Low Birth Weight and Maternal Health

Middlesbrough

Report to Scrutiny December 2012

PURPOSE OF THE REPORT

1. To provide an overview of the current data that relates to low birth weight (LBW) babies and maternal health in Middlesbrough. This report will focus in on the preventable environmental factors that contribute to poor maternal health and LBW babies. The paper concludes with a set of proposals and recommendations.

CONTRIBUTIONS TO C&YPP PRIORITY THEMES

2. Ensuring all young people are safeguarded from intentional and unintentional harm

3. Ensuring all young people remain free from the harm caused by negative risk taking behaviour

4. Ensuring all young people have good physical and emotional health

BACKGROUND

What is low birth weight and why is it important

5. LBW is an enduring aspect of childhood illness, a major factor in infant mortality and has serious consequences for child heath both in early years and later life. It is caused by either a short gestation period or intrauterine growth restriction (IUGR) (or a combination of both).

6. LBW is defined as births under 2,500g (Krammer 1987). There are further sub classifications for birth weight which includes:

    - Extreme Low Birth Weight (ELBW) less than 1,000g
    - Very Low Birth Weight (VLBW) less than 1,500g

7. LBW babies are more common in the following circumstances:

    - Babies born to mothers under the age of 20 and over the age of 40
    - Babies born to mothers living in deprived areas or mothers with low socio-economic status
    - Babies born to lone mothers
    - Babies born to mothers born outside the UK – especially in some black and minority ethnic groups

8. LBW babies can be born full or pre-term and have varying degrees of health, well-being and psycho-social outcomes. LBW is associated with a broad spectrum of growth, health, and developmental outcomes. While the vast majority of LBW children have normal outcomes, as a group they generally have higher rates of subnormal growth, illnesses, and neuro-developmental problems. These problems increase as the child's birth weight decreases.

9. As LBW is a leading cause of infant mortality, preventing it is highly important to public health and evidence of effective interventions is urgently needed to contribute to the delivery of these targets

10. International comparisons suggest that factors beyond genetic constraints are responsible for differences in birth weight within populations and that birth weight distributions can potentially be altered by public health interventions

(Paneth, 1995). A key message from the Marmot Review highlight's that health inequalities results from social inequalities, and in order to facilitate that every child has the best possible start in life, action on health inequalities requires action across all the social determinants of health. (Marmot 2010).

Preventable environmental factors for low birth weight

11. Smoking during pregnancy is the major modifiable risk factor contributing to LBW and preterm delivery, with greater risk associated with heavier smoking. Babies born to women who smoke weighed on average 200g less than babies born to non-smokers; incidence of LBW is twice as high among smokers (Messecar 2001).

12. NICE guidance (Bull et al 2003) highlights that women who smoke in pregnancy are more likely to experience lower SES, low education, lower income and employment status.

13. Whilst cigarette smoking appears to be the most important mediating factor for LBW, other factors such as low gestational weight gain and short stature also pay and important role. For preterm births there are significant social gradients associated with smoking and bacterial vaginosis, this social gradient may also explain some of the socio-economic disparities reflected in the data on preterm births. (Bull et al 2003)

14. The table below illustrates the association between increased social and economic disadvantage and higher levels of smoking amongst women with young children.

Social disadvantages and cigarette smoking among women with young children, UK 2001 – 2002 (n=13,573)

All mothers		28%
	Mothers with childhood disadvantage (based upon father's occupation)	33%
+	Left school ≤ 16 years	44%
+	A mother < 20 years	63%
+	Adult disadvantage (Annual household income ≤ £11,000)	69%
+	Lone mother	72%
	Mothers experiencing none of above	12%

Table 1 (Graham 2010)

Factors that contribute to low birth weight

Risk Factor	Prevalence
Substance misuse	More common in low SES women
Work/physical Prolonged standing and activity strenuous work	
Bacterial vaginosis	
Psycho-social factors More stressful life events, more chronic stressors	
Depression and low levels of social support	
Micronutrients Low dietary intake	
Cigarette smoking	Higher prevalence and heavier smoking among low SES women
Anthropometry/ nutritional status	Short stature, low pre-pregnancy body mass index (BMI), low gestational weight gain more common in low SES women
Prenatal care	Lower uptake among low SES women
Multiple birth	Less common among lower SES groups

Table 2 (Bull et al 2003)

Local picture

15. Middlesbrough's proportion of LBW children (9.5%) is approximately 1% above the Tees Valley average and 2% above the national average (2010). Current performance indicators (2012) for Middlesbrough show that the number of LBW babies continues to rise (10.1%).

