... 63
### TABLE OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Client Demographics</td>
<td>31</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Referral Sources for SUPPS clients</td>
<td>35</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Drug Use at Presentation</td>
<td>36</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Drug Use During Pregnancy</td>
<td>37</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Drug Use After Pregnancy</td>
<td>37</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Infant Outcomes for SUPPS and non-SUPPS groups</td>
<td>38</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Maternal Compliance Information</td>
<td>40</td>
</tr>
</tbody>
</table>
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EXECUTIVE SUMMARY

The purpose of this report is to present the preliminary data from the evaluation of the Substance Use in Pregnancy and Parenting Service (SUPPS). SUPPS has been funded as a Drug Summit initiative (NSW Health) and managed by the Illawarra Drug, Alcohol and HIV/AIDS Service. The service has been operating on a trial basis since October 2001, and data for this preliminary evaluation was collected until June 2002. This report is intended as a guide for service planning and development, and to inform health care workers of the needs and issues surrounding substance using pregnant women.

The Substance Use in Pregnancy and Parenting Service (SUPPS) is a specialist collaborative program operating between Drug and Alcohol Services and Maternal and Paediatric Services within Illawarra Health. SUPPS offer timely interventions before, during and after pregnancy to ensure better outcomes for women and their families affected by alcohol and other drug use. The guiding principle of SUPPS is to provide an accessible service that offers continuity of care.

Currently, the two part-time SUPPS staff (Drug and Alcohol CNC and CNC midwife) case manage 24 antenatal clients and 15 postnatal clients, for a total caseload of 39. In addition, they have 43 casual clients, who are usually low-level cannabis users that are referred to traditional drug and alcohol, maternity and community services. SUPPS may only provide the initial substance use assessment and liaise with other agencies on behalf of these clients. They have also discharged 13 postnatal clients; therefore the total number of clients referred to SUPPS over the 9-month period is 95. The majority of these referrals have been from Wollongong Hospital (48%) followed by the Drug, Alcohol and HIV/AIDS Service (27%). The large number of referral sources suggests an awareness of the service amongst government and non-government organizations.
Clinical case management is the model used by SUPPS to facilitate continuity of care, which includes assessment, planning, implementation monitoring and review (Onyett, 1992). SUPPS liaise with other service providers such as the antenatal clinic, mental health services, child protection, housing, counselling and correctional services to provide optimal access to services. SUPPS aims to fulfil the recommendations of the NSW Child Death Review (2001) and the NSW Framework for Maternity Services (2000) through working collaboratively with services such as the Department of Community Services (DOCS), and with early identification of clients through flexible service delivery and collaboration. The use of co-case management and consultation with stakeholders allows for continuity of care and effective planning for follow up care.

The literature review in this report provides evidence that substance using pregnant women are a high-risk, high need group that often present late for antenatal care. It has been demonstrated that infant outcome improves with increased compliance with antenatal care. Programs similar to SUPPS have been found to successfully increase compliance with antenatal care.

**METHOD**

Consent was obtained from 27 SUPPS clients and 15 drug-using, non-SUPPS women. The non-SUPPS subjects were from a retrospective sample that had given birth in Wollongong Hospital up to two years prior to the establishment of SUPPS. They were contacted by Wollongong Hospital with a letter describing the service and the study and requesting their consent to access their medical records.

The data collected on the mother included various demographic (age, ethnicity, number of children) and socio-economic variables (marital status, education, accommodation, living arrangement, income). Maternal compliance information was collected on the number of ultrasounds, blood tests, social work, doctor’s and antenatal care visits received. In addition, substance use assessments were done on presentation, during and after pregnancy, to determine if there was any change in maternal drug use.
Infant outcome measures included gender, gestational age, weight, one and five minute Apgar scores, and whether the infant was medicated for withdrawal. The highest Finnegan (1975) score was used as a measure of the level of withdrawal.

All variable means for the SUPPS and non-SUPPS groups were compared and analysed with independent sample t-tests.

RESULTS and CONCLUSIONS

Preliminary data from the SUPPS evaluation provides evidence that the establishment of this service has led to earlier engagement of substance using pregnant women. The average weeks of pregnancy of the SUPPS group at first presentation to SUPPS was 17.25 (± 7.89) weeks compared to 21.73 (± 9.54) weeks for the non-SUPPS group. Preliminary data also shows increased compliance with antenatal care, with SUPPS clients receiving an average of 8.00 (± 5.20) antenatal visits compared to 4.69 (± 5.65) visits for the non-SUPPS group. 55-67% of clients had also reduced or ceased their alcohol, heroin or amphetamine use 6 weeks after pregnancy.

Infant outcomes have also improved; in particular, the average level of withdrawal is lower for SUPPS infants (highest Finnegan score 7.00 ± 5.23) compared to the non-SUPPS group (9.82 ± 2.56). The length of stay in the Neonatal Unit and hospital is six days shorter on average, which represents significant cost savings for the hospital. In addition, the percentage of infants exhibiting symptoms of withdrawal and medicated for withdrawal are less for the SUPPS group (46%) compared to the non-SUPPS group (67%). These results suggest optimism regarding the effectiveness of a dedicated service for the case management of these clients.

There are limitations to the available data, including the small sample size, the retrospective nature of the non-SUPPS group, and a possible factor bias in those women that consented to the study and responded to the satisfaction survey. There is a need to continue the evaluation process to be able to draw more reliable and stronger conclusions regarding SUPPS effectiveness.
INTRODUCTION

High Need Population

The majority of drug-abusing women are of reproductive age (Kaltenbach, Beghella & Finnegan, 1998). During pregnancy, opioid-dependant women do not tend to get adequate rest, nutrition and antenatal care (Finnegan, 1988; Ward, Mattick & Hall, 1998). Obstetric management is also complicated by medical complications due to drug use: eg anaemia, cardiac disease, depression/psychiatric disorders, hepatitis, HIV, other sexually transmitted diseases, hypertension, diabetes, pneumonia, abscesses, poor dental hygiene, tuberculosis, urinary tract infection (Kaltenbach et al., 1998). There is also evidence of gender-specific difficulties, with women showing high rates of unemployment, depression and anxiety disorders, and more severe medical problems than men (Kosten, Roundsville & Kleber, 1985). Obstetric management of substance using women is complicated by the many psychosocial problems that may impede optimal care. Many must cope with single parenthood, lack of social support, poverty, homelessness, lack of education, domestic violence, depression, stress and low self-esteem (Finnegan, 1991; Waldby, 1988).

Poor Antenatal Care

Many substance-using women book late for antenatal care, or present in labour with no previous antenatal assessment or care (Stauber, Schwerdt & Tylden, 1982). A London study estimates 75% of drug users are undetected by their obstetric services (Morrison, Siney, Ruben & Worthington, 1995).

Many heroin-dependant women present late for care because they often misinterpret the symptoms of pregnancy. Due to the high incidence of menstrual abnormalities among these women, there is a myth in the heroin subculture that a woman is unlikely to become pregnant while using heroin (Waldby, 1988). Thus, contraception is often neglected and the early symptoms of pregnancy (nausea, headaches, fatigue, etc) are attributed to withdrawal symptoms or contaminated drugs.
They may have lost children to child welfare agencies in the past, and as a result are reluctant to contact health care agencies (Olivia, Reinks & McDermid, 1999). Diagnosis may also be delayed because the patient is non-compliant with prenatal care, avoiding what is perceived as a threatening medical environment (Kaltenbach et al., 1998; Lewis, Klee & Jackson, 1995). The physician, and the health care system in general, may have in the past been judgmental, labelling them as drug users. Guilt, shame, and low self esteem may lead to lateness or missed appointments, continued use of illicit drugs and what is perceived as indifferent and uncaring behaviour, all of which is difficult for clinical staff to tolerate (Kaltenbach et al., 1998). Interviews with pregnant women revealed that the main barriers to accessing antenatal care were transportation, waiting too long for appointments, having too many other problems (eg. housing legal), the belief that prenatal care is unnecessary, fear of medical examination, no childcare for other children, and fear of judgemental staff (Mikhail & Curry, 1999; Olivia et al., 1999).

**Infant Outcomes at Birth**

Some of the problems experienced by infants born to opioid-dependant mothers are drug related, such as neonatal abstinence syndrome, but most are due to harm associated with a substance using lifestyle (intoxication, withdrawal, infections, poverty, inadequate care, etc.) (Deren, 1986; Hoeberman, Wilson, Thurnomd & Schnoll, 1990; Householder, Hatcher, Burns & Chasnoff, 1982; Kaltenbach and Finnegan, 1989; Kaltenbach, 1994). The vast majority of heroin users are also cigarette smokers, which has been linked to decreased infant birth weight, intrauterine growth retardation and prematurity (Doberczak et al., 1987; Ellwood, Sutherland, Kent & O'Connor, 1987; Gibson, Baghurst & Colley, 1983; Giles, Patterson, Sanders, Batey, Thomas & Collins, 1989). After birth, children of cigarette smoking mothers are at higher risk of asthma and cancer and show higher rates of hyperactivity and inattention, which may result in educational underachievement (Buka, 1991).

Studies show generally poor outcomes for babies born to opiate-addicted mothers (Finnegan et al., 1975; Green and Gossop, 1998). Studies of the effect of opiate
use in pregnancy have reported a number of serious obstetrical complications that can occur, including abortion, abruptio placentae, amnionitis, breech presentation, intrauterine death, gestational diabetes, postpartum haemorrhage, premature labour and septic thrombophlebitis (Connaughton, Reeser, Schut & Finnegan, 1997). In addition to the symptoms of opioid withdrawal (irritable, tremulous etc) opiate-exposed infants have demonstrated significant interactive impairment resulting in their being more difficult to console, and may lead to difficulties with mother-infant attachment and bonding (Chasnoff, 1988).

Other consequences of illicit drug usage include: increased rates of intrauterine growth restriction (Lam et al., 1992) neonatal encephalopathy and seizures (Doberczak, Kandall & Wilets, 1991). Maternal withdrawal is also associated with an equally wide range of serious complications (Rementeria & Nunag, 1973). Sporadic drug use or uncontrolled withdrawal episodes should be avoided as it is the opioid withdrawal that poses the most risk to the foetus (Kaltenbach et al., 1998).

Most medical complications among infants born to opiate-dependant mothers are linked to premature delivery (Oleske, 1977). Pregnant drug-dependant women also present with a wide range of medical problems, including anaemia, bacterial endocarditis, hepatitis, other sexually transmitted diseases and pneumonia (Connaughton et al., 1997). Finnegan (1982) found that 40-50% of American pregnant drug abusing women had medical complications. Many are therefore medically “high risk” and should be given special antenatal consideration. The clinical management of pregnancy is further complicated by the fact that drug users continue to use drugs, and often do not attend prenatal care. Studies on the intellectual development of infants exposed to heroin in utero suggest that inadequate antenatal care is common for severely impaired children (Wilson, 1989).

