Preface to the Review

A number of documents highlight the importance that Government has placed on reducing health inequality including the latest Child Health Promotion Programme for Pregnancy and the First Years of Life (DH 2008), which clearly sets out the responsibility that Primary Care trusts have to improve the health of all children, and particularly the health of the poorest. Reducing infant mortality (IM) is integral to that responsibility, with the aim of both Bolton PCT and the Royal Bolton Hospital being to ensure a safe outcome to the pregnancies of women in their care, as well as their health and wellbeing and that of their babies. To achieve that aim, the staff of both the PCT and RBH employ their considerable expertise and skills to good effect, and as a result the overall standard of care received by mothers and their babies in Bolton is of the highest quality.

However, that does not mean that there is no room for improvement. The 2007 Status Report on the Programme for Action of Tackling Health Inequalities shows that that the performance of Bolton as a contribution to the National Life Expectancy Target is not on track for either Life Expectancy or Infant Mortality. This critical review of the services in Bolton, which highlights areas for improvement and makes recommendations for action, has been undertaken in order to improve performance on reducing IM, including narrowing the gap between the routine and manual group and the rest of the population. It should be read taking the above facts into consideration.

The review has been undertaken by lead professionals in relevant service areas and I commend both it and its recommendations to your attention and for your action.

Jan Hutchinson
Director of Public Health
Bolton PCT
June 2008
A Review of Infant Mortality in Bolton

Section 1: Introduction.
Infant mortality (IM), defined as the number of deaths of infants one year of age and younger per 1000 live births, is seen as being a useful indicator of the level of health and development of any one country. In the UK, the IM rate is currently at an all time low, with the overall situation continuing to improve. However, every year in England, about 3,000 babies do not live to celebrate their first birthday and many more are stillborn or have long-term disabilities. And while the IM rate is improving, it is improving more slowly for disadvantaged people and thus contributes to health inequalities. The gap between the routine and manual group and the population as a whole widened from 13% in 1997-99 to 19% and in 2002-04, with there being substantial variations between the babies of mothers born in Pakistan (10.2 per 1000 live births which is double the overall IMR), the Caribbean (8.3 per 1000 live births which is 63% higher than the national average), young mothers, and mothers who register the birth alone1.

The death of a baby is a devastating loss for a family, and the Government has made tackling IM a priority, setting in 2002 a national health inequalities Public Service Agreement (PSA) target: to reduce inequalities in health outcomes by 10% by 2010 as measured by infant mortality and life expectancy at birth. This target was underpinned by the objective to reduce by at least 10% the gap in mortality between the routine and manual group and the population as a whole.

Based on 2002-04 data, 43 local authorities with the highest levels of infant mortality amongst the routine and manual group were identified as being areas where the most impact could be made so as to achieve the target. The IM rate in Bolton is higher than that for England Wales (see fig 1), and because it is one area where the IM rate has risen over the past two years, Bolton, was one of six areas identified for action.

<table>
<thead>
<tr>
<th>Figure 1: IM Rates in Bolton 2006</th>
<th>BTN</th>
<th>NW</th>
<th>ENG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live births per 1000 resident population</td>
<td>13.7</td>
<td>12.3</td>
<td>12.5</td>
</tr>
<tr>
<td>Proportion &lt;2500 grams per 1000 live and still births</td>
<td>9.7</td>
<td>8.1</td>
<td>7.9</td>
</tr>
<tr>
<td>Infant mortality rate per 1000 live births</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>7.4</td>
<td>5.6</td>
<td>5</td>
</tr>
<tr>
<td>&lt;4 weeks</td>
<td>4.7</td>
<td>3.8</td>
<td>3.5</td>
</tr>
<tr>
<td>&lt;1 week</td>
<td>3.3</td>
<td>2.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Still birth rate per total live and still births</td>
<td>7.6</td>
<td>5.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Perinatal mortality rate - still births and deaths under 1 week combined per 1000 total live and still births</td>
<td>10.9</td>
<td>8.3</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: ONS Vital Statistics

In October 2007, the National Health Inequalities Support Team reviewed the progress that key agencies in Bolton were making in addressing health inequality, with a particular emphasis placed upon life expectancy, including the IM targets set by Government. Among their recommendations was that we should:

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Build on and improve partnership working across Directorates in the PCT and with partners agencies to strengthen their contribution to the 2010 life expectancy target

- Develop action plans for the 6 topics known to be impacting on life expectancy in Bolton (including IM)
- Strengthen and develop the public health intelligence service
- Develop a comprehensive strategy for community engagement
- Mainstream areas of good practice – ‘systematic planning at an industrial scale’

This review of Infant Mortality, conducted between January and April of 2008, is part of the PCTs response to their recommendations.

Section 2 The Infant Mortality Review

2.1 Methodology:

Aims:
1. Identify the interventions, services and structures already in place to address the causes of IM
2. Set out any gaps in provision and make recommendations to close the gaps
3. Enable the development of a clear set of prioritised actions to enable the target for IM to be met in Bolton.

Objectives

The IM rate is strongly associated with:
- the social position of women²
- birthweight and pre-term birth
- mothers’ age
- birth spacing
- access to a range of maternal health technologies
- the lifestyle characteristics of the mother and her household
- maternal health status
- congenital anomalies ³

Reducing IM therefore involves improving life chances for disadvantaged families as well as communities, so that the responsibility for its reduction lies outside as well as within the health service. The review working group (see Appendix 1) therefore comprised a multi-professional group drawn from those agencies with responsibility for services having the greatest potential to impact upon the determinants of infant mortality⁴. These include:

- Ante and post natal care
- Breastfeeding,
- Maternal obesity
- Smoking
- Substance misuse
- Teenage parenting
- Sudden Unexplained Deaths in Infants (SUDI)

³ ONS Figure 14. Stillbirth and infant mortality rates by cause, England and Wales. ONS birth statistics. Series FMI http://www.statistics.gov.uk
This group met twice to:

1. Map the information base for IM and identify gaps
2. Map the current provision in respect of the above indicators paying particular attention to those factors most likely to have the greatest impact on IM rates.
3. Identify good practice as well as gaps and deficiencies in provision.
4. Make recommendations based upon best practice as identified by the DH Good Practice Guide, the Bradford IM Commission and the National Health Inequalities Support Team recommendations.

NB. The first Child Death Overview Panel report on child deaths in Bolton is pending so that any recommendations made should be taken into account with their findings.

Scope of the Report
Because the causes of IM are complex so are the possibilities to affect it. The Review of the Health Inequalities Infant Mortality PSA Target identified that the following action could reduce the IM gap by 7%. These were:

- Reducing the prevalence of obesity in the Routine and Manual worker group (R&M) by 23% to the current levels of obesity in the population as a whole
- Meeting the national target to reduce smoking in pregnancy from 23% to 15% in the R&M group
- Reducing sudden unexpected deaths in infancy in the R&M group by persuading 1 in 10 women in this group to avoid sharing a bed with their baby or putting it to sleep prone (on its front)
- Achieving the teenage pregnancy target.