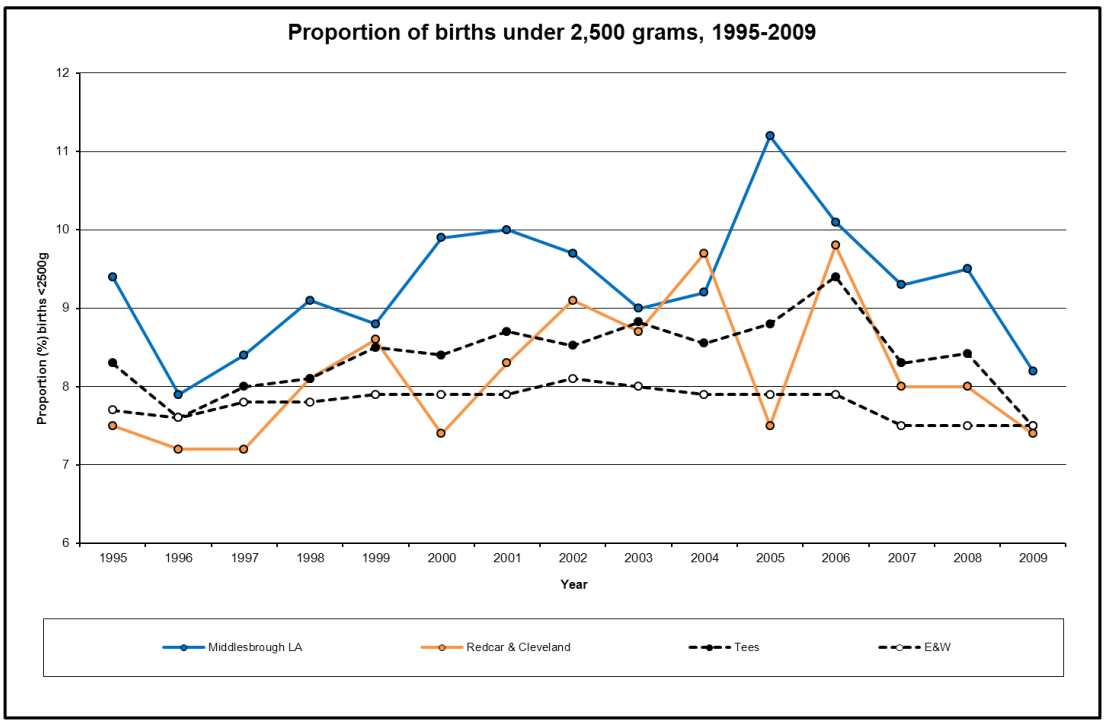

Figure 1: (Aszkenasy et al 2007)

16. In Middlesbrough (1991 – 2004) the average rates for LBW children ranged from a low 2.4% (Nunthorpe) to 19.9% (Park End). There is an associated distribution of LBW and SES. There is a higher distribution of LBW children in poorer areas (figure 1 below).