Neonatal Abstinence Syndrome (NAS) refers to a pattern of withdrawal symptoms that may be observed in infants exposed in utero to opiates. Symptoms of NAS are non-specific: high pitched crying, irritability, vomiting, diarrhoea and tremor (Kelly, Davis & Henschke, 2000; Levy and Spino, 1993). NAS is characterised by
dysfunction of the central and autonomic nervous systems, gastrointestinal tract and respiratory system (Fischer, Jagsch, Eder, Gombas, Etzersdorfer, Schmidl-Mohl, Schatten, Weninger & Aschauer, 1999). Autonomic symptoms include yawning, sneezing, mottling, and fever (Kaltenbach et al., 1998). Neonates often suck frantically on their wrists or thumbs, yet may have extreme difficulty feeding because of an uncoordinated sucking reflex. Withdrawal symptoms are variable between infants. Initially, tremors are mild and occur only when the infant is disturbed, but may progress to occur spontaneously without any stimulation (Kaltenbach et al., 1998). The withdrawal may be mild and transient, delayed in onset, and increase step-wise in severity. It may be intermittently present, or have a biphasic course, with acute withdrawal followed by improvement, followed by subacute withdrawal (Desmond & Wilson, 1975). The relationship between methadone dose and severity of withdrawal has been difficult to establish, with some studies finding a significant relationship (Ostrea, Chavez, & Strauss, 1976; Harper, Solish, Feingold, Gersten-Woolf & Sokal, 1977; Madden, Chappel, Zuspan, Gumpel, Mejia & Davis, 1977) and others find no differences (Blinick, Jerez & Walach, 1973; Rosen & Pippenger, 1976; Stimmel et al., 1982; Mack, Thomas, Giles et al., 1991; Kaltenbach & Comfort, 1997).

The severity of neonatal symptoms is usually assessed at birth with the Neonatal Abstinence Score (also called Finnegan scores), the standardised measure of withdrawal signals in infants exposed to narcotics prenatally (Malpas et al., 1995; Kelly et al., 2000). The onset of withdrawal symptoms occurs at any time in the two week period following birth, although the majority appear within 72 hours (Finnegan, 1982). The onset is influenced by many factors, including type of drug used, dosage and timing of dose before delivery, type of analgesia given in delivery, and the presence of intrinsic disease in the infant. The onset and course of withdrawal varies greatly among neonates (Desmond & Wilson, 1975).

Kelly and colleagues (2000) conducted an audit of the Chemical Dependency Unit at Royal Women’s Hospital, Melbourne, Australia of babies delivered during 1997. They compared 96 infants of drug-dependant mothers, to 200 controls matched for age, socio-economic status, maternal IDU and non-ID use (self-reports), smoking,
and viral serology (HIV and Hep C). 90% (n=86) of the drug-dependant mothers were on methadone and 68% (n=65) were still using heroin during pregnancy. A minimum of seven days observation was required to detect withdrawal (Kelly et al., 2000). As per the original Finnegan (1975) protocol, an infant that was greater than or equal to a level 8 Finnegan score for three consecutive measures was put into treatment (Kelly et al., 2000). They found the infants of the drug-dependant mothers were significantly less mature (mean gestational age 37.6 (SD= 1.9) vs. 38.4 (SD= 3.1) ) and lighter (weight 2899 (SD = 522) grams vs. 3151 (SD = 775) grams) than control infants (Kelly et al., 2000). Another study also found that drug-exposed infants have lower birthweights and longer hospital stays than non-exposed infants (Johnson, Nusbaum, Bejarano & Rosen, 1999).

53 (55%) of the infants born to drug dependent mothers in the Kelly et al. (2000) study required treatment because of neonatal abstinence syndrome (n=29) or other medical reasons (n=24). Of the 29 that required admission to the Neonatal Unit because of neonatal abstinence syndrome, 16 required treatment with morphine for an average of 34 days. The other 24 infants were admitted to the Neonatal Unit for illnesses not directly linked to withdrawal (premature, respiratory distress, poor feeding, sepsis) (Kelly et al., 2000). The median length of hospital stay was significantly longer for drug-exposed infants compared to controls (8 vs. 3 days, p<0.01). 19 notification/protection orders were filed with a government agency, and 5 of these infants were put into foster care. Thus, infants born to substance using women are large consumers of health and welfare resources.

A study by Malpas et al. (1995) found a dose-response relationship between maternal methadone dose at delivery and duration of hospital stay, and the proportion of infants receiving treatment and the duration of treatment. However, maternal methadone doses (average 15.4 mg) and infant withdrawal symptoms (3.4 to 12.7) were relatively mild overall, which influenced the results (Malpas et al., 1995). The mild infant withdrawal symptoms were most likely correlated with the low maternal methadone doses (Malpas et al., 1995). Overall, 43% of infants of mothers receiving methadone required withdrawal treatment (Malpas et al., 1995).
The medical and social problems of these infants extend to the newborn period. Successful management is aided by standardised assessment of infants at risk and adherence to proven protocols (Kendall, 1999). Some of the unresolved questions include: Which drugs are best for maternal maintenance and NAS? Should neonatal therapy be inpatient or outpatient? What is the long-term neurodevelopmental outcome for such infants?

**Long-term infant outcomes**

Neurobehavioral, somatic growth, and developmental deficits in children born to drug-abusing mothers have been demonstrated (Thandi, 2002). The effects of alcohol on foetal and child development have been well examined (Rosett, Weiner, Lee, Zuckerman, Dooling & Oppenheimer, 1983; Abel & Sokol, 1986). Infants born to mothers who used alcohol during pregnancy are more likely to display motor and language skill deficits, hyperactivity, tremulousness, lower levels of arousal, habituation and irritability (Chasnoff, Griffith, Freier, & Murray, 1992).

There is also evidence to suggest that infants born to substance using women are at increased risk of physical abuse and neglect, asthma, learning disabilities, and behavioural problems (Buka, 1991; Fried & Watkinson, 1990). However, it remains undetermined to what extent these difficulties are due to prenatal drug exposure or to the environmental factors that may accompany substance use (i.e. poverty, homelessness, level of educational attainment, lack of support).

The effect of environmental stress and its interaction with prenatal drug and alcohol exposure on a child’s development is unknown (Thadani, 2002). Studies with pregnant animals under controlled conditions show drug-induced long-term alterations in brain structures and functions in the offspring (see Thadani, 2002 for a review).

These alterations are associated with disruptions in neurotransmitter systems. Substance use, and the associated environmental stress (lifestyle), is thought to influence the brain development and the neurobiology of the stress response later in life. This is manifested through the activation of the hypothalamic-pituitary-adrenal (HPA)
axis (De Bellis et al., 1999; Graham, Heim, Goodman, Miller & Nemeroff, 1999). Research in animals links prenatal stress coupled with acute postnatal stress to long term alterations in the brain glucocorticoid receptors as well as changes in the activity of the HPA axis, such as plasma ACTH and corticosterone levels (reviews: Baram et al., 1998; Ladd et al., 2000).

A study by Field and colleagues (1998) found that compared to controls, newborns of drug using mothers showed poor habituation and orientation, abnormal reflexes, poor regulatory capacity, general irritability, and spent less time in quiet sleep and more time crying. However, following a comprehensive six-month postnatal intervention program the drug-exposed infants had caught up with controls on all measures.

Other studies also cast doubt on the long-term, detrimental effects of prenatal heroin exposure on child development. Michailevskaya, Lukasov, Rar-Hamburger and Harel (1996) examined 336 children for developmental delays and behavioural disorders from 6 months old to 6 years. While children born to heroin-addicted parents had a high incidence of hyperactivity, inattention and behavioural problems, the developmental and intellectual capacities were lowest in those children in the low socio-economic status and environmentally deprived control group (Tomison, 1996). Those children born to heroin using mothers that were removed from the home at a young age and adopted, scored as well as the “normal” control groups, while the children raised at home scored significantly lower (Tomison, 1996). Therefore, for children born to heroin using mothers, born without any significant neurological damage, developmental outcome appeared to depend more on home environment than heroin exposure. Werner’s (1989) longitudinal study indicated that exposure to adverse social conditions, such as harshness in parenting behaviour, is ten times more likely than perinatal complications to result in poor development.

These findings would suggest that factors such as social support, parenting skills, the parent-child relationship and family resources should be taken into account when making decisions on what is in the child’s best interest, and not only substance
use (Assi-Lessing & Olsen, 1996). Also, parenting skills should be a focus of postnatal care programs. Effective interagency cooperation between alcohol and drug services and child protection units is needed to assess and prevent the maltreatment of children in “at risk” families.

**Methadone Maintenance**

Methadone, a synthetic opiate, blocks both the euphoriant effects of heroin and the addict’s craving for the drug. It is administered orally, and following absorption into body tissues is released unchanged into the bloodstream (Dole & Kreek, 1973). Like heroin, methadone is increasingly transferred across the placenta as gestation proceeds. Animal studies suggest that foetal storage of methadone occur primarily in the brain, lung, liver, kidney and spleen (Shah, Donald, Bertolatus et al. 1975).

Methadone maintenance during pregnancy is used for various reasons. Methadone replaces illicit opioid of varied composition and dose, with a pure substitute at a stable dose. A methadone program retains women in treatment, providing them with antenatal care and access to other medical and social welfare services. Complete detoxification is unrealistic and often leads to abstinence syndrome leading to foetal distress, which is more harmful than methadone dependence (Finnegan, 1991).

Evidence shows methadone maintenance produces superior outcomes compared to not being in treatment. Infants born to heroin-dependant mothers are often of premature birth and small for their gestational age (Ellwood et al., 1987; Finnegan, 1991). Babies born to methadone maintained mothers are larger, have longer gestations and fewer obstetrical complications than babies of mothers not in treatment. Women in methadone maintenance attend more antenatal care than women not in treatment (Giles et al., 1989; Soepatmi, 1994). The amount of antenatal care is a predictor of outcome for both mother and infant (Suffet & Brotman, 1984; Wilson, 1989). Both attendance at antenatal care and improved infant outcomes are related to time spent in methadone maintenance (Doberczak et al., 1987; Elwood et al., 1987; Suffet & Brotman, 1984). However, outcomes are generally not equivalent to drug-free pregnancies.
The incidence of obstetric complications in women maintained on methadone is less than the incidence in heroin users (Finnegan, 1992). Effective methadone maintenance prevents the onset of opioid abstinence syndrome for 24 hours or more, reduces or eliminates hunger or craving, blocks the euphoric effects of illicit narcotics, prevents erratic maternal opioid levels and protects the foetus from repeated episodes of withdrawal. Methadone maintenance also indirectly decreases the mother’s risk of hepatitis C and HIV infection, reduces drug-seeking behaviours (i.e. prostitution, criminal activity) and increases legitimate employment (Kaltenbach et al., 1998; Maddux & Desmond, 1992). Wells and colleagues (1996) found that women who stayed in methadone treatment reported reducing the number of their injecting drug using sexual partners.

Methadone has been shown to cause elevations of amniotic fluid, epinephrine and norepinephrine levels during a slow withdrawal (Zuspan, Gumpel, Mejia-Zelaya, Madden & Davis, 1975). It has been suggested that there are maintenance agents other than methadone that result in a less prolonged NAS (Fischer et al., 1996). A study comparing methadone and slow-release morphine maintenance in pregnant addicts found no difference in the number of days the infants had NAS, but significantly fewer benzodiazepines and additional opiates were consumed by the morphine-maintained women (Fischer et al., 1999). Benzodiazepines, in contrast with opiates, can cause teratogenic effects, disrupting the neurological development of the foetus (Brown & Zuckerman, 1991). Abuse of benzodiazepines by pregnant women has also been associated with lower birthweight compared to infants who were not exposed to benzodiazepines in-utero (McCarthy, Siney, Shaw & Ruben, 1999).