In Bolton where the data does not support a differentiation of IM rates between social groups, the data available demonstrates that IM is most often attributed to the following three causes:

- Prematurity and Low Birth Weight
- Severe congenital anomaly
- Unexpected Death in Infancy

(see appendix 2)

This report presents the evidence in terms of these priorities for action, while keeping in mind the impact on each of the other contributory factors.

Section 3: Information

3.1 The national Neighbourhood Renewal floor target and Public Service Agreement target is to reduce the gap in IM between babies born to fathers in manual and routine occupations and the population as a whole by 10% by 2010.

This target assumes the accurate recording of births, deaths and associated individual socio-economic data. However, there is no single dataset that provides a comprehensive picture of IM in Bolton. The most complete data sets available are:

- The annual district birth and death abstracts comprising all live births and stillbirths and all infant deaths registered within a given period.
- Information on all births registered or resident in Bolton as held by the Child Health Department of the PCT

Occurrences of infant death registered in Bolton are notified to Child Health, and in turn to the recently established Child Death Overview Panel. However:

6 This data set contains details of all the birth and death registration of people usually resident in Bolton district
• Children whose births are registered and who reside in Bolton may have their deaths registered in another District, and current procedures for passing on such information are not robust.
• There is no agreed shared protocol in place that ensures the notification of a child death is passed onto everyone holding information on children in a timely manner.

While the group did not undertake a review of the quality of available data, evidence from the Bradford IM Commission suggests that the following issues may also cause further inconsistencies:

• Differences in spelling and typing errors
• Babies names changing
• Changes of address
• Out of date or incorrect NHS numbers

Maternity and health visiting patient records hold vital aspects of information such as maternal medical history, smoking status, gestation at booking for antenatal care, alcohol and drug use, consanguinity and congenital anomalies.

These are not routinely transferred into data sets.

The patterns of risks factors differ between social and ethnic groups, and in order to be able to map the differing causal pathways IM statistics would need to be separated by ethnicity and social status as well as the age of death, while recognising that for individual women, any of a number of risk factors may apply in their case. While IM rates are used as performance indicators to monitor service delivery of public sector organizations, it is not currently possible to reliably analyse IM in Bolton (or according to an analysis by NHS Northwest, across the whole of the north west) by individual socio-economic characteristics for a number of reasons including that:

• There is no recording of ethnicity at birth and death registration.
• The recording and coding of parental occupation at a birth or death appears to be neither consistent nor reliable
• Confidentiality rules applying to the disclosure of patient identifiable information restrict agencies accessing data held by other organization/services and systems are not compatible and there are no cross data sets.

Section 4: Prematurity:
A higher risk of infant death is associated with both a low birth weight (defined by WHO as below 2500g) and prematurity, and in Bolton it is estimated that 50% of deaths each year contributing to the IM rate are attributable to prematurity. Factors affecting prematurity include:

• Pre-conceptual behaviours and knowledge
• Quality of ante-natal care
• Serious maternal medical and psychological conditions that may be aggravated by pregnancy
• Congenital anomaly
• Substance and alcohol misuse
• Smoking
• Maternal nutrition

These factors are considered in turn below, except for congenital anomaly with is considered separately in section 5
4.1 Preconceptual behaviour and knowledge:
The risk of prematurity is lessened if women who are at risk of or contemplating a pregnancy are informed of risk factors, and supported in accessing service to minimise their impact before pregnancy occurs. There is no target relating to preconceptual care in the National Implementation Plan, nor are preconceptual services currently commissioned in Bolton. Existing services able to contribute to such a service include GPs surgeries, Community Pharmacists, The Parallel, Family Planning Clinics and Children’s Centres.

Some social groups who are at a greater risk of deprivation also face the greatest barriers to accessing services even in these venues. These include Pakistani women who are over represented in IM statistics.

Gaps:
There is insufficient information detailing the barriers to individuals in such social groups accessing appropriate and timely preconceptual information and support, including preparation for parenthood groups.

A project employing an ex-service user of Substance Misuse Services (SMS) in an attempt to engage current SMS clients in discussions about pregnancy and parenting issues including breastfeeding, offers an opportunity to identify and explore ways to overcome some of the barriers for this vulnerable group.

4.2. Quality of antenatal care:
Access to high quality personalised maternity services is the right of all women in the UK. Access to, and the delivery of those services is important to pregnancy outcomes including prematurity, which in turn impacts upon IM. A higher rate of infant death for example is associated with both low birth weight (defined by WHO as below 2500g) as well as a birthweight above 4000g. The monitoring of foetal growth should therefore be an important component of the antenatal care pathway, as should interventions to address other risk factors for prematurity such as maternal diabetes, smoking, substance misuse, and maternal weight.

Maternity Matters and the new Child Health Promotion Programme (CHPP) require maternity services to ensure that all women have accessed maternity care that includes a full health and social care assessment by the 12th week of their pregnancy, with the midwife rather than the GP being the first point of contact for care. Late booking, most common in women from BME and other at risk groups may result in mothers missing vital screening tests and other early opportunities for intervention.

The Healthcare Commission Review of Maternity services (2007), which measures maternity services in each Trust against a range of performance indicators, assessed maternity services in Bolton were rated as ‘fair’ with a score of 2.87 out of 5 overall, which includes a full health and social care assessment by the 12th week of their pregnancy, with the midwife rather than the GP being the first point of contact for care.
and above the acceptable level in some areas. Areas in which it is judged to be underperforming include the following:

a) Ensuring timely access to maternity care
b) Ensuring sufficient availability of antenatal classes
c) Ensuring services are adequate and configured to ensure appropriate involvement of obstetricians and midwifery in care and length of mothers stay in hospital

a) Ensuring timely access to maternity care
Approximately half of all mothers in Bolton book after 12 weeks gestation in Bolton with 7.2% continuing to book after 20 weeks (see fig 2). Marked improvements have been made in the last 3 years but more remains to be done.

Fig 2: Gestation at Booking.

<table>
<thead>
<tr>
<th>Gestation at Booking</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 11+6 weeks</td>
<td>29.9%</td>
<td>39.6%</td>
<td>52.4%</td>
</tr>
<tr>
<td>12-17+6 weeks</td>
<td>60.5%</td>
<td>51.5%</td>
<td>39.1%</td>
</tr>
<tr>
<td>18-19+6 weeks</td>
<td>3.2%</td>
<td>2.8%</td>
<td>2.8%</td>
</tr>
<tr>
<td>More than 20 weeks</td>
<td>7.5%</td>
<td>7.5%</td>
<td>7.2%</td>
</tr>
</tbody>
</table>

Posters signposting and informing those who are at contemplating pregnancy or who are newly pregnant of how to access midwifery support and advice, and highlighting the importance of early booking, are now being displayed in a range of community settings such as pharmacies and children’s centres.