Low birth weight in Middlesbrough and Redcar and Cleveland – 1991 – 2004

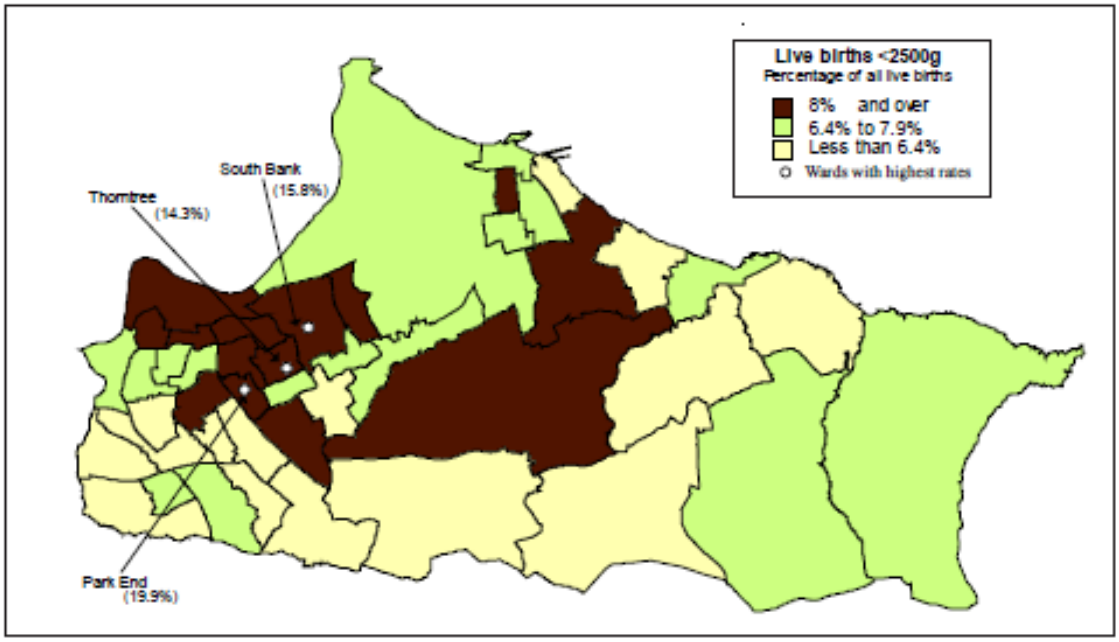

Figure 2: (Aszkenasy et al 2007)

Smoking in pregnancy in Middlesbrough

17. A recent analysis of the pregnant smoking population in Middlesbrough using Mosaic confirms that this profile is replicated in Middlesbrough maternal smoking population.

18. Middlesbrough has consistently had poor outcomes in relation to smoking in pregnancy. Middlesbrough Smoking and Tobacco Control JSNA 2012 identify that 31% of women aged 20-24 smokes. The prevalence of smoking in pregnancy in Middlesbrough is 27.2%; this is double the national average in England of 13.5%, and significantly higher than the regional average, which is 21.1%.

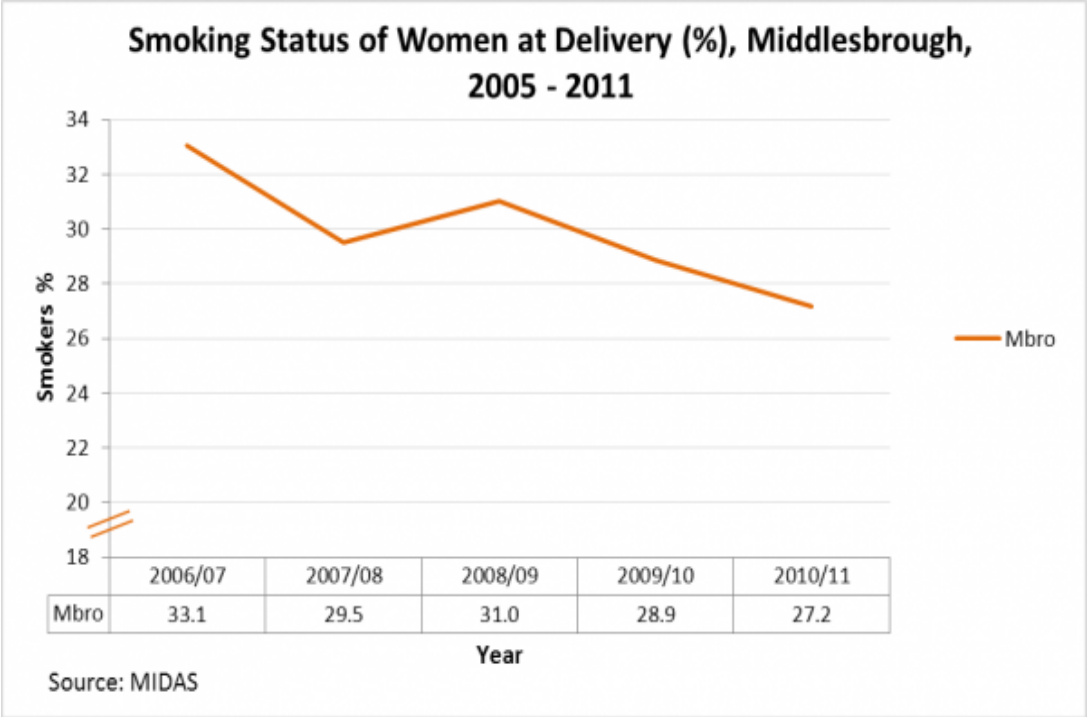

Figure 3: Middlesbrough JSNA Tobacco (2011)