Despite the fact that methadone treatment has been established for about 30 years, no specific guidelines and/or optimal methadone dosing schedule currently exist for women during pregnancy. In order to limit the foetus’ exposure to all drugs to a minimum, the ideal dose for heroin-dependant pregnant women would be low (<40mg) early in the pregnancy for stabilisation, and then slowly reducing the dose (5mg per
fortnight) between the 14\textsuperscript{th} and 32\textsuperscript{nd} week so both mother and infant are drug-free during the birth (Kaltenbach et al., 1998).

Treatment programs for substance using pregnant women cannot make use of detoxification or rapid reduction in methadone dose, because detoxification is contraindicated in pregnancy. If detoxification is requested, withdrawal is best carried out during the 14\textsuperscript{th} to 32\textsuperscript{nd} week period, because it may induce abortion before the 14\textsuperscript{th} week and premature labour or withdrawal-induced foetal stress after the 32\textsuperscript{nd} week.

Detoxification is an unrealistic option for most women in general, and pregnancy does not significantly alter this. Finnegan (1991) reports a 100% failure to achieve abstinence, either because patients could not bear the diminishing doses, or could not proceed due to the likelihood of premature labour. Many would quickly relapse into heroin or other drug use, which is more harmful than methadone dependence (Finnegan, 1991). Generally, high doses between 60 and 150mg have been recommended, because lower methadone doses have been associated with increased use of illicit drugs and reduced program retention rates (Grabowski et al., 1999; Kandell et al., 1999, Strain, Bigelow, Liebson & Stitzer, 1999; Laken, McComish & Agar, 1997; Maremmani et al., 1994). The most desirable option according to some, is maintenance on as low a methadone dose as possible, for the least negative effects on the foetus, and least withdrawal distress (Laken et al., 1997). However, programs that adhere to this philosophy have found that methadone treatment is associated with increased illicit drug usage and no effect on treatment retention (Laken et al., 1997). In addition, Doberczak et al. (1987) found that higher doses of methadone were associated with greater increases in maternal weight. Also, maternal methadone levels tend to fall during pregnancy (Jarvis et al., 1999). Therefore, some clinicians have increased methadone dosages in late pregnancy to maintain constant maternal serum methadone levels, to prevent withdrawal symptoms and maintain maternal comfort and program compliance, and promote foetal growth (Doberczak et al., 1987). However, mothers who were able to successfully reduce their methadone dose during pregnancy gave birth to significantly heavier infants than women whose dose remained stable or increased (McCarthy et al., 1999).
The dosing schedule has also been questioned. While some methadone clinics individualise dosing, many provide the usual standard of a once daily and/or a strictly low dose regimen. Pond et al., (1985) found that methadone plasma concentrations are lower in the second and third trimester of pregnancy than after delivery and increased excretion was observed after delivery, thought to be correlated to an increase in withdrawal symptoms. Others have found that twice daily dosing (splitting the dose) in later pregnancy increased program compliance and decreased cocaine use (Wittmann & Segal, 1991; DePetrillo & Rice, 1995). In addition, Jarvis and colleagues (1999) found that methadone elimination was significantly more rapid for pregnant patients compared to non-pregnant patients; thus, they were more likely to require higher and more frequent dosing. Pregnancy not only accelerates methadone metabolism, but may also decrease the fraction of methadone absorbed, impacting on the clearance and volume of distribution (Jarvis et al. 1999). Therefore, modifications in methadone dosing are required for optimal control of withdrawal in pregnant opioid-dependant women. Serious evaluation of patient complaints of a dose “not holding” through a 24 hour period are recommended, particularly considering the risks of treatment failure to the foetus (Jarvis et al., 1999).

Studies that compare maternal methadone dosage with neonatal withdrawal have produced conflicting results. Some have found no correlation (Mack et al., (1991) using an average methadone dose of 42.5 mg), some have found a moderate relationship (Morrison et al., 1995) while others have found a strong relationship (Doberczeck et al., (1993) using an average methadone dose of 49.9mg; Malpas et al., 1995). Doberczeck et al (1993) found that 81% of infants required withdrawal treatment, and that higher initial methadone levels were associated with more rapid declines of drug levels in neonates probably through enzyme induction and enhanced drug methylation and cyclization in the liver. Malpas et al., (1995) found that on average, the drug-dependant sample (n=70) was lighter (by 370g) and had smaller head circumferences (by 1cm) than controls (n=1265). A higher proportion of the drug-dependant sample were smokers (80% vs. 34%), a factor that was not controlled for in this study. In addition, it was not stated whether or not any of the women in this study continued using heroin throughout the pregnancy.
Despite evidence of its usefulness in opioid addiction, methadone has little impact on the women’s use of cocaine, alcohol, and other illicit substances (Kirn, 1988). Therefore, enhanced treatment programs that take poly drug use into consideration along with antenatal care need to be considered for this population.

Enhanced Treatment Programs for Substance Using Pregnant Women

It has been well demonstrated that methadone treatment provided within a comprehensive program that includes prenatal care can reduce obstetric and foetal complications and neonatal morbidity and mortality (Suffet & Brotman, 1984; Finnegan, 1991; Freda, Chazotte & Youchah, 1995; Jarvis & Schnoll, 1994; Morrison et al., 1995). The most successful treatments and outcomes for both mother and infant were found in centres that offered methadone maintenance at an appropriate dose, combined with antenatal care and a comprehensive system of support for the opioid-dependant women (McLellan, Arndt, Metzger, Woody & O’Brien, 1993). An antenatal program in New Zealand involved attendance at an antenatal day care centre, involvement with drug and alcohol counsellors, counselling for HIV testing and consultation with a neonatal paediatrician (Malpas et al., 1995). Antenatal care in the Kelly, Davis and Henschke (2000) study consisted of stabilising drug use with enrolment in the methadone program and support from a social worker and dietician. Kaltenbach et al. (1998) suggest HIV and hepatitis C testing and counselling should also be offered. In a study comparing enhanced versus standard methadone maintenance, those in the enhanced program had longer gestations, and had infants of higher birth weight (Carroll, Chang, Behr, Clinton & Kosten, 1995). The standard program consisted of daily methadone, weekly group counselling and urine toxicology screening, while the enhanced program also included weekly prenatal care, weekly relapse prevention groups, therapeutic child care and positive contingency awards for abstinence. The enhanced program was associated with improved infant outcomes, but the program appeared to have little effect on maternal drug use (Carroll et al., 1995). This finding suggests that improved antenatal care can lead to improved infant outcomes even without a significant reduction in drug use. An earlier study found that subjects in enhanced treatment had 3 times as many prenatal visits (8.8 vs. 2.7) and...
heavier infants (2959 vs. 2344 grams) (Chang, Carroll, Behr & Kosten, 1992). These results also suggest that an enhanced program can improve infant outcome and, in particular, reduce low birthweight for this high risk population. The low birth weight range is associated with increased neonatal and postnatal mortality, an increased risk of a variety of health problems, such as neurodevelopmental and congenital abnormalities, and significantly increased hospital care costs (Institute of Medicine, 1985). However, it should be noted that the enhanced group had less overall illicit substance use, which would have contributed to the improved infant birthweights and other outcomes. The results of a case control study comparing methadone-maintained pregnant subjects with untreated women showed that both groups used illicit substances at high rates, and gave birth to infants of similar weight, although the treated women had more prenatal care (Edelin, Gurganious, Golar, Oellerich, Kyei-Aboagye, & Hamid, 1988).

Conversely, an earlier study found that their enhanced treatment group significantly improved in number of days of employment (30%) decreased use of cocaine (57%), and decreased the number of days of alcohol use, opiate use, illegal activity, and psychological problems (67%) (McLellan et al., 1993). DePetrillo & Rice (1995) found a relationship between measures of non-compliance (amount of drugs in urine) and the trimester of entry into the methadone program, with women entering in later pregnancy having decreased program compliance. Also, women admitted in their third trimester had higher levels of opiates and cocaine in their urine and a higher rate of urine test non-compliance.

**Maternal Engagement, Retention and Continuity of Care**

Studies on treatment compliance have found that compliance increases among women who had undergone previous substance abuse treatment (Clark, Dee, Bale, & Martin, 2001; Laken et al., 1997; Laken & Ager, 1995). Some studies investigating infant outcome of substance using women have also examined maternal compliance to antenatal care. In a retrospective study (n=12), Green and Gossop (1998) found that use of antenatal care was poor; booking was late (mean 25 weeks) and two women never attended any antenatal clinic. The mean number of visits to an antenatal clinic during pregnancy was 4.36 (optimum=16). This study also examined the amount of
collaboration between drug and alcohol agencies and maternal and paediatric services. Liaison between inpatient drug units and obstetric hospitals were good, with 3 of the 5 patients who booked early coming from an inpatient unit. However, although eight patients were linked with an outpatient drug unit during their pregnancies, there were no records of any communication between these units and the antenatal clinic (Green & Gossop, 1998). The researchers identified the need for better channels of communication between the different treatment facilities involved with pregnant addicts and recommended that one agency should take responsibility for the monitoring and supervision of the drug status of the women throughout pregnancy. Linking midwifery services to drug units as required should be considered. Where different treatment agencies are concerned with the same individual, communication between agencies should be facilitated to optimise the medical care actually received in the antenatal period.

Green and Gossop (1998) also identified the need to look at ways of improving these women’s engagement with health care facilities and their poor attendance at antenatal facilities. A supportive, non-judgemental, non-punitive attitude is necessary among all health care providers to engage and develop a relationship with the client. They recommend that key worker involvement within the first six months of pregnancy could improve antenatal attendance, allow for evaluation of dietary habits and nutritional status and enable housing to be assessed and improved upon, if necessary, prior to the birth of the infant (Green & Gossop, 1998). Assessing and improving the women’s parenting skills can also be made a priority. In conclusion, research evaluating interventions for pregnant drug-users indicates that a comprehensive program, either combining needed services in the one location or having one service liaise with other needed services and case manage the client, was an important factor in engaging and retaining clients (Condelli & Dunteman, 1993; Freda et al., 1995; McCarthy et al., 1999, McLellan et al., 1993).

Studies have shown that retention in treatment programs is improved if case management is provided throughout pregnancy (Rahdert, 1992). Although there is no agreed consensus on the definition of case management, core elements of all models
appear to include assessment of need for health and social services, planning, coordination, monitoring to ensure services are received, and advocacy on behalf of the clients (Graham & Timney, 1990). The intensity of case management, including providing transportation, contributes significantly to retention in substance abuse treatment during pregnancy (Laken & Ager, 1996). Despite being a barrier to engagement, Laken and colleagues (1997) found the threat of child protective services encourages treatment retention, and retention in turn has a positive effect on reducing illicit substance use. However, the sample they obtained was self-selected, and therefore may have been more highly motivated. Identified systems barriers included lack of comprehensive services such as on-site child care and transportation, lack of a gender-specific approach, fragmentation of services, and negative attitudes of providers (Laken & Ager, 1996).

Studies of length of stay in residential treatment for substance abuse have produced mixed results. Consistently, men stayed in treatment longer than women, and increased their length of stay when women enrolled in the program (Lewis & Ross, 1994; Sansone, 1980; Stevens & Guilder, 1994). For pregnant and parenting women, retention improved significantly when the women’s children lived on site (Coletti, Hughes & Landress, 1992; Hughes, Colletti, Neri, Urmann, Stahl, Sicilian & Anthony, 1995). No differences in length of stay or perinatal outcomes were found when residential and outpatient programs were compared (Laken et al., 1997).