Gaps:
Further work in required to ensure that all mothers are aware of the importance of early booking and know how to access midwifery services within the community setting

b) Ensuring sufficient availability of antenatal classes
The recently published Child Health Promotion Programme (CHPP) requires that parents be prepared for parenthood from early in pregnancy. This preparation must encompass social support - through the provision of group based antenatal classes – be responsive to the priorities of parents, and cover the transition to parenthood, parent-infant relationships, problem solving skills and the specific concerns of fathers, as well as inform about pregnancy, labour and breastfeeding.

Midwives currently run 7 classes a week covering the majority of these topics in community venues across Bolton, at various times of day including a monthly session on Saturdays

A Midwife and a Linkworker jointly deliver weekly parentcraft sessions targeted at, and attended by large numbers of women from within the Asian community

Gaps:
Current Midwifery levels on the Unit restrict the availability of preparation for pregnancy classes as demand currently exceeds the to deliver them as does a lack of venues and the size of rooms available.

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/DH_083645
Classes do not predominantly attract women from the most disadvantaged groups who are most at risk of prematurity.

There is insufficient information detailing the barriers that prevent some individuals in the most disadvantaged groups from accessing preparation for parenthood groups.

c) Ensuring services are adequate and configured to ensure appropriate involvement of obstetricians and midwifery in care and length of mothers stay in hospital.

The DH Making it Better consultation\textsuperscript{18} outlined how maternity services needed to be reconfigured to meet the needs of mothers and babies and stated that:

- all women should have a choice of where to give birth
- any woman giving birth at home should have the assurance that she can be transported to a consultant-led unit safely and quickly if necessary
- all women should be have access to epidural anaesthesia if choosing to deliver in a unit with a 24-hour specialist anaesthetic service
- all women should have access to other forms of pain relief such as balls, birthing pools and gas and air
- care for newborn babies, including the most complicated cases, should be provided within the safety net of fully agreed networks to ensure they have access to the whole range of specialist services.

Reduction in neonatal mortality rates has been linked to improvements in intensive neonatal care including specific technological developments in synthetic lung surfactant to treat respiratory distress in neonates\textsuperscript{19}

Achieving the standard of maternity care required for all women to be ensured of the best possible outcome for themselves and their and babies is an important priority for Bolton Hospital NHS Trust and the PCT. The Maternity Unit is therefore working to meet all the recommendations of Maternity Matters, The Children’s NSF and the HCC report as well as achieving Baby Friendly Status, and already complies with the National Antenatal Screening Programme.

Gaps:

Midwifery levels on the Unit have been below that national average. However, staffing levels have improved recently and currently stand at 1:29 (Birth rate recommendations are 1:28)

The unit does not currently comply with the Consultant Obstetric presence quality standard for Central Delivery Suite (CDS)

Bolton is designated as a consultant led maternity unit for the area. At present there is no separate Neonatal team for Neonatal ICU/CDS but this may be remedied when as a result of the implementation of Making it Better across Greater Manchester\textsuperscript{20}, Bolton becomes one of the 2 x level 3 Neonatal Intensive Care (NNIC) units

4.3 Other risk factors for prematurity

**Serious pre-existing medical/psychological conditions**

The CEMACH report (2007) recommended that women suffering from pre-existing disease or conditions that may affect the outcome of their pregnancy be offered pre-pregnancy counselling and advice.

\textsuperscript{18} Shribman, S. (2007) Making it better for mother and baby: Clinical case for change London DH

\textsuperscript{19} Sullivan et al (2001) Review of risk factors for SIDS. Paediatric and Perinatal Epidemiology vol 15 (144-200)

\textsuperscript{20} GM Strategic Health Authority (2007) Best For Health http://www.bestforhealth.ahs.uk/
Gaps:
No auditable data is collected in Bolton to determine the percentage of pregnant women who receive preconceptual counselling and advice concerning their risk from pre-existing disease or conditions.

Alcohol and substance use and misuse
Alcohol misuse poses a threat to a developing foetus. Alcohol is a teratogenic compound that readily crosses the placenta and interferes with the normal development of the embryo or fetus. In the absence of a developed blood filtration system, the fetus is unprotected from alcohol circulating in the blood system. Prenatal alcohol exposure can affect the fetus in a number of ways. The most devastating effects are caused by the adverse impact of alcohol on fetal brain development and the central nervous system (CNS)\textsuperscript{21}. The latest NICE guidelines advise women against drinking any alcohol during pregnancy, while stating that if they must drink they should not do so in the first three months, and should limit consumption to one or two units once or twice a week afterwards\textsuperscript{22}.

Those who misuse alcohol and illegal substances may also be heavy smokers and have a poor diet.

A programme of training for primary care staff is in place to assist them in the identification of problem drinking, the delivery of brief interventions, motivational interviewing and harm reduction approaches. Training in the delivery of enhanced services is also available.

All women are provided with information about the danger alcohol poses to the foetus at booking.

For substance misusers, pregnancy is a critical time for both mother and child. Substance misuse can harm a foetus, yet pregnancy can act as a strong incentive to make a positive change to substance-misusing behaviour.

Substance misuse is more prevalent in areas of deprivation where women may face other risk factors to the outcomes of their pregnancy.

Substance misuse during pregnancy increases the risk of:

- having a premature or low weight baby, particularly for users of cocaine and crack
- the death of the baby before or shortly after birth
- Sudden Infant Death Syndrome
- physical and neurological damage to the baby before birth, particularly if parents are users of stimulant and benzodiazepines, or when violence accompanies parental use of drugs or alcohol

Substance misusers face particular barriers to a safe pregnancy outcome. They may not seek antenatal services until late in pregnancy or when in labour because:

- they may not realise they are pregnant because of the effects of some substance use on the menstrual cycle
- their substance misuse may mask the symptoms of pregnancy.
- their substance misuse and associated life-style may make other more urgent demands on their time.

\textsuperscript{22} NICE Draft Guidelines March 2008
they may fear that if they tell staff, or their drug use or drinking is detected through routine urine or blood tests, that they will be treated differently, or that child protection agencies will be contacted automatically.

Many of these problems can be overcome by provision of accessible antenatal services that tackle these worries honestly and sympathetically.

Services particularly targeted to help women address their behaviours include:

- weekly women only sessions providing access to a female doctor in the Community Drugs team.
- ongoing partnership work with Urban Outreach working with female street sex workers and work by Hostel Liaison Worker
- continuity of care provided by outreach midwives

At booking, pre-natal drug usage is assessed and recorded so that users and their partners are prioritised for treatment both by services in the community and those provided in treatment centres.