19. The distribution of smoking prevalence in Middlesbrough mirrors the patterns of deprivation with the deprived wards having higher percentage of smokers compared to affluent wards. In an analysis of the maternal smoking population in Middlesbrough (2011) using Mosaic, 80% of the maternal smoking population is distributed across 6/69 public sector types. (table 2)

Public Sector Type	%	Preferences	Non-receptive	Service Channels
Families in low rise social housing with high levels of benefit need (public sector group)				
Vulnerable young parents needing substantial state support	40%	SMS Text Face to Face National Papers Local Papers	Internet Telephone Mobile Phone Post	Face to Face
Older Tenants on low rise social housing estates where jobs are scarce	15%	Face to Face Local Papers	Internet Telephone Mobile Phone Post	Face to Face
Lower income workers in urban terraces in often diverse areas (public sector group)				
Older Town centres terraces with transient, single populations	9%	Face to Face Local Papers SMS Text Interactive	Internet Telephone Magazines Post	Face to Face
South Asian communities experiencing social deprivation	6.5%	SMS Text National Papers	Internet Telephone Face to Face	None-significant
Lower income families occupying poor quality older terraces	3.5%	SMS Text Face to Face Interactive TV	Magazines Post	Mobile Phone
Residents with sufficient incomes in right to buy social housing (public sector group)				
Older families in low value housing in industrial areas	6%	Face to Face Local Papers	Internet Telephone Mobile Phone Post	Face to Face
Total Maternal Smoking Population				**80%**

Table 3 (Mosaic Data on Maternal Smoking in Middlesbrough 2010 – 2011)

Teenage pregnancies

20. Births to women under 20 years is a know risk factor of increased likelihood of LBW children. Middlesbrough has the 2nd highest rates of teenage conception in England. In 2010 the teenage conception rate was 64.5 per 1000 women aged 15-17 years; this was a rise of 7% on the previous year, which was 60.4 per 1000. Overall for the same period the average rate of teenage pregnancy in England has fallen by 7% (2009 – 2010). (ONS 2010).

21. In Middlesbrough there is a strong correlation between teenage pregnancy and levels of deprivation. The more deprived the area, the higher the number of under-18 conceptions. Almost 48% of teenage conceptions in Middlesbrough in 2009 were in East Middlesbrough or in the adjoining wards of Clairville and Beechwood (Table 3 below)

2009	Rate per 1,000	Numbers
National Average (England)	38.2	
Regional Average (North East)	46.9	
Middlesbrough	60.4	174
East Middlesbrough	80.4	83

Table 4 Middlesbrough Teenage Conceptions 2009

22. Average conception rates have fluctuated between 1998 and 2010 (Figure 4). The overall trend shows a slowly declining rate over this time period. Rates are higher than the North East, and England rates but lower than Kingston upon Hull until 2010.

Under 18 conception rate (per 1000 15-17 year olds) in Middlesbrough and comparator areas, 1998-2010

