#### Appendix 1: Drugs and their effects on the developing baby

All women should be given information on the effects of smoking, alcohol use and drug use in pregnancy. Ideally, information should be given well before conception so that the woman has an opportunity to modify her drug use before she becomes pregnant.

The general answer to a question like ‘I took some x before I found out I

was pregnant. Is it likely to harm the baby?’ is almost certainly ‘no’. However, outcomes depend on the drug used, the amount taken, over what time period, how it was taken, at what stage in pregnancy, and many other factors such as diet and social circumstances. One unfortunate aspect of over-emphasising the likelihood of adverse effects is that it may persuade some concerned women to inappropriately consider termination. Others may suddenly stop their dependent drug use (which could be dangerous to the foetus) or avoid engaging with professionals because of exaggerated concerns.

Drug use is associated with increased rates of obstetric and paediatric mortality and morbidity and can affect pregnancy in a number of ways. During the 1st trimester, when foetal organs are actually forming, teratogenic (malformation) effects are the main concern. This is a time when the woman may not even know she is pregnant. During the 2nd and 3rd trimester the main concern is about growth and functional development. Impaired placental function and foetal growth can result in a low birth weight baby. Chaotic drug use can increase the risk of pre-term labour and result in early delivery. The risk of Sudden Infant Death Syndrome (SIDS) is increased and Neonatal Abstinence Syndrome is common in the babies of women who are dependent on certain drugs.

Many women with alcohol / drug related problems feel worried and guilty about the effects of their drug use on the baby and may appear reluctant to discuss these issues as a result. Professionals need to give parents license to voice concerns, fears, and questions that they are reluctant to bring up spontaneously. Very often parents will be relieved when a professional raises the subject and encourages them to share their concerns. Allowing them to voice anxieties about poor outcome and their ambivalence about

their current situation, including their substance use, treatment and so on can be therapeutic. Parents often complain that they are not ‘told enough’ and professionals comment that parents are ‘ill prepared’ or ‘ill informed’.

Effects of tobacco

The significant risks associated with maternal use of tobacco are particularly well established. There are many harmful substances contained in cigarettes. Nicotine, carbon monoxide and cyanide are thought to have the greatest adverse effects, reducing blood flow and oxygen to the foetus. Maternal smoking in the first 12 weeks of pregnancy (until the end of the 1st trimester) is responsible for up to 25% of all low birth weight babies.

Smoking tobacco causes a reduction in birth weight greater than that from heroin and is a major risk factor in Sudden Infant Death Syndrome.

Although there is no convincing evidence that smoking cigarettes causes congenital birth defects, many other pregnancy complications are associated with smoking (Johnstone 1998). These include:

miscarriage

pre-term (premature) delivery stillbirth

intrauterine growth restriction (IUGR) or ‘small for dates’

low birth weight placental abruption

reduction in breast milk production

sudden Infant Death Syndrome (SIDS or ‘cot death’).

Babies born to heavy smokers may also exhibit minor signs of withdrawal, including ‘jitteriness’ in the perinatal period. Children of smokers also suffer more respiratory infections in childhood and adolescence.

Effects of alcohol

Alcohol use during pregnancy may potentially affect foetal brain development at any gestation. At all points along the continuum from occasional light drinking to regular heavy drinking there is conflicting evidence as to the possibility of damaging effects on the foetus.

Very heavy drinking in pregnancy (including heavy ‘binge’ drinking) results in a small number of babies being born with foetal Alcohol Syndrome (FAS). In Scotland, there are an estimated 38 babies born per year with FAS. Foetal Alcohol Syndrome is characterised by:

foetal growth restriction (with subsequent low birth weight, reduced head circumference and brain size)

Central nervous system problems, including cognitive dysfunction (learning difficulties) and neurological abnormalities

A cluster of characteristic facial abnormalities e.g. short palpebral fissures (eye openings), thin upper lip, flattened midface, and indistinct philtrum

Failure to thrive (the child remains below the 10th centile)

Studies that report alcohol consumption related to FAS have found high levels of drinking (>42 units per week). Patterns of consumption also seem to be important. Frequent high dose (‘binge’) drinking, to the point of intoxication, is thought to be a greater risk to the foetus than steady moderate drinking. Many other confounding factors, however, may be important. These include general physical health, nutrition, age, parity, smoking and other drug use as well as social deprivation. A wide range of other alcohol-related birth defects (ARBD) appear to occur with heavy drinking. These ‘foetal alcohol effects’ include more subtle problems identified on behavioural, cognitive, psychological and educational tests.