Daley, Argeriou, and McCarty (1998) compared the use of treatment services by pregnant and non-pregnant women, and found that pregnant women averaged more admissions to treatment, most of which were re-admissions for detoxification. An equal proportion of both groups went on to continuing treatment following detoxification, with similar completion and drop out rates. Pregnant women entered more residential programs and more methadone programs, either through referral from a counsellor or concern for their baby. However, increased access did not necessarily result in better treatment outcomes (Daley et al., 1998). Pregnant women were 1.7 times more likely to relapse, although this risk was reduced through participation in continuing recovery programs (Daley et al., 1998).
There have also been NSW reports of the need for a specialised service for substance using pregnant women. The Child Death review of 2000-2001 recommended improved collaboration between Maternal and Paediatric, Drug and Alcohol and Child Protection agencies both antenatally and postnatally. The NSW Framework for Maternity Services (2000) highlights the need for antenatal care to be delivered in a flexible manner suitable to clients needs and to be collaborative with other services.

The background research reviewed in this introduction informed the development of the Substance Use in Pregnancy and Parenting Service (SUPPS) and the evaluation of SUPPS. Evidence-based practice has provided information on the size and particular needs of our target group in the Illawarra, and will be necessary for future planning and service development. This evaluation will determine if SUPPS is effective in improving infant outcomes, engaging substance using pregnant women into antenatal care earlier, increasing maternal compliance with antenatal care, increasing harm minimisation practices and decreasing or ceasing drug use. A client satisfaction survey is also given to the client during the 6 week follow-up visit, to identify service strengths and weaknesses. As an adjunct to this research, a drug and alcohol assessment tool was introduced into the antenatal clinic at Wollongong Hospital.

There are a number of similar programs currently operating or being developed, statewide, nationally and internationally (i.e. Chemical Use in Pregnancy Service (CUPS), South Eastern Sydney Area Health Service, Australia; Chemical Dependency Unit, Royal Women’s Hospital, Melbourne, Australia; Pregnant Addicts and Addicted Mothers (PAAM) Program in New York, USA; Obstetrics Liaison Service (Liverpool Drug Dependency Clinic), London, England). However, there are few studies that actually evaluate outcome measures for intervention programs for pregnant substance users (Finnegan, 1978; Suffet & Brotman, 1984; Dawe, Gerada & Strang, 1992; Chang et al., 1992; Randolf & Sherman, 1993; Freda et al., 1995; Morrison et al., 1995; Carroll et al., 1995; Green & Gossop, 1988; Kelly et al., 2000). Many of these studies have limitations (see discussion) and do not investigate all of the outcome variables that will be collected upon completion of this evaluation. This report contains preliminary data on a subset of these outcome variables.
Development of SUPPS

What is SUPPS?

The Substance Use in Pregnancy and Parenting Service (SUPPS) is a specialist collaborative program operating between Drug and Alcohol Services and Maternal and Paediatric Services within Illawarra Health. SUPPS offer timely interventions before, during and after pregnancy to ensure better outcomes for women and their families affected by alcohol and other drug use. Information regarding all aspects of drug use in pregnancy is provided to enable informed choice. The guiding principle of SUPPS is to provide an accessible service that offers continuity of care.

At the time of the writing of this report, SUPPS had been in operation for 9 months. The SUPPS staff consists of a Drug and Alcohol CNS and a certified midwife CNS, each working part-time, two days a week. Currently, they case manage 24 antenatal clients and 15 postnatal clients, for a current total caseload of 39. In addition, they have 43 casual clients, who are usually low-level cannabis users that are referred to traditional drug and alcohol, maternity and community services. SUPPS may only provide the initial substance use assessment and liase with other agencies on behalf of these clients. They have also discharged 13 postnatal clients; therefore the total number of clients referred to SUPPS over the 9-month period is 95.

Model of Care

Clinical case management is the model used by SUPPS to facilitate continuity of care. Clinical case management includes the core tasks of assessment, planning, implementation monitoring and review (Onyett, 1992). Initially, clinical case management involves engagement, relationship building and planning with the client, as well as a comprehensive antenatal and drug and alcohol assessment. This is followed by various interventions with the client or on behalf of the client with other health care and community service providers (Onyett, 1992). Regular antenatal care correlates highly with improved health outcomes for pregnancy in the general population. Women using substances need additional care and encouragement to attend appointments. This
marginalized group of women and their families may have difficulty in accessing pregnancy care often unaware of the options available to them. SUPPS liaise with other service providers such as the antenatal clinic, mental health services, child protection, housing, counselling and correctional services to provide optimal access to services. SUPPS aims to fulfil the recommendations of the NSW Child Death Review (2001) and the NSW Framework for Maternity Services (2000) through working collaboratively with services such as the Department of Community Services (DOCS), and early identification of clients through flexible service delivery and collaboration. This allows the service to antenatally plan strategies to ensure child safety whilst actively working with the client to achieve this. Service delivery is illustrated in the flowchart in Appendix 1. The 34-week Antenatal Case Conference initiated by SUPPS is an example of where key stakeholders are involved in the case planning prior to the birth. The use of co-case management and consultation with stakeholders allows for continuity of care and effective planning for follow up care.

Staff education and support

Staff education and support has also been identified by SUPPS as crucial to fully achieve best outcomes for our clients. Traditionally Drug and Alcohol workers are unfamiliar with pregnancy issues and Maternity Services unfamiliar with Drug and Alcohol Services. SUPPS is a bridge between these two services enabling sharing of information and greater support to each service.

To date this has been achieved through numerous in-service visits to each service. SUPPS provides education for drug and alcohol workers on the needs of special risk women and child protection issues, and appropriate services to access. They also provide training to hospital nurses on how to conduct a substance use assessment. The training is informal at this point and has not been included in the evaluation; however, the success of this education has been reflected through the sources of referral (Figure 2). In the future, SUPPS aims to look at educative in-services run regularly in each area with the view to conference presentations in both Drug and Alcohol and Midwifery forums. These educative opportunities have not been optimised yet due to funding and staffing constraints.
SUPPS is an interdisciplinary service that provides antenatal, perinatal and postnatal care for pregnant women with substance use problems and their infants. During the antenatal period, clients receive regular obstetric care from the SUPPS midwife, hospital antenatal clinic midwives, and doctors or obstetricians. The SUPPS drug and alcohol nurse provides drug and alcohol assessment and counselling according to best practice guidelines (NSW Health Alcohol and Other Drugs Policy for Nursing Practice in NSW Clinical Guidelines 2000-2003). Antenatal care focuses on stabilising drug use and where possible starting and maintaining the women on a methadone maintenance program. The SUPPS staff provide the case management of these clients, booking blood tests and ultrasounds, and providing transport when this is identified as a reason for non-compliance by the client. Clients also receive visits from a social worker antenatally and postnatally.

The antenatal care provided is in accordance with the current standards of practice within NSW (NSW Health Circular 2000/63; Chalmers, Enkin & Keirse, 1991). This procedure includes ultrasounds at 17-18 weeks gestation and 32-34 weeks gestation for low lying placenta, and blood tests at the first visit and/or 28 weeks and 34 weeks. Ultrasounds at 18 to 22 weeks gestation for detection of foetal anomalies and in the third trimester for foetal growth are recommended. (Kaltenbach et al., 1998). Two to three (high risk pregnancies) visits to the doctor/obstetrician are also recommended (Chalmers et al., 1991). Withdrawal of the infant is measured using the standardized Finnegan (1975) scoring system. Successful management of drug-exposed neonates has been shown to be aided by standardised assessment of infants at risk and adherence to proven protocols of management (Kendall, 1998).

The SUPPS staff also provide postnatal home visits, and advocacy and referral when needed. SUPPS staff liaise with other organisations where appropriate, such as housing, mental health services, the private methadone unit, youth organisations and the Department of Community Services (DOCS). SUPPS holds antenatal and postnatal case
conferences with DOCS for the majority of their clients. SUPPS staff visit their clients during and after birth on the ward, visit the babies in the Neonatal Unit, and conduct postnatal home visits. A postpartum six-week follow-up is conducted with each SUPPS client and their infant.

Attempts to reduce drug use are encouraged, and any improvement in the mother’s drug use and antenatal care compliance are praised. The aim is to raise the woman’s sense of self-esteem, rather than focus on negative elements so as to demoralise the woman when she is already vulnerable and has fears of being perceived as a bad mother who doesn’t care about her baby. Pregnancy can be a great motivator for change (Daley et al., 1998), and antenatal care a good opportunity to engage the client, develop a relationship and discuss the clients’ substance use. Cessation or reduction of drug use is not the only concern, and stabilisation and harm minimisation (i.e. not injecting) may be more realistic goals. This philosophy is mirrored in similar services of this kind (Morrison et al., 1995).

All babies born to substance using mothers are monitored on the postnatal wards for the presence of withdrawal. Those infants exhibiting symptoms at birth or identified as at high risk for withdrawal are transferred directly to the Neonatal Unit where they are monitored for NAS using the Finnegan et al. (1975) scoring system. A minimum of 7 days observation in hospital is required to detect symptoms of withdrawal, and the persistence of scores above a threshold level (level 8 or more for 3 consecutive measures) results in drug treatment. If the scores remain high, oral morphine therapy is commenced at a dose of 0.5-0.9 mg/kg/day. Once the symptoms are controlled, the dose is reduced by 10% every 3 days, until the dose is 0.2mg/kg/day, when morphine is discontinued.

**Existing Services and Programs**

Community Health Adolescents In Need (CHAIN) is a non-government youth health centre in the Illawarra. CHAIN is a multi-disciplinary team of youth workers, midwives, hospital antenatal and neonatal staff, family support workers, prenatal social...
workers, and family planning nursing staff. “Baby CHAIN” is designed specifically for pregnant adolescents and operates within CHAIN. It is staffed by a part-time midwife from Wollongong Hospital. BABY CHAIN provides a viable antenatal service to ‘at risk’ young women, and meets their varied needs as they make the transition from pregnancy to parenthood. BABY CHAIN provides a ‘how to’ manual and training for staff. However, the needs of substance using pregnant adult women are not within the scope or resources of this service.

The Wollongong Hospital contains an antenatal clinic and employs hospital and community midwives and social workers to provide antenatal and postnatal care to patients. However, these visits occur at the hospital (i.e. antenatal clinic or maternity ward) and are not outreach visits to the home or elsewhere. Two obstetricians have their own private patient caseload as well as those referred by the hospital (or SUPPS), which are generally high-risk pregnancies. Patients may also be seen by a Registrar. Patients are referred by their GP for visits with the obstetrician, blood tests or ultrasounds, and book their own appointments.
METHOD

Participants and Procedure

This study was approved by Illawarra Health and the University of Wollongong Human Research Ethics Committee. Consent was obtained from 27 SUPPS clients and 15 drug-using, non-SUPPS women. As of June 2002, 17 of the SUPPS sample were postnatal clients, and all but two had received their 6-week follow-up visit.