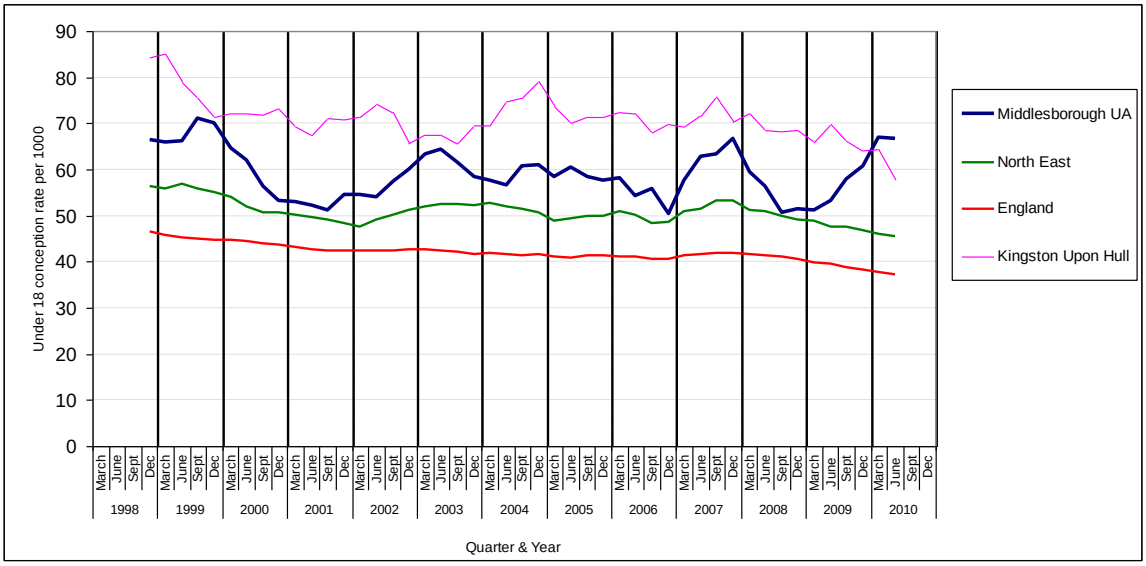

Figure 4: Source JSNA refresh 2012 – sexual health topic

Substance misuse during pregnancy – drugs and alcohol

23. Alcohol consumption of more than one unit per day during pregnancy is a risk factor for low birth weight and fetal alcohol syndrome and fetal alcohol spectrum disorders. Women who drink 1 to 2 units per day are 1.62 times more likely to have a LBW baby; women who drink 3 to 5 units per day are two times more likely to have a LBW baby (Tolo et al 1993).

24. Substance misuse during pregnancy is associated with a range of health problems for both the mother and the baby. This is due to a complex combination of the direct impact of drugs on the growing foetus, other health issues that may co-exist with the substance misuse during pregnancy (poor general health and health problems associated with the drug misuse) and wider social and economic factors such as poverty, crime and domestic abuse. Pregnant women who misuse substances may not engage may not seek ante-natal services until very late in pregnancy.

25. Further work is required to understand the patterns and levels of drugs and alcohol consumption during pregnancy in Middlesbrough and the current services that are in place to address these issues for pregnant women.

Dietary intake

26. Low dietary intake and low body mass index during pregnancy are associated with LBW and poor outcomes for the baby and the mother. Maternal nutrition plays a crucial role in influencing fetal growth and birth outcomes. It is a modifiable risk factor of public health importance in the effort to prevent adverse birth outcomes, particularly among low-income populations.

27. Women with low pre-pregnancy weight for height or low BMI are at increased risk for a number of adverse pregnancy outcomes, including preterm birth, LBW and IUGR. A low BMI interacts with other risk factors such as smoking and stress to increase risk of poor pregnancy outcomes.

28. Further work is required to explore the local data that is captured by maternity services on maternal weight gain in pregnancy.

Antenatal care

29. Low uptake of prenatal care is identified as a risk factor for poor outcomes in pregnancy (Bull et al 2003). There is sufficient data from repeated epidemiological studies that socio-economic deprivation is linked to both decreased access to antenatal care and increased maternal morbidity and mortality (Downe et al 2008).

30. Data on access and service usage to antenatal care in Middlesbrough will capture more detailed description of any demographical differences.

Bacterial vaginosis

31. Bacterial vaginosis and other infections (Strep B) during pregnancy are associated with low birth weight and small for gestational age. There is a socio-economic gradient in the distribution of bacterial vaginosis with more women in lower socioeconomic groups having the condition compared to more affluent socioeconomic groups. Local data is not available on the extent and socioeconomic distribution of bacterial vaginosis in Middlesbrough.

Pyscho-social factors

32. Stress full life events, poor mental and emotional health and chronic stressors during pregnancy are associated with low birth weight and poor outcomes for babies. There is a complex interaction between psycho-social factors and other factors such as deprivation, smoking during pregnancy, alcohol and substance misuse and poor engagement with antenatal care services.

33. Domestic violence and abuse during pregnancy can have serious consequences for maternal and infant health. Evidence suggests that around 30% of domestic violence starts or worsens during pregnancy. It is estimated that one in six pregnant women will experience domestic violence at some point during pregnancy with a greater proportion of these being women from deprived areas. Domestic violence and abuse during pregnancy can also indirectly impact upon the health of a woman and her baby through poor diet, poor mental and emotional well-being, poor physical health, homelessness and restricted access to antenatal care.

34. Further work is required to understand the scale and distribution of domestic violence during pregnancy in Middlesbrough and the effectiveness of the services that are in place to deal with this issue.