Can n ab is ( e.g. marijuan a or ‘h ash ’)

Despite its widespread use, information on the effects of cannabis in pregnancy is generally poor. A review of cannabis by the World Health Organisation (1997) concluded that there was no good evidence that cannabis itself has a direct effect on pregnancy or the developing baby.

Cannabis, however, is normally mixed together with tobacco and smoked in a ‘joint’. Tobacco causes a reduction in birth weight, increased risk of sudden infant death syndrome (SIDS or ‘cot death’) and many other pregnancy complications.

Benzodiazepines (e.g. diazepam & temazepam)

There is no conclusive evidence that benzodiazepine use by the mother causes adverse effects on the developing foetus. Most studies, however, have studied low dose use, whereas many drug users in Lothian report high dose intake. There have been some reports of facial abnormalities (i.e. cleft lip and palate) following prolonged high dose benzodiazepine use in early pregnancy but these findings have not been reliably reproduced.

Benzodiazepines are associated with withdrawal symptoms in the new- born baby that can be severe and prolonged. Because of concerns about the possible increased risk of cleft palate, reduced growth and brain development and long-term outcomes for the baby, dependent women are normally advised to gradually reduce their benzodiazepine use during pregnancy.

Opioids (e.g. heroin, methadone, dihydrocodeine)

Evidence on the effects of opioids is fairly limited, particularly on the long- term effects on the child. Opioids are associated with an increased risk of:

low birth weight

intrauterine growth restriction (IUGR) or ‘small for dates’

pre-term delivery (associated with foetal withdrawal in-utero, poor diet, and maternal health)

Sudden Infant Death Syndrome (‘SIDS’ or ‘cot death’).

There is no convincing evidence that opioids cause any significant or permanent neurological damage or increased risk of congenital abnormalities. Abrupt withdrawal of opiates (i.e. ‘cold turkey’) has been associated with miscarriage in the 1st trimester and stillbirth and pre-term labour in the 3rd trimester. Sudden opiate withdrawal is therefore considered potentially dangerous to the foetus, although the risks of

withdrawal have probably been exaggerated in the past and can be minimised by appropriate drug therapy for the mother. Most studies that report these findings relate to women with a history of injecting opiate use (primarily ‘heroin’) and chaotic illicit drug use. See section on ‘Management of problem drug use’ for further information on drug reduction and detoxification during pregnancy.

Neonatal Abstinence Syndrome

NAS or ‘neonatal withdrawal’) is well documented in babies born to opiate dependent women and is the most commonly reported effect of opiate use in pregnancy.

Cocaine and ‘Crack’

Cocaine is a powerful vasoconstrictor (restricting blood flow and oxygen to the foetus) and this effect is reported to increase the risk of:

placental abruption (placental separation with haemorrhage and foetal hypoxia)

intrauterine growth restriction (including reduced brain growth) underdevelopment of organs and/or limbs

foetal death in-utero (miscarriage and stillbirth) low birth weight babies

pre-term (premature) delivery.

Adverse effects have been largely reported in heavy crack/cocaine users, rather than with ‘recreational’ or occasional users. Cocaine ‘binges’ can potentially cause foetal brain infarcts due to sudden reduced blood flow. Mothers-to-be should be advised not to use cocaine or ‘crack’ in pregnancy if they possibly can.

High dose cocaine use in the mother can result in the new-born showing signs of intoxication at birth that include: ‘jitteriness’, irritability, hypertonia, poor feeding and an abnormal sleep pattern. Neonatal Abstinence Syndrome (NAS) has not been reliably reported.