**Gaps:**

The exact level at which alcohol poses a risk to the developing foetus has yet to be ascertained

Government advice regarding safe limits for alcohol consumption in pregnancy remains unclear and open to interpretation

There is currently no specialist service/post for substance misuse in pregnancy, and in such absence there is a need to explore potential sources of funding to support the creation of a specialist midwifery post; and to review and develop protocols to ensure case recording is standardised, and processes for information sharing are sufficiently robust to enable the needs of substance misusing parents to be met in an appropriate and timely manner

Resources to enable contraceptive services to be provided within SMS sessions could reduce the risk of unwanted pregnancy in this at risk group.

**Smoking**

Babies born to mothers who smoke during pregnancy are on average 200g lighter and have double the risk of being low birth weight with the effects graded according to the number of cigarettes smoked 23,24. Data from Bolton Stop Smoking Services indicate that 30% of women were smoking at conception and over 20% continued to smoke until delivery and beyond (See fig 2) although data collection and analysis is not thought to be robust. Over 70% of those women smoking at booking that were asked reported not wanting help to quit.

Services to help pregnant women quit smoking include:

- Smoking cessation advice and support at booking and at each subsequent AN visit
- Home visits by the Stop Smoking Service (SSS) where required including to family members
- 100% smokers who are referred to SSS are offered risk/benefit analysis regarding NRT usage
- Liaison with midwives at Children’s Centres to offer support and advice on quitting smoking for pregnancy women in hard to reach groups

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- All PCT and acute Trust frontline staff are offered brief intervention training (some to Level 2), with information on SSS being inserted into mandatory training at PAMU
- Self-referral to services
- Promotion of services in GP premises and children’s centres

**Gaps:**
Barriers to reducing rates of smoking in pregnancy include:
- Lack of information about resistant groups preventing the appropriate targeting of interventions
- Insufficient targeting of information and support to women at risk of or contemplating a pregnancy.
- Not all front line practitioners trained in enhanced intervention or with knowledge regarding use of NRT in pregnancy.
- Stop Smoking training is mandatory for some PCT and all maternity staff but not for all relevant staff groups

**Figure 2  Smoking Statistics 2007**

Maternal Nutrition
Both over and under nutrition can negatively impact upon the birth outcome of pregnant women, as good nutrition is essential to normal foetal development and growth and to the maintenance of a pregnant woman’s own health and wellbeing. A maternal diet for example low in folate, increases the risk of neural tube defects in the foetus, lower birth weight and prematurity, and a lack of n-3 fatty acids limits placental function and reduces foetal weight gain and growth\(^25\), while maternal obesity significantly increases the risk of maternal complications in labour\(^26\).

The infants of adolescents, those living in the most deprived areas, single mothers, and women from ethnic minority groups who are also socially disadvantaged, are most at risk from their mothers having a poor nutritional status\(^27\), as are those of women who misuse substances.

\(^{27}\) Baker, D McClusky, S (2007) Setting Standards for preventative Services to Reduce Child Health Inequalities in greater Manchester. University of Salford
The Healthy Start scheme was introduced by Government in 2006 to improve maternal nutrition. However, uptake of the free vitamins it offers to welfare dependent pregnant women has been low across the UK including in Bolton so that the PCT has commissioned the provision of free vitamins to all women and children under two in all at risk groups regardless of income. The effectiveness of this intervention to improve uptake will be reviewed within the next 12 months.

Maternal obesity is a significant risk for poor pregnancy outcome, and the prevalence of maternal obesity has trebled since the 1980s. NICE guidelines suggest that women with a BMI of >30 are encouraged to loose weight before becoming pregnant.

All women are weighed and provided with dietary information at booking. Those with BMI>35 are offered a Glucose Tolerance test (GTT), dietician referral, and receive follow up and support.

Gaps:
No PH initiatives are provided to support women with a BMI>30 who are contemplating pregnancy in weight management

There is no care pathway in place for women with BMI >35 even if their BMI suggest they are significantly overweight

There is no evidence of the efficacy of current support services to reduce the risk from BMI>35 in pregnancy

Section 5: Congenital Anomaly
5.1 Congenital anomalies are an important determinant of IM. Approximately 2% of live births have major congenital abnormality. The incidence is increased in pre-term and small for gestational age infants.

Social disadvantage as well as higher parity, maternal age, social status and undiagnosed type 11 diabetes are predisposing factors for congenital anomaly, with the contribution of the latter to a higher rate within Pakistani population being strongly suggestive of genetic pre-disposition.

Consanguinity (marriage within families) and its genetic consequences has been the subject of considerable research particularly in South Asia where the practice is common, and in Europe, where the relative risk of IM for consanguineous marriages compared with non- consanguineous marriages after accounting for other confounding variables suggest a relative risk of up to 2.4.

Consanguinity is culturally rather than religiously determined and is therefore likely to affect women of all faiths and particularly from areas of the Asian subcontinent including from Pakistan.

In the UK communities with history of consanguinity are likely to display a wider range of rare anomalies than non-consanguineous populations. The degree to which those communities in Bolton understand the risk is unclear.

The following have the potential to reduce the incidence of IM from severe congenital anomaly:

- Genetic counselling and pre-pregnancy testing

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http://www.nice.org.uk/CG43
- Pre-natal diagnosis and support for decision-making where a family is known to be particularly at risk
- Early screening and intervention. (Antenatal screening coordinator in place at RBH).
- Education and information to inform cultural practices
- Measures to address deprivation and disadvantage
- Folic acid supplementation

The commissioning arrangements for genetic and screening services for congenital anomalies provided by RBH and Central Manchester and Manchester Children’s University Hospital (CMMC) are difficult to clarify.

At present, all mothers are offered a dating scan plus testing to detect Downs Syndrome, cystic fibrosis, infection disease and haemoglobinopathies together with a further anomaly scan at RBH. Any parent receiving a diagnosis of congenital anomaly is also offered counselling in the clinic by a consultant paediatrician, obstetrician or specialist midwife. Mothers who have an anomalous scan may also be offered amniocentesis at RBH.

Parents with a previous history of congenital anomaly, or who require more specialist services e.g. cardiac or renal anomaly are offered referral to the specialist foetal management unit at CMMC with the potential for their maternity care to be also managed at the hospital if required.

The new NICE guidelines for screening i.e. dating scan 10-12 weeks, Downs Syndrome testing 11-13 weeks through combined nuchal translucency screen and serum test (currently serum test alone at 16-18 weeks) and anomaly scan at 18-20 (currently 20-22 weeks) has required the streamlining of clinics, and a recent LEAN event has helped to identify the unit as a centre of best practice.