Pre-term births

35. Low birth weight and gestational age are inter-related, as a LBW can be as a direct consequence of a preterm birth. There is less evidence on the causes of preterm delivery. Research has shown that birth before 26 weeks gestation is associated with a high prevalence of neurological and developmental disabilities. In Middlesbrough there are a higher percentage of preterm births in deprived areas compared to more affluent wards.

Distribution of all live births under 38 weeks gestation, South Tees electoral wards, 1991-2004

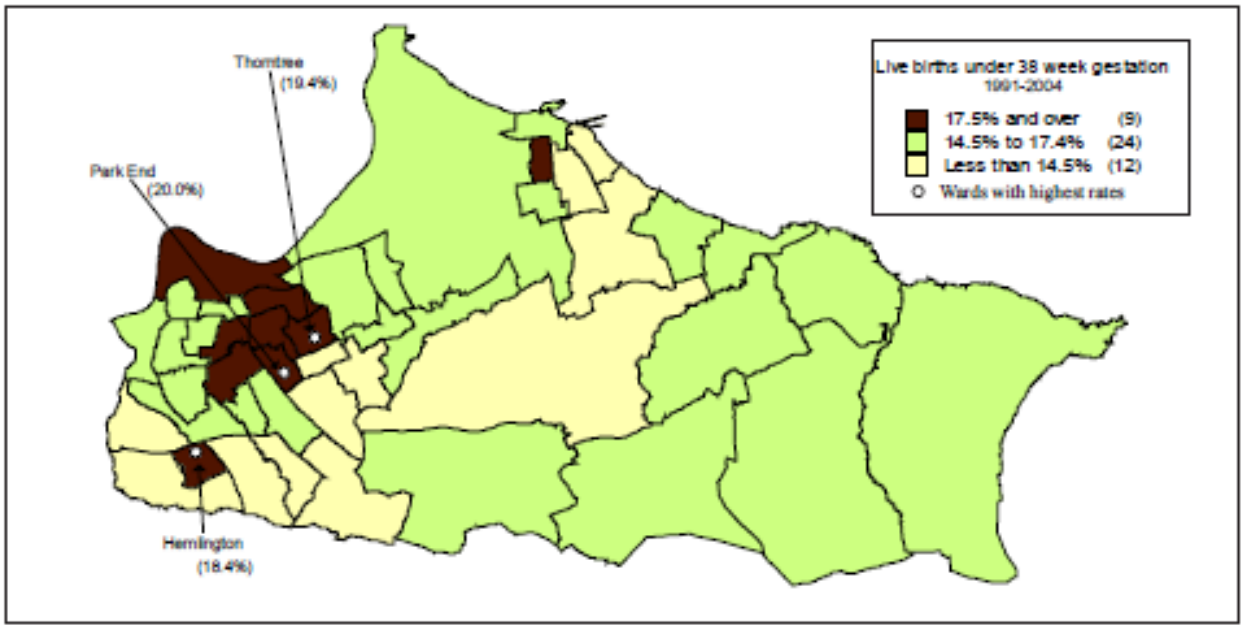

Figure 5 (Aszkenasy et al 2007)

36. At 30 months of age 24% of survivors have severe disabilities (Marlow et al 2005), with a total of 80% of survivors experiencing some form of disability (Bradford et al 2012). The Regional Maternal Survey Office (RMSO) has undertaken a rapid data retrieval of information about children with disabilities. The graph below charts the year on year increase in the number of children likely to require special needs provision as a result of serious congenital abnormalities.