The majority (n=12) of the non-SUPPS subjects were from a retrospective sample that had given birth in Wollongong Hospital up to two years prior to the establishment of SUPPS. They were contacted by Wollongong Hospital with a letter describing the service and the study and requesting their consent to access their medical records. The potential sample was generated from a database query that identified women who had given birth in the previous two years and had any drug or alcohol use indicated in their initial assessment. This was not a comprehensive substance use history. The drug was indicated but not the frequency or severity of use or when the women had last used. As a result, some women may have used a very small amount of drugs, or not at all during the pregnancy.

The response rate to the letter requesting participation and consent was extremely poor; 273 letters were mailed and only 12 (4%) signed consent forms were returned. Three clients that were referred to SUPPS after giving birth to their baby were included in the non-SUPPS group, because they did not receive any antenatal care from SUPPS. Data on the non-SUPPS group had to be collected retrospectively from medical records because most current substance using pregnant women in the area were being referred to SUPPS. Those substance-using pregnant women that were not accessing health services would be too difficult to identify and contact. Due to the retrospective nature of the data collection for the non-SUPPS group, some of the demographic and psychosocial data for the non-SUPPS group is missing, and a full substance use history was not obtained. Hospital staff indicated only a history of or current illicit drug use and/or cigarette smoking in the medical record; alcohol use and the frequency and duration of drug use was not collected. Efforts were made to collect missing data from
drug and alcohol treatment records if clients had previously received treatment from the Drug, Alcohol and HIV/AIDS Service.

**Measures**

Client data included the number of antenatal, postnatal, and casual clients and the sources of referral of the clients.

The data collected on the mother included various demographic variables (age, ethnicity, number of children) and socio-economic variables (marital status, education, accommodation, living arrangement, income). Maternal compliance information was collected on the number of ultrasounds, blood tests, social work, doctor’s and antenatal care visits received. These mean and standard deviations of these variables were compared for the SUPPS and non-SUPPS groups. Independent sample t-tests were performed on the means. In addition, substance use assessments were done on presentation, during and after pregnancy, to determine if there was any change in maternal drug use. Client satisfaction surveys were handed out after the 6-week follow-up, and clients were provided with a return addressed postage paid envelope. These surveys were anonymous to ensure honest responses.

Infant outcome measures included gender, gestational age, weight, one and five minute Apgar scores, and whether the infant was medicated for withdrawal. The highest Finnegan (1975) score was used as a measure of the level of withdrawal. Again, the means for the SUPPS and non-SUPPS groups were compared and analysed with independent sample t-tests.
RESULTS

Case Presentation

The following is a case presentation of a SUPPS client, as an example of the collaborative case management and care SUPPS provides. It also illustrates some of the difficulties SUPPS staff have in engaging clients and ensuring compliance to antenatal care. The clients’ demographics are typical of many SUPPS clients, with the exception of her extremely high amount of amphetamine use.

Jane (name changed) is a 22-year-old sex worker, who uses $1000 of Amphetamine a day. She was referred to SUPPS from the First Step Program, the needle and syringe program in the Illawarra (for description see O’Toole, Hudoba & Grenyer, 2001). Jane reported to staff she was 35 weeks pregnant. The SUPPS staff (Midwife and Drug and Alcohol nurse) made a home visit because Jane was unwilling to come to the antenatal clinic. The SUPPS staff conducted an antenatal history and check, a drug and alcohol assessment, and discussed child protection issues. The client was still active as a sex-worker, so harm minimisation strategies and safe sex practice were discussed. SUPPS also provided the client with clean needle kits and condoms. SUPPS staff also discussed safer sex-working practice with Jane, and booked ultrasound, pathology, and obstetric appointments and transport for the next day. During this visit, SUPPS staff also engaged Jane’s roommate “Trish”, a co-worker who was also pregnant and using $250 of amphetamines per day, as a client. They provided the same care and booked additional appointments for Trish. SUPPS staff later discussed this case with DOCS.

The next day, SUPPS staff made another home visit to pick up Jane for her appointments, but she was not home and was unable to be located. SUPPS staff returned the next day but again Jane was not around. Trish revealed that Jane was homeless and had been for some time, and only stayed with her occasionally. SUPPS staff offered Trish Jane’s obstetrician’s appointment,
ultrasound etc., and transported Trish to the appointments. SUPPS staff also arranged a bed at the inpatient detoxification unit for Trish.

The next morning during a visit to Trish’s home, Jane indicated she was frightened to engage with SUPPS due to their involvement with DOCS. Jane was advised of services available with SUPPS including advocacy. Trish told Jane that the SUPPS staff were “cool”, and Jane eventually came to Wollongong hospital where a full antenatal check-up and pathology was performed by an obstetrician. SUPPS staff booked her in to the hospital for the birth. Jane related she had not used drugs for two days. She was advised that a bed may be available through Orana House (detoxification unit) who prioritised beds for pregnant women. SUPPS staff arranged antenatal and medical cover for Orana, and transported Jane to Orana (at Port Kembla Hospital).

That afternoon, there was a case discussion between SUPPS staff, who were concerned over the appropriateness of detoxification at Orana with unknown dates for pregnancy and Jane’s allergy to Valium. SUPPS staff discussed the case with Chemical Use in Pregnancy Service (CUPS) team, and the Clinical Midwife Consultant who in turn discussed the case with the Director of Maternal and Paediatric Services. The recommendation was that Jane detox in the birthing unit then go to Orana after 3 days. SUPPS staff arranged a case conference with the manager of Orana, the clinical midwife consultant, the Director of Illawarra Maternal and Paediatric Services (IMAPS) and the obstetrician for later that afternoon, and arranged an emergency ultrasound to determine the stage of pregnancy.

Given that neither SUPPS staff were working the next day (both staff part-time) when Jane’s detoxification was to commence, SUPPS staff arranged for a youth drug and alcohol worker to assist in supporting Jane the next day. SUPPS staff then went back to Orana to pick up Jane for her ultrasound. Jane was now showing signs of severe withdrawal. SUPPS staff transported Jane back to Wollongong Hospital and were met by the youth Drug and Alcohol Substance Use in Pregnancy and Parenting Service (SUPPS) Preliminary Evaluation Data
worker. Jane’s ultrasound indicated a 30-week pregnancy. The case conference then convened to discuss the best form of care for Jane. Orana could retain the client and has adequate staff levels but as Jane was likely to undergo severe withdrawal, this could cause complications in the pregnancy. The birthing unit could monitor the baby but may not be able to retain the client, as they were understaffed, had limited drug and alcohol experience, and there were potential reactive staff attitudes to pregnant substance using women, that might alienate the client so that she would leave. SUPPS staff arranged Jane’s admission to birthing unit for 3 days, and then admission to Orana to complete detoxification with daily community midwife visits. Despite being in severe withdrawal, Jane was unwilling to stay as she had an access visit to her two other children not in her care. Jane agreed to come in early the next day. SUPPS staff arranged transport for Jane with Youth Drug and Alcohol worker and a nurse from the Community Health Adolescents In Need (CHAIN) service. SUPPS staff also arranged for the Youth Drug and Alcohol worker to speak with the Specialist Advisory Service to assist with the case plan.

Transport occurred as planned, but the Birthing Unit was full and short staffed, so they were unable to admit Jane. Jane had used that morning so her withdrawal was not severe. SUPPS staff arranged for Jane to come back in the next day, but they were unable to provide transport as neither SUPPS staff nor youth worker were working the next day and Jane did not present. A joint visit with SUPPS midwife and a First Step worker was made, and Jane was located in a pub. Jane said she had detoxed herself, and agreed to continue antenatal care through SUPPS. She continues to be an active sex worker.

This case illustrates SUPPS’ collaborative approach to case management, which engaged numerous services. It also illustrates the communication and collaboration occurring between various drug and alcohol agencies, community agencies and maternal and paediatric services. The First Step Program (NSP) referred the client to SUPPS and provided joint visits. Orana House (inpatient detoxification unit) provided flexible options for detoxification, priority for pregnant women and re-examined their
policies. The obstetrician agreed to prioritise the client and to examine her despite Jane presenting late for care and missing appointments, and met with SUPPS team for a case conference despite a busy private patient caseload. The CMC was available for case conferencing despite her busy schedule, and provided flexibility in service delivery in the birthing unit. The CMC also advocated for the client with other nursing staff with judgemental attitudes towards substance using pregnant women, and co-ordinated the client’s care when SUPPS staff were not on duty. The obstetric registrar was on call for the weekend, and agreed to provide detoxification in the birthing unit over the weekend if needed. The Director of IMAPS was available for case conferencing despite a busy schedule, and provided flexible service delivery. Medical Imaging Services provided flexibility in prioritising Jane immediately even though they already had a room full of patients waiting. Pathology staff allowed the client to show where her best veins were without judgement. The Youth Drug and Alcohol Service interrupted their work schedule to provide collaborative care, called the Specialist Advisory Service (SAS) for advice, and provided transport. CHAIN also provided transport and engaged with the client for ongoing support. DOCS provided ongoing antenatal and postnatal support. SAS provided clinical support and advice. CUPS provided ongoing clinical support and advice. Finally, the Director of the Drug, Alcohol and HIV/AIDS Service reviewed and created new policies for the detoxification of amphetamine users, incorporating co-case management with IMAPS. As a result of the development of SUPPS, there has been a shift in work practices between many services to co-manage non-compliance and complicated cases. As a result of this shift, SUPPS staff are able to fast-track accessing clinical services for these clients, and provide flexible service delivery (i.e. joint visits), which is often necessary so that antenatal care can be optimised for these clients. There was evidence of excellent collaboration between services and their staff.
## Demographics

Figure 1: Client Demographics

<table>
<thead>
<tr>
<th>Demographics (n=42)</th>
<th>SUPPS (n=27)</th>
<th>Non-SUPPS (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>26.33 (± 5.26)</td>
<td>27.80 (± 6.56)</td>
</tr>
<tr>
<td>NESB or Born Outside Australia</td>
<td>15 %</td>
<td>33%</td>
</tr>
<tr>
<td>ATSI</td>
<td>15 %</td>
<td>0% (7% Missing)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;year 10</td>
<td>22 %</td>
<td>7%</td>
</tr>
<tr>
<td>Year 10-12</td>
<td>63 %</td>
<td>53%</td>
</tr>
<tr>
<td>HSC or more</td>
<td>11 %</td>
<td>0%</td>
</tr>
<tr>
<td>Missing data</td>
<td>-----------</td>
<td>40%</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>44%</td>
<td>60%</td>
</tr>
<tr>
<td>Separated</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Married</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>Defacto</td>
<td>48%</td>
<td>27%</td>
</tr>
<tr>
<td>Missing Data</td>
<td>-----</td>
<td>7%</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Temporary Benefit</td>
<td>19%</td>
<td>34%</td>
</tr>
<tr>
<td>Pension</td>
<td>74%</td>
<td>40%</td>
</tr>
<tr>
<td>Dependant on others</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Missing data</td>
<td>4%</td>
<td>20%</td>
</tr>
<tr>
<td>Accommodation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homeless</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Temporary or supported housing</td>
<td>19%</td>
<td>0%</td>
</tr>
<tr>
<td>Rent/Own</td>
<td>52%</td>
<td>53%</td>
</tr>
<tr>
<td>Other</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Missing Data</td>
<td>-----</td>
<td>40%</td>
</tr>
</tbody>
</table>
Demographics (n=42) SUPPS (n=27) Non-SUPPS (n=15)

**Living Arrangement**

<table>
<thead>
<tr>
<th></th>
<th>SUPPS</th>
<th>Non-SUPPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner only</td>
<td>26%</td>
<td>20%</td>
</tr>
<tr>
<td>Partner and all children</td>
<td>22%</td>
<td>7%</td>
</tr>
<tr>
<td>Partner and some children</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Parents</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>Alone</td>
<td>41%</td>
<td>7%</td>
</tr>
<tr>
<td>Alone with all children</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Alone with some children</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Missing Data</td>
<td>------</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Children under 18yrs**

<table>
<thead>
<tr>
<th></th>
<th>SUPPS</th>
<th>Non-SUPPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average #</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>None</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>1</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td>2 or more</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>Missing data</td>
<td>------</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Drug Use in Previous Pregnancies**

<table>
<thead>
<tr>
<th></th>
<th>SUPPS</th>
<th>Non-SUPPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>N/A (because first pregnancy)</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>Missing data</td>
<td>7%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 compares the demographic data for SUPPS (n=27) and non-SUPPS (n=15) clients. The age of the clients in the two groups was not significantly different; the mean age overall is 27 years. An independent sample t-test was performed on the means, and the difference did not reach significance.