Folic acid is a key nutrient in helping to prevent neural tube defects (NTD) such as spina bifida, which can lead to paralysis and hydrocephalus. 1100 NTD pregnancies occur each year in the UK and supplementation in the 12 weeks prior to and after conception is recommended to ensure women have a sufficient level29.

The risk that disadvantage presents for severe congenital anomaly has been related to a number of factors including level of education, level of income and maternal nutrition. While the resources to address such issues may lie outside of the health service, improving the nutritional status of pregnant women and of women within disadvantaged communities is within the remit of the PCT and RBH.

Gaps:
The nationally recommended ultrasound screening for structural anomalies between 18 to 20 weeks gestation that the Maternity Unit are working to achieve is the minimum age at which a useful scan can be performed. Because this may be too late to allow for acceptable termination of pregnancy in some cultural groups, there is need to ensure they are informed of the risks and choices available.

Any pressures on scanning services that create barriers to all women being offered timely and appropriate screening of their pregnancies may increase the risk for late termination which requires referral to specialist services. National screening committee recommendations which will include nuchal translucency screening for Downs syndrome and which are due to be implemented later this year may add to the existing pressure on sonography services, and there is a need for careful and integrated planning to ensure that such services are not overstretched.

A significant percentage of women book in Bolton continue to book too late to benefit from early screening and intervention (see para 4.3). The new information campaign

to encourage women to access advice early in pregnancy may help to reduce this percentage, but other creative, multi-agency initiatives need to be developed to identify and overcome the barriers to early booking.

Many women remain unaware of the importance of folic acid in preventing neural tube defects. Folic acid may be bought over the counter but is only available on prescription to pregnant women and to those who have had a previous NTD and are contemplating a pregnancy. This places women with low incomes at a greater disadvantage. The PCT has commissioned a specially designed leaflet to be distributed to all women of childbearing age by front line practitioners in a range of settings, but there is no system in place to quantify its efficacy.

Section 6: Unexpected Death in Infancy

Unexpected death in infancy is a significant cause of IM. It may be sudden and unexpected (SUDI), the result of an accident, or non-accidental. In each case it is an often preventable and distressing tragedy.

6.1 Sudden Unexpected death in Infancy (SUDI)

SUDI most often occurs within the first eight months of life, with a higher risk for males, pre-term and low birthweight babies and those sleeping in non-supine positions. Although SUDI occurs in all socioeconomic groups it is more common in disadvantaged populations.

Partly as a result of the ‘back to sleep’ campaign, the incidence of SUDI has fallen sharply in recent years although 600 babies die continue to die suddenly every year in the UK, with the highest levels persisting in disadvantaged and routine and manual groups. 21% of infant deaths in Bolton were attributed to SUDI in 2004 (4 out of 18)

The most common causes of sudden unexpected deaths in infancy (SUDI) include infections followed by cardiovascular anomaly, child abuse and metabolic/genetic disorders. Epidemiological studies have identified several risk factors. These include asphyxia caused by suffocation due to overlaying when the baby was bed sharing with others in an adult bed or on a sofa or armchair, or factors such as habitual smoking, the consumption of alcohol and/ or illicit drugs.

All mothers are advised and provided with literature, during the antenatal period and following delivery, about safe sleeping and the risks of SUDI from behaviours such as smoking, and the consumption of alcohol or illicit drugs. Health visitors provide parents with further written information in leaflets and in parent held records at primary visits.

Second deaths from SUDI are not unknown, with some families having experienced three. A CONI (Care of Next Infant) programme, provided to parents who have experienced a SUDI, is delivered through health visiting services.

Gaps:

Notification to health visitors of a need for a CONI programme only happens after delivery of a subsequent child so that there may be a delay in procuring the resources a family requires.

6.2 Non-Accidental death

31 Sudden unexpected death in infancy A multi-agency protocol for care and investigation The report of a working group convened by The Royal College of Pathologists and The Royal College of Paediatrics and Child Health The Royal College of Pathologists and The Royal College of Paediatrics and Child Health, September 2004
Organisations are required to make appropriate arrangements to safeguard and promote the welfare of children. Government guidance makes it clear that safeguarding— and in particular protecting them from significant harm— is a shared responsibility, and depends upon effective joint working between agencies and professionals that have different roles and expertise. Safeguarding children is therefore the responsibility of all staff.

It is impossible to be certain, but it is estimated that each year in England and Wales there may be about 30–40 infant deaths from covert homicide, which represents about 10% of the current annual total of sudden unexpected deaths in infancy. Risk factors include:

- Mother’s mental health
- Disadvantage
- Teenage pregnancy

6.3 **Mother’s mental health.**

Postnatal depression is a common form of clinical depression that can affect women, and less frequently men, after childbirth. Studies report prevalence rates among women from 5% to 25%, but methodological differences among the studies make the actual prevalence rate unclear. Mothers with postpartum depression can unconsciously exhibit fewer positive emotions and more negative emotions toward their children, are less responsive and less sensitive to infant cues, less emotionally available, and in more extreme cases some women may have thoughts of harming their children.

The Edinburgh Postnatal Depression Scale (EPDS) has proved an effective way of measuring postnatal depression in the community. Extra resources were allocated to Health Visiting services in 2007 to ensure that EPDS together with follow up listening visits and an agreed referral pathway as required was made available to all newly delivered women in Bolton.

Puerperal psychosis is a different condition from postnatal depression. It is an acute, severe mental illness characterised by hallucinations and delusions that generally occurs within the first 2–4 weeks after childbirth, with an increase in severity over a 10–14 day period, although the sufferer may be unaware that she is unwell. Clinical management typically involves rapid admission to hospital, usually with the baby. Correctly diagnosed and treated, the illness is recoverable within a few weeks. Only 1% to 2% of of women following birth develop puerperal psychosis, and while the risks of a mother suffering this illness harming her baby are low, 49 women were convicted of infanticide between 1989 and 2000 in the UK.

The diagnosis of puerperal psychosis depends on the mother having regular contact with health professionals in the post-natal period, as relatives may be unaware of the

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seriouness of symptoms. Mothers with a previous history of mental illness who are at a greater risk should receive careful monitoring.

All mothers are visited by a midwife or health visitor in the first two to four weeks following delivery when any indication of puerperal psychosis would be referred to the GP for treatment.

**Gaps:**
Low staffing levels in some health visiting teams as a result of sickness and maternity leave, together with the lack of support groups available for mothers, and ongoing increases in the work required to protect children from harm generally, continue to be barriers to the equitable and consistent delivery of EPNDS and follow up to all women.