Dependent crack/cocaine users should be managed by the consultant obstetrician and referred to a specialist drug agency for help (see ‘services’ list).

Amph etamin es ( e.g. ‘sp eed ’ or ‘wh izz’)

There is no conclusive evidence that amphetamine use directly affects pregnancy outcomes. However, amphetamine sulphate is a powerful CNS stimulant and heavy users tend to have poor health (due to poor nutrition, weight loss, anaemia, and mental health problems). Like cocaine, amphetamines cause vasoconstriction and hypertension, which may result in foetal hypoxia. Withdrawal symptoms in the new-born baby have not been reliably reported with amphetamine use. As with other drugs, in the absence of good data, advice should be to avoid or at least reduce intake during pregnancy.

Ec stasy ( ‘E’)

There is no conclusive evidence that ecstasy use directly affects pregnancy outcomes, however information in the literature is very scarce. Heavy users of ecstasy may have poor physical and mental health (e.g. depression) and this may affect outcome. Ecstasy use by the mother does not appear to cause withdrawal symptoms in the new-born baby.

Hallu c inogens ( e.g. LSD ( lysergic ac id d ieth ylam id e or ‘ac id ’) and ‘Magic

Mu sh rooms ’)

There is little evidence regarding the effects of hallucinogens in pregnancy. There is no evidence of congenital malformations and no conclusive evidence of other increased risks in pregnancy.

So lven ts & vol atile sub stan c es ( e. g. ‘glu e’ an d b u tan e gas)

There is little evidence regarding the effects of solvent and volatile substance use in pregnancy. However, inhaled solvents may reduce oxygen supply to the foetus and Neonatal Abstinence Syndrome has been reported in heavy users. A number of young people in Scotland die each year from the effects of volatile substances (usually as a result of arrhythmia) and

women who continue to use volatile substances in pregnancy run the risk of sudden death.

Neonatal Abstinence Syndrome (NAS)

A group of drug withdrawal symptoms referred to as Neonatal Abstinence Syndrome (NAS) can occur in infants born to mothers dependent on certain drugs. NAS occurs because, at birth, the infant is cut off from the maternal drug supply to which it has been exposed in utero. NAS is the most commonly reported adverse effect of dependent drug use in pregnancy. In Lothian, approximately 40 babies present with NAS each year and this number is likely to increase with the increasing prevalence of substance misuse.

The classes of drugs that are known to cause NAS include the opioids, benzodiazepines, alcohol, and barbiturates. Classical symptoms of NAS have not been consistently reported with solvents, hallucinogens, cannabis, and most stimulants. NAS symptoms are generally non-specific to the class of drug and differ from drug withdrawal symptoms seen in adults.

NAS is well described in babies born to opiate dependent women. The majority of infants born to dependent mothers (60-90%) will show varying symptoms of NAS.

NAS is characterised by central nervous system irritability, gastrointestinal dysfunction, and autonomic hyperactivity. The following signs and symptoms have been reported in babies born to opiate and benzodiazepine dependent women (including polydrug users) and describe the more severe range of symptoms that a baby may display:

irritability (marked tremor, easily startled, increased reflexes and excessive crying)

hyperactivity (excessive body movements, face scratching) hypertonicity (increased muscle tone and rigidity)

a fairly continuous high-pitched cry inability to settle or sleep after feeds

excessive sucking (including fist sucking) increased appetite

poor feeding ability (hungry but difficulty in sucking, swallowing and successfully completing a feed)

regurgitation and vomiting

frequent loose stools or diarrhoea (which cause peri-anal excoriation)

poor weight gain or weight loss

repetitive sneezing, yawning, hiccoughs, nasal stuffiness tachypnoea (rapid shallow breathing)

respiratory depression increased pulse and heart rate

temperature instability, fever (>37.5 C), sweating and dehydration mottling (discolouration of skin)

excoriation (skin abrasions) from excessive movement (usually seen around the buttocks, back of the head, shoulders, and heels)

seizures (fits)

Seizures occur rarely (in approximately 5% of infants) and may manifest up to 30 days after birth (mean age of onset is 10 days). The onset, duration, and severity of NAS symptoms vary greatly and depend on many factors, including the:

type of drugs used

duration of mother’s dependency

timing and amount of the mother’s last dose

metabolism and elimination of the drug by the infant, as well as the gestational age of the infant.