15% of the SUPPS group and 33% of the non-SUPPS group were either born outside Australia or from a non-English speaking background (NESB). This suggests
that either 1) SUPPS does not engage as many NESB and non-Australian born clients that present to hospital to give birth, or 2) more NESB substance using pregnant women gave birth in the two years prior to SUPPS and/or these women were more likely to consent to their data being used in this study. Irrespective of reasons, the percentage of NESB and non-Australian born clients is still higher than the number in the majority of drug and alcohol agencies in the Illawarra (based on unpublished data, Minimum Data Set, July 2000-Feb 2002).

15% of SUPPS clients and 0% of non-SUPPS clients are of Aboriginal or Torres Strait Islander origin; however, data on 13% of the non-SUPPS clients is missing, which suggests the percentages may not be so discrepant.

26% of SUPPS clients completed year 10 or less of high school, a further 63% completed up to year 12, and 3 clients (11%) completed their HSC one of whom went on to start university. Non-SUPPS data suggests their educational attainment is similar; however, 40% of the data is missing (information on educational attainment is not collected in medical records).

The majority of women in both groups were either single (SUPPS=44%; non-SUPPS=60%) or in a de facto relationship (SUPPS= 48%; non-SUPPS= 27%). This is most likely correlated to the fact that the majority of women (SUPPS= 93% and non-SUPPS 74% (20% unknown)) were on some kind of benefit or pension (e.g., single parent pension).

22% of the SUPPS group were homeless, with a further 19% in temporary or supported housing. 41% of the SUPPS group and also live alone. 40% of this data was missing for the Non-SUPPS group, but data did indicate at least 21% lived alone (with or without children). This data indicates that these women are a high need group, many with little or no social support.
Across both groups, for 33% of the women, this was their first pregnancy. Of those that had children, 26% of the SUPPS group and 13% (27% missing data) of the non-SUPPS group had used drugs during one or more of their previous pregnancies.

The following demographics were available only for SUPPS clients (n=27):

- 93% (n=25) had a self reported history of domestic violence, with 48% (n=13) currently experiencing domestic violence.

- 67% (n=18) of SUPPS clients are Hepatitis C positive, 33% (n=9) are confirmed negative. Studies show a 3% perinatal transmission to infants (Garland, Tabrizi, Robinson, Hughes, Markman, Devenish & Kliman, 1998).

- 63% (n=17) of the women have a diagnosed mental illness; mostly depression (n=15), and a further 22% (n=6) self report depression.

- 26% (n=7) are (or were) involved in prostitution
### Referral Source

Figure 2: Referral Sources for SUPPS clients

<table>
<thead>
<tr>
<th>Referral Source</th>
<th>Total Referrals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wollongong Hospital Antenatal Clinic</td>
<td>21</td>
</tr>
<tr>
<td>Wollongong Hospital Neonatal Unit</td>
<td>13</td>
</tr>
<tr>
<td>Wollongong Hospital Birthing Unit</td>
<td>6</td>
</tr>
<tr>
<td>Wollongong Hospital Community Midwives</td>
<td>4</td>
</tr>
<tr>
<td>Wollongong Hospital Maternity Unit</td>
<td>2</td>
</tr>
<tr>
<td>Shellharbour Community Midwives</td>
<td>7</td>
</tr>
<tr>
<td>Public Methadone (Bungora)</td>
<td>7</td>
</tr>
<tr>
<td>Public Methadone (Bungora) Outreach</td>
<td>1</td>
</tr>
<tr>
<td>Private Methadone (Dennison St.)</td>
<td>2</td>
</tr>
<tr>
<td>First Step Program (NSP)</td>
<td>5</td>
</tr>
<tr>
<td>Inpatient Detoxification Unit (Orana House)</td>
<td>4</td>
</tr>
<tr>
<td>Adult CONTACT (Drug and Alcohol agency)</td>
<td>2</td>
</tr>
<tr>
<td>Youth CONTACT (Drug and Alcohol agency)</td>
<td>3</td>
</tr>
<tr>
<td>Inpatient Rehabilitation agency (Kedesh) (NGO)</td>
<td>2</td>
</tr>
<tr>
<td>Aboriginal Medical Service</td>
<td>3</td>
</tr>
<tr>
<td>Department of Community Services</td>
<td>3</td>
</tr>
<tr>
<td>Department of Housing</td>
<td>1</td>
</tr>
<tr>
<td>Probation and Parole</td>
<td>1</td>
</tr>
<tr>
<td>Self Referrals</td>
<td>2</td>
</tr>
<tr>
<td>Other client/friend</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>95</td>
</tr>
</tbody>
</table>

Figure 2 provides referral sources for SUPPS clients and suggests an awareness of the service amongst government and non-government organizations. Of the 95 referrals to SUPPS, the vast majority are from health care and community agencies. 48% of clients were referred from Wollongong Hospital, followed by 27% from the Drug, Alcohol and HIV/AIDS Service. Only two clients self referred, and one woman was referred by another client.
Drug Use

The most common principal drug of concern for both the SUPPS (48%) and non-SUPPS group (53%) was heroin, followed by amphetamines (33%) and cannabis (15%) for the SUPPS group and cannabis (33%) and amphetamines (7%) for the Non-SUPPS group. As amphetamines are considered a more harmful drug than cannabis given the same frequency of use, duration of use and amount, the higher percentage of clients with amphetamines as their principal drug of concern among the SUPPS clients would suggest infant outcomes would be, on average, worse.

74% of SUPPS and 47% of non-SUPPS clients use a polydrug combination. Amphetamines and cannabis or heroin and cannabis were the two most common combinations.

Figure 3 shows the drug use of both the SUPPS and non-SUPPS groups at first presentation. Of note is that all the nicotine users (both groups) smoked cigarettes daily.

Figure 3: Drug Use at Presentation

<table>
<thead>
<tr>
<th>Drug Use</th>
<th>SUPPS (n=27)</th>
<th>Non-SUPPS (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine</td>
<td>96%</td>
<td>80%</td>
</tr>
<tr>
<td>Caffeine</td>
<td>78%</td>
<td>20%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>41%</td>
<td>27%</td>
</tr>
<tr>
<td>Cannabis</td>
<td>59%</td>
<td>40%</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>67%</td>
<td>13%</td>
</tr>
<tr>
<td>Heroin</td>
<td>44%</td>
<td>47%</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>19%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Figure 4: Drug Use During Pregnancy

<table>
<thead>
<tr>
<th>Drug</th>
<th>Ceased</th>
<th>Reduced</th>
<th>Same</th>
<th>Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine</td>
<td>0</td>
<td>0</td>
<td>11 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Alcohol</td>
<td>2 (33%)</td>
<td>3 (50%)</td>
<td>0</td>
<td>1 (17%)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>1 (11%)</td>
<td>3 (33%)</td>
<td>4 (45%)</td>
<td>1 (11%)</td>
</tr>
<tr>
<td>Heroin</td>
<td>3 (60%)</td>
<td>1 (20%)</td>
<td>1 (20%)</td>
<td>0</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>6 (55%)</td>
<td>3 (27%)</td>
<td>1 (9%)</td>
<td>1 (9%)</td>
</tr>
<tr>
<td>Inhalants</td>
<td>0</td>
<td>0</td>
<td>1 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>0</td>
<td>1 (100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>1 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(n=13, data missing on 4 clients: two yet to have 6-week follow-up, one eliminated because ceased use in jail)

Figure 5: Drug Use After Pregnancy

<table>
<thead>
<tr>
<th>Drug</th>
<th>Ceased</th>
<th>Reduced</th>
<th>Same</th>
<th>Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine</td>
<td>0</td>
<td>0</td>
<td>11 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Alcohol</td>
<td>4 (67%)</td>
<td>1 (17%)</td>
<td>0</td>
<td>1 (17%)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>3 (33%)</td>
<td>2 (23%)</td>
<td>3 (33%)</td>
<td>1 (11%)</td>
</tr>
<tr>
<td>Heroin</td>
<td>3 (60%)</td>
<td>1 (20%)</td>
<td>1 (20%)</td>
<td>0</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>6 (55%)</td>
<td>3 (27%)</td>
<td>1 (9%)</td>
<td>1 (9%)</td>
</tr>
<tr>
<td>Inhalants</td>
<td>0</td>
<td>0</td>
<td>1 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>1 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>1 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Figures 4 and 5 show that 55-67% of clients ceased or reduced alcohol, heroin and amphetamine use either during or after pregnancy. However, all clients smoked cigarettes at the same level both during and after pregnancy. In addition, during pregnancy, 45% of those that used cannabis did not change their amount of use (Figure 4). This suggests that nicotine and cannabis are not perceived as harmful as heroin or amphetamines. After pregnancy, approximately the same number of clients ceased, reduced or did not change their cannabis use (Figure 5). Slightly higher numbers also ceased their alcohol and ecstasy use after pregnancy (Figure 5).
Infant Outcomes

In the SUPPS group (n=13) 3 of the infants were male, and 10 were female. In the non-SUPPS group (n=12), 7 of the infants were male and 5 were female. In all SUPPS cases, DOCS was notified. SUPPS staff were open and honest about their involvement with the child welfare agencies, emphasising their role of advocacy for the client.

Figure 6 shows the difference found between the SUPPS and non-SUPPS infants in highest Finnegan Scores (7.0 vs. 9.8 - higher score indicates greater withdrawal) and average length of stay in the Neonatal Unit (14.1 vs. 20.1 days) and hospital (14.5 and 20.3 days), although these differences were not found to be significant. Independent sample t-tests were done on the means of the two groups. Figure 6 also shows a difference in the number of infants that exhibited symptoms of withdrawal: 54% of SUPPS infants compared to 91% of Non-SUPPS infants. In addition, 46% of SUPPS infants had to be medicated compared to 67% of non-SUPPS infants. Again, these differences were not found to be significant. As expected, there were no differences in the one and five minute Apgar scores, as these have not been found to be effected by withdrawal, which starts to appear later after birth (Finnegan, 1982; 1991). Low Apgar scores are associated with more immediate obstetric factors such as duration of labour and method of delivery (Gibson et al., 1983).
Two SUPPS infants were eliminated from the sample: one was a stillbirth and the other was premature so the Finnegan score could not be determined. Premature infants have nasogastric feeding tubes inserted, which interferes with the items on the Finnegan scoring system to do with feeding (see Appendix 2). Three non-SUPPS clients were eliminated as the infants were not admitted to the Neonatal Unit, and/or Finnegan scores were not taken. This indicates there was no concern by hospital staff of the infants undergoing withdrawal. Two of the mothers used cannabis only, one only early in pregnancy and the other prior to pregnancy. One of these babies was transferred to the Neonatal Unit due to perinatal asphyxia. The third woman was only a social drinker and no illicit substances were taken.