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### Section 7: Disadvantage

Whether measured by the index of multiple deprivation (IMD) or occupational class of the father, a mother’s socioeconomic position is a determinant of pregnancy outcome and IM. Income is associated with a number of factors including mothers’ nutrition, lifestyles and behaviours, social conditions and level of educational attainment, which in turn are strongly associated risk factors for premature delivery and low birth weight, SUDI, accidental and non accidental injury and therefore infant death. Disadvantaged women are also less likely to breastfeed, and face greater barriers to accessing services if their first language is not English.

Social groups who are at a greater risk of deprivation including Pakistani women, are over represented in IM statistics.

Although many of the determinants of deprivation lie outside of the influence of the PCT, the new Child health Promotion programme (CHPP) requires commissioners to ensure that reliable, systematic and consistent processes are in place to assess the needs of all mothers and children, and that those needs are met by services delivered within a model of ‘progressive universalism’, which targets resources to the most disadvantaged individuals.

The model the Government recommends to safeguard children from disadvantage is health led, and incorporates the universal delivery of the CHPP by midwives and health visiting teams based in community settings in partnership with other children’s services, together with an intensive proactive home visiting programme to the most vulnerable first-time parents. Other parents are to be offered additional help and support as required or their need dictates.

Parents may, for a variety of reasons, experience difficulty with parenting even from an early age, and require help and support to enable them to ‘parent well’. The Government has emphasised the importance of providing support for parenting from the antenatal period, when it is concerned with preparing parents for parenthood in order to maximise the potential for sensitive responding to a child’s needs and therefore ‘attachment’, and parent and child wellbeing. More often it is provided as parenting programmes to prevent or deal with behavioural problems as a measure against social exclusion.

Bolton’s Parenting Strategy states that interventions should empower parents to meet the needs of their children, and that parenting programmes are a valuable and effective mechanisms for providing that support. Current programmes being used in

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41 Hobbiss (2006) ibid
42 Health Inequalities: Improving NHS performance. Communication from the Department of health to Chief Executives of primary Care trusts, August 2004
43 DH 2008 ibid
Bolton to support families with young children include Webster Stratton Parenting and the Solihull Parenting Programme, which are delivered in children’s centres and other community locations by centre staff and health visitors. Parenting programmes are not currently delivered by substance misuse services.

Gaps:
There is no comprehensive strategy for community engagement in place - as recommended by National Inequalities Support team - to ensure that services, such as those to safeguard children from the effects of disadvantage including IM, meet the needs identified by ‘at risk’ individuals and groups.

Current shared funding and management arrangements and agreements are not sufficiently robust to support the joined up working required to maximise the potential of the resources available across Bolton to deliver the Government’s agenda to efficiently, effectively and proactively safeguard children.

There is insufficient recognition of the resource required to work with children and their families on the cusp between safeguarding and child protection. This is a barrier to proactive safeguarding.

Lack of crèche places and spaces is a major barrier to delivering a whole range of services and interventions to safeguard children and support their parents.

Current provision of parenting support do not sufficiently take into account the needs of parents who misuse substances, and who may be hard to reach except through SMS.

Section 8: Teenage pregnancy
Each year in the UK around 39,000 girls under 18 become pregnant. These pregnancies occur throughout the population, although they are much more likely to occur in deprived neighbourhoods. The overwhelming majority of under 18 conceptions are unintended, and in 2004 nearly 61% of all under 18 pregnancies ended in abortion45.

Although year on year rates of under 18s conceptions in Bolton continue to fluctuate, Bolton’s conception rates remain high, although figures for the last 2 years have shown a small decrease, so that rates are now lower than at any time since 1998. Attaining the government target of a 50% reduction by 2010 is a real challenge, but remains a priority target for the PCT.

The disadvantages of teenage pregnancy are striking compared to women who delay motherhood. It is known that teenage mothers are less likely to finish their education or to breastfeed; more likely to bring up their child alone and in poverty; are more likely to smoke during pregnancy and to have three times the rate of post-natal depression of older mothers, and to have a higher risk of poor mental health for 3 years after the birth. Moreover, the infant mortality rate for babies born to teenage mothers is 60 per cent higher than for babies born to older mothers46.

Services in Bolton to prevent teenage pregnancy include The Parallel. Situated in the town centre this provides services for a wide range of health needs for 11-19 age group. A large proportion of their work is concerned with sexual health and contraception. Further development of this work is underway in Horwich, Farnworth, Westhoughton and Johnson Fold as part of a government funded Teenage Health project.

45 Source: Office for National Statistics and Teenage Pregnancy Unit
Teenage pregnancy disrupts young peoples’ education, and for mothers of compulsory school age the Department of Education & Skills (DfES) guidance makes it clear to schools that pregnancy is not a reason for exclusion from school\textsuperscript{47}. Local Education Authority’s (LEAs) therefore have a duty to provide suitable education for pupils who become parents while of compulsory school age. In Bolton, a reintegration offer ensures that pregnant girls of school age have access full time education either in school, in a new Pupil Referral (Young Mum’s) Unit, or on occasion in the home. For those over 16, there are appropriate courses on offer for teenage mothers in a ‘virtual sixth form’. These services have contributed to the good outcomes for teenage mothers in Bolton including the high levels of teenage mothers continuing with their education during pregnancy and after delivery.

A major difficulty that teenage parents face is with their accommodation, particularly when living in their parental home is either not possible or thought to be undesirable. The Government aim is to ensure that those aged over 16 years are provided with accommodation with support until they are 18 in order that they might make a successful transition to independent living. This support is provided via semi-supervised housing units or as ‘floating’ support for those living elsewhere.

**Gaps:**
To reduce the risk of IM and to prevent their over-representation in the child protection system, better levels of support are required to help teenage parents ‘parent well’. With only one antenatal/postnatal group provided at The Parallel, more localised services are required including a first time parenting programme for teenage parents who may require extra support to help them in the care of their baby including breastfeeding. Previously such services were successfully provided through the Sure Start midwifery project. The decision to no longer fund this post should be reconsidered.

Although supported housing provision for those in contact with services is good in Bolton, some teenage parents find difficulty in accessing appropriate housing advice and support due to fragmented referral systems.

There is concern that a significant percentage of young people continue to be unaware of the Parallel’s location or the services it offers\textsuperscript{48}. This may be addressed by changes to the SRE curriculum in schools, which will in future include lesson plans on how to improve local services.

There is a lack of clarity regarding the roles and responsibilities of agencies and professionals within children services in regard to the provision of parenting support programmes. A new Parenting Strategy for Bolton has just been published that may help to resolve this issue.