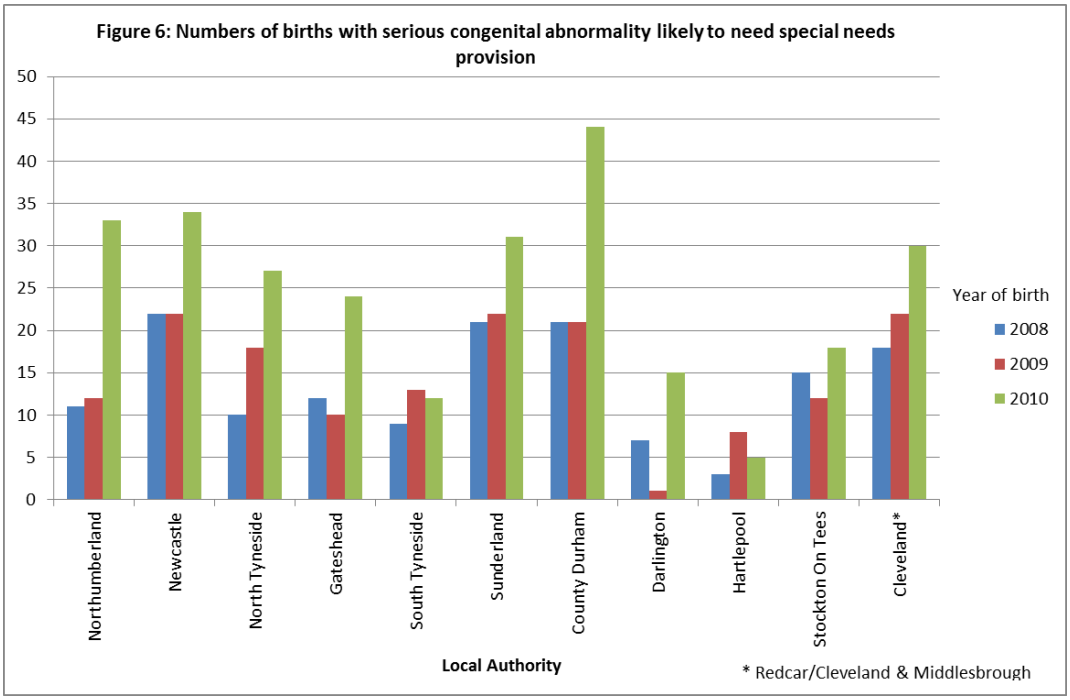

Figure 6 (Bradford et al 2012).

37. The RMSO has identified that increase in survival rates of preterm births have improved over the last 15 years. In the North East and Cumbria survival at 24 weeks is around 60% (RMSO 2012). Further work is required to understand the outcomes of preterm births and the impact of improved survival rates on health and well-being outcomes for the babies, current and future special needs provision.

Current work streams to address low birth weight in Middlesbrough

38. The Middlesbrough Joint health and well-being strategy identifies as one of its strategic aims the need to ensure children have the best start in life. Under this strategic aim is a priority to improve outcomes for babies and infants. The health and well-being board signed off the strategy at a meeting in October 2012 and work is underway to develop the board's annual work programme, performance management framework and the delivery mechanisms for the strategy.

39. The Middlesbrough Health Scrutiny is reviewing the services available for children with complex needs and as part of this work scrutiny have asked for the review to include programmes that are aimed at preventing and reducing the number of children with complex needs across Middlesbrough.

40. Across South of Tees a maternal health sub-group has been proposed to provide a strategic forum for maternal health services and programmes across Middlesbrough and Redcar and Cleveland

41. A SEN and disability review is being carried out through Middlesbrough Achievement Partnership, and this includes a review of the preventative programmes delivered during pregnancy aimed at the environmental factors

42. The Middlesbrough Tobacco Alliance has reviewed data on maternal smoking in Middlesbrough and are exploring ways of engaging with maternal smokers using social marketing methods.

43. The healthy child programme (HCP) is a complex, inter-related, multi-disciplinary preventive health programme that requires the involvement of statutory and voluntary sector organisations. The HCP covers the breadth of a child's health and well-being needs from 0 to 19.

44. Working within the emerging commissioning structures and the NHS reforms is a key priority.

45. Implementation of the single care plan for 0 – 25 year olds with complex care and special needs (April 2014).

46. Working with the National Support Team's recommendations on reducing infant mortality rates in Middlesbrough.

47. The regional roll out of training for midwives to implement NICE smoking cessation in pregnancy care pathway. Midwives will be trained to support pregnant women to stop smoking. Middlesbrough is in the phase 2 roll out (March – June 2013). This programme will be evaluated by Newcastle University.

NEXT STEPS

48. Middlesbrough Children and Young People's Trust/Executive Board has formed a task and finish group that will oversee the following work streams.

MATERNAL HEALTH NEEDS ASSESSMENT

49. Undertake a full Health Needs Assessment (HNA) for maternal health and outcomes for babies and children aged under 5 years. The needs assessment will combine an analysis of routinely collected information as well as explore opportunities for carrying out bespoke data collection especially for risk factors where data collection does not currently exist. The HNA will also seek to engage service providers and stakeholders to gain an understanding of services and programmes that are currently being delivered, interagency working and gaps in the current model.