At the time of this report, together with consultation with the SUPPS staff, the hospital staff had begun collecting Finnegan scores on babies in the ward, in addition the Neonatal Unit. As a result, SUPPS can now recommend that an infant not be transferred to the nursery automatically after birth in cases where the infant is not at risk of withdrawal usually in cases where the mother has ceased drug use. These infants are monitored, and in the event they start to exhibit symptoms of withdrawal, are transferred to the Neonatal Unit. To date, this has not been necessary, resulting in cost savings for the hospital and decreased mother-infant separation.

No significant difference was found in gestational age or weight at birth between SUPPS and non-SUPPS infants. This might have occurred due to the fact that a larger percentage of SUPPS women had amphetamines as their principal drug of concern as opposed to cannabis in the non-SUPPS group. Cannabis is known to increase appetite while amphetamines are an appetite suppressant, so the effects of the drug on gestational age and weight might be confounded by differences in diet.

**Maternal Engagement and Compliance**

The preliminary data indicates that SUPPS engages women into antenatal care earlier. The average weeks of pregnancy of the SUPPS group (n=12) at first presentation to SUPPS was 17.25 (± 7.89) weeks compared to 21.73 (± 9.54) weeks for the non-SUPPS group (n=15). Independent sample t-tests were performed on the means
of the two groups for all variables, but no differences were found to be significant. Five of the non-SUPPS women presented within a day of delivery.

The majority of the postnatal group was engaged or referred to SUPPS when the service first began operating. These women would have been at various stages of pregnancy, and their referral would have been due to the fact that this was a new, specialised service available to them and not necessarily related to when they presented to other health care providers. Therefore, the (12) women that presented within the first three months of when SUPPS began operating were removed from the sample for the purposes of this calculation.

Figure 7: Maternal Compliance Information

<table>
<thead>
<tr>
<th>Compliance Information</th>
<th>SUPPS (postnatal n=17)</th>
<th>Non-SUPPS (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average # Doctors visits</td>
<td>2.53 ± 1.37</td>
<td>2.33 ± 1.87 (n=12)</td>
</tr>
<tr>
<td>Total # social work visits</td>
<td>3.47 ± 4.26</td>
<td>1.27 ± 1.22</td>
</tr>
<tr>
<td>Average # blood tests</td>
<td>1.82 ± 0.73</td>
<td>1.47 ± 0.74</td>
</tr>
<tr>
<td>Average # of Ultrasounds</td>
<td>2.18 ± 1.33</td>
<td>1.67 ± 1.29</td>
</tr>
<tr>
<td># DOCS case conference</td>
<td>15</td>
<td>No data available</td>
</tr>
<tr>
<td>Average # Antenatal visits</td>
<td>8.00 ± 5.20 (midwifery and D&amp;A)</td>
<td>4.69 ± 5.65 (n=13) (midwifery only)</td>
</tr>
</tbody>
</table>

Figure 7 compares the maternal compliance information for the SUPPS and non-SUPPS groups. A difference between the two groups was found in the average number of ultrasounds, social work visits and antenatal visits by SUPPS or other midwives, but this difference was not found to be significant. DOCS case conferences were initiated with the implementation of SUPPS and were not held previously. Only three of the non-SUPPS clients received drug and alcohol treatment other than methadone. One had an initial assessment and was referred for inpatient detoxification but never presented for admission. Another received outpatient counselling but left before completion. This was at an agency at another area health service, so we were unable to determine how many sessions she attended. The third women was a client of the Magistrates Early Referral Substance Use in Pregnancy and Parenting Service (SUPPS) Preliminary Evaluation Data
Into Treatment (MERIT) program, where clients with legal issues are referred for counselling and case management, usually as a condition of bail. She received 15 outpatient counselling sessions. This data was not included in Figure 1, so the non-SUPPS antenatal visits data is based on antenatal care received only. The majority of SUPPS visits were joint antenatal care and drug and alcohol counselling visits and any additional drug and alcohol counselling sessions were not included in the calculation of the mean.

Client Satisfaction Survey

As of June 2002, five client satisfaction surveys were returned from the 17 postnatal clients. This is a relatively poor response rate and may represent a possible bias as those clients who were satisfied with the service may have been more likely to fill out and return the survey.

To the open-ended question “What did you like about SUPPS?” all clients responded positively:

- “The non-judgemental, friendly, kind, and understanding workers. The whole service is wonderful in all aspects.”
- “I liked that the SUPPS workers never judged me for what I was doing and never looked down upon me for the drug taking. They were very friendly and helpful. When I’d fall back [to using drugs] they didn’t make me feel bad but lifted me up to be more confident that I could do this.”
- “They were there to listen to what I had to say, and they didn’t turn their back on me, and they didn’t say anything nasty to me, about me being on drugs.”
- "The people involved were very nice, supportive and comfortable to be around.”
- “I enjoyed the home visits, hearing our son’s heartbeat for the first time in my own flat. The constant information and any questions I had were answered honestly and openly.”

When asked what they did not like about the program, and what they would change, the responses were:
“Nothing (2), just needs more advertising.”

“I wished they’d come around more often. Stayed a lot longer after the baby was born. I think more regular visits keeps you at bay. The further away visits are, the more tempted you are. Regular visits keeps the information fresh on the brain and helps you remember you are better than that.”

“They didn’t ring me enough when my drug counsellor went away, but I still think they are pretty good.” “[I would change] that they left me sooner than later.”

When asked if the SUPPS staff were accessible, the clients responded:

- “Yes, and if they weren’t they always got back to me on the same day.”
- “Yes, they were, although weekends could really do with some SUPPS workers as weekends seem more tougher than other day.”
- “Yes, except for one time.”
- “Very, anytime I needed Inga or Belinda they were here and very helpful.....”[reference to potentially identifying information omitted].

When asked at what point in their pregnancy they came to SUPPS, two were within two months of birth or full term. Two were earlier in pregnancy at 12 and 24 weeks, and the last client just stated: “As soon as they started and I found out about them.”

When asked why they did not come sooner, the clients responded:

- “Scared, unsure, in denial, couldn’t face the reality of it all.”
- “I was first client, SUPPS didn’t exist…. [earlier].”
- “I didn’t think I needed to as I stopped using when I was 5 months pregnant.”

To the question: “If this was not your first delivery, how did the service compare to that at previous deliveries?”, the clients answered:

- “I definitely got more out of SUPPS as they sincerely care and want to help you out more. The other deliveries were very formal and felt very [ill] at ease and uncomfortable. SUPPS [staff] became my friends as well as my confidante, which made my pregnancy a lot calmer and easier.”
• “I wasn’t using anything or doing anything that I shouldn’t have with my first.”
• “I didn’t have home visit[s] on my first pregnancy and was seeing my GP…[reference to potentially identifying information omitted].”

When asked about whether or not they got enough information on their babies’ withdrawal, clients answered:
• “not really, [because of] my short amount of contact”.
• “Yes, they informed me of every little step of the withdrawal of babies and put my mind at ease with every question I needed to know.”
• “My [baby] didn’t have any withdrawal or anything (2).”
• “Yes, even though she didn’t withdraw.”

To the question: “Was the information presented clearly so that you felt you understood it?” clients answered:
• “Yes, I knew the possibilities and they were clearly explained”
• “Every bit of it and a lot more”
• “Most of it was”
• ”Yes, it was.”

When asked if their experience in the hospital reflected what they were told about the delivery by the SUPPS staff, and why or why not, the answers were as follows:
• ” No, because they were not half as hospitable or friendly because of my methadone and I was treated terribly and was told I would be in a caring environment and friendly, but it wasn’t.”
• “Yes, it was the same as they discussed, keeping me informed of [my babies’] withdrawal information, explaining each and every withdrawal scale and what it meant and why”. “I wasn’t told anything except for that I might lose [my baby] if [my baby] was addicted or something. And when I was in labour I was pretty scared ‘cause I didn’t want to lose [my baby].”
• “Yes, it was easier than I had imagined.”
• “Yes, they were very helpful.”
The survey included space for additional comments, which included thanks (3) and the following comments:

- “Inga and Belinda are doing wonderful jobs and helped change my life. I hope this service can continue so other mothers can get the help and support they need.”
- “I will use this service again.”
- “I don’t want them to leave me, NOT YET. Keep on funding this program as it is really needed, if it wasn’t for SUPPS I’d have a huge habit and a sick baby.”
DISCUSSION

Infant Outcomes

Three of the infants were transferred to the Neonatal Unit for reasons unrelated to withdrawal, but due to problems associated with prematurity, respiratory distress, poor feeding, and suspected sepsis. This is consistent with other studies that report increased rates of non-withdrawal morbidity in babies born to substance using mothers (Vance, Chant, Tudehope, Gray & Hayes, 1997; Lam et al., 1992).

It is particularly surprising that the Finnegan Scores were found to be higher (indicating more withdrawal) in the non-SUPPS group considering the large amount of drug use in the SUPPS group. In the SUPPS group, a higher percentage of women had heroin and amphetamines as their principal drug of concern, while the non-SUPPS group had a higher percentage with cannabis as their principal drug (See Results- drug use). There are other factors that would have affected the withdrawal of the infant. For example, one of the SUPPS clients was on a large amount of amphetamines and caffeine, and the infants’ withdrawal was severe. Morphine was administered to the infant despite the SUPPS staff assurance that the mother was not on heroin, and had little effect on decreasing the infant’s withdrawal. Another client was on methadone and large amounts of controlled, prescribed benzodiazepines as an antidepressant, which could have contributed to the infant’s withdrawal (Heyman, personal communication). The effects of antidepressants and amphetamine use on the infant need to be further examined.

Earlier Engagement

Engaging women earlier leads to more antenatal care, and potentially greater compliance (Morrison et al., 1995). In the belief that they can prevent their baby from being born addicted, many women suddenly cease drug use before birth, which can adversely affect the foetus, especially in the final trimester. With earlier engagement, sudden detoxification can be prevented and the alternative of controlled reduction can be discussed. The pilot data from this study indicates that substance-using pregnant
women are engaged earlier into antenatal care as a result of a specialist service for these women.

**Maternal Compliance**

Studies have found that treatment compliance does not vary by sociodemographic characteristics, type of substance use or the women’s experience of violence (Clark et al., 2001). However, women with less education, who are unmarried, indigenous or of an ethnic minority are less likely to obtain adequate antenatal care (Mikhail & Curry, 1999). Both the SUPPS and non-SUPPS groups had similar characteristics. This suggests that SUPPS engages and retains pregnant women with high-risk characteristics who do not adequately access existing services through traditional routes.

**Prostitution**

Illicit drug use was funded through prostitution by 22% of the sample. Prostitution exposes women to sexual infection, dangerous, violent and stressful situations. Prostitutes are also more likely to miss daytime antenatal appointments if they work at night (Morrison et al., 1995). All of these factors are potentially detrimental to the pregnancy.