**Section 9: Other factors associated with IM**

**9.1 Breastfeeding**

It is well established that breast milk not only provides complete nutrition for the development of health infants, but also has benefits for maternal health. These include protection for the baby against a number of illnesses and against overweight, and for the mother against some forms of cancer and obesity. Therefore the Government has recommended that babies are exclusively breastfed for the first 6 months of life, with breastfeeding continuing after this age alongside of solid foods,


\textsuperscript{48} HEALTH RELATED Exeter Survey 2006
and it has set a national target to increase breastfeeding initiation rates by two points per year, focusing on women from disadvantaged groups.\textsuperscript{49}

A review of seventeen studies involving 806 participants found early skin-to-skin contact between mother and baby to have significant benefits for the behaviours and physiology of mothers and their healthy newborn infants. These included statistically significant and positive improvements in breastfeeding initiation and duration, maintenance of infant temperature in the neutral thermal range, infant blood glucose and infant crying; and improvements in summary scores of maternal affection during an observed breastfeed within the first few days of the baby’s life.\textsuperscript{50} Sustained breastfeeding is thought to improve bonding, encourage responsive care giving and attachment, and increase maternal and infant wellbeing.

Bolton continues to have lower than average rates for breastfeeding initiation and breastfeeding at 6 weeks, although the rates are improving. Evidence suggests that the interventions having the greatest likelihood of success in improving these rates include peer support programmes, interventions encouraging support from family members,\textsuperscript{51,52} and the attainment of Baby Friendly status. This is a worldwide programme of the World Health Organization and UNICEF that was launched in 1992 to encourage maternity hospitals to implement the Ten Steps to successful breastfeeding and to practise in accordance with the International Code of Marketing of Breast Milk Substitutes. In the UK it comprises a Seven Point Plan for the Promotion, Protection and Support of Breastfeeding in community health care settings, and works with the health care system to ensure a high standard of care for pregnant women and breastfeeding mothers and babies.

RBH is working to achieve Baby Friendly status. All mothers are encouraged to have skin to skin contact with their babies as soon as is possible after delivery. Advice and support for breastfeeding is made available to all pregnant women at booking and after delivery in hospital, and in the community. The quality of this support is dependent upon the knowledge and skills of those delivering it, and Bolton has a dedicated feeding specialist based in the community who provides support for mothers with particular breast-feeding difficulties, as well as for the professionals who work with them. She is also responsible for promoting breastfeeding training, and plans are in place to ensure that all front line professionals are trained to an appropriate level.

A Breast Feeding Action (BOAT) project is currently being implemented in the Tonge area of Bolton to improve breastfeeding rates, which will be rolled out across Bolton if successful.

There are now strategies in place to improve training for midwives and other maternity staff with breastfeeding training being mandatory.

A small scale Breast Buddies scheme is in operation. This needs expanding with appropriate resources and training commissioned if it is to achieve its potential to increase breastfeeding rates.

Because mothers may have decided on how they will feed their baby before conception,\textsuperscript{53} pre-conceptual information that is compliant with ‘informed choice’ and

\begin{footnotesize}
\begin{itemize}
\item DH (2000) NHS plan Improving health and reducing inequality London DH
\item Fairbank, L. et al. (2000) A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding. Health Technology Assessment 4: 1-171
\item DH (2007) Maternity Matters ibid
\end{itemize}
\end{footnotesize}
prevents subliminal or covert messages about bottle feeding and its benefits is required to replace that currently provided during PSHE in schools.

**Gaps:**  
Despite evidence of their effectiveness, the current level of commissioning for peer support breastfeeding programmes is insufficient to maximise their potential to improve breastfeeding rates.

There are no ‘off the peg’ teaching session that could be used preconceptually to promote the importance of breastfeeding and support the work of professionals delivering PSHE in schools or in promoting breastfeeding in other settings.

At present the following do not access breastfeeding training: School Nurses, Family Support Workers, Social Workers, Youth Workers and there are difficulties in ensuring midwives in particular can be released from normal duties to attend statutory training.

9.2 **Immunisation**

Bolton has robust immunisations systems in place, and as a result has the highest MMR uptake in NW (92.5%) with 88% uptake for the 5in 1 vaccine. Excellent supportive relationships exist between staff and specialists, and a new immunisation team has been established to support the work of front line practitioners, and to address the under immunisation of most vulnerable groups including asylum seekers.

**Gaps:**

Not all staff are adequately trained in respect of HIV, Hep B, Rubella and Syphilis and neonatal BCG, nor aware of the epidemiological evidence nor sufficiently conversant with the eligibility criteria for programmes to ensure optimal and appropriate uptake of immunisation and vaccination by the most at risk groups.

The lack of a policy for storage and monitoring of vaccine and fridges policy in non-PCT community premises is a significant barrier to reducing under-immunisation within vulnerable and hard to reach groups.

Discrepancies between children’s immunisation status as held on GP immunisation records and those held on child health computer systems continue to affect the delivery of timely and appropriate immunisations to some children.

9.3 **Accidental death**

An accident is an unintentional injury that occurs as a result of an unplanned and unexpected event that takes place at a specific time from an external cause. While accidents are part and parcel of growing up, unintentional injury remains a leading cause of death among children, and results in more children being admitted to hospital than any other cause.

There is a strong correlation between deprivation and accidental injury, with children in the most deprived wards begin three times more likely to be injured in a road traffic accident, and 37 times more likely to die as a result of exposure to smoke, fire or flames than children in the 10% least deprived wards.

An Accident Prevention Strategy has been developed in Bolton that includes a responsibility for health visitors to advise and educate parents on the dangers that children face in the home and outside, in order to prevent accidents occurring. In particular health visitors advise on a range of issues including protecting children from fires, cookers, poisoning from medications and substances, falls, equipment (e.g. cots and car seats) and water. However, in deprived areas where parents on low incomes

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http://www.childreninwales.org.uk/areasofwork/childsafety/safetypublications/index.html
may have difficulty in affording appropriately kite marked new equipment, many are reliant upon second hand purchases and gifts that may not meet safety standards. Previous schemes providing free smoke alarms, and the loan of fireguards and safety gates to most at risk groups are no longer in operation.

**Gaps:**
While professionals may offer education and advice on matters of safety, the ability of the most at risk parents to afford to protect their children against some risks is a barrier to reducing the risk of IM from childhood accidents.

**Section 10: Recommendations.**
The review group have made the following recommendations.

**10.1. That the PCT should:**
Ensure that IT infrastructure are urgently reviewed and that:
- Computer systems support the linking of data across agencies
- A linked data set is developed with sufficient fields to provide a comprehensive picture of IM in Bolton
- Procedure and routines are established and a process put in place to maintain the dataset and update it to include all relevant information in an efficient and timely manner.
- Service providers improve the collection and analysis of data pertaining to interventions offering protection against IM
- A protocol linked to the child index is developed to enable all relevant practitioners and services with responsibilities in this area to be informed of a child’s death in a timely manner.