CO-ORDINATION OF MATERNAL WORKING GROUPS

50. There are a number of work streams and groups whose work will have an impact on maternal health and outcomes for babies and infants. With the current NHS reforms there is need to ensure coordinated efforts and collaborative working to avoid duplication of efforts. The HNA will map the current work streams and strategic groups that can contribute to reducing numbers of LBW children and improving maternal health outcomes in Middlesbrough and make recommendations for coordinated efforts across these groups.

LOCAL AND REGIONAL SURVEILLANCE

51. There is need for robust monitoring and local surveillance systems to capture demands placed upon special care services and the nature of the complexity of the presenting cases. This will help to evaluate any changes in the needs of

the population and will assist in future projections and service planning for the life course of this population.

52. Contribute to a bespoke regional data collection project managed by the RMSO. The RMSO have access to data on region wide basis and is able to produce a data set for Middlesbrough, which could be contextualized within a trend's analysis for the Region.

- Numbers of babies born by gestational age alive at 1 year
- Numbers of congenital abnormalities
- Projection of numbers likely to require special educational needs
- Estimations of children with mild disabilities
- Numbers of children with complex cerebral palsy
- Mortality data (including category e.g. sudden death syndrome)
- Analysis of LBW and gestational age
- Survival rates and LBW, VLBW and ELBW

SOCIAL MARKETING

53. The children's trust executive will identify how best the efforts to reduce the preventable causes of LBW and poor outcomes for babies and infants can be coordinated to avoid silo working and pregnant women having to access a number of different services. There is also need to increase awareness of a healthy pregnancy with the use of social marketing approaches to ensure that messages are being delivered in the best way.

RECOMMENDATIONS

54. That scrutiny notes the current position on LBW and the work that the children's trust will be coordinating to address the issues.

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References:

Aszkenasy, M. Branch, K. Eynon, C. Green, L. Heywood, P. Reilly, M. Tse, Y and Woodward, B (2007) Childish things. Reflections on the health of children resident in the South Tees area 2006. NHS Tees. http://www.teespublichealth.nhs.uk/Download/Public/1012/DOCUMENT/5899/Childish%20things.pdf

Bradford, C. Miller, N. Green, M and Ward Platt, M (2012). Child deaths in North East of England, April 2008 to March 2010. NEPHO. Occasional Paper No. 51 2012

Bradford, C. Miller, N. Green, M and Ward Platt, M (2012). North East estimates of children with disabilities and special needs. RMSO

Bull, J. Mulvihill, C and Quigley, R (2003) Prevention of low birth weight: assessing the effectiveness of smoking cessation and nutritional interventions. Health Development Agency. London.

Chaikind, S and Cormon H (1991). The impact of low birth weight on special education costs. *Journal of Health Economics,* 10: 291 -311.

Downe S, Finlayson K, Walsh D, Lavender T. (2009) 'Weighing up and balancing out': a meta-synthesis of barriers to antenatal care for marginalised women in high-income countries. BJOG;116:518–529.

Graham H. The International Handbook of Gender and Poverty: Women's smoking and social disadvantage. Chan S, editor. Cheltenham: Edward Elgar; 2010.

Kleinman, J., Mitchell, B., Madan, J.H., et al. (1988). The effects of maternal smoking on fetal and infant mortality. *American journal of epidemiology,* 127(2): 274-82.

Kramer, M. S. (1987). Determinants of low birth weight: methodological assessment and meta-analysis. *Bulletin of the World Health Organization* 65: 663-737.

Marlow N, et al., EPICure Study Group (2005) *Neurologic and developmental disability at six years of age after extremely preterm birth*, New England Journal of Medicine, 352(1): 9–19

Marmot Review. Fair Society, Healthy Lives: Strategic Review of Health Inequalities in England Post 2010. London: Marmot Review; 2010

Messecar, D. (2001). Smoking cessation interventions for pregnant women: what does the evidence show? *Journal of Academy of Nurse Practitioners* 3: 171-7.

Tolo K and Little R. (1993) Occasional binges by moderate drinkers: implications for birth outcomes. *Epidemiology.* 4: 415–20.

Unsworth, L. Sofianopoulou, Yung, J. (2011) Child health profiles for the North East. NEPHO.