**Social Support**

41% of the SUPPS group and at least 21% (40% of the non-SUPPS data is missing) of the non-SUPPS group lived alone (Figure 1), which suggests they had little or no social support. El-Bassel and colleagues (1998) investigated the social support networks of women on methadone. They suggest that social support is provided in a hierarchical, descending order beginning with the spouse, then relatives, friends and neighbours and finally, formal organizations. There is an ordered preference to whom a woman asks for support according to the degree of intimacy of the relationship. The exception was childcare, which was shown to be related to family (El-Bassel et al., 1998).
Monetary support from the father, being in a defacto relationship, cohabitating with the babies’ father, (even if unwed) and a high level of father involvement has found to have a positive effect on the birth weight of babies’ born to non-drug using mothers (Padilla & Reichman, 2001). However, these results do not appear to hold for high-risk pregnant women, particularly when the father or partner is also a drug-user.

Members of a women’s social network who currently used drugs were more likely than those who did not to provide financial aid, and furnish a place to stay; however, they were also more likely to assist in drug procurement and less likely to encourage the women to stop using drugs (El-Bassel, 1998). Thus, some women depend on their sexual partners for negative (drug-related) as well as positive (emotional and financial) social supports. They need to be aware of these dual roles, and develop the help-seeking and interpersonal skills to expand their non-drug using networks (El-Bassel, 1998).

**Depression**

A high (56%) percentage of the SUPPS group had diagnosed depression, with a further 22% self-reporting depression. Maternal depression has been shown to have a negative impact on maternal emotional availability, and is associated with increased incidence of behaviour disorders in young children (Dumas & Serketich, 1994). Johnson et al. (1999) found that maternal stress and lack of social support accounted for the significant variance in child behavior problems between drug-exposed infants and controls. Degen and colleagues (1993) found a correlation between depression and social support: women with less social support had higher levels of depression. Women who are depressed are also are more likely to use drugs and alcohol both before and after knowing they are pregnant (Hanna, Faden & Dufour, 1994).

**Domestic Violence**

Research both in Australia and overseas, has shown that domestic violence often begins or escalates during pregnancy (Gazmararian, Lazorick, Spitz, Ballard, Saltzman & Marks, 1996). A study by Curry and colleagues (1998) reported 37.6% of adolescents and 22.6% of adult pregnant women experienced physical abuse in the
preceding year or during pregnancy. Abused women are more likely to have unplanned pregnancies, begin antenatal care later (after 20 weeks) and use drugs and alcohol during pregnancy than non-abused women (Curry et al., 1998). Interestingly, this study found no significant difference in the total number of prenatal visits between abused and non-abused adults. A review of the literature by Gazmararian and colleagues (1996) found that the prevalence of violence during pregnancy ranges from 0.9% to 20.1%. Studies that asked about violence more than once during detailed in-person interviews or asked later in pregnancy (during the third trimester) reported higher prevalence rates (7.4%-20.1%). Thus, many studies most likely underestimate the prevalence.

A recent review of eight studies reported that infants born to women who suffered physical, sexual or emotional abuse during pregnancy were more likely to be of low birth weight compared to non-abused controls (Murphy et al. 2001). Abuse may interact with other psychosocial factors to reduce birth weight. We would suggest there is a potential for domestic violence to interfere with prenatal care, as the partner may prevent the woman from attending antenatal and drug and alcohol counselling appointments (Heyman, personal communication). Refusal to use substances with the abuser has also been associated with the initiation or escalation of abuse during pregnancy (Campbell, 1986). Due to the high incidence of domestic violence in our sample (93%, 48% current), domestic violence assessment, counselling and referral occurs often in conjunction with housing issues. This highlights the need for close liaison and referral between drug and alcohol, obstetric and community services.

**Satisfaction Survey**

The satisfaction survey demonstrates an overwhelmingly positive response to the service, with clients perceiving SUPPS staff to be non-judgmental, supportive, open, honest, sincere and helpful. The comments are evidence of a relationship that has developed between SUPPS staff and their clients, built on a trust that SUPPS is there to support the clients and their needs as well as attempting to ensure the best possible outcome for their baby.
These responses, as well as the evidence of improved compliance, demonstrate the effectiveness of a specialised service dedicated to this client group in increasing engagement and compliance with antenatal care. As client needs are multifaceted, requiring intervention from a variety of agencies, case managers assist women to navigate multiple agencies with different eligibility and reporting requirements and service gaps. In addition, home visits allow women to keep appointments more easily and concentrate on recovery by giving special attention to women who generally feel stigmatised by health professionals, a finding echoed in similar services (Laken & Ager, 1996).

The responses also indicate a need to expand the service, with many clients requesting more calls and visits (i.e. on weekends) and extended contact postnatally. This is an area of concern given that the current workload is such that the postnatal clients (and their case management) must be referred to relevant agencies and other drug and alcohol counsellors after their 6-week follow-up in order for the service to be able to assume case management of new antenatal clients. However, this is often a difficult transition for the clients, as they have not developed a relationship with the new drug and alcohol worker. SUPPS makes every attempt to increase the contact of health care and community agency staff with the client as early and as much as possible (i.e. through a case conference with the client and all staff from all relevant organisations present). Ideally, this transition would be facilitated with another Drug and Alcohol staff member and a social worker working as part of the SUPPS staff.

Using a collaborative approach, the SUPPS staff has worked towards educating other health care workers on the needs of pregnant substance users. They have promoted more accepting attitudes rather than discriminatory attitudes toward pregnant substance using women by other health care providers. Internal observations of hospital staff and feedback from clients suggest at least partial success in improving pregnant women’s experiences. However, one client still reported judgemental attitudes towards her methadone use by hospital staff, and another feared losing her baby to welfare agencies.
Limitations

The limitations of this evaluation include its small sample size, which restricts the generalisability of our findings and limits statistical power. Attempts are being made to increase the sample size of the non-SUPPS group, and data collection will continue on those women accessing SUPPS. The satisfaction survey also had a relatively low response rate (29%); however, substance users are an extremely transient and difficult sample to access. Small sample sizes have limited many studies of similar services due to the specific population and gestation period (Chang, et al., 1992; Carroll et al., 1995; Green and Gossop, 1998). Those studies with large sample sizes use retrospective methods, so full information (lifestyle factors and psychosocial variables), which could influence treatment retention, compliance and infant outcome are often not collected (Kelly et al., 2000; Morrison et al., 1995). Our non-SUPPS group was mostly a retrospective sample, but all effort was made to collect data that was missing or not collected in the medical record from their methadone or previous drug and alcohol treatment records. A possible factor bias of the sample may have been the reluctance of women more actively engaged in drug use who are potentially more transient and lead more chaotic lives and thus were less likely to respond to the survey.

CONCLUSIONS

Pilot data from the SUPPS evaluation provides evidence that the establishment of this service has led to earlier engagement of substance using pregnant women and increased compliance with antenatal care. 55-67% of clients had also reduced or ceased their alcohol, heroin or amphetamine use 6 weeks after pregnancy. Infant outcomes have also improved; in particular, the average level of withdrawal is lower for SUPPS infants compared to the non-SUPPS group. The length of stay in the Neonatal Unit and hospital is six days shorter on average, which represents significant cost savings for the hospital. In addition, the percentage of infants exhibiting symptoms of withdrawal and medicated for withdrawal are less for the SUPPS group compared to the non-SUPPS group. These preliminary results suggest optimism regarding the effectiveness of a dedicated service for the case management of these clients.
RECOMMENDATIONS

The recommendations for the improvement of SUPPS and potential areas of future expansion are as follows:

1. Expansion to 5-day service with 2 staff per day: The large caseload and client feedback from the satisfaction survey indicates that the service cannot fully meet client need with only two part-time staff. Another drug and alcohol worker on staff would facilitate the transition for the postnatal clients into mainstream drug and alcohol treatment, as they could develop a relationship with the client over the antenatal period. In addition, many services of this kind (e.g. CUPS) also have a social worker on staff to liaise with the relevant community agencies on behalf of the client.

2. Extension to the Shoalhaven as a consultative service. There is anecdotal evidence of high client need in the Shoalhaven, but geographical distance and large caseloads currently do not make servicing this area feasible.

3. There is a need for a formalized agreement with the Department of Community Services around child protection issues.

4. There is a need to further encourage and integrate clients into mainstream antenatal and drug and alcohol care, with SUPPS providing case management. This would decrease the workload of the SUPPS staff, so they could take on the case management of more antenatal clients.

5. An area-wide education program for nurses and drug and alcohol staff on the special needs of pregnant substance using women.

6. There is a need to continue the evaluation process to be able to draw more reliable and stronger conclusions regarding SUPPS effectiveness.
REFERENCES


NSW Health Alcohol and Other Drugs Policy for Nursing Practice in NSW Clinical Guidelines 2000-2003.


O’Toole, M., Hudoba M., & Grenyer B.F.S. (2000) First-Step: An assertive community outreach program to minimise the harm associated with illicit intravenous drug use. (Report for the NSW Department of Health.) Wollongong, NSW: University of Wollongong, Illawarra Institute for Mental Health, Centre for Research and Education in Drugs and Alcohol.


APPENDIX 1: Flowchart of SUPPS Service Delivery

SERVICE ENTRY →

SUPPS D&A Assessment Booking History

Booking History Identify D&A Issues

1st visit at 12 weeks Dr. Clinic

Appropriate Antenatal Care

Dr. Clinic at 30 weeks

Appropriate Antenatal Clinic

34 week Antenatal Case Conference – Birthing Unit / Maternity Unit / Neonatal Unit / Social Work / DOCS / SUPPS

Dr Clinic at 37 weeks

Appropriate Antenatal Clinic

DELIVERY

Notify SUPPS / SW / DOCS as plan

SUPPS to review clients prior to discharge

SUPPS to work with existing service to provide postnatal support at least visit weekly for 6 weeks postpartum

- Monthly review notes with Clinical Midwife Consultant and Obstetrics & Gynaecology Specialist
- Monthly meeting of clients at 34 weeks 2nd Monday in month
- SUPPS contact monthly with all clients

Antenatal role for SUPPS
- Identify D&A issues (assessment)
- Refer as appropriate to D&A Service
- Provide Antenatal Care and do booking history as required
- Encourage Mainstream Antenatal Care
- Provide link between D&A & Hospital in terms of Antenatal Care
- Do home visits as required
- Attend antenatal Case Conference with DOCS
- Attend 34 week antenatal Case Conference at Hospital
- Follow up Do Not Attends of SUPPS clients
- Provide education to Services as required D&A and Illawarra Maternal and Paediatric Services

Postnatal Role of SUPPS
- Work with NNU and SW providing information and support for child protection issues
- Do home visit / phone contact to clients weekly for 6 weeks.
- Assist with transfer to Baby CON as required
- Provide education and support to services as required Baby CON and Early Childhood Health Clinic

Drug & Alcohol Role of SUPPS
- Identify Drug & Alcohol issues (assessment)
- Harm Minimization information
- Support client with information re Drugs in Pregnancy
- Referral to Detoxification, Drug & Alcohol counsellor.
APPENDIX 2: Neonatal Abstinence Score Sheet and Guidelines for Use

With Permission from IAHS Wollongong Hospital Neonatal Unit
(Adapted from Finnegan, 1975)