**10.2 That the PCT should:**
Commission an urgent review of maternity and health visiting services as a starting point for developing a comprehensive public health service for children and their families/carers from pregnancy until school entry to support all children in achieving the five outcomes of Every Child Matters, and as a measure against health inequality and social exclusion.

This review should take into account:
**A:** the recommendations of:
- Choosing Health (2004)
- Our Health Our Care Our Say (2006)
- The Chief Nursing Officer’s Review (2004)
- Maternity Matters (2007)
- Facing the Future (2007)
- The Child Health Promotion Programme (2008)

These provide a powerful context for local action to improve outcomes for children, young people and their families, including the potential of Midwives and Health Visitors to promote health and reduce health inequality and social exclusion through their universal and non-stigmatizing interventions to a well population.

**B:** the findings of a segmented social marketing project to be commissioned by the PCT that will present the views of at risk groups including BME communities on how to address the barriers to:
- early booking and AN screening
- preparation and readiness for parenthood
- behavioural and lifestyle changes e.g. substance misuse, smoking, good nutrition and breastfeeding

10.3 That the PCT and RBH should:
- Make it mandatory for all appropriate frontline staff (PCT and RBH) to attend training for breastfeeding, brief interventions including alcohol, smoking, and weight management and assessing vulnerability
- Commission sufficient staff resources to ensure attendance
- Commission the development of a specific brief intervention training pathway for young people
- Raise the awareness of partner agencies of the role and training needs of their staff in these areas

10.4 That the PCT should:
Require the report and its findings to be disseminated to partner agencies and stakeholders at an appropriate event

10.5 Other Recommendations/Quick wins:

That the PCT should take steps to:
- Prioritise the following recommendations
- Set requirements and time scales for action
- Allocate responsibilities
- Commission the resources required

Preconceptual
- The healthy school team to avail itself of the opportunity of a forthcoming curriculum to work with partner agencies to ensure that preconceptual care and parenting education are included and delivered to children in schools and in other settings, and work partnership with breastfeeding specialists to develop ‘off the peg’ breastfeeding teaching/information sessions for use in school and other settings
- Midwifery services work together with the PH team to increase the signposting of preconceptual health promotion advice and information to a wider range of settings including community buildings such as housing offices.
- Senior medical staff in relevant disease specialisms to give urgent consideration to ensuring appropriate information is made available to their patients of childbearing age at routine consultations so that they are aware of the potential risks posed by their condition and to ensure that as many as is possible have a care plan identified before a pregnancy occurs.
- Community weight management services to include all those with BMI of > 30 who are at risk of or contemplating a pregnancy

Antenatal
- Midwifery and substance misuse services to develop joint information systems to reduce the risk to pregnancy outcome from drugs and alcohol substance use and misuse.
- Services to reduce maternal obesity to include women with a BMI> 30 at booking and evaluate the efficacy of current provision
• Commissioning arrangements for screening services and follow up counselling and care to be clarified, and integrated service planning put in place to ensure mothers are offered timely screening for congenital anomalies and referral in compliance with the recommendations of the national screening committee.

• GPs and midwives to provide folate supplementation as a routine to all women on notification of pregnancy, and the effectiveness of the current recommendation for all practitioners in contact with all women of childbearing age to provide information and advice on the importance of folate when contemplating a pregnancy and during the first trimester to be assessed.

• Funding is sought to enable a teenage pregnancy midwifery post to be developed

Post natal

• Systems of recording in the antenatal records a previous death from SUDI to include a notification to health visitors of the need for a CONI programme to ensure that resources are in place to support parents after delivery

• A business case to be developed that will ensure a central referral system for teenage parents seeking housing provision and support

• Polices and procedure to be developed to enable the safe storage and management of vaccine in settings such as children’s centres to remove barriers to immunisation for children in hard to reach groups

• Consideration to be given as to how those most at risk from accidental injury are enabled to attain the resources to protect them

• Immunisation training to be expanded to ensure that staff on the neonatal unit are trained in respect of HIV, Hep B, Rubella and Syphilis in line with national guidance; and that all staff understand the epidemiological evidence underpinning eligibility for neonatal BCG and the risks to looked after children and families who care for them from Hep B to ensure appropriate uptake of the protection available.
Appendix 1

Members of the Review Group

Cathy Atherton  Consultant Midwife Royal Bolton Hospital
Catherine Barrett  Head Bolton Substance Misuse Service
Jane Booth  Head of Service – Child Protection and Leaving Care
Jayne Brazil  Head of Great Lever Children's Centre
Brenda Griffiths  Senior Public Health Practitioner
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Tracey Holliday  Smoking Cessation Specialist Pregnancy Advisor
David Holt  Public Health Intelligence Specialist
Pam Jones  Designated Nurse for Safeguarding
Chris Jordan  Specialist Health Visitor for Breast Feeding
Jayne Littler  Head of Service - Teenage Pregnancy
Graham Munslow  Health Protection Specialist/Emergency Planner
Margaret Osborne  Head of Service – Health Visiting
Peter Powell  Consultant Paediatrician RBH
Phil Ramsell  Senior Health Promotion Specialist
Appendix 2
Primary Causes of IM. Babies born in Bolton 2006

1 day  F  Extreme immaturity
1 day  M  Extreme immaturity, termination of pregnancy, bone and articular cartilage
1 day  M  Primary atelectasis of newborn, extreme immaturity, extremely low birth weight
1 day  M  Renal dysplasia, hypoplasia and dysplasia of lung, Edwards' syndrome,
1 day  F  Extreme immaturity
1 day  F  Extreme immaturity
1 day  M  Extreme immaturity

1 week  F  Persistent fetal circulation
1 week  M  Extreme immaturity
1 week  M  Primary atelectasis of newborn, pneumothorax originating in the perinatal period
1 week  F  Congenital pneumonia, persistent fetal circulation
1 week  F  Extreme immaturity, extremely low birth weight, intracerebral (nontraumatic) haemorrhage
1 Month  F  Extreme immaturity, sepsis of newborn due to Escherichia coli
1 Month  M  Necrotizing enterocolitis of fetus and newborn, other preterm infants
1 Month  F  Extreme immaturity, unspec pulmonary haemorrhage origin in the perinatal period
1 Month  F  Other ill-defined and unspecified causes of mortality
1 Month  F  Birth asphyxia, other preterm infants, respiratory distress syndrome of newborn,
1 year  M  Albinism
1 year  M  Congenital hypertrophic pyloric stenosis
1 year  F  Meningococcaemia
1 year  M  Congenital hydrocephalus
1 year  F  Unspec chronic resp disease origin in the perinatal period
1 year  M  Other ill-defined and unspecified causes of mortality
1 year  M  Other specified respiratory disorders
1 year  M  Congenital malformation of heart
1 year  M  Myoneural disorder

Total 26