Data on possible dose related effects of methadone are inconclusive. Some studies show no correlation between maternal methadone dose and the development or severity of NAS. Others have found a weak positive correlation. Little data exists on the dose related effects of maternal benzodiazepine use. Symptoms normally present within the first 24 - 72 hours of birth (in approximately 75% of cases). Methadone withdrawal in the neonate can present later than heroin withdrawal. Methadone withdrawal symptoms can also last longer and be more severe. The onset of benzodiazepine withdrawal in neonates can also be delayed (due to slow metabolism in the neonate) presenting at 5-10 days of age (Coghlan et al 1999).

Acute symptoms of NAS may persist for several weeks and irritability can last for some months (particularly from benzodiazepines). Pharmacological treatment is required for some infants with acute symptoms (approximately 25% - 40%). Most studies show that babies who require treatment develop symptoms within 72 hours of birth, including babies born to methadone dependent women.

Withdrawal symptoms in pre-term infants tend to occur later than full-term infants and are generally milder and require less treatment. This is thought to be due to a number of different factors, including: their reduced total drug exposure in utero, the developmental immaturity of their central nervous system, the different metabolism of pre-term infants, and reduced ability to communicate the distress of withdrawal. Some babies may present with symptoms of NAS with no reported history of maternal drug use. If NAS is suspected, then the neonatal paediatrician can confirm the diagnosis by toxicology and will discuss the results sensitively with the parents.

Parents who have an infant with NAS experience the same range of emotions as any other parent of a new-born baby who is poorly. Anxiety, helplessness, fear, and grief are commonly reported feelings. In addition, they often feel guilty and ‘to blame’ for their baby’s condition and will require considerable support, reassurance, and encouragement. Caring for a baby with NAS can be very stressful and parents will require a lot of

patience. Involving the parents in all the decisions and choices about their infants care and keeping them fully informed of the baby’s progress is important. Ideally, parents will have been given clear and accurate information about NAS in the antenatal period so that they are well prepared.

#### Antenatal screening for problem drinking

The T-ACE questions are listed below.

T (tolerance) How many drinks does it take to make you feel high? Answer: ‘3 or more drinks’ scores 2 points

A (annoyance) Have people annoyed you by criticising your drinking? Answer: ‘Yes’ scores 1 point

C (cut down) Have you ever felt you ought to cut down your drinking? Answer: ‘Yes’ scores 1 point

E (eye-opener) Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? Answer: ‘Yes’ scores 1 point

A total score of greater than or equal to two points is considered positive.

#### Sudden Infant Death Syndrome (SIDS)

Maternal tobacco use, as well as drug and alcohol misuse are associated with an increased risk of Sudden Infant Death Syndrome (‘SIDS’ or ‘cot death’). All parents who use these drugs should be given advice about how to reduce the risk of cot death. The leaflet ‘Reducing the risk of cot death’ (produced by the Scottish Executive 2000) is included in the hospital ‘discharge pack’.

#### Risk of relapse

In the postnatal period, increased drug and alcohol use is common. For women who have managed to reduce their intake during pregnancy or even come off drugs or alcohol, the risk of relapse to former levels of drug taking is high. There are a number of reasons for this, including:

* feeling that it’s now OK to use again
* relief at having a ‘normal’ baby
* wanting to celebrate!
* the stress of caring for a new born baby (perhaps with NAS)
* ‘baby blues’ or postnatal depression
* poor support from partner or family
* anxieties about motherhood

It is important for professionals to acknowledge that relapse is common. Re-assessment of substance use and careful drug management is essential at this time, along with support to remain stable and to prevent relapse.

Ensuring the woman is engaged with a specialist drug and alcohol agency that can provide a relapse prevention service may be an important part of the postnatal care